DEVELOPING KNOWLEDGE EXPERT REPOSITORY SYSTEM FOR IT PROFESSIONALS AT CICT, UTM

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Dedicated to my mother and father whose love, encouragement and values will always guide and inspire me.

PATIMAH SERJAN

ARWAHYARHAM ISHAK BIN HASANUDDIN

and

To my loving friend, MOHAMAD HAFIZ and beloved siblings (CT, EJAT & PALI)

In the hope that they will be encouraged to strive for the best throughout their lifetime studies and thank you so much for being so patient and being there for me.

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ABSTRACT

ICT is rapidly changing. Rapid changes in ICT causes the skills and knowledge required IT Professionals to change in order to update and upgrade their IT skills and knowledge. Furthermore, the rapid innovations in ICT are resulting in fast changing requirement and the need of knowledge sharing among the IT Professionals. One of the objectives of this study is to identify the required skills and knowledge required by the IT Professionals at CICT. Then, based on the information, IT Expertise Framework is formulated. The project solution goes through project initiation and planning, designs system, develop prototype, build final system, perform user acceptance testing, finalize system and report writing. The information was collected by interviewing CICT top management and end user, study past literature review such as journals, books and website. A Unified Modeling Language is use in the conceptual designs that are use case, class diagram and sequence diagram. The end results for this project are IT Expertise Framework and Knowledge Expert Repository System (KERYS). IT Expertise Framework is a dynamic framework that categorized IT skills into 3 main categories, which are technical skills, soft skills and business skills. Then IT Expertise Framework is mapped into KERYS that able to store and gather expertise information. Furthermore, this system will provide an effective ways and venue for the IT Professionals to share expertise and knowledge that encourage collaboration and commitment towards lifelong learning.

ABSTRAK

ICT adalah satu bidang yang berkembang pesat. Perubahan yang pesat di dalam bidang ICT menyebabkan kepakaran and pengetahuan yang diperlukan oleh Profesional IT juga turut berubah untuk memastikan kepakaran IT mereka seiring dengan kemajuan dan perkembangan IT. Objektif pertama kajian ini ialah untuk mengenalpasti kemahiran, keupayaan dan pengetahuan yang diperlukan oleh Profesional IT. Projek ini melalui fasa perancangan, fasa merekabentuk sistem, membangunkan prototaip sistem, merekabentuk sistem akhir dan dokumentasi. Hasil informasi diperolehi daripada pelbagai kaedah kajian seperti menemubual pihak pengurusan atasan CICT dan pengguna akhir, merujuk kepada kajian literatur hasil kajian lepas seperti jurnal, buku dan halaman web. Konseptual model yang digunakan untuk kajian ini ialah Unified Modeling Language iaitu rajah *use case*, rajah kelas dan rajah jujukan. Hasil kajian ini ialah rangka kerja Kepakaran IT dan Sistem Pengetahuan Pangkalan Data Pakar IT. Rangka kerja Kepakaran IT dibahagikan kepada 3 kategori utama iaitu kemahiran teknikal, kemahiran perlu (*soft skills*) dan kemahiran perniagaan. Berdasarkan rangka kerja, satu sistem telah dibangunkan yang dapat membantu menyimpan informasi kepakaran pengguna. Selain itu, sistem ini juga membolehkan pakar-pakar IT di dalam UTM untuk saling berhubung untuk berkongsi kepakaran dan pengalaman yang menggalakkan kolaborasi sesama mereka.

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LIST OF ABBREVIATIONS

CDS	Competence Database System
CICT	Center of Information and Communication Technology
FSKSM	Faculty of Science Computer and Information System
KERYS	Knowledge Expert Repository System
KM	Knowledge Management
KMS	Knowledge Management System
UAT	User Acceptance Test
UML	Unified Modeling Language
UTM	Universiti Teknologi Malaysia

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CHAPTER 1

PROJECT OVERVIEW

1.1 Introduction

Knowledge worker are becoming an increasingly important segment and valuable asset in the organization. In today's world, knowledge workers play a major role in a success of organization, and the management of knowledge has become as important as management of physical asset (Mills and Friesen, 1992; Winter and Dowling, 1991; Nonaka, 1999). Although the term "Knowledge Worker" was introduced by Peter Drucker over 40 years ago, the level of interest in Knowledge Management and Knowledge Worker has only started in Asia over the past 3 to 5 years.

As Malaysia aspires to become a develop country by the year 2020, it is vital for the nation to transform itself into a knowledge-based economy or k-economy. The k-economy has created a growing need for knowledge worker that will form a backbone of the future. The National IT Agenda and the Multimedia Super Corridor (MSC) are designed to explore and exploit the potential of ICT to create knowledge-savvy society. As Malaysia become more knowledge-based, it becomes more important to retain highly skilled knowledge workers.

Knowledge is increasingly regarded as the critical resource of firms and economies and organizational knowledge and the management of this knowledge is considered crucial to competitive advantage and organizational success (Nonaka and Takeuchi, 1995; Steward, 1997). As a result, organizations are seeking ways to convert individual skills, expertise and experience to organizational knowledge.

Information technology plays a fundamental role in supporting knowledge work in organizations but technology alone does not ensure the effectiveness of the knowledge environment and it cannot ensure that people share and use each other's knowledge.

