

## Implementation of Mediawiki as A Tool for Knowledge Sharing

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### Abstract

Knowledge management is an important issue that is often brought up in the modern organization. Implementation of knowledge management is not only about selection of the right application, but rather to spread a culture of sharing knowledge among members of the organization itself. One of the important aspects on implementations Knowledge management is the process of knowledge capture and knowledge sharing. This process must be supported by adequate application and easily learned by all parties.

Wikimedia, since the very beginning, has been regarded as one of the practical applications that can support collaborative writing and interaction among users. Wikimedia also can be considered as one of the practical applications for the process of capturing knowledge and knowledge sharing. Ease of installation and customization process made Wikimedia as one popular application adopted by the organization.

University, as a source of knowledge, should facilitate the sharing of information and knowledge in the local community or to the general public. However, in many universities, especially in Indonesia, does not yet provide adequate medium for sharing knowledge. It is considered as an opportunity to develop a prototype of media dissemination of information in the form of an online encyclopedia for Widyatama University. Requirement identification for media collaboration is done with the PIECES approach, and the result is realized by build the prototype of Widyapedia based on Wiki.

Keywords : Knowledge capture, knowledge sharing, WikiMedia, online encyclopedia.

### Introduction

Knowledge Management (KM) is very popular issue in modern organization. Many organizations realize the important of KM implementation in their environment but not much of them do the real action to implement the KM, especially in Indonesia. KM implementation sounds like easy project but actually it consists lots of steps and many potential issues need to address by managements in organization. The organization should prepare the plan carefully to support the successful KM implementation. Each step need to be supported by employees and managements and need the sufficient tools.

University, as part of knowledge collection and creation, has many knowledge sources and proposed to produce useful knowledge for society. The knowledge that available in the university often needed by communities which come from inside or outside the university. But, as the source of knowledge, many universities do not provide proper tools for knowledge acquisition and sharing.

According to Nonaka's model, the second stage in SECI KM cycle is explicit-to-explicit. This phase consists of activity combining different types of explicit knowledge, which usually needs computerized tools. The tools will provide the features such as collaborative writing, peer review and discussion among participants. The tools also provide easy access into knowledge resources consist of data, information, or bank of documents. The tools usually supported by tag, bookmarked and hyperlinks facilities. Recently many tools are available for free or commercial based. The web 2.0 technology makes web as favorite interfaces for many people.

These fact become the basic idea for the student group to try the implementation of the knowledge sharing tools to support acquire and share the knowledge between the stakeholder in a university, by implement the Wikimedia. Wikimedia was selected based on familiar features such as open source, easy customization, user friendly interface, and easy to learn. Through this project, the students expect they can start to promote the knowledge culture between employees, by provide the tools for

collaborative writing between stakeholders. As pilot project, this project focused on documenting information related to University, so it will run as personal encyclopedia for the university, which was called as “WidyaPedia”, stands for “Widyatama Ensiklopedia”.

## Knowledge Management

### Definition

Davenport (1994) defined KM as : "Knowledge management is the process of capturing, distributing, and effectively using knowledge.". This definition then become more complex regarding the wider view of KM, as we can conclude from definition of KM from Gartner Group (Duhon, 1998): "Knowledge management is a discipline that promotes an integrated approach to identifying, capturing, evaluating, retrieving, and sharing all of an enterprise's information assets. These assets may include databases, documents, policies, procedures, and previously un-captured expertise and experience in individual workers." [1]

The most important point of KM is how to manage the knowledge in organizations.

The popularity of knowledge management could not separated from basic idea related to knowledge creation which was introduced firstly by Nonaka. Nonaka proposed the model of knowledge creation which well known as SECI Model. SECI is stands from Socialization, Externalization, Combination, and Internalization. This models show the transition of information from tacit knowledge into explicit and vice versa. Through this model, Nonaka explains how or when tacit become explicit knowledge and how explicit knowledge can generate new knowledge which is reside in people experience so it become tacit knowledge. The phase of knowledge transformation through SECI model can describe below[2]:

