

Creating Shared Knowledge: Instructional Knowledge Management Systems

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ABSTRACT

Document management, information management, and knowledge management are three processes of an instructional knowledge management system (IKMS) that require different ways of thinking. Well-constructed IKMSs share a number of common features including ease of use, ease of navigation, security, indexing and searching, automatic HTML conversion, document version tracking, platform independence, ease of access and notification. A robust knowledge management system allows users to store and retrieve both digital documents and paper-based documents or notes that have been scanned into the system. An IKMS should allow users to upload documents into the central document repository using a number of methods. Document management systems also can be used to facilitate collaboration of groups on a project.

Keywords: Knowledge management, Web-based knowledge management

Introduction

Information and communications technologies are changing the nature of instructional design (Ganesan et al., in press). This article focuses on how information and knowledge management technologies are effecting both instruction and instructional design. Information management and knowledge management are two processes that require different ways of thinking. Information management and knowledge management, are often confused with one another. Information management involves the retrieval and movement of information, often contained within documents. Knowledge management, on the other hand, is “the process through which organizations generate value from their intellectual and knowledge-based assets” (Santous & Surmacz, 2001). Twonley (2001) defined knowledge management as “the set of processes that create and share knowledge across an organization to optimize the use of

judgment in the attainment of mission and goals” (p.1.). Knowledge management focuses on the continued change, growth, and creation of knowledge. It allows organizations to share ideas, documents and information across their enterprise and to link users into a community of shared knowledge regardless of physical location or time constraints. Along with the use of knowledge management comes the creation of a culture that encourages people to view knowledge as something that continually grows and changes, and that provides a means for processing information, as well as the development of an information architecture to help facilitate the process and to manage the documents (Adams, 2001).

The current culture of information dissemination in the classroom is organized around a semester and specific groups of students registered in one class. The culture of knowledge management can alter this in that information and student created knowledge is shared across classes and semesters, allowing students to learn from current and past students. Consequently a course history of shared knowledge is created and maintained by the instructional knowledge management system (IKMS). IKMS is the process through which academic departments or colleges generate learning and maintain intellectual and knowledge-based assets associated with courses. Marshall and Rossett (2000) noted that knowledge management systems “are composed of two complimentary parts: one technical, the other social” (p. 26). The technical component seeks to “capture, package, and distribute tangible, documented products” while the social side “enables collaboration, connection, and reflection among system users” (Marshall and Rossett, 2000, p.26). An IKMS is comprised of individuals, information and technology within an instructional environment. It is the interaction of these three components that facilitates the creation and sharing of knowledge (Figure 1).

Technology and the use of the Internet and world-wide-web has allowed major changes both in teaching practice and learning, and consequently, in the management of information and knowledge. Since the inception of the world-wide-web in the early 1990s, increasing numbers of educators have used this medium to make information relevant to their courses available to students. The ability to use the Internet to place information online for others to access, as well as to collaborate with others, creates a new way of thinking about the management of knowledge, information and documents, especially as they pertain to learning and instruction.

