A framework for e-learning as a tool for knowledge management

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Keywords
Internet, Computer based training, Knowledge workers, Organizational learning

Abstract
A common thread among the plethora of definitions of knowledge management is that its objective is to identify and leverage the collective knowledge in an organization to help organizations compete and survive. One potential lever is e-learning, the creation and distribution of organizational knowledge through the online delivery of information, communication, education, and training. John Chambers, of Cisco Systems, said: "The two great equalizers in life are the Internet and education", so why not fuse the two to provide an efficient way to empower a workforce with the skills and knowledge it needs to compete amid the rapid pace of change in business? In this paper we discuss the relationship between knowledge management and e-learning and present a framework for employing e-learning as a valuable tool for knowledge management. The framework encompasses the planning and implementation elements necessary for organizations to leverage existing technologies and implement new ones to promote organizational learning and contribute to the management of organizational knowledge.

Industrial Management & Data Systems
102/7 [2002] 371–380

[ISSN 0263-5577]
[DOI 10.1108/02635570210439463]

Introduction

One of the difficulties facing organizations and researchers alike is that knowledge management, while being intuitively important, is intellectually elusive (Despres and Chauvel, 1999). It is important because, "with rare exceptions, the productivity of a modern corporation or nation lies more in its intellectual and system capabilities than in its hard assets ..." (Quinn *et al.*, 1996). It is elusive because, "to define knowledge in a non-abstract and non-sweeping way seems to be very difficult. Knowledge easily becomes everything and nothing" (Alvesson and Willmott, 1996). Therein lies the conundrum, one of many surrounding this important, and arguably necessary, tenet of present day organizational management.

Although there exists a plethora of definitions of knowledge management, there are noticeable commonalities among them. In particular, there is general agreement that the primary objectives of knowledge management are to identify and leverage the collective knowledge in an organization to achieve the overriding goal of helping organizations compete and survive (Choo, 1996). Knowledge management involves a mix of cultural, organizational, process, management, and technology initiatives. In addition, there appears to be general agreement that a knowledge design process is required to identify and leverage this collective knowledge.

Weggeman (1997) defines the knowledge value chain as four successive constituent processes (Figure 1). First, an organization's strategic knowledge requirements need to be identified. Second, the knowledge gap (the quantitative and qualitative difference between the knowledge needed and that available in the organization) needs to be determined. Third, the knowledge gap needs to be closed either by developing new knowledge, buying knowledge, improving existing knowledge, or getting rid of out-of-date or irrelevant knowledge. Finally, the available knowledge needs to be disseminated and applied to serve the interest of customers and other stakeholders.

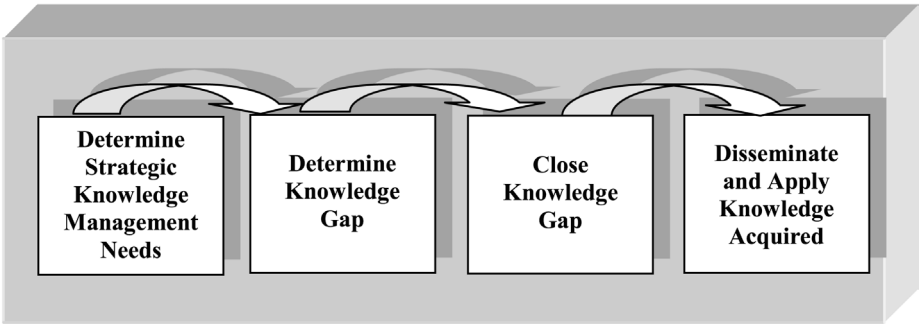
The processes in the knowledge value chain do not necessarily require the use of information technology (IT); however, throughout the literature there seems to be agreement that IT will most likely play a dominant role in facilitating or enabling knowledge management (Alavi and Leidner, 2001). One obvious use of IT to enable knowledge management is through e-learning, the creation and distribution of knowledge through the online delivery of information, communication, education, and training.