- Tacit to Tacit (Socialization) - explains Social interaction as tacit to tacit knowledge transfer, sharing tacit knowledge through face-to-face or share knowledge through experiences. For example, meetings and brainstorm can support this kind of interaction.
- Tacit to Explicit (Externalization) - Between tacit and explicit knowledge by Externalization (publishing, articulating knowledge), developing factors, which embed the combined tacit knowledge which enable its communication. For example, concepts, images, and written documents can support this kind of interaction.
- Explicit to Explicit (Combination) - Explicit to explicit by Combination (organizing, integrating knowledge), combining different types of explicit knowledge, for example building prototypes. The creative use of computerized communication networks and large-scale databases can support this mode of knowledge conversion. Explicit knowledge is collected from inside or outside the organization and then combined, edited or processed to form new knowledge. The new explicit knowledge is then disseminated among the members of the organization
- Explicit to Tacit (Internalization) - Explicit to tacit by Internalization (knowledge receiving and application by an individual), enclosed by learning by doing; on the other hand, explicit knowledge becomes part of an individual's knowledge and will be assets for an organization.

### KM Life Cycle

The concept which was introduced by Nonaka, has many interpretation and extended implementation. Sagsan(2006) promote the concept of KM Life Cycle which consist of 5 stages [3] :

- Knowledge Creating
- Knowledge Sharing
- Knowledge Structuring
- Knowledge Using
- Knowledge Auditing

Knowledge sharing is the second stage of KM life cycle, involves creating knowledge by individuals and groups with their interactivity and connectivity in organizations. Knowledge sharing is carried out by social and technical communication channels, which depends on the stability and durability of organizational infrastructure. If organizational infrastructure is suitable for aligning the knowledge

management system infrastructure, the successful knowledge sharing can be carried out. The ways and tools for effective knowledge sharing as follows:

- Formal social communication network,
- Informal social communication network, teamwork,
- Communities of practices,
- Organizational learning, rumors and, formal structured technological communication networks (e-mail, mobile communications, teleconferences, videoconferences, etc.).

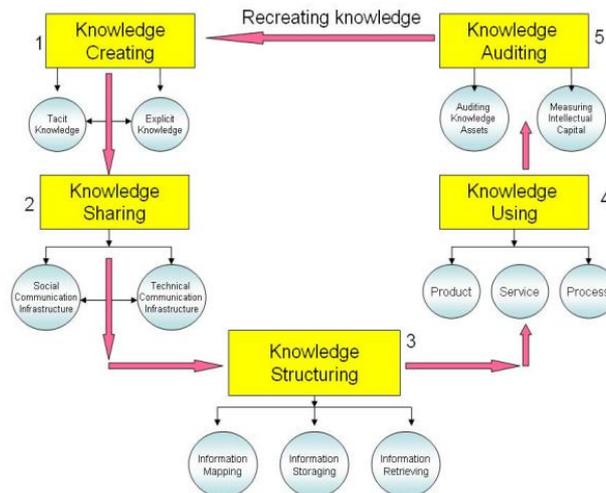


Figure 1. Knowledge Management Life Cycle as Proposed by Sagsan [3]

### Tools for Knowledge Management

Recently, many tools are available for KM, which can be categorized into many groups such as [4]:

- Tools to access knowledge: these tools provide access to explicit knowledge that can be shared and transferred through the enterprise information systems.
- Tools for semantic mapping: These tools are meant to quickly support presentation of information, analysis, and decision making. Ontology tools are also part of this category as they enable users to organize information and knowledge by groups and schemata that represent the organizational knowledge base.
- Tools for knowledge extraction: These tools support structured queries and replies. They help mining text by interpreting relationships among different elements and documents.
- Tools for expertise localization: These tools enable quick location of the knowledge holders in the enterprise and facilitate collaboration and knowledge exchange.
- Tools for collaboration work: these tools enable teams to globally share dedicated spaces for managing the project lifecycle; editing and publishing materials; conducting live discussions and interactions; and maintaining a repository of materials associated with every step of the process.

The advance of web technology provides us more alternative in KM implementation. These tools can be categorized as database tools, process modeling tools, workflow management tools, enterprise resource management tools, agent tools, search engine, and collaborative tools. Web 2.0 is also (perhaps most) often described as a group of people-driven tools that allow collaboration. These include blogs, tags, mash-ups and, wikis.

