Practical Application of Knowledge Management for System Development

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ABSTRACT

System development applies a phased approach to analyze and design systems developed through the use of a specific cycle of activities. It is dependent on the ability to leverage all elements of knowledge value chain, including the creation, identification, collection, adaptation, organizing, application, and sharing of knowledge. This is where knowledge management enters. This paper presents and discusses knowledge management that can improve the performance of system development. Also it describes one model of formal knowledge management system for system development, CyclePro.

Keyword

Knowledge Management, System Analysis and Design, System Development

1.0 INTRODUCTION

The quality of system development is dependent on the expertise level of people that are involved in the system development project, also on more complex aspects, such as interdisciplinary communication, managing the staffs with different disciplines or backgrounds, modernizing the tools, and reusing the codes, modules and experiences (Baeck et al., 1999).

Knowledge management can be used to handle these conditions and support the knowledge communication and sharing processes well. Knowledge management (KM) is the collection processes that support the creation, dissemination and utilization of knowledge between individuals, groups within an organization or independent organizations (Baeck et al., 1999). A well-structured knowledge repository improves the flexible knowledge acquisition, sharing, and application and enhances integration across the different kind of knowledge in system development processes. And selective identification of knowledge provides the transparency levels that enable individuals in the system development teams to find their bearings and gain better access to the knowledge resources. It helps them to accomplish synergies and make valuable contacts.

The approach to build knowledge management system (KMS) combines a design process, which leads to the development of a KMS, and a knowledge management toolkit, which provides concepts of knowledge management, e.g. shared perspective of information, knowledge mapping. The aim of this project is to provide the software engineers or developers to cooperate and communicate knowledge sharing. The formal knowledge management system is named *CyclePro*, and it is applied in system development processes.

2.0 KNOWLEDGE MANAGEMENT FOR SYSTEMS DEVELOPMENT

Knowledge management (KM) is a necessary and integral part of an effective and successful support organization. Knowledge management (KM) is the set of human, process and tool interventions to support the *creation, assimilation, dissemination* and *application* of knowledge (Kotnour et al. 1997). *Knowledge creation* is the improvement of and/or increasing the certainty of a piece of knowledge and occurs during a learning experience. *Knowledge assimilation* is the collection, storage, and refinement of the created knowledge with existing knowledge. *Knowledge dissemination* is the retrieval and distribution of the knowledge to use in another learning experience. *Knowledge application* is the use of past knowledge to help solving the current problem. Knowledge is created in a learning experience, such as problem-solving experience, project or task.

Current thinking and best practices in the KM industry seem to bear witness to the fact that KM is growing fastest at the grassroots level rather than at the corporate-wide or enterprise level. While there is a lot of interest building enterprise-wide solutions, the preponderance of successful initiatives is occurring among small groups of individuals (Marsh, 2000) or department, such as systems development department.

Knowledge management in system development can emphasize creation of systems creatively, commercializing ideas quickly, pursuing the new solutions, tailoring and shaping the systems to fit customers' needs. A successful development project satisfies of exceeds the user's expectations, is developed in a timely and economical fashion, and resilient to change and adaptation. And the development life cycle must be controlled and measured to ensure that the system developments are completed (Quatrani, 1998).

The quality of system development is dependent on the expertise level of people that are involved in the system development project and on more complex aspects such

as interdisciplinary communication, managing the staffs with different disciplines or backgrounds, bringing up to date the tools, and reusing the codes, modules and experiences.

And Knowledge Management (KM) can make internal knowledge visible that can determine the current status, i.e. make the system development team / department aware of its own abilities. For example, what experts do we have and how might they help the team to increase its competencies. Selective identification of knowledge provides transparency levels that enable individuals in the system development teams to find their bearings and gain better access to the knowledge resources. KM helps them to accomplish synergies and make valuable contacts.

2.1 Knowledge Management Model

Knowledge source maps can show which persons in a team, an organizational or the external environment can contribute important knowledge to particular tasks / jobs. Maps of knowledge assets can describe where and how particular assets are stored. It makes a great deal of difference to the user whether the information is in a computer centre, on diskettes, on paper or in a retired specialist (Probst at al., 2000).

The Knowledge source maps in system development are detailed further to identify the required and available knowledge for each phase of system development. They will contain formally approved knowledge elements. Figure 1 describes mapping knowledge to phases and objectives of system development processes.
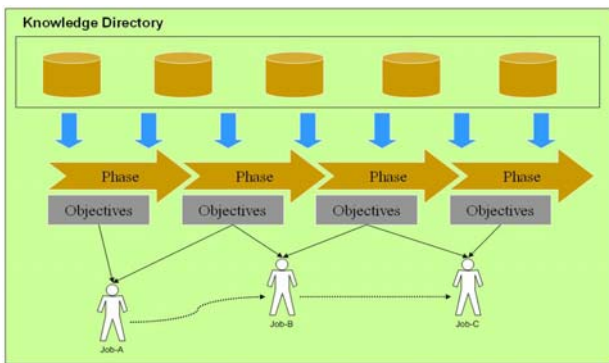

Figure 1: Mapping Knowledge to Phases and Objectives

Knowledge resources are usually defined templates, best practice of software application, tutorials, presentations, and references or other literatures.

