

# Integrated Knowledge Management System Design: A Case Study in a Malaysian Higher Learning Institution

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## ABSTRACT

*One of the challenges of Knowledge Management System in an organization is to integrate both the tacit and explicit knowledge in one integrated system. Though a lot of organizations have developed their own Information System to capture the explicit knowledge, but most of the information systems are not knowledge based. The same thing happen when comes to the tacit knowledge, where most of the knowledge portals are just concentrating on the tacit knowledge leaving the explicit knowledge un-captured. This paper then proposes an Integrated Design of Knowledge Management System (KMS). The integrated design of KMS integrates all components of knowledge management system available in the organization. It includes the Knowledge Based Enterprise Application, Document Resource Center, e-learning and Knowledge Portal. All the components will be integrated through an integrated search engine to capture the knowledge. The project has been implemented in e-management environment where it embedded the software in knowledge workers' everyday processes and practices. The project has been started in University College of Engineering & Technology Malaysia since 2002 and it is an ongoing project.*

## Keywords

*Integrated Knowledge Management Design, Knowledge Management Conceptual Design, Knowledge Management System.*

## 1.0 INTRODUCTION

Organizational knowledge is now considered as a very important resource in the organization (Teece 1998; Tsai & Ghoshal 1999). A lot of effort has been focused on developing software applications to capture knowledge such as data warehousing and document repositories linked to search engines to support the digital capture, storage, retrieval and distribution of an organization's

explicitly documented knowledge (Jungpil & Mani 2005). KMS also encompass of system capturing tacit knowledge of experts and expertise. (Davenport et al. 1998; Pickering and King 1995). Capturing the explicit knowledge through information system is an easy part, but to make the knowledge accessible and to encourage the staff to use the existing knowledge is the real challenge (Jerry McGarrity 2000). The knowledge management success is also depends on the voluntary participation from everyone in the organization including the sender of knowledge and receiver of knowledge. Everyone must be willing to informing and be informed all the time. Hence, the most promising approach to support the commitment and participation from all staff is to embed knowledge management software into the daily processes (Marcel et al. 1999). Combining these two perspectives of the existing research of KM which focus on tacit and explicit knowledge, this paper combines and expands the existing theoretical and practical work in the fields of knowledge Management (KM) by emphasizing the comprehensive and integrated approach of KM.

## 2.0 KNOWLEDGE COMPONENTS AND DESIGN.

There are four major knowledge component identified in the Malaysian Higher Learning Institution environment. The components are Best Practices of Business Processes, Decision Making Support Knowledge and Executive and Strategic Knowledge generated from Knowledge-based Enterprise Application, Knowledge generated from Document Resource Center, knowledge generated from e-Learning System and knowledge generated from Knowledge Portal. The four components have been integrated through the integrated search engine as illustrated in KMS Design shown Figure 1 below.

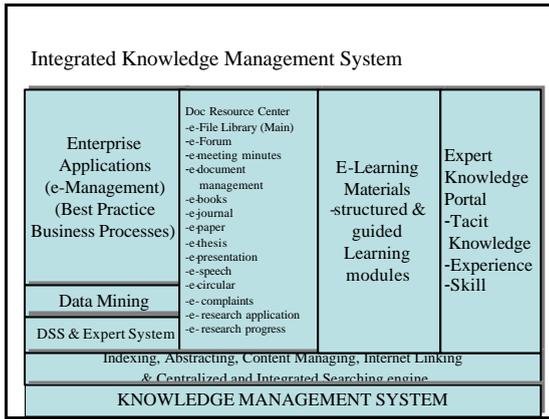


Figure 1. Integrated Knowledge Management Design Model.