In this paper, we discuss the benefits of e-learning and provide a framework for the e-learning process, which includes the factors to consider before going online, the key elements of effective online education, and important e-learning implementation considerations. We tie this framework to the processes in the knowledge value chain to illustrate how e-learning can be used as an important tool in knowledge management.

Is there a market for e-learning?

Fundamental to today's knowledge economy is how companies foster learning and obtain and retain knowledge from their workers. The rapid pace of change in what workers need to know, the growth of the Internet, and accelerated global competition, all contribute to the requirement that successful companies efficiently harvest and use knowledge. Industry experts recently assessed the knowledge enterprise industry, which includes both training and education, at more than $2.2 trillion. It has become clear to corporate America that the management of

Figure 1
Knowledge management value chain



company knowledge should be as disciplined as the management of land, equipment or investments.

In *The Fifth Discipline*, Peter Senge (1990) defines a learning organization as "... an organization that is continually expanding its capability to create its future". Garvin (1993) provides a more specific definition stating "... a learning organization is an organization skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights". The concept of a learning organization is a very important component of knowledge management and requires that the organizational learning process involve not only training and education but a means for sharing and disseminating knowledge among workers to achieve improved organizational performance.

E-learning is a revolutionary way to empower a workforce with the skills and knowledge it needs to turn change to an advantage. Many corporations are discovering that e-learning has many of the same attributes as basic knowledge management processes and thus can be used as a tool for knowledge management. A study by Merrill Lynch projects that the online component of education alone will grow from $9.4 billion this year to $53.3 billion by the year 2003, representing a 54 per cent compound annual growth rate. International Data Corporation predicts that corporate e-learning will increase by an 83 per cent compound annual growth rate during this same period. E-learning in the IT field is expected to account for half of all training expenditures (Swanson, 2000). The National Household Education Survey, conducted by the National Center for Education Statistics in Washington DC, provides further insight into the current and potential impact of e-learning. In 1999, an estimated 90 million (46 per cent) adults in the USA participated in adult education activities. This number represents six times the enrollment of students in higher education during the same year. Workers want and need knowledge and e-learning is an efficient and potentially fruitful means to this end.

Businesses are not alone in recognizing the benefits of e-learning. According to a study sponsored by Merrill Lynch and Co., SunTrust Equitable Securities Corp., and Bank of America Securities LLC, the number of college students expected to enroll in Internet education is projected to be 2.2 million students by 2002 (FDCH Congressional Testimony, 2001). According to a survey by *The Chronicle of Higher Education*, 60 per cent of US colleges and universities offered online courses in 2000. An additional 8 per cent plan on starting such programs in the next 12 months, and 92 per cent plan on expanding their online learning programs in the next year. A total of 97 per cent of college students today use the Internet for research, and 70 per cent use the Internet daily (Hamm, 2000). A study conducted by Yen *et al.* (2001) showed there is an increasing focus on networking and Web development tools in MIS curricula throughout colleges of business. The US Government is equally supportive of education through technology. In the US last year, $800 billion was spent on education. Part of this sum was spent on a Government initiative to install electronic links in schools (known as the E-Rate). E-Rate will ensure that 95 per cent of all state schools, and 63 per cent of all the classrooms in them, will have Internet access. In short, our schools, colleges, and universities will have the infrastructure in place to support electronic learning. In turn this will produce a workforce comfortable with the paradigm of e-learning. Ultimately, e-learning will become ubiquitous where there is knowledge to be captured, shared, and applied.

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What does e-learning mean to businesses?

Firms have embraced the notion of "knowledge" as an asset that creates value when shared. Training is no longer seen as an extravagance after a good year of profits, but as a necessity in order to keep up with competitors. Equally, these days, companies worry less about training workers and then having them leave and more about not training workers and having them stay.

This makes the corporate training/knowledge management market the most promising for e-learning. In business, network technology makes e-learning possible and allows it to take place during the course of work. Corporations are already heavily wired and conduct an increasing volume of their business, both internally and externally, over the Internet (McManis *et al.*, 2001). The speed at which this makes it possible to introduce new products, services, and features means that employees have to learn and consolidate new information more and more rapidly. Educating these workers in an efficient and effective way becomes critical to the knowledge management of a firm since organizational survival depends on the service provided to customers; much of this service requires up-to-date knowledge of new products (and their ever-changing features), customers and suppliers.

