

KNOWLEDGE MANAGEMENT NOVEL APPLICATIONS

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Abstract: Knowledge Management (KM) is a process through which an enterprise gathers, organizes, shares, and analyzes the knowledge of individuals and groups across the organization in ways that directly affect performance. Numerous businesses have implemented KM systems in an effort to achieve commercial effectiveness. This paper has collected information about a number of KM systems developed and used by modern businesses. It then presents the development steps leading to the implementation of a Web Content Management System to be used as a Research Management System. This will manage the acquisition, analysis, perseverance and utilization of knowledge regarding various research projects - including proposed projects, ongoing projects and finalized projects - and research-related emails.

1 INTRODUCTION

Knowledge Management, as it is practiced today, is a system of technologies focused upon the delivery of strategically useful knowledge and expertise, the availability of which facilitates effective collaboration and timely decision-making. (Villegas, 2001) Such technologies include: Intranets, Extranets, Data Warehouse, Document Management, Groupware, Decision Support Systems, Web-conferencing, Project Management, Work flow, and more.

Using KM systems organizations may integrate their knowledge into their business processes, products and services. In general, KMS assist organizations to:

- Capture important knowledge that would otherwise be lost when employees leave the organization
- Increase productivity and efficiency
- Improve customer service and support
- Improve collaboration with partners and suppliers
- Perform improved decision-making
- Reduce costs by eliminating redundant processes
- Train and develop employees' skills.

2 KM MARKET PLAYERS

Top vendors of Knowledge Management software include Autonomy, IBM Lotus, Plumtree, Microsoft, Hummingbird, and Open Text. Others include Sybase, Brio, Cognos, Tibco, SageMaker, SeeCommerce, Viador and Hyperion. Their products range from specialized KM solutions to KM portals.

The market players though in the area of KM are not only the above major vendors but also a great number of businesses that have implemented specialized KM solutions in several of their functional units. A small sample of technology leading companies and some reference to the KM systems developed is possible to see in Table 1.

3 A KMS MATERIALIZES

The system described in this case is a Web Content Management System (WCMS) to be used to manage research activity.

To meet its aims and objectives, Intercollege's Research Office needs to acquire, analyze, preserve and utilize knowledge regarding various projects - including proposed projects, ongoing projects and finalized projects - and research-related emails.

Table 1: Examples of Knowledge management Systems.

Company Name, Product Name	Brief KMS description/purpose
Centrelink, Off-Site File Storage project	Maintain and provide the corporate memory to support our people and ensure the right information is available to them at the right time, so that they can develop and share their knowledge with the organisation.
Centrelink, Performance Data Management System project	Apply our knowledge (corporate and specific) to analyse the information in terms of requirements and operation.
Abuzz, Beehive	A system that receives email containing requests for information and routes it to experts, based on profiles.
Ernst & Young, Future State '97 (FS'97) strategy (Davenport, 1997)	Included, but not limited to, capturing and leveraging knowledge from consulting engagements and the rapid application of this knowledge, models, and approaches to client situations.
Hewlett-Packard, Connex, a Network of Experts.. (Davenport, 1996)	A guide to human knowledge resources within the labs. Also available in HP are a KMS on product processes and a Computer Dealer Channel
Hewlett-Packard, Trainers' Trading Post (Davenport, 1996)	Knowledge sharing for HP educators. Includes a discussion database on training topics and a collection of training documents.
Higher Level Systems, Assistum	A suite of software products that uses rules and fuzzy logic to aid decision making
IntraBlocks, e:Folders	A collaboration tool which works with Microsoft and Netscape servers to allow users to create folders for sharing knowledge objects.
Microsoft , SPUD (Skills Planning und Development) (Davenport, 1997b)	Keeps a structure of competency types and levels required for particular jobs, rates employees' performance and links competencies to learning offerings.
Molloy Group, The KnowledgeBridge	A product using AI techniques to help customer support personnel solve problems.
Primus Communications Corp.	A system that allows a group of high tech companies to share an advanced technical customer support.
IBM, Internet Knowledge Manager	A system that allows nonprogrammers to write and run their own internet agents using Netscape.
AiA Inc., IdeaProcessor	A tool to graphically capture and show the relationships between concepts discussed during meeting, interviews, and in documents.
Wincite Systems	A KMS that allows the mapping of knowledge to markets, products, processes and manager responsibilities and supports the distribution of timely intelligence.
HP, Connex – A Network of Experts	The goal of this program is to provide a guide to human knowledge resources within the Labs and, eventually, to other parts of Hewlett-Packard.
HP, Knowledge Management on Product Services	A corporate group and software with the mission of advancing product development and introduction