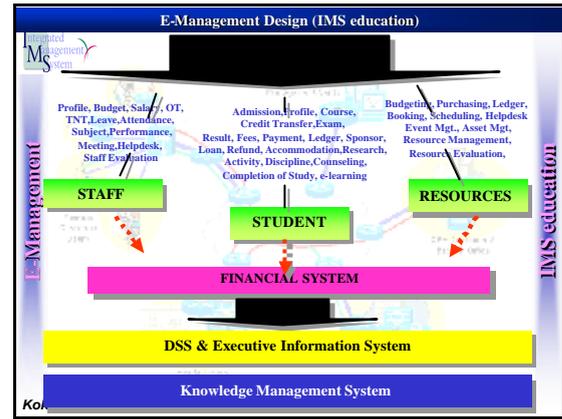


Figure 2. e-Management Conceptual Design

## 2.1 Knowledge-based Enterprise-wide Applications.

The enterprise-wide application has been designed and developed using e-management approach. E-Management is the university-defined approach of developing an integrated enterprise application. E-management is defined as a strategic approach of managing an organization through the implementation of a high performance and technology based system, focused on Integration, Automation, Intelligent, Dynamic and Paperless, and developed using Rapid Development Methodology, towards the creation of Knowledge Environment to achieve organization's mission (Wan Maseri, 2004). E-Management's missions are: i) to improve efficiency and productivity; ii) to reduce operation cost and increase profit; iii) to inculcate good culture values; iv) to utilize world class business processes and practices; v) to integrate the organization through Integrated Information System; vi) to provide effective Decision Support Tools, and to provide effective Strategic Planning Tools (Wan Maseri, 2004). The conceptual design of e-management is illustrated in Figure 2. The knowledge generated from the e-management system has been identified as Best Practice Business Processes, Decision Making Support Knowledge and Executive and Strategic Knowledge. All these knowledge is embedded in e-management applications and unconsciously utilized by all the workers in their daily activities. Conceptual design of the knowledge extracted from the applications is illustrated in Figure 3. Example of Executive Knowledge is illustrated in Figure 4.

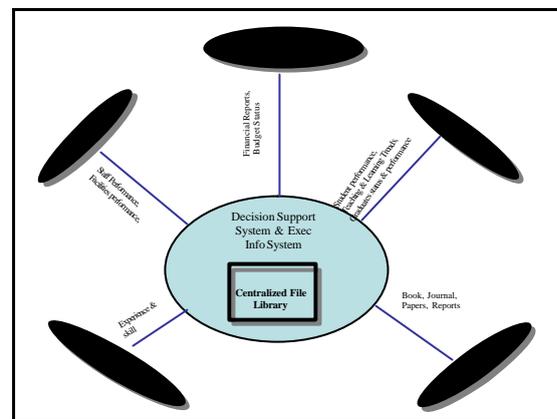


Figure 3. Decision Support and Executive & Strategic Knowledge Conceptual Design.



Figure 4. Financial EIS

The best practice business processes are managed through TQO system where the system captures all the approved processes, allow ongoing feedback from all associates through online feedback system. The TQO system is illustrated in Figure 5.

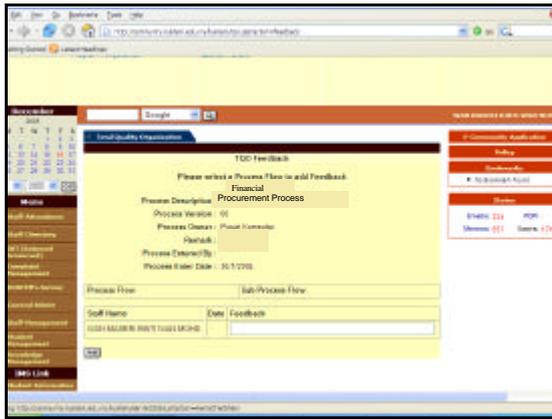


Figure 5. TQO Management System

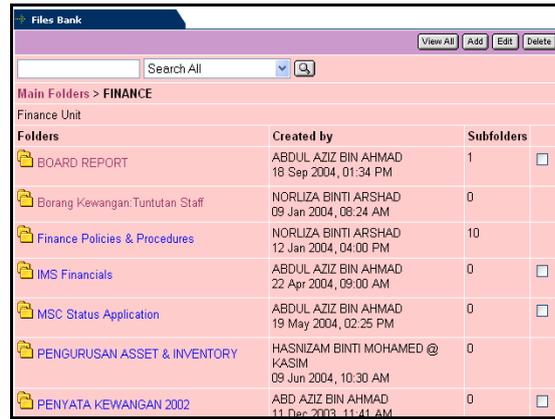


Figure 7. Managing Document through Files Bank

## 2.2 Document Resource Center

Another major components of organization knowledge are the documents. There are numerous types of documents in the organization such as working paper, minutes of meeting, books, journals and so on. The list of identified documents in the organization is identified and the associated e-systems have been developed to manage all those documents. Some of the systems are *e-Kbank*, *e-File Bank*, *e-Forum*, *e-meeting minutes*, *e-document*, *ebooks*, *ejournal*, *epaper*, *ethesis*, *e-presentation*, *e-speech*, *e-circular*, *e-complaints*, *e-research application*, *e-research progress* and a lot more. Some of the systems are illustrated in Figure 6-9.