### Wiki

A wiki is fundamentally a web of interlinked pages where each page typically contains a concept (a name) and a description of that concept (an article). Users are allowed to edit any part of the article, modify the description, add new names, add external links and add links to names (and their corresponding articles) that do not exist yet (so that another user can fill in the description of the new concept). They are extremely easy to navigate in and add content to. User security is usually set low,

giving users as much power as possible to change the content. Page changes, old versions of pages and recent changes of pages are all well documented and manageable by users and/or administrators. Wikis, have become a tool for online collaboration and community building. They are the best suited for building a knowledge base from a variety of users input. The most well known example of a successful wiki is Wikipedia.org, a free online encyclopedia composed of articles written by the general public. [4]

Recently, users have been using Wikipedia as a tool for finding, editing and discussing information on a wide variety of issues (Dearstyne, 2005). They can instantly edit contents, link tens of thousands of articles through the keywords, and retrieve information instantly (Androutsellis-Theotokis & Spinellis, 2004). At the same time, users can search for historical events, and then revise and discuss the contents with others. Even though experts may not write the articles, everyone can discuss them until they agree upon a satisfactorily logical explanation. Hence, it can be said that Wikipedia is one of the mankind's central sources of knowledge, maintained by thousands of contributors (Zack, 2007). Its inherent freedom, and other functions, makes Wikipedia different from other knowledge management systems. [5]. The wiki has a number of other features that make it unique and ideal for collaborative writing projects [6]:

- Version control. Wiki also keeps track of the changes, and allows users to revert to an earlier version if necessary. It is also possible to compare versions of documents from different dates.
- Record of users. A wiki user usually create an account, so that when they edit a wiki page, their contributions are recorded. Additionally, although many wikis might allow anonymous editing, the IP addresses of a computer used to make a change is recorded and can be used to determine the identity of a user if necessary.
- Discussion. Many wikis have a 'talk' page, where any topics can be discussed by users. Wiki pages that have been created also have this 'talk' feature, where users who may not want to change the content of a page, but wish to discuss it, can leave comments.
- Navigation. The wiki has a number of features that assist the user with its navigation, including the 'recent changes' feature (a page that tracks and lists any changes to the wiki), a means of categorising pages, and a search facility.
- Wikis use a simplified version of HTML (also known as wiki syntax or 'wikitext').
- Wiki options, there are a number of options available, ranging from open source, freely available options, through to proprietary, licensed products with a range of features aimed at the corporate market.

Issues that need to be considered by any library wanting to use a wiki include [6]:

- Cost
- Number of users, especially for proprietary products
- Need for access control.
- Installation or hosting of the wiki.

## Development of Widyapedia

Widyapedia development is based on the need for the media to document the various information and knowledge relevant to various aspects of academic and community activities at the University Widyatama. Currently, the use of computer networks, the Internet, and social networks has been increasing both among students, faculty and staff. Various applications have been developed, both are made centrally by the University or developed by certain parties to support the activities of their units. Utilization of facilities and infrastructure is done is reactive and based on needs, without adequate information architecture planning. As a result, information can be scattered everywhere in the form of non-uniform and only from one side. Applications are made too often is interactive and one-way delivery of information only. As an alternative, many people who end up using social media networks as a means of interaction with users. However, the use of social networks is also less well managed so often avoid confusion in the delivery of information.

On the basis of these conditions, it is necessary provide a portal application that can be used as a

means of gathering information. Ideally resources on the portal can come from anywhere, but still given a certain level of moderation to control the content. Interactive Aspect provides equal opportunity to all parties to be able to provide validation of the information or add new information. It is then triggered the need to make some sort of encyclopedia of the considerable collective Wiki form. Widyapedia implementation is done by applying MediaWiki applications and perform customization as needed. Customization is done based on the results of the analysis performed using the framework approach PIECES. PIECES stands Performance, Information, Economics, Control, Efficiency and Services. Analysis was done by reviewing the needs in every aspect PIECES itself, for example, what needs to be categorized to address issues of economic sectors. Then the results described in the following table.