The following diagram depicts the logical data structure of knowledge management system for system development processes including the objectives and phases.
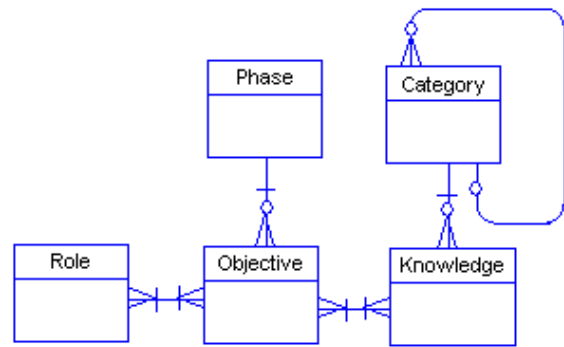

Figure 2: Logical Data Structure of KMS for System Development

It offers possibilities to connect formally knowledge resources to objectives defined in each phase of system development processes. And it is applied in the formal of knowledge management system for system development, CyclePro. Later CyclePro can be implemented for other projects, multimedia education or communication engineering.

2.2 CyclePro

CyclePro is Web-based knowledge management system. The following interfaces developed depict mapping and sharing knowledge in CyclePro.

Figure 3: Objectives Matrix

Users can get a quick view of the project phases for their roles (Figure 3). This matrix is called the *Objectives* matrix, and each cell show the number of objectives in the particular phase. By clicking on any of cells in the matrix, they can get the list of objectives in that cell (Figure 4).
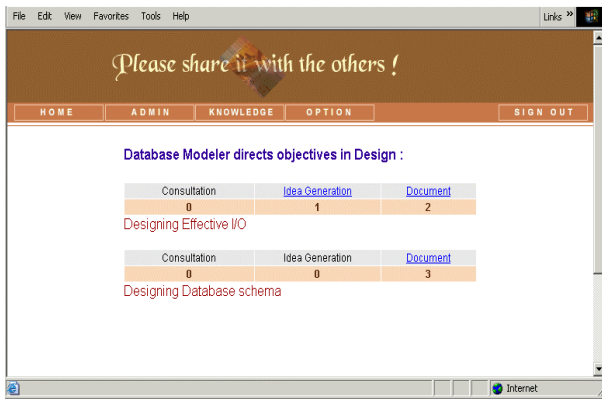
Figure 4: List of Objectives

And they can view number of knowledge in each cell directly (Figure 5). This matrix is called the *Resources* matrix, and each cell show the number of knowledge in the particular phase. In this case, they can list the knowledge that supports their activities in system development.
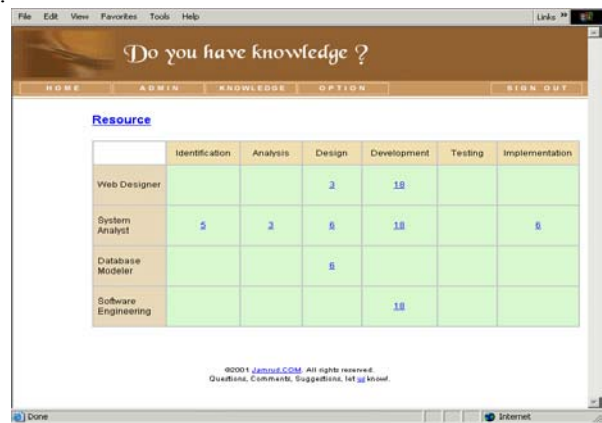
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Figure 5: Resources Matrix

By clicking on any of cells in the matrix, they can get the list of knowledge in that cell (Figure 6).

Figure 6: List of Knowledge

CyclePro has the following features:
- *Phase and Objective Management*. The feature is a principal characteristic where phases and objectives are to map knowledge that is required to support the job.
- *Knowledge Category Management*. The feature is a facility to arrange categories.
- *Document Management*. The feature allows users to file their document into the as new documents. Also it stores URL links at Intranet/Internet.
- *Collaboration Management*. The feature will provide discussion and consultation forums. Consultation forum can be used by users to pose questions and experts can reply to the questions. It also provides a collaborative workspace or platform to facilitate groups, project teams or communities to collaborate and work on a specific task.
- *Expertise Management*. The feature will be able to capture, identify and search for persons with specific competence, expertise to provide information of individuals' expertise. These profiles are be used to create visual "social networks" that shows connections and overlaps in interests and expertise.

CyclePro has the intelligent agents (IA) that can help users to share knowledge effectively. They have some major functions, such as:
- Assisting users to share knowledge according to their roles and objectives and inform them locations of knowledge resources
- Assisting users to update their interests
- Encouraging users with higher competence levels to improve other users with lower competence levels
- Improving users' accountabilities in sharing knowledge

CyclePro is applied in knowledge management initiative for system development life cycle according to Kendall's processes (Kendall, 1999) and the project roles consist of system analyst, database modeller, software engineer, and web designer. The following benefits of CyclePro implementation are:
- Sharing knowledge more systematically.
- Accelerating the learning curve in coding and programming
- Saving time and cost in developing new products or system

3.0. CONCLUSIONS AND FUTURE WORK

Knowledge management in systems development can emphasize creation of systems creatively, commercializing ideas quickly, pursuing the new solutions, tailoring and shaping the systems to fit customers' needs.

This project is a preliminary research. Knowledge management (KM) metrics can be used to measure knowledge management practice in systems development. The metrics are used to focus the recording of KM practice in key areas (Levett and Guenov, 2000).

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