Such tasks can be handled using the proposed Research Management System, a web-enabled Content Management System. As a web-enabled system and since it will be installed on Intercollege's intranet, this CMS will provide the ability to its end-users to access it securely from anywhere within Intercollege eliminating the need for any software to be installed on their desktop computers. Furthermore, such a system will be more easily maintained and upgraded. Through it the Research Office will be able to rapidly publish a variety of content to interested parties.

The methodology selected for developing the Research Management System was that of Rapid Application Development (RAD) with the following phase breakdown (van Vliet, 2002): Requirements planning, User Design, Construction and Cutover.

During the construction phase, a prototype system was created by the developer to be reviewed by the end-users. Modification and upgrades were then made on the prototype until this was considered to be complete. At the cutover phase –the last phase of the RAD model- the constructed system has undergone thorough testing by the developers and the users. Training was provided to end-users and the system implementation was considered to have been completed.

3.1 RAD Phases of Project Development

Requirements Planning: The main two problems identified with the existing system were: 1) the tracking of faculty's proposed, ongoing and finalized projects and current or future research activity. , 2) the publication and distribution of research-related emails, (received in hundreds every week from local and international agencies), to interested parties at Intercollege.

User Design: In a JAD session arranged with the Research Office to review in detail the requirements set at the JRP it was decided that:

- The system should be designed as a Web-based system accessible through a browser from any machine on the Intercollege network. Plans for Internet accessibility were considered but dropped for security reasons.
- The system should provide the ability to users with administrative privileges to fully manage it
- Additionally, the system should provide tools that would aid the end-users being the faculty to submit their projects and research activities and then manage (add / edit / delete) all their details.

- Users should also have the ability to track down projects, research interests and emails using a search tool resembling those found on Internet search engines.
- The system should retrieve new emails from the mail servers at scheduled time intervals, store them in its database on a readable format, notify the administrator about their arrival and provide a function for their acceptance/rejection and further distribution (publication) to interested user groups. If the administrator selected to distribute the emails to any interested group then the members of this group should be notified of the existence of new emails that may concern them.
- The system should be fast, stable and above all extremely secure due to the importance of the information being manipulated.

Construction: The construction phase of the project began by taking under serious consideration the hardware and the software infrastructure of Intercollege.

Hardware Infrastructure: An in-depth analysis of hardware infrastructure was made to establish that this could support the proposed system.

Due to the fact that the system to be built would acquire, manage and store information; a need for a database server was imperative. The only server option available at Intercollege was Microsoft's Internet Information Services (IIS 6.0), which run under Windows 2000 Advanced Server of Windows 2003 Server platforms.

Finally, because the system was to interact with a mail server for the retrieval, categorization and publication of research-related emails the Microsoft's Exchange Server used at Intercollege to handle all incoming/outgoing mails would be used. This provides secure access to ones mail inbox from the Intercollege's network (LAN) or from remote networks (WAN).

Software Infrastructure: Following a systematic comparison of all the widely used languages it was decided to use Microsoft's ASP.NET Internet programming language since this would allow us to develop in a more clear, precise and rapid manner the system, minimizing the occurrence of errors.

Entities of the System: The Research Office required that the design of the online Web Forms should match the design of the paper forms used to hand out to researchers. The collection and examination of all of the data that appears in these forms let to the construction of the knowledge base Entity Relationship Model.

Coding the System: As mentioned earlier, Microsoft's ASP.NET programming language was selected in order to develop the system. ASP.NET is a server-side language in which the code is not included within the HTML.

