Build and design knowledge management system for sharing material teacher

Fajar Muttaqi
West Jakarta, Indonesia
fajarmuttaqi@gmail.com

Abstract. Human resources in education become a force for institution itself because it can be an asset and capital owned in order to compete with other institutions. The design of knowledge management system aims to facilitate the educators in sharing knowledge both in each school and between the two schools. In this case the knowledge management system can serve to help educators in collecting knowledge and share material of teaching materials owned, so that tacit and explicit knowledge of each teacher can be well documented. This research uses RAD (Rapid Application Development) method with UML (Unified Modeling Language) as its development tools. While making its own application using PHP 7 and MySQL programming language for database processing. This research produces a web based knowledge management system that can collect, manage, store, and disseminate existing knowledge from teacher.

1. Introduction
In the process of development of information technology and science knowledge to be important to lack of information and knowledge as the main source in supporting the educational process for institutions in the field of education [1]. Human resources in education become a force for institution itself because it can be an asset and capital owned in order to compete with other institutions. With increasing technological sciences and of course as a new challenge, schools must manage the assets of knowledge well integrated with collaborative sharing and innovation to create knowledge management.

The researchers Cho & Korte (2014) and Tubigi & Alshawi, (2015) claimed that knowledge has successfully motivated the organizations to move towards the use of knowledge management [2]; [3]. Knowledge has been considered as global economy transformation center [4]. Besides, it is also an important source of wealth and key for the organizations to stay competitive in business environment [5]. Knowledge management has become a main key to create customer values. This has led to the consideration of knowledge as strategic source for organizations. In order to implement and make full use of knowledge management, the organizations must have a clear understanding on how knowledge is formed, disseminated and applied within organizations [6]; [7].

Knowledge management helps to create and propagate information and knowledge. It also provides a sufficient, effective and efficient use of knowledge in order to provide a strategic competitive advantages for organizations [8]; [9]; [10]; [11]. Researchers Lee & Lan (2011); Liu & Deng (2015) also said that knowledge is an important success factor that helps the organizations to gain a sustainable competitive advantage [12]; [13].

Schools have to contributes to educate their students for having a soul of creativity, to master the technology and science. To achieve its goals, teachers have to manage their teaching materials
properly. Therefore, schools need a new tool that can be used to share knowledge, whether it be information, teaching materials, training materials, or other knowledge as well as experience sharing media.

2. Literature review

2.1. Knowledge management system

Knowledge is a vital asset and a significant resource of any organization; it conveys meaning and hence tends to be much more valuable, yet more ephemeral [14]. Knowledge management contents typically focus on firm’s strategic objectives such as innovation, improved performance, competitive advantage, as well as success stories and lessons learned. Hence, Knowledge Management Systems (KMS) can play a significant role in improving organizational and individual performance. Considered as the memory of the organization by leveraging the collective knowledge of the company from one project to another, substantial investments are done in technology infrastructure for KMS. Yet, little is known about return on investment for KMS, in terms of impact on employees and organization performance [15]; [14].

KMS incorporates: create and capture new knowledge, support and facilitate content management, and share and re-use knowledge to generate value [16]. Therefore, individual contributions, technology acting, and task structure are three of the main aspects of KMS [17]. There is an increasing need within organizations to comprehend the antecedents of KMS usage and impact on employees’ performance from the perspective of these various aspects [18]; [16]; [19].

2.2. KM success models

KMS involve IT-based systems that have been developed to support and enhance the processes of knowledge creation, storage/retrieval, transfer, and application. KMS success can be defined as making KMS components more effective by improving their search speed and accuracy, among other qualities. KMSs that enhance search and retrieval functions enhance decision-making effectiveness by improving the ability of the decision maker to find and retrieve appropriate knowledge in a more timely manner. In other words, enhancing KMS effectiveness makes KMSs more successful, in addition to being a reflection of KM success. This implies that by increasing KMS effectiveness, KMS success and decision-making capability are enhanced, thereby positively influencing organizations. KM success is crucial for understanding how initiatives and systems should be designed and implemented [20].

KM success can be defined as capturing the right knowledge, getting the right knowledge to the right user, and using this knowledge to improve individual performance. Considering the many view of KM, in this paper the definition of “KM success” means that the organization's employees manage and use the knowledge lead to the organization's benefits (such as better decision-making, faster response time to key issues, increasing productivity and job effectiveness, sharing best practice etc.) or KM could provide the appropriate knowledge to those that need it when it is needed [21].

Based on those literature, the researcher will conduct research under the title "Build and Design Knowledge Management System for Sharing Material Teacher". The purpose of this development is to build a system application to make it easier for teachers to manage their knowledge assets well, to exchange ideas between teachers, and to help educators in collecting knowledge and share material of teaching materials owned, so that tacit and explicit knowledge of each teacher can be well documented.

