

Knowledge Management: Principles and Practice

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ABSTRACT

Knowledge management (KM) promises to improve the quality, efficiency, and effectiveness of business, education, and government. This tutorial will define terms, outline the history, describe key subfields, and exemplify the field of KM. The tutorial will introduce KM strategy and processes, KM benchmarking, and technologies to support knowledge discovery, dissemination, and expertise management. The tutorial lasts three hours and is primarily a lecture presentation. An on-line version of the tutorial will be made accessible from: <http://www.mitre.org/resources/centers/it/maybury/um/index.htm>

Keywords

Knowledge management, knowledge discovery, knowledge dissemination, knowledge mapping, expertise management, collaboration.

Target Audience

This tutorial is intended for students, researchers and practitioners interested in investigating, designing, and/or implementing knowledge management strategy, processes, and systems. There is no prerequisite knowledge required, although general knowledge of management and information technology will enhance the value of this course for participants.

INTRODUCTION and DEFINITIONS

Knowledge Management (KM) is the strategy, processes, and technology employed to enable an enterprise to acquire, create, organize, share, and make actionable knowledge needed to achieve the vision of the enterprise. KM draws solutions from and contributes to multiple disciplines including management science, information retrieval, artificial intelligence, and organizational behavior. A continuously learning organization will manage its knowledge as a strategic asset, continually refreshing and investing in quality improvements to enhance its competitive position. The tutorial will consider KM strategy, technology, and benchmarking.

KNOWLEDGE MANAGEMENT STRATEGY

Following some basic terminology definitions, the tutorial will turn to the elements of a KM strategy. Successful KM initiatives need to engage the human, process, and technological assets in a comprehensive manner to ensure success. Addressing organizational missions, culture, and processes are as critical as technological infrastructure, and we will discuss how a strategy can incorporate these essential elements.

KNOWLEDGE DISCOVERY:

From Knowledge Maps to Knowledge Creation

We will overview a range of tools and techniques that support a range of knowledge discovery activities. These will include models for knowledge capture, knowledge access (e.g., question answering (AQUAINT)), knowledge mining, knowledge summarization and knowledge mapping and visualization. We will illustrate with examples from implemented systems that perform these functions and summarize the current state of the art.

EXPERTISE MANAGEMENT

Effective management of corporate expertise requires support for enabling, discovering and maintaining both experts and expert teams. This raises a series of complex issues including: What is an expert? How can various levels of expertise or competence be characterized (e.g., student, master)? How can experts be authenticated or validated? How does and individual's level of expertise evolve over time? How can we effectively foster, capture and distribute expertise? How can this be systematically supported in a cost-effective manner? We will illustrate expert finding systems and technologies as well as capabilities to support distributed and virtual expert collaboration.

KM BENCHMARKING AND EVALUATION

A final area addressed by the tutorial will be evaluation. Benchmarking, hypothesis testing, and repeatable experiments are fundamental to any endeavor. Performed objectively, precisely, and comprehensively, evaluation can benchmark, chart progress, and enable comparison of relative strengths and weaknesses of approaches. Evaluations

can be either glass-box (internal) and black-box evaluation (end-to-end). Criteria for evaluation can include quantitative measures (e.g., time to perform tasks, accuracy of tasks, percent of inter-assessor agreement) as well as qualitative ones (e.g., user indication of utility, ease of use, naturalness). We will discuss a range of models and techniques used for KM benchmarking including balanced scorecard, intellectual capital models, and also methods for testing automated systems such as wizard-of-oz experiments, simulations, and instrumentation of live knowledge environments.

KNOWLEDGE MANAGEMENT CMM

We introduce the notion of a Knowledge Management Capability Maturity Model (KM-CMM) that describes the principles and practices underlying KM process maturity. KM-CMM aims to help knowledge organizations improve the maturity of their knowledge processes in terms of an evolutionary path from ad hoc, chaotic processes to mature, disciplined KM processes.

SUMMARY

Effectively implemented and deployed, KM promise many benefits. These include:

- More *strategic* management of intellectual resources – unlocking the full enterprise potential.
- More *efficient* knowledge discovery -- enabling more rapid knowledge creation with less work.
- More *effective* knowledge application -- tailoring the knowledge and its engagement to the context of the challenge.

TUTORIAL STRUCTURE

The tutorial introduces KM using the following outline:

- KM strategy, models, and processes
- Technologies to support knowledge discovery, dissemination, and expertise management
- KM benchmarking
- KM CMM

The tutorial may include animations and video demonstrations.

INSTRUCTOR

Mark Maybury received his M.Phil. in Computer Speech and Language Processing (1987), an MBA from RPI (1989), and his Ph.D. in Artificial Intelligence (1991) at Cambridge University, UK. Mark has organised international symposia, given tutorials, and published over fifty articles in the area of language generation, multimedia presentation, text summarization, and intelligent information retrieval. Mark is editor of *Intelligent Multimedia Interfaces* (AAAI/MIT Press, 1993), *Intelligent Multimedia Information Retrieval* (AAAI/MIT Press, 1997), co-editor of *Readings on Intelligent User Interfaces* (Morgan Kaufmann Press, 1998), *Advances in Text Summarization* (MIT Press, 1999) and *Advances in Knowledge Management: Classic and Contemporary Works* (MIT Press, 2001) and co-author of *Information Storage and Retrieval: Theory and Implementation. 2nd Edition* (Kluwer Academic, 2000) and co-editor of *Knowledge Management* (MIT Press 2000). Mark is Executive Director of MITRE's Information Technology Division and a member of the Steering and Program Committees for ACM IUI.

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