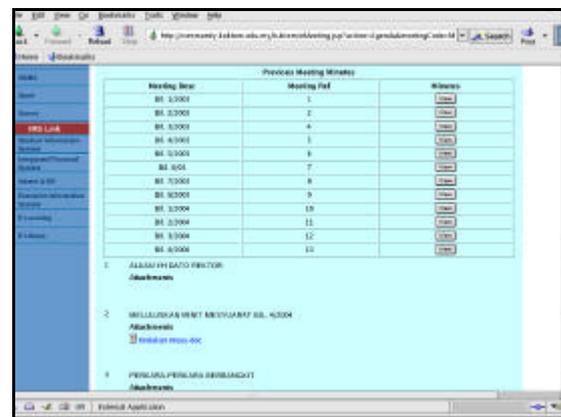


Figure 8. Managing minutes of meeting through e-meeting system

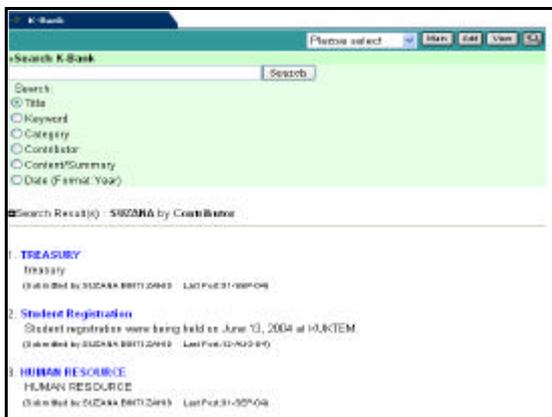


Figure 6. Managing Knowledge through K-Bank

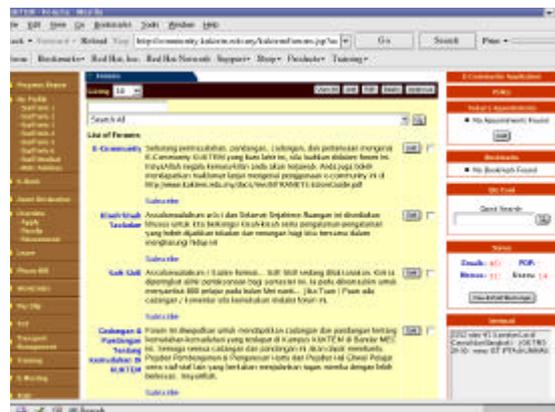


Figure 9. Managing Discussion through e-Forum

## 2.3 e-Learning

Lecture notes, group discussion, exam question bank are identified as organization knowledge captured by e-Learning system. Some of these knowledge are illustrated in Figure 10 and 11.

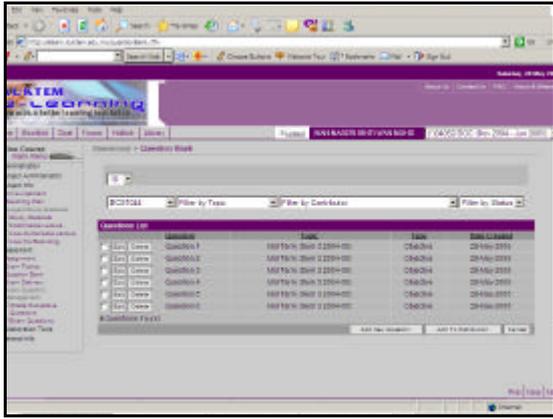


Figure 10. Exam Question Bank



Figure 13. K-Portal for Civil Engineering Department.

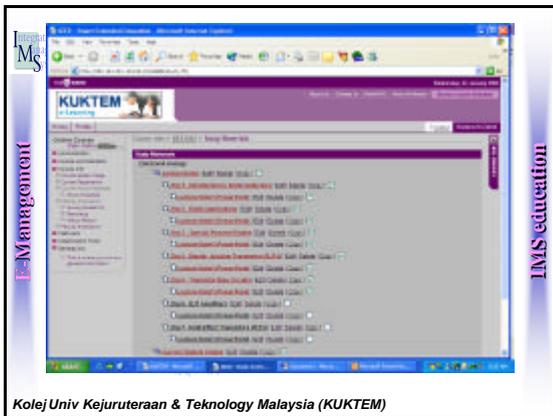


Figure 11. e-Notes

## 2.4 Knowledge Portal

Knowledge Portal is designed to manage the tacit knowledge of the knowledge workers in the organization. Figure 12 and 13 illustrate the Knowledge Portal.