E-learning, the exchange of knowledge through online media, is a logical solution to this need. To be effective, e-learning should not be just the passive delivery of learning one way. If properly applied and exploited, it can be a huge benefit to firms and their partners by providing access to both explicit corporate knowledge as well as valuable tacit knowledge that has been captured and made available as a firm's resource. This will permit firms to accrue capital value that detaches itself from that of the individuals within it. The similarities of knowledge management processes to e-learning processes make the two easy partners for companies that have recognized their importance. Properly developed, e-learning creates a growing repository of knowledge that will continuously deliver to employees just what they need to know at any particular moment, and in a style that each individual can understand. E-learning at this level is similar to its efficiency counterpart in inventory management; it can be thought of as "just-in-time learning". In short, e-learning permits participants to acquire knowledge, pass it from one person to another, apply it to organizational problems/opportunities, and store that knowledge for future use. If this sounds familiar it is because, essentially, knowledge management and e-learning are both about knowledge generation (acquisition, creation, capture, and adoption), knowledge storage, knowledge distribution, and knowledge application.

E-learning's potential benefits to business are numerous. Companies are seeking the kind of easily accessible, highly flexible training that e-learning can deliver in order to contend with the rapid pace of change in business and shorter product cycles. One of the most obvious benefits to e-learning is the economic advantage from not having to fly employees to attend expensive seminars and thus lose important work time. According to Hicks (2000), companies can save up to 70 per cent of their training budget when instituting e-learning courses within their firms.

In addition, e-learning personalizes the learning experience and allows for greater flexibility. Employees can take courses around their schedules and at their own pace while maintaining a consistency of material with their fellow workers. Through online training, companies increase the likelihood of getting training to employees wherever they live or work and, as a result, retain valuable employees longer. Perhaps the greatest argument for e-learning are the findings comparing e-learning to more formal training programs. Findings at this point show e-learning produces greater retention of material. According to Webster's (2001) study, e-learning students have 60 per cent faster learning curves compared to classroom counterparts.

What is required for e-learning to become an effective knowledge management tool?

Several trends are spurring the momentum behind e-learning. One, as stated earlier, is the need for firms to keep up with the ever-changing businesses environment and shorter product lifecycles. Another trend is the growing importance of information sharing. E-learning can be taken outside of company firewalls and can be used to educate firm partners, customers, and suppliers, in addition to the firm's employees. In return, the firm can generate new knowledge through the use of chat rooms, surveys, etc. Knowledge partners benefit from the information gained through e-learning, while the firm in turn benefits from the capture of new information from knowledge partners. Once information is captured and categorized as useful knowledge, its sources become irrelevant in terms of value

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(Swanson, 2000). Cisco Systems, one of the many companies that promotes e-learning as part of its knowledge management strategy, defines the benefits of e-learning as follows (Cisco Systems, 2001):

- E-learning provides a new set of tools that can add value to all the traditional learning modes – classroom experiences, textbook study, CD-rom, and traditional computer-based training.
- Old-world learning models do not scale to meet the new world learning challenges. E-learning can provide the tools to meet that challenge.
- With e-learning you can empower learners, and the learner as well as the mentoring system is held accountable.

Numerous studies have been conducted regarding the effectiveness of e-learning. To date, there are only a few that argue that learning in the online environment is not equal to or better than traditional classroom instruction (Institute for Higher Education Policy, 2000). However, e-learning is not meant to replace the classroom setting, but to enhance it, taking advantage of new content and delivery technologies to enable learning. Several considerations must be taken into account for e-learning to be a lucrative investment and an effective knowledge management tool. Figure 2 depicts an e-learning value chain that represents the e-learning planning process, which can be directly linked to the knowledge management value chain. The elements of the e-learning planning process include assessing and preparing organizational readiness (factors to consider before going online), determining the appropriate content (content that ties into the goals of knowledge management), determining the appropriate presentation modes (considering factors contributing to effective e-learning), and implementing e-learning (content and technology infrastructure considerations).

