

TESTING & IMPLEMENTATION ISO 9126 FOR EVALUATION OF PROTOTYPE KNOWLEDGE MANAGEMENT SYSTEM (KMS) E-PROCUREMENT

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ABSTRACT

The implementation of Knowledge Management System (KMS) with a web-based system is the solution of knowledge transfer requirements for e-procurement activities. This study used descriptive qualitative method. Prototype system development method using Evolutionary prototyping. The method in analyzing and designing a system is Object Oriented Analysis and Design using the Unified Modeling Language. Validation testing using the Focus Group Discussion, software quality is tested based on four characteristics of software quality model of ISO 9126, namely: functionality, reliability, usability, and efficiency, the software testing techniques with Black Box Testing and testing web applications with Acunetix.

KEYWORDS: ISO 9126, E-procurement, Kms, Black Box

1. INTRODUCTION

The development of business and technology moves very fast, knowledge becomes one of the primary needs for a company to improve the effectiveness of its business processes. Realizing the increasingly heavy competition, we need to change the paradigm that originally only relies on resource-based knowledge.

The role of knowledge in an agency is a necessity. But currently in the company there is still a lot of knowledge and experience that has not been documented, and there is also a very minimal culture of knowledge sharing between staff. At PT. SIGMA PRO, has made a prototype of a web-based e-Procurement knowledge management system, but there has been no testing of the prototype. The purpose of this research is to find out the quality of the Knowledge Management System (KMS) prototype in the company.

2. PLATFORM THEORY

A. Definition of Knowledge

Probst argued that knowledge is the whole part of the existing knowledge and skills of individuals who are used to solve the problem. Knowledge is divided into theory and practice which are generally in the form of rules and guidelines to make decisions. Knowledge depends on the data and information held by a personal which reflects on an opinion, according to Probst.

Knowledge is information that has been organized in the framework, model, worldview, concepts, principles, theories, hypotheses, or ground into action to improve the understanding

of problem solving and decision making related to the situation and increase the likelihood of completion of a task. Knowledge is the domain of understanding of people's actions, according to Beasley.

Knowledge is information that comes with the understanding of the relationship patterns of information with experience, both individuals and groups within the company. Knowledge is an application of the information believed to be directly used to take the decision to act, according to the Wida.

B. Knowledge Management

President and Founding Chairman of Brinnt Institute states that "knowledge is the potential for action based upon the data, information, insights, intuition and experience". yangartinya knowledge is potential for action based on the data, information, insight, intuition and experience, according to Malhotra.

Knowledge Management works to increase the organization's ability to learn from their environment and incorporate knowledge into business processes. Knowledge Management is a set of processes that are developed in an organization to create, collect, preserve knowledge of the organization, according to Laud.

C. Software Testing Techniques

Black Box Testing (Black Box Testing). By knowing the predetermined function, so that the test is done to look for errors in each

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function. Black Box Testing is designed to validate functional requirements without the need to know the internal workings of a program.

D. Web Application Testing Techniques

Acunetix is one of the software used by the network security testing of web, software is used to find the weak spots of a web-based application that can then be covered by improving the existing weak point. Acunetix is used by IT consultancy and Web Developer in testing web applications. Acunetix can scan a website and displays a security hole in a fairly comprehensive report.

E. ISO 9126 Models

Software quality can be assessed through measurements and certain methods, as well as through software testing. One measure of the quality of the software is ISO 9126, established by the International Organization for Standardization (ISO) define that ISO9126 quality software products, models, quality characteristics and related metrics used to evaluate and define the quality of a software product. ISO 9126 standards have been developed in an attempt to identify the key attributes for the quality of computer software. The quality factor according to ISO 9126 includes six quality characteristics as follows:

1. Functionality. The ability of software to provide functions according to user needs, when used in certain conditions.
2. Reliability. The software’s ability to maintain a certain level of performance, when used in certain conditions.
3. Usability. The ability of the software to be understood, learned, used and attractive to the user, when used under certain conditions.
4. Efficiency is the software’s ability to provide appropriate performance and relative to the amount of resources used at the time of the situation.
5. Maintainability is a software’s ability to be modified. Modifications include corrections, improvements or adaptation to a changing environment, requirements and functional specifications.
6. Portability. The ability of the software to be transferred from one environment to another environment.