Throughout our project the syntax used for ASP.NET language was VBScript (Visual BASIC Script). Additionally for our project knowledge of SQL (Structured Query Language) was imperative due to the extensive use of data stored in a database.

The Cutover phase: During the Cutover phase the final constructed system went through thorough testing by the development team. Real data such as project proposals and research-related material was obtained and used as testing aids to measure the correctness and usability of the system. Additionally, at the pre-implementation phase the system was tested against various emails with different content such as images, executable file, etc. to ensure that mails arriving from research-related agencies would be available to its end-users.

4 CONCLUSIONS

This paper presented examples of business knowledge management systems and demonstrated through a case study the development of one such system that falls in the subcategory of Web Content Management Systems. The system under construction being a Research Management System is required to acquire, analyze, preserve and utilize knowledge regarding various projects - including proposed projects, ongoing projects and finalized projects - and research-related emails. The methodology followed and the detailed description of all the decisions that needed to be made as well as the overall work that was completed, might prove useful to others with similar requirements that would call for the development of a Web Content Management System.

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REFERENCES

Alavi M. Knowledge Management and Knowledge Management Systems

- <http://www.mbs.umd.edu/is/malavi/icis-97-KMS/sld001.htm>
- Centrelink, 2004. APS KM Case Studies. *Centrelink - Data shop KM Products*, Commonwealth of Australia
- Crowley J., 2004. Beginning Active Server Pages - Introduction
<http://www.developerfusion.com/show/1010/1/>
- Davenport T., 1996. Knowledge Management at Hewlett-Packard, 1996.
<http://www.mccombs.utexas.edu/kman/hpcase.htm>
- Davenport T., 1997. Knowledge Management at Ernst & Young, 1997.
http://www.mccombs.utexas.edu/kman/e_y.htm
- Davenport T., 1997b. Knowledge Management at Microsoft, 1997.
<http://www.mccombs.utexas.edu/kman/microsoft.htm>
- Figallo C., Rhine N., 2002. *Building the Knowledge Management Network, Best Practices, Tools and Techniques for Putting Conversation to Work*, John Wiley & Sons, pp. 3-14 (ISBN 0-471-21549-X)
- Hemamalini, S., 2002. Knowledge Management- The Road Ahead for Success. *PSG Institute of Management*
- Kendall K., Kendall J., 2002. *Systems Analysis and Design*, Prentice Hall International Inc., 5th ed., pp. 6, 10-16 (ISBN 0-13-042365-3)
- Microsoft Corporation, 2005. Active Server Pages
<http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnanchor/html/activeservpages.asp>
- Microsoft Corporation, 2005. Technology Overview
<http://msdn.microsoft.com/netframework/technologyinfo/overview/default.aspx>
- Microsoft Corporation, 2006. Why ASP.NET? Writing dynamic, high-performance Web applications has never been easier
<http://www.asp.net/whitepaper/whyaspnet.aspx?tabindex=0&tabid=1>
- Myers J., Rose M., 1996. Post Office Protocol Version 3, pp. 1-23, *RFC-1939*
<http://www.faqs.org/rfcs/rfc1939.html>
- Santozus M., Surmacz J., 2001. The ABC of Knowledge Management
<http://www.cio.com/research/knowledge/edit/kmabcs.html#what>
- Tobin T., 2004. The Top 4 Reasons you Need KM – Today. *A Supplement of KMWorld Magazine, Best Practices in Enterprise Knowledge Management*, IV,13,10.
- van Vliet H., 2002. *Software Engineering, Principles and Practice*, John Wiley & Sons, 2nd edition, pp. 57-58 (ISBN 0-471-97508-7)
- Villegas, R. Jr., 2001. Knowledge Management White Paper. *New Century Marketing Concepts*.
- W3Schools. Introduction to JavaScript.
http://www.w3schools.com/js/js_intro.asp
- Watson I., 2003. Applying Knowledge Management, Techniques for Building Corporate Memories San Francisco, Morgan Kaufmann, ISBN 1-55860-760-9, pp. 7-10