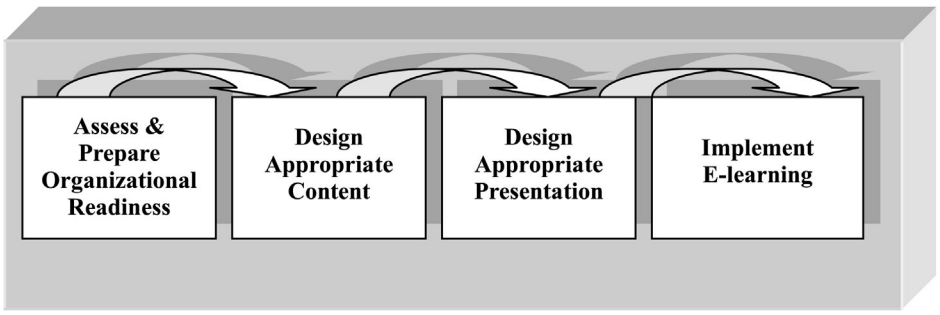
Organizational readiness is directly tied to the first two processes in the knowledge management value chain, i.e. it requires the determination of strategic knowledge requirements and an assessment of the current organizational knowledge gap. The last two processes in the knowledge value chain (closing the knowledge gap and disseminating the knowledge acquired) are aligned with the last three phases of the e-learning value chain. The design of knowledge content and presentation and the subsequent e-learning implementation are intended to close the knowledge gap and disseminate the knowledge required to promote organizational survival and improve its competitive position.

Phase 1. Organizational readiness

Online education meets the need for "information liquidity". This means having information when needed, where needed, and in the right context. Online education can take full advantage of the multimedia aspects of the Web and encourages peer interaction through electronic focus groups, bulletin boards, chat rooms, etc. However, a firm should consider a number of factors before taking the e-learning plunge (Berry, 2000). The list below summarizes the organizational readiness issues that should be addressed in preparation for implementing e-learning and highlights the questions an organization must ask and answer in preparation for e-learning:

- *Infrastructure*. Does a knowledge management infrastructure exist?
- *Knowledge editor*. Is the company willing to invest in a knowledge editor?
- *Organizational culture*. Does the existing culture encourage and promote knowledge sharing?
- *Employee attitude*. Do employees accept the notion of sharing knowledge?
- *Knowledge needs*. Have the strategic knowledge needs been identified?

Figure 2
E-learning value chain



- *Computer usage*. Are workers computer literate?
- *Technology requirements*. Is the company sufficiently "wired"?

These questions are further defined in the following subsections.

Knowledge management infrastructure
Does the company already support a knowledge management infrastructure? A knowledge infrastructure provides a mechanism to perform necessary knowledge processes with the maximum efficiency (Senge, 1990). The content of the infrastructure is the knowledge services available to knowledge workers. These services may include, for example, databases of "best practices", maps of employee skill sets, on-line analytical processing tools to tap into company data warehouses, etc. The primary goal of the infrastructure is to channel knowledge through organizational business processes. Adoption of e-learning is easier and less expensive if this infrastructure is already in place.

Knowledge editor
Is the company willing to invest in an "editor" to seek out and confirm what qualifies and can be housed as knowledge, and what may be incorporated into the e-learning environment? Is the firm willing to create functional units in place solely for the purpose of overseeing the fusion of knowledge management into e-learning courseware and vice versa?

Organizational culture
Is the company willing to invest in a paradigm shift from knowledge hoarding to knowledge sharing? (For example, rewarding knowledge sharing with bonuses, profit sharing, etc.) Have clearly articulated policies been established to explain the benefits of e-learning and its ties to knowledge management? Organizations that succeed in knowledge management are likely to view knowledge as an asset and to develop organizational norms and values that support the creation and sharing of knowledge (Davenport *et al.*, 1998).