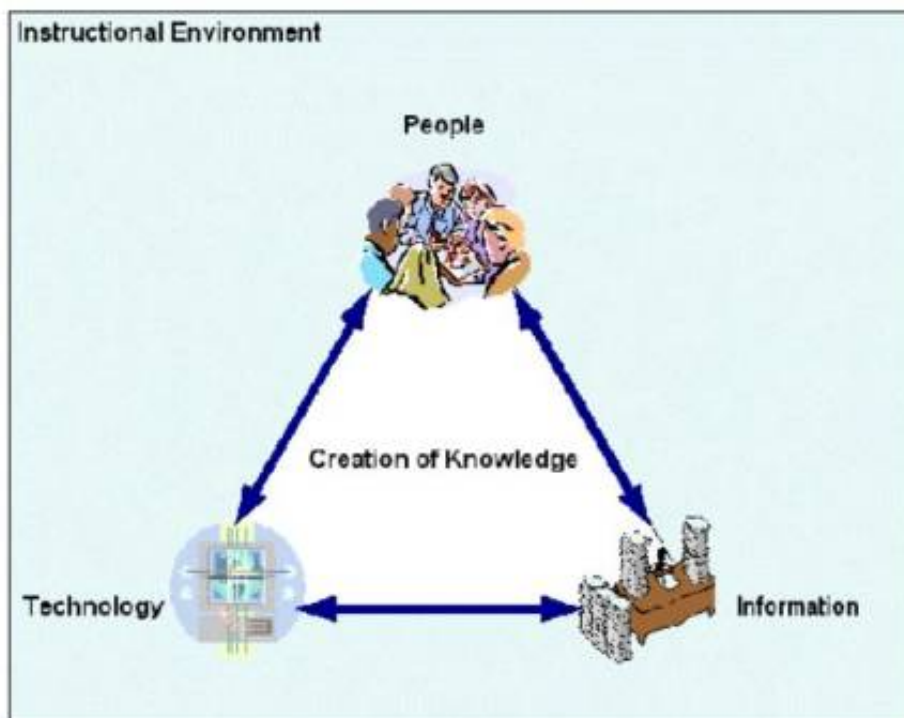


Figure 1. An instructional knowledge management system

The Internet provides the means for making documents available to a broader audience and for facilitating both document management and knowledge management. The Internet allows faculty to digitally store and share documents to support traditional face-to-face classes, as well as to offer online courses. Initially there existed no quick and easy method for getting professors' documents to the web without knowing the basics of web-specific technologies (e.g., HTML, FTP, WYSIWYG editors, etc.), or having the technical support to post the documents. Converting paper-based documents to the web posed even bigger challenges both in moving paper-based documents to the web in a quick and timely fashion (minutes not days), as well as in maintaining the formatting of the initial document or transforming the document into a format that students could easily download. In the latter half of the 1990s companies began to introduce course-management software (CMS) to develop and help deliver instruction via the web. Colleges and universities focused on course-management systems (e.g., WebCT and Blackboard) for supporting distance learning initiatives as well as face-to-face instruction. Typically these course-management systems feature communications tools (email, chat, etc.), document repositories (e.g., course descriptions, assignments, etc.) and many other features (e.g., online quizzes, calendars, etc.).

While it is a major step forward in terms of organization, CMS software does not address several issues in the area of knowledge management or document management. First, it does not handle paper-based documents (e.g. documents without a digital counterpart) in an organized and systematic manner; uploading documents into these systems is more or less complicated depending on the system. Second, these systems are designed to deal with information on a course by course basis; they are not designed to deal with volumes of information that need to be organized across subjects, disciplines, and/ or courses, or to provide the means to search and retrieve documents. The challenge faced by both business and education is not only how to best manage the volume of information so that it is easily

accessible to search and retrieve materials but also how to provide people with the ability to post information and to enhance collaboration. It is important to create a culture where instructors and students are willing to share their information and knowledge as well as contributing to the generation of new knowledge. The application of knowledge management principles and the desire to deliver documents to learners has opened the door for knowledge management systems in the instructional environment. This paper describes features of knowledge management systems and discusses how these systems are used to support instruction.

Instructional Document Management Systems – Features

Well-constructed IKMSs share a number of common features:

1. *Ease of Use*: Effective use of an IKMS depends on ease to use. Users should not be forced to use new applications or learn HTML in order to move documents into a web-based system. At the simplest level, it should both obvious and intuitive.
2. *Ease of Navigation*: The interface of the system should be easy to navigate, including menus and icons that are consistent within the system. Users should not be required to install or purchase special software to use the IKMS. Ideally the basic interface should be through a web browser. The system should be accessible from anywhere a user desires access.
3. *Security*: The system must be secure, allowing for parts or all of the system to be password protected. It should also be possible to assign different security levels by person, by user group, by document or by directory.
4. *Indexing and Searching*: Documents should be easily indexed and searchable. The system should be capable of searching the full text of each document, regardless of file format.
5. *Automatic HTML Conversion*: If you have multiple users from different organizations that have different software, or even different versions of the same software, opening and viewing documents can cause users difficulties. The ability for the systems to automatically generate a dynamic HTML version of the document can allow users across platforms, as well as across software application types, to view all documents. For example, if a some users posts a document in Word2000 and other users have WordPerfect 7, the auto-html feature allows individuals to be able to view the document via their web browser, and, if necessary, cut and paste it into their own word-processor.
6. *Document Version Tracking*: In those instances where users wish to use the IKMS for collaboration (e.g., a final report), it is helpful if an IKMS can track and manage multiple versions.
7. *Platform Independence*: While the IKMS resides on a specific platform and may use a specific operating system, users should not be restricted in their choice of platform or operating system. The IKMS should deliver documents to users regardless of the platform or operating system they use to access the system.
8. *Ease of Access*: A robust knowledge management system allows users to store and retrieve both digital documents and paper-based documents or notes that have been scanned into the system. The system should allow users to upload documents into the central document repository using a number of methods:
 - a. *via a web browser*: Using a web browser like Internet Explorer or Netscape, users can point and click to add documents to the web or download them to their desktops.