3. PREVIOUS RESEARCH

Research on Knowledge Management System prototype has been much researched, some previous studies that Suhitarini S. daughter, and Togar Hope Pangaribu the eventual task of researching on “Knowledge Management System: Knowledge Sharing Culture in Social Service DKI Jakarta”. It studied is how to build a culture of knowledge sharing anther employees of the dept. The research method with the delivery of images and concept knowledge management system for Social Service using Moodle. Results from this study is the knowledge management system Portal Social Office with Moodle CMS.

Agus Umar Hamdani examines “Model Development Knowledge Management System at the General Affairs and Human Resources Yayasan Budi Luhur”. It studied is how to model a prototype knowledge management system that is suitable for excellent service in the General Affairs and HR Budi Luhur. The method of research conducted with the formulation

stage of the problem, knowledge needs analysis, design models of knowledge management system, testing. Results from this study is the prototype Knowledge Management System for public agencies and human nobility by using CMS and Joomla.

Selvia Ferdiana Kusuma researching on “Website Quality Measurement Based on ISO 9126: Systematic Mapping”. In his research explained in memberikan mapping of website quality ratings basedISO 9126. This study uses a systematic method of mapping as a method to collect information on the quality assessment of the website. The result is based on the keywords used, obtained 179 papers from Elsevier, 5330 papers from Google Scholar, and 274.558 paper of IEEE. ISO 9126 conclusion that the characteristics of the most widely used in assessing the quality of a website is usability.

4. RESEARCH METHODS

To answer and describe the problems - problems arising from the background and the formulation of the problem, then the method in the study, can be seen in the picture below

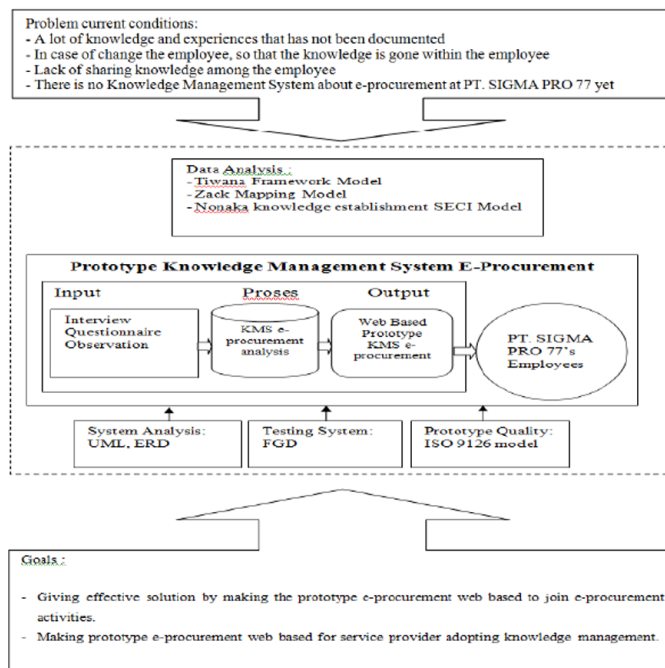


Figure 1: Framework Troubleshooting

Troubleshooting Mindset explanation as used in this study can be explained as follows:

1. Researchers conducted a technology assessment that review of aspects of the problems that occur at this time, as well as review of the concept of knowledge management and information technology aspects.
2. Using Evolutionary prototyping system development methods, researchers will perform system analysis and design with UML, followed by encoding using the PHP programming language and MySQL database as well as the testing of the system has been developed using FGD, and Black Box Testing.
3. Display applications are built so that the user can input data, the data is stored in a MySQL database and time data to be displayed in the form of a visual display of information

with a more user friendly and a good user experience. Applications can also be accessed by users of the system according to user level restrictions.

4. Tests with some of the methods that have been done then conclude whether the system meets the requirements to pass the test by testing software test ISO 9126.

5. RESULTS AND DISCUSSION

A. Use Case Diagram

Based on functional requirements and specifications actor involved in the system, it can be modeled by use case diagram. Use case diagram illustrates the expected functionality of a system. Use case also illustrates the interactions that occur in the system, that gives the user a picture or actor associated with the system and matters related to the user in the system. Here is the user interaction in KMS e-procurement.



Figure 2: Use Case Diagram

B. Activity Diagram

Activity diagram describes the activity flow in the system that is being designed, how the flow starts, how decisions can occur, and finally how the system ends. In this study, researchers describe the activity diagram by the interaction between the actor with the system to be built. Thus, activity diagrams derived from any use case that was made before, to describe each procedure in the prototype KMS e-procurement. Here are a few examples of activity diagrams developed system.