**Table 1. Requirement Analysis using PIECES**

No	Requirement	Area
1	Application should easy to access and learnt by the users	P
2	Application should develop in fast and simple way	P
3	Application can implement in recent network architecture	P
...	.....	
1	Information should easy to access	I
2	Users can add supplemental information to the information already loaded	I
3	Information should connect to outside source if necessary	I
...	.....	
1	No additional cost for application implementation	E
2	No need training cost for the users	E
....		
1	Contributor is limited from internal university	C
2	Application can record who is entering the information	C
3	The users were able to review the information which is entered by other users	C
4	Administrator can block the user	
...	.....	.....
1	Application should easy to install	Ef
2	No need more human resource to maintain the application	Ef
...	.....	
1	Application can facilitate interaction between users	S
2	Application can provide information for wider community outside the university	S
...	.....	...
...	.....	....

Mediawiki chosen as a solution to these problems based on the consideration that Mediawiki can answer some of the needs that were identified previously. Table II shows the results of the analysis of some features on Mediawiki associated with requirements that need to be addressed by the system.

**Table 2. MediaWiki Features**

No	Features	Requirement
1	Editing/contribution : Support rich text editor, multimedia and template	P1, I1, I3,....

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2	code, Large-scale editing, proofreading, specialized content	I2, C2, S1
	Collaboration : discussion, broadcasting tools, e-mail alerts, process supports (article deletion, voting)	
3	Language: UI localization, text input, search indexing, multilingual discussion.	I1, E2, S2
	Interfaces and APIs : Authentication/authorization, cross-wiki integration, read/write APIs for all features	Ef1, Ef2, E1
	Platform : Performance, Wikitext, hardware support, structured data, research infrastructure	
	.....	
	.....	
4		Ef1, S1, I1, ...

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The most important issue that need to be addressed by the application is whether the application can provide a media of knowledge capture and knowledge sharing among all members of the community. Referring to Wikimedia features, we assume that WikiMedia can fulfill the need as mentioned before. After decided to implement WikiMedia, the next step is to install and customize the application so it can be used easily and efficiently by user. Mediawiki is used for the development of this WidyaPedia is MediaWiki version 1.21.1. Mediawiki is installed in the Apache web-server and MySQL database are packaged in XAMPP.

Content control can be done by defining two types of user's role : administrator and user. User can be anyone who has official university email address. It designed to control the user which limited from internal stakeholders. Administrator is the person who has responsible to control the application. The application has 6 functions as seen on usecase diagram in figure 2. Function navigation and tools then further divided into several sub-functions as follows:

- Navigation : Main Page, Community Portal, Help, Recent update, News, Random Page
- Tools : Upload file, Special page, Previous Link, Print Version, Permanent Link, Relevant update

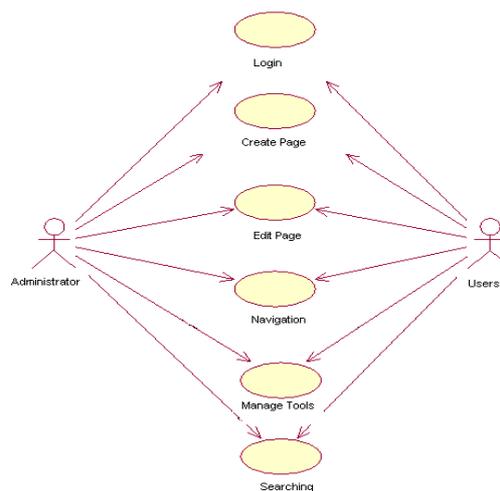


Figure 2. Use Case Diagram of WidyaPedia

Customization is done mainly on the display, such as the adjustment icon, setting the administrator functionality, and defining content for specific pages such as community portals.

Figure 3a and 3b show the main page of WidyaPedia and screen for user's Login. Figure 4a and 4b show the display to page articles are displayed in random and community portals. Community portal will be used as a medium for discussion and communication among users.