Figure 12. K-Portal Main Page

The implementation of Knowledge Portal is done through various activities such as faculty and department KM initiatives, Knowledge Management Center (KMC) initiatives such as interviews, intellectual discourse and so on.

## 3.0 RESEARCH METHOD

Since this study involved a real-life project while the author was a Head of Computer Center during the time, it is more appropriate to apply the qualitative research specifically participatory action based research method. Argyris stated that the action research is empirical, though the collected data is typically qualitative and interpretive. Data can be collected through audio-taped observations, interviews, action experiments and participant-written cases. Action experiments entail discussions with subjects "on the spot" during action taking, while participant-written cases are the written recollections of the subject following action taking (Argyris, 1985). The participatory action research has been divided into 5 steps which are problem diagnosis, action planning, action taking, evaluating and specify the lesson learn (Baskerville, 1997). Based on the proposed approaches, the author diagnosed the problem based on experience and previous literature, plan the action through establishing master plan, organization structure and policy, taking action through the project implementation, collecting data through the meetings, workshops, brainstorming, discussion and observation as a structured diary of research activities, then evaluating and specify learning by modifying the model. The participatory-action research methodology has been adopted to experiment the Integrated KM models through a real-life project activity shown in Figure 14.

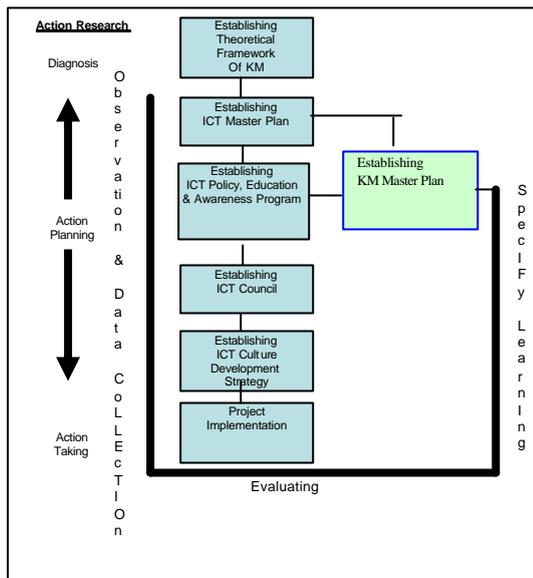


Figure 14: Participatory-action Research Methodology Mapping with the Project Activities

#### 4.0 RESULT AND DISCUSSION

In participatory action research, the researcher perceives the "meaning" of the observation. As the researcher attempts to understand what is observed, this personal understanding will invade the recording of the observation and the deductions that follow [23]. In the case study, data has been collected through involvement, observation and interview with each user group. The observation has been done through out the whole project life cycle through the meetings, workshops, brainstorming, discussion and observation as a structured diary of research activities [21]. Based on author's evaluation and interpretation, the case study that has been conducted shown several success indicators which are:

- Better decision making and management control - accurate, on-time, available and accessible information to appropriate individuals .
- Organization knowledge is captured effectively and successfully.
- Knowledge Culture was instilled in the organization.
- Resource utilization is improved, and the ability to grow without proportional cost is increased.
- Expedite many management works which in return give more time to do planning.
- Organization has the ability to react faster to changes in economy and government policies
- Business processes has improved significantly: simplified and reduced non-value added activities; enterprise view incorporating cross functional focus, information availability and

aligned infrastructure information technology, training, people, policies, structure etc.

- Reduction in supporting staff monthly salary due to small number of supporting staff required in automated environment.
- Reduction in paper cost, printer and toner cost due to paperless implementation.
- Reduction in preparation time for meetings, reports and analysis.
- The organization has won several recognition and awards within two years of software development and implementation. Some of the awards are Premier ICT Award for Public Sector 2004(MAMPU), APICTA Merit Award 2003(MDC) and Finalist e-Asia Award 2004(e-Asia).

Through the author's interpretation based on the participation and observation, it can be concluded that Integrated KM model improve the management of organization knowledge, hence improve the efficiency and productivity of the organization

#### 5.0 CONCLUSION

The project has changed the way people work and interact. The benefits of the project was extended to all stakeholders including staff, customer, board of directors, management members, supplier, banks and all other entities related to the university. In this project, the implementation of quality principles, agile-based methodology and culture-based implementation has given some impact to the success of the project. The integrated search engine is in development stage. The author may discuss about the finished product of the integrated engine in future paper. This study also should be verified by empirical research method to further verify and improve the result.

#### 6.0 ACKNOWLEDGEMENTS

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