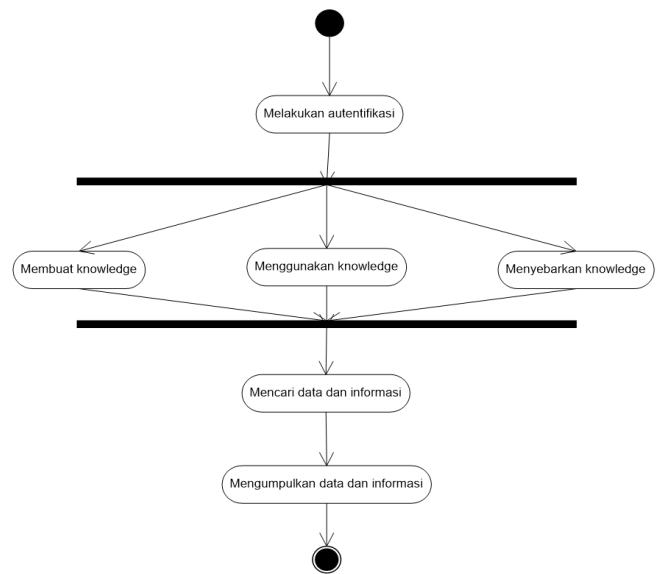


Figure 3: Activity Diagram Overall Process Knowledge KMS e-procurement

C. Sequence Diagram

Sequence Diagram The flow of functionality in a use case. A sequence diagram shows the sequence of object interactions arranged in a time sequence. It describes the objects and classes that seen in the scenario and the sequence of messages exchanged between the objects needed to perform the functions of the scenario. Usefulness to show a series of messages sent between objects is also interaction between object, something that happens at a certain point in the execution system. Here's an example of multiple sequence diagrams KMS prototype e-procurement:

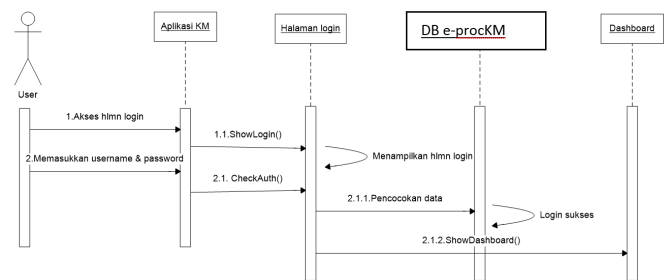


Figure 4: Sequence Diagram Login Process KMS e-procurement

D. Class Diagram

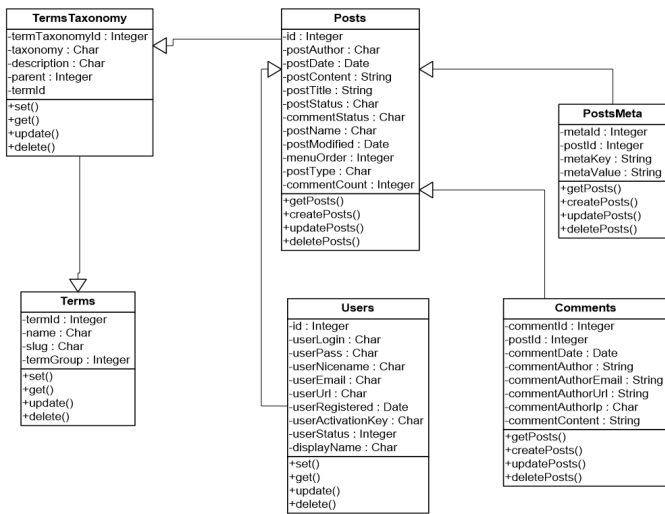


Figure 5: Class diagram KMS e-procurement

E. User Interface

Display interface of each page in the KMS e-procurement can be seen in the following figure:

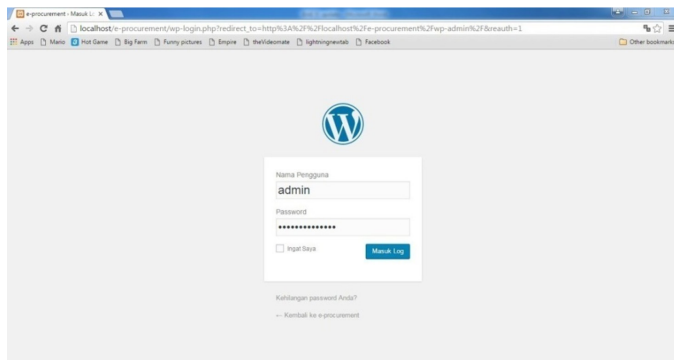


Figure 6: Login page KMS e-procurement

The first login page appears when a user accesses the KMS e-procurement web application. Users must authenticate by entering a username and password, only registered users can log in.