- b. *via drag and drop*: Using client software the IKMS system is accessed as any other shared resource within a network. Documents can be added to the IKMS by dragging and dropping them in to the appropriate folder.
 - c. *via applications*: From word-processing or other applications users can open or save document-directly to the web.
 - d. *via networked (e.g., TCP/IP enabled) scanners*: Using special scanning software users can scan documents directly to the web.
9. *Notification*: The IKMS should include a notification feature that automatically informs users via email when documents have been added or changed within a monitored directory, so that users don't have to continually check for changes, additions or new versions of documents.
10. *Language*: The IKMS should be able to display its menus and other features in multiple languages to assist individuals across language groups.

Instructional Document Management in Action

The application of IKMS to educational environments impacts a number of areas including: (1) administration, (2) instruction, (3) instructional support and (4) collaboration.

Administration: The application of IKMS to administrative tasks can influence the time to complete specific tasks such as graduate admissions review. For example, a graduate admissions folder could contain an application form (typed or hand written), writing sample, test scores, letters of reference and transcripts. Typically this material is placed in a folder that is then passed from one reviewer to another. Folders can be misplaced or delayed, as one reviewer may take longer to review the material than another. With an IKMS in place the entire application folder can be transformed from one file format into another.], and placed in a central repository. Reviewers can be granted access and workflow software can be used to control access to documents and allow for the addition of comments.

Many educational organizations share information with external groups such as parents, interested students, or the general public. Document management systems allow for the sharing of documents between different groups. School districts can and do use an IKMS to provide documents and updates to their community and to create internal areas related to teaching standards (<http://docushare.edutech.org/dscgi/ds.py/View/Collection-4562>).

Instruction: When an instructor wants to deliver course documents, an IKMS provides an alternative to CMS such as WebCT or BlackBoard. IKMS does not replace CMS. IKMSs can be used for stand-alone support or integrated into a CMS (see, for example, <http://supa.syr.edu/docushare/dscgi/ds.py/View/Collection-869>).

Instructional Support: Many professors still desire to place materials on reserve in library or have course packets printed at local print shops (see <http://errol.iupui.edu/>).

Another example of instructional support through a knowledge management system is the health sciences database at the Tufts' Medical School. Initially the incentive was to create a digital library of images used in courses to help maintain images (originally slides used in lectures) as well as to make sure the images were available to both students and faculty when they were needed. Later more and more course materials were added to the system. Some universities use IKMSs to create digital librarians to support multiple courses and materials

(see for example: <http://www.cio.com/archive/020101/tufts.html>).

When constructing the database, the development team consulted with faculty to determine how best to organize materials to make them useful to faculty and students and found that organizing it relative to the curriculum made the most sense. Materials and documents are entered in chunks, versus a fully formed course, allowing the materials to be easily updated and the faculty to be able to pick and choose what they need from within specific topic areas, aiding in creating a more integrated curriculum.

Students also can set up their own personal knowledge management systems by creating their own folders, keeping their own electronic notes and organizing their materials in a way the makes sense to themselves, allowing them to be both consumers and constructors of knowledge (Genusa, 2001).

Collaborative: IKMSs can also be used to create collaborative work areas. As mentioned above, a key feature of an IKMS is the ability to track multiple versions of a document. Within a class, team areas could be created that allow team members to post and share documents. Combined with the editing features found in MS Word the IKMS provides a method to coordinate and control the different versions of the document.

Conclusion

Knowledge is becoming understood as dynamic rather than static. An IKMS reconceptualizes the link between courses and knowledge by creating a shared repository between students (past, present and future) as well as making students not just passive receptacles of knowledge, but also creators. An IKMS facilitates the coordination and control of documents regardless of the platform or operating system of its users. It allows students to view the history of change to a single document and the contribution of documents in an area of study as it transforms over time. IKMS is an exciting avenue for educational institutions to change the culture of learning.

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