One of the main aims of KM is to provide an environment for optimal sharing of knowledge between individuals and groups. An important thing characteristic of firms that have successful knowledge management system is that knowledge sharing is part of the ongoing habits and practices of the organization (McDermott & O'Dell, 2001).

Alavi and Leidner (1999) defined KMS as an emerging line of systems which target professional and managerial activities by focusing on creating, gathering, organizing, and disseminating an organization's knowledge as opposed to information or data. The purpose of KMS are to support organizational members to capture and retrieve knowledge, find and interact with experts, and thereby collaborate and co-operate more effectively (Lindgren, 2002).

1.2 Problem Background

Information communication and technology (ICT) is rapidly changing. New IT products emerge and current ones change rapidly. Rapid changes in information communication and technology cause the skills and knowledge required of IT professionals to change and lead to new roles for IT professionals. Furthermore, the rapid innovations in ICT, resulting in fast changing skills requirements and the need of knowledge sharing and knowledge transfer among the IT professionals to keep update and upgrade their skills.

The Centre of Information and Communication Technology (CICT) is the only one service provider of ICT in the Universiti Teknologi Malaysia (UTM). One of the main objectives of CICT is to become an information technology reference centre. In UTM, there are also many staffs especially lecturers from Faculty of

Computer Science and Information System (FSKSM) who are really experience and expert in ICT area. So, they need to collaborate and share knowledge as well as their expertise to assist IT professionals in line with university's policy which is to recognize ICT problems and solve them in a short time. Furthermore, IT professionals need to upgrade their skills and competency to guide them in developing their career path.

One of the ways to organize expertise in organization is by developing knowledge repositories that attempt to manage knowledge by holding pointers to experts who posses specific knowledge within an organization. Despite the considerable research interest shown in various types of knowledge management systems, not much academic work can be found on information technology support for managing competence (Lindgren, R. and Stenmark, D., 2002).

At the moment, there is no expert repository that stores and gathers IT professional skills, expertise and experience in UTM. Due to this, management faces problem in assigning suitable jobs or tasks to each workers based on their expertise. Without a proper expert repository, the management difficult to identify the gap between the skills they have and the skills needed by the IT professional. Thus, the management did not send them for training to upgrade their knowledge.

1.3 Problem Statement

In order to address key issues as mention at previous section, there are two problems need to address here. Firstly, there are no standard IT skill framework for IT professionals and secondly, there is ineffective ways to access IT Professional's skills and expertise information and profile. Furthermore, there is no effective ways that allows IT Professional at the CICT to share their expertise and collaborate among them. A knowledge expert repository system is needed to encourage IT professionals to improve and share their knowledge. In order to achieve that, these questions must be addressed:

i) What are the appropriate skills, knowledge and ability that required by the IT professionals?

ii) How knowledge expert repository can be used to manage IT skills and support IT Professional's career development?

1.4 Project Objectives

i) To study the required skills, knowledge and ability required by the IT professionals.

ii) To formulate IT Expertise Framework as a standard guidelines for managing IT skills.

iii) To develop Knowledge Expert Directory (KERYS) that able to store and gather expertise information and managing career development for IT Professional's in CICT and UTM based on IT Expertise Framework.

iv) To formulate organizational strategy for IT university community by providing an effective ways and medium to solve problems, share expertise information and knowledge that encourages collaboration and commitment towards lifelong learning.

1.5 Importance of Study

It is hoped that result of this project will give a positive impact to the IT professionals in CICT and UTM. By developing expert repository for IT Professional at UTM, it help IT professionals to accelerate long life learning and increase commitment to the organization.

This is also as guidance for the IT professionals to upgrade their knowledge. Simultaneously, it will help to generate competencies that provide the organization with the right mix of talent to meet existing and future needs (Nordhaug, 1993). This can increase job satisfaction and can guide career path of the workers.

Furthermore, KERYS can help CICT's top management to analyze the gap between skills they needed and skills they have and also managing resource planning and budget for future staff intake.

Besides that, the system can help IT professionals to communicate solutions to problems. The system will provide expertise information by searching features. They can refer to the expertise experience and opinion in order to solve problems that related to IT topic. By doing this, it also can help to improve ICT services, thereby providing quality service to clients especially university community. The implication is the productivity of work will increase because they can respond faster to the client. It is also to enforce the university's policy which is to recognize ICT problems and solve them in a short time.

1.6 Project Scope

i) The study only covers IT professionals include Information System Officer (System Analyst) and Information System Assistant Officer (Programmer) at CICT, computer technicians and lecturers at all faculties in UTM.
ii) The end product of this project will be IT expertise framework and web-based Knowledge Expert Repository System that provide them a venue to share expertise information, discuss problems and collaborate.
iii) The IT expertise framework will be assigned based on the CICT services.

1.7 Summary

Ironically, the job domains most affected by technology are information technology workers. Thus, the need of IT professionals at CICT to upgrade and update their skill and expertise is becoming more important. By identifying skills, knowledge and abilities needed by IT professionals shall produce an IT Expertise Framework that beneficial to IT professionals in managing IT skills and career

development. This framework then can be used as a guide to implement expert repository system that can help the IT professionals to keep update and upgrade their expertise. By using this system, IT professionals in CICT and UTM can also share expertise information as well as sharing knowledge and collaborate among themselves. Furthermore, the system can help in analyzing gap between skills they needed and skills they have. It also can be used in managing resource planning and budget for future staff intake.

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