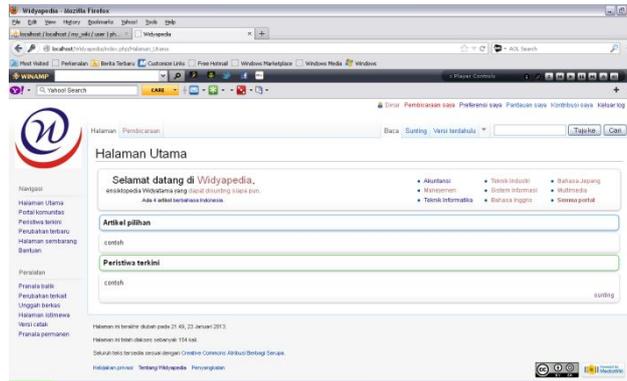


Figure 3.a. Main Page



Figure 3.b. Login Page

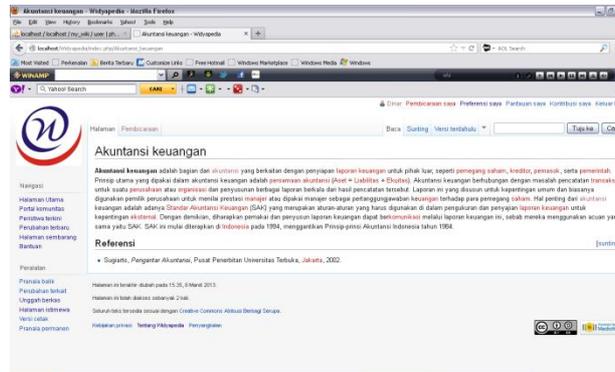


Figure 4.a. Random Page

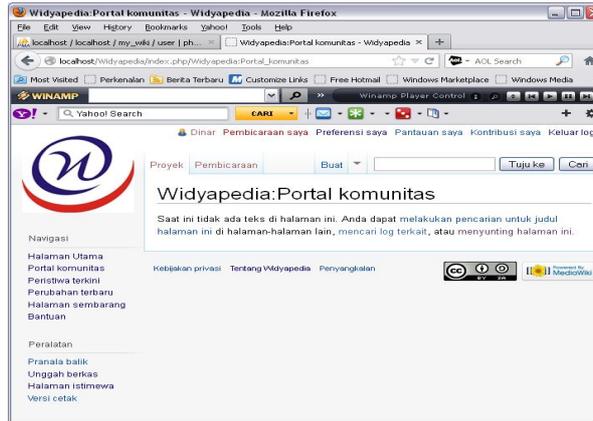


Figure 4.b. Community Portal Page



Figure 5.a. Help Page

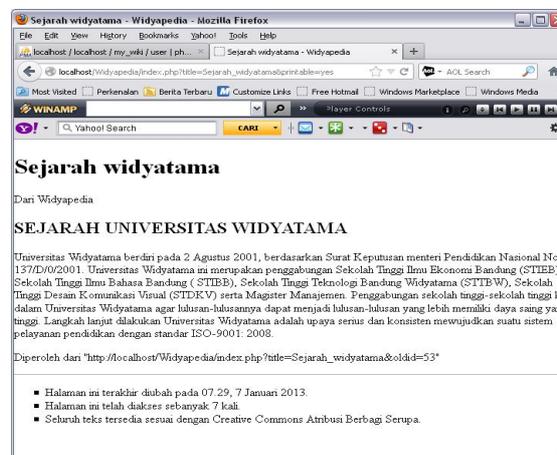


Figure 5.b. Printed Version

This project is still a prototype and not yet implemented in the actual environment. Successful implementation will be determined by the level of user participation as a source of information and active user in conducting peer review of information already entered.

## Conclusion

Based on previous discussion, we can conclude some of the following:

1. Knowledge capture and knowledge sharing is an important process to support the realization of knowledge management in an organization. This process needs to be supported by adequate infrastructure and applications.

2. Wikimedia is an alternative application that is easy to implement, practical and very supportive of the process of collaboration and sharing of information, so it is deemed appropriate as a tool for capturing knowledge and knowledge sharing.
3. In this case, Wikimedia is applied in the form of a wiki-based application development Widyamedia a culture as a tool for sharing information within the internal university community Widyatama.
4. Wikimedia is choosed based of requirement analysis of application for media collaboration, through PIECES approach, by utilizing the existing infrastructure within the university and ease of management of the Wikimedia itself.

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