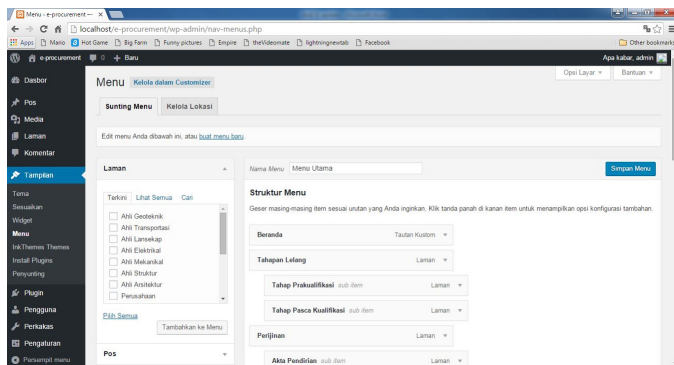


Figure 7: Admin Panel Page of KMS e-procurement

On the Admin Panel page, the Administrator performs the task of managing posts or knowledge and also managing web settings and appearance.

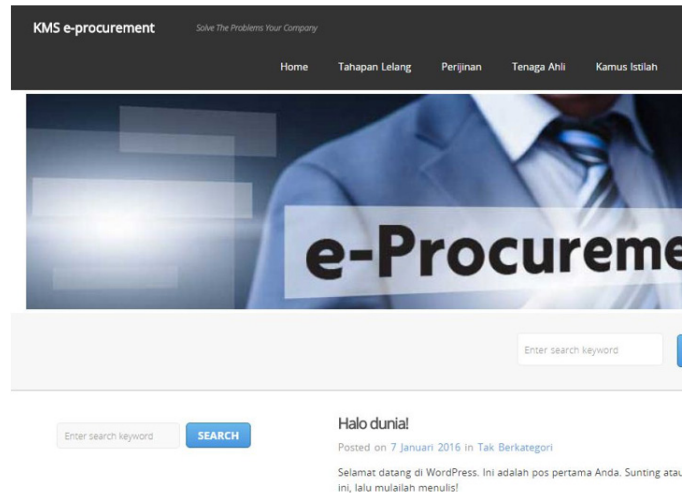


Figure 8: Home Page of KMS e-procurement

On the home page of the KMS web can be seen there are hyperlinks to article categories, pages about, files, forums, discussion summaries and contact.

F. Testing With ISO 9126

ISO 9126 quality testing consists of two parts, namely: the quality level of each aspect based on four characteristics of ISO 9126, and the overall quality level of the four characteristics of ISO 9126. Of the 10 respondents who filled out the questionnaire for quality testing of KMS e-prototype software web-based procurement. Respondents' responses to the quality level of web-based e-procurement KMS prototypes based on respondents' answers to software quality indicators according to ISO 9126, can be measured using the following formula:

$$\% \text{ Score Actual} = x 100\% \frac{\text{Skor Aktual}}{\text{Skor Ideal}}$$

Information :

1. Actual Score is the answer of all respondents to the questionnaire that has been submitted.
2. Ideal score is the highest value or all respondents are assumed to choose the answer with the highest score.

Furthermore, the results are processed and calculated with the criteria set out in the research design, namely:

% Total Score	Criteria
20.00% - 36.00%	Very Not Good
36.01% - 52.00%	Not Good
52.01% - 68.00%	Enough
68.01% - 84.00%	Well
84.01% -100%	Very Good

Table 1. Percentage Criteria for Ideal Scores ([Narimawati 2007], 84-85)

Note: 20% lower limit is obtained from 1/5 of the upper limit of 100%.

Following is the Calculation of Test Questionnaire Results with the ISO 9126 Model:

1. Responses of respondents to the Functionality of the KMS e-procurement prototype.

Criteria Answer	Weight	Functionality									Total
		Suitability		Accuracy		Security		Interoperability		Comp-liance	
		1	2	3	4	5	6	7	8	9	
VG	5	4	8	5	6	2	2	10	5	2	220
W	4	6	2	5	4	8	8		5	8	184
E	3										
NG	2										
VNG	1										
Total Respondent		10	10	10	10	10	10	10	10	10	
Actual Score		44	48	45	46	42	42	50	45	42	404
Ideal Score		50	50	50	50	50	50	50	50	50	450

Table 2. Results of Functionality Testing

$$\% \text{ Actual Score} = x \ 100\% \frac{\text{Skor Aktual}}{\text{Skor Ideal}}$$

$$= \frac{404}{450} \times 100\% = 89.78\% \text{ (Very Good criteria)}$$

In the table above, it can be seen that the majority of respondents strongly agree that the web-based e-procurement KMS prototype has good functionality according to its functions. The percentage of respondent's score of 89.78% is in the Very Good criteria.