Employee attitude
Have employees been persuaded to share knowledge, rather than keep it to themselves in the tradition of "knowledge is power"? Are they willing to commit to a policy of self-study? Firms must incorporate policies, etc., into their culture that support the elimination of barriers between those who have information and those who need information. A study conducted by the American Productivity and Quality Center (1999) concluded that knowledge sharing can be encouraged through the development of formal human networks and is more likely to become embedded in people's behavior when it is tied to strategic business goals.

Knowledge needs
Have the strategic knowledge management needs been determined? Once specified, the knowledge requirements should be mapped to current knowledge processes to identify the gap between what knowledge is available and what knowledge is needed. The e-learning environment will attempt to close this gap.

Computer usage
How computer literate are the firm's knowledge workers? To prevent confusion between content and process, workers should be comfortable with the technology used for e-learning before actually using the technology for learning purposes.

Technology requirements
Does the firm's technology infrastructure support the bandwidth, multi-media, ISPs, etc., necessary for creating an e-learning/knowledge management environment? Existing technologies can be leveraged to support e-learning so the learning of new technologies does not interfere with the goals of e-learning.

Phase 2. Designing the appropriate content for e-learning

The content of e-learning, as stated previously, should be guided by the strategic knowledge requirements of the firm. The appropriate content for any given organization is varied; however, the type of content can be broadly categorized as content to transfer either tacit or explicit knowledge (Table I).

Nonaka and Takeuchi (1995) differentiate between tacit knowledge, intuitive knowledge that is generally accrued through experience, and explicit knowledge, factual knowledge that can be easily expressed and transferred. For many organizations there is a huge gulf between the intrinsic value of tacit and explicit knowledge. According to Fry (2001), tacit knowledge is the key to what corporate clients pay for and what corporate

Table I
Knowledge content considerations for e-learning

Tacit knowledge	Explicit knowledge
Deep knowledge	Factual knowledge
Insights	How-to knowledge
Expertise	Incremental knowledge

e-learning systems should ultimately strive to communicate. E-learning can then permit the capture and dissemination of key earners' insights and expertise through audio, video, and textual media. If tacit knowledge can be made available across the firm coupled with feedback/response evaluations, e-learning will serve as a valuable tool for knowledge management by helping to achieve the ultimate goal of knowledge management: achieving and maintaining a healthy competitive position. Most e-learning requires content that supplies explicit information, training, or knowledge required for workers to perform their jobs better and help improve the products and services offered. Explicit content may vary widely involving knowledge about new markets, customers, suppliers, product features, as well as process features and technology. The range of topics is limitless; however, for e-learning to be a valuable tool for knowledge management, the content should be matched to the strategic knowledge requirements of the firm.

Phase 3. Designing the appropriate presentation for e-learning

Table II summarizes elements of effective traditional learning that should be coupled with characteristics of online learning to produce a successful e-learning environment. Combining the characteristics of effective traditional learning with those of effective online learning will provide a rich and varied presentation environment that will satisfy the many content, application, and individual needs of learners. Each characteristic is discussed in the following subsections.

Characteristics of effective traditional learning

Once a commitment has been made to integrate e-learning with knowledge management, it is in the best interest of the firm to consider a strategy for this integration. Any effective learning strategy has the task of bridging the gap between those who have knowledge and those who will benefit from the knowledge. Theories of effective traditional learning are well documented and should be considered when developing a firm's strategy for online course content (MacDonald, 2001). Critical elements of effective learning include the following:

- *Engage learners*. The learning process should seek to engage learners fully as both participants and contributors to the learning process.
- *Develop cognitive skills*. Promoting the development of the cognitive skills of articulation, reflection, analysis, synthesis, problem-solving and evaluation supports the development of knowledge and should be the focus behind the design of learning activities.
- *Use learners' previous experience*. Utilize learners' previous experience, existing knowledge and personal conceptions as the starting point for discussion, clarification, and learning. Identify the social context in which previous learning has occurred, checking beliefs and value systems to diagnose learning needs.
- *Use actual problems*. Use problems as the stimulus and focus for learning. Use problems to add meaning to the learning process. Content embedded within the context of a problem engages learners in the learning process.
- *Encourage co-operation*. Provide learning activities that encourage co-operation between group members as a means of creating a "sense of community" and promoting learning as a social process. A sense of ownership encourages learning and adds enjoyment and thus motivation to the learning process.