3. Methodology

The system development method that researcher use is the Rapid Application Development (RAD) method. RAD is an object-oriented approach to system development which includes a method of software development. RAD conceptually aims to shorten the time that is usually required in the development of traditional systems between the design and application of information systems [22].
There are 3 phases in RAD, the first phase is requirement planning, in this phase, the user and analyzer meet to identify the goals of the application or system and to identify the information requirements arising from those objectives. This phase requires a deep active role from both groups; not only shows proposals or documents. In addition, it also involves users from several different levels in the organization.

The second phase is workshop design, This phase is the design and improvement phase which can be described as a workshop. During the RAD design workshop, the user responds to the prototype being worked on and the analyst refines the design module based on the user's response. The format of the workshop is admirable and encouraging, and if the user and analyst are experienced people, there is no doubt that this creative endeavor can encourage development to an accelerated level.

The third phase is implementation, in this phase the analyst works intensely with users during workshops to design business and non-technical aspects of the company. As soon as these aspects are agreed upon and systems are built and screened, new systems or parts of the system are tested and then introduced to the organization.

The design tool used unified modelling language, to describe use case diagram, use case is a description of the function of a system from the user's perspective. Use case works by describing a typical interaction between the user of a system with its own system through a story of how a system is used. Design class diagram, class diagram is diagram that illustrates the structure of the system in terms of defining the classes that will be made to build the system. The class has 3 main parts namely attribute, operation, and name. classes in the structure of the system must be able to perform functions in accordance with system requirements.

![Use Case Diagram](image_url)

**Figure 1. Use case diagram**
Use case diagram describes general activity in system. It shows all the process of user activity and shows the procedure. Use case diagram shown in Figure 1.

![Use case diagram](image)

**Figure 2. Activity diagram**

Activity diagram describes every activity in system. It shows all the process of user and system activity and shows the procedure. Activity diagram shown in Figure 2.

### 4. Results

Based on ingredients that have been collected, the system can be developed using the chosen concepts, and use case diagram. The result of building and designing the knowledge management system is shown as follows:
4.1. Interface system

![Figure 3. Interface KMS](image)

Figure 3. Interface KMS

Figure 3 shown interface from menu “home”, it shows the beginning process to access the knowledge management system.

4.2. Knowledge documentation

![Figure 4. Knowledge documentation menu](image)

Figure 4. Knowledge documentation menu

This process can only be accessed by the teacher by selecting the knowledge documentation menu, then the system will display documentation data. Actors click add material then the system will display the input form teaching material along with the file upload form, after that the actor fills in the form and click submit then the system will store and display the knowledge data.
4.3. Forum

This process can be accessed by all actors by selecting the forum menu, then the system will display forum data, if the user clicks add forum, then the system will display the forum data input form, after that the user fills in the forum data form and click submit if it has finished filling the data, then the system will display an updated list of forum data. If the user clicks edit, the system will display the forum data edit form, after that the user fills in the data to be changed and click submit when the data is finished changing, then the system will display an updated forum data list. If the user clicks delete, the system will delete the forum data and display the forum data update list.

In features testing, the researcher used a black box method that is used for software function test. In this testing, the researchers stated the expected results and the results were accepted in every case tested. When the received result is in accordance with the expected result then the feature is successfully applied. From 27 cases tested such as testing buttons, and function on a knowledge management system that has been done, it has been found that all the features have been going well. Hence, in terms of features, the researcher conclude that this system is ready to use and has good performance.

To find out the teachers improvement using this KMS, the researcher conducted this testing. It found out the effectiveness of using knowledge management system. The methods used in this testing are pretest and post-test with 20 items, pretest tested before using KMS and posttest tested after using KMS. For testing the effectiveness of sharing media used in this KMS, researcher used 30 respondents by the teachers in both school.

After testing the effectiveness of learning media, it has been found that the median value is proven to rise to 36.47% and the average value between the pretest and posttest which has a significant difference was using paired sample t-test (t = 18.49, p < 0.001) with intervals of 95% confident. Based on those result, it showed that the mean values of the mean pretest and posttest showed a significant increase, it is seen that the knowledge management system was able to increase knowledge by sharing material and idea in KMS.

5. Conclusion

Based on the results of a research thesis under the title "Build and Design Knowledge Management System for Sharing Teacher Material", it can be concluded that:
This research produced a web-based knowledge management system that can collect, store, manage, and disseminate existing knowledge in two senior high school. With this web-based knowledge management system can help teachers in the search for knowledge that has been stored in the system. Also can make good communication between the teachers in both schools. The web-based knowledge management system that is implemented can help teachers in the learning process to improve the competency of each teacher by sharing knowledge in the knowledge management system.

There is a significant increase of the mean value of the average results reserved prior to using the knowledge management system. This is shown with a percentage increase of 36.471% and results of paired sample t-test that got significant value with 95% confidence interval, i.e., 000 (very small) which means it has the significant differences between the pretest and posttest. This average value rising proves that knowledge management system is appropriate to be sharing media for teachers.

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