2. Response of respondents to the Reliability of the KMS e-procurement prototype.

Criteria Answer	Weight	Reliability					Total
		maturity		Fault tolerance		recoverability	
		10	11	12	13	14	
VG	5	2	5		2	10	95
W	4	8	5	7	8		112
E	3			2			6
NG	2			1			2
VNG	1						
Total Respondent		10	10	10	10	10	
Actual Score		42	45	36	42	50	215
Ideal Score		50	50	50	50	50	250

Table 3: Reliability Testing Results

$$\% \text{ Score Actual} = x \ 100\% \frac{\text{Skor Aktual}}{\text{Skor Ideal}}$$

$$= \frac{215}{250} \times 100\% = 86\% \text{ (Very Good criteria)}$$

In the table above, it can be seen that the majority of respondents strongly agree that the web-based e-procurement KMS prototype has good reliability according to its functions. The percentage of respondent's score of 86% is in the Very Good criteria.

3. Response of respondents to the Usability of the KMS e-procurement prototype.

Criteria Answer	Weight	Functionality								Total
		Understandability		Learnability		Operability		Attractiveness		
		15	16	17	18	19	20	21	22	
VG	5	5	5	1	3	5	5	2	6	160
W	4	5	5	8	7	5	5	8	4	188
E	3			1						3
NG	2									
VNG	1									
Total Respondent		10	10	10	10	10	10	10	10	
Actual Score		45	45	40	43	45	45	42	46	351
Ideal Score		50	50	50	50	50	50	50	50	400

Table 4: Usability Testing Results

$$\% \text{ Actual Score} = x \ 100\% \frac{\text{Skor Aktual}}{\text{Skor Ideal}}$$

$$= \frac{351}{400} \times 100\% = 87.75\% \text{ (Very Good criteria)}$$

In the table above, it can be seen that the majority of respondents strongly agree that the web-based e-procurement KMS prototype has good use according to its functions. The percentage of respondents' score of 87.75% is in the Very Good criteria

4. Response of respondents to the Efficiency of the KMS e-procurement prototype.

Criteria Answer	Weight	Efficiency				Total
		Time behavior		Resource Behavior		
		23	24	25	13	
VG	5	7	7	5	2	95
W	4	3	3	5	8	44
E	3					
NG	2					
VNG	1					
Total Respondent		10	10	10	10	
Actual Score		47	47	45	42	139
Ideal Score		50	50	50	50	150

Table 5: Efficiency Testing Results

$$\% \text{ Actual Score} = \frac{\text{Skor Aktual}}{\text{Skor Ideal}} \times 100\%$$

$$= \frac{139}{150} \times 100\% = 92.67\% \text{ (Very Good criteria)}$$

In the table above, it can be seen that the majority of respondents strongly agree that the web-based e-procurement KMS prototype has very good efficiency according to its functions. The percentage of respondents' score of 92.67% is in Very Good criteria.

Based on the analysis of the data obtained from the questionnaire, the following is the recapitulation of the results of quality testing based on four aspects of software quality according to ISO 9126, namely:

Aspek	Actual Score	Ideal Score	% Actual Score	Criteria
Functionality	404	450	89.78%	Very Good
Reliability	215	250	86.00%	Very Good
Usability	351	400	87.75%	Very Good
Efficiency	139	150	92.67%	Very Good
Total	1109	1250	88.72%	Very Good

Table 6: ISO 9126 Testing Results

Based on the table above it can be concluded that the quality level of this web-based e-procurement KMS prototype is overall in Very Good criteria, with a percentage of 88.72%. The highest quality aspect is based on the Efficiency aspect with a percentage of 92.67%, while the lowest quality aspects are Reliability with a percentage of 86.00%.

6: CONCLUSIONS

Based on test results, testing for the second hypothesis in this study proved that the quality of the KMS prototype web-based e-procurement is generated when measured by the software quality model of ISO 9126 achieve its original expectations is Very Good. The final result of the quality of the software according to the respondents is Very Good with a percentage of 92.67% of respondents. The final results of the testing with black box testing is not found a gap in the application and web so safe to use by the user.

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