Table II
Knowledge presentation considerations for e-learning

Characteristics of traditional learning	Characteristics of online learning
Engage learners fully	E-learning should be interactive
Promote the development of cognitive skills	E-learning should provide the means for repetition and practice.
Use learners' previous experience and existing knowledge	E-learning should provide a selection of presentation styles
Use problems as the stimulus for learning	E-learning content should be relevant and practical
Provide learning activities that encourage co-operation among team members	Information shared through e-learning should be accurate and appropriate.

Key elements of effective online education

The characteristics of effective learning should be coupled with the characteristics of online learning to develop e-learning courses. By combining traditional learning characteristics with the unique environment available online, elements will emerge that will differentiate excellent e-learning (i.e. sharing of knowledge) from mediocre or ineffective learning (Eisinger, 2000). Key characteristics of online learning include the following.

- *Interactivity*. E-learning should be interactive. There are opportunities for both learners and knowledge holders to build on the information being conveyed in the online environment. Opportunities include threaded discussions, chat areas, and exercises that invite learners to interact with the content and respond. Most importantly, learners and instructors should have a means to contact the content expert or others in the actual learning environment. E-mail, discussion bulletin boards, groupware environments such as LotusNotes™, etc., can be used to support interactivity.
- *Repetition and practice*. E-learning should include a means for repetition and practice. In other words, the courses should engage and challenge the learners to evaluate, select, and use the information in their everyday lives. The content should be relevant to the learner's frame of reference (i.e. content that is practical and understandable to the user). Case studies, simulations, and "what would you do" exercises help learners grasp the content and find ways to use the new information creatively in their lives. The Web is an excellent resource for establishing a frame of reference for exercises.
- *Presentation styles*. E-learning should provide a selection of presentation styles. The most beneficial courses offer several ways for learners to absorb the material. Written content is fine, but more learners grasp concepts with illustrations that accompany the content. Video, audio, and other multi-media choices within an online environment contribute to the richness of presentation choices. Instructors can inquire in the online classroom about other ways to present the material if alternative delivery methods are available or preferred by members of the learning group.
- *Content*. E-learning content should be relevant and practical. Adults learn better when the objectives of the course are directly linked to issues, theories, case studies, research, and knowledge that is practical. Simply putting material online does not make e-learning successful. Learners require some amount of integration of all of the information being provided in the learning environment so that it makes sense and has meaning and utility in their lives. Company intranets permit employees to access issues facing the organization that can enrich the content of learning activities.
- *Accuracy and timeliness*. Information shared through e-learning should be accurate and appropriate. Instructors should employ measures (usually by direct contact with learners, but also by assessments such as surveys) to ensure that the content provided in the course is appropriate to learning needs. The course content should be reviewed regularly to ensure accuracy and timeliness.

Phase 4. Implementation considerations

After an organization has identified its strategic knowledge management requirements, prepared a readiness infrastructure for using e-learning as a tool to support knowledge management, and has specified the content and presentation design for e-learning, the knowledge holders should design and develop courses that provide the optimal learning environment as suggested under the five key elements above. Implementation of online courses requires a ready network, content application software and tools, and a learning map to link e-learning goals to the knowledge requirements of the firm (Berry, 2000). Figure 3 summarizes this implementation plan.

Ready network

Tom Kelly, VP Internet Learning Solutions at Cisco Systems, said: "Content may be king, but network infrastructure is God" (Cisco Systems, 2001). While many may question this statement, the importance of a properly planned, provisioned, and maintained network infrastructure to support e-learning must be underscored. Network readiness factors to be considered include the response time for users, the ability to multicast live video feeds, the mechanism for local caching of large content files, and the security privileges tied to sensitive content.

Content application software and tools

Whatever an organization chooses to do with its content (videotape or broadcast it live; animate, simulate, or reuse it; host it or point to it; test on it or report on its use; sell it or tie it to performance results) the right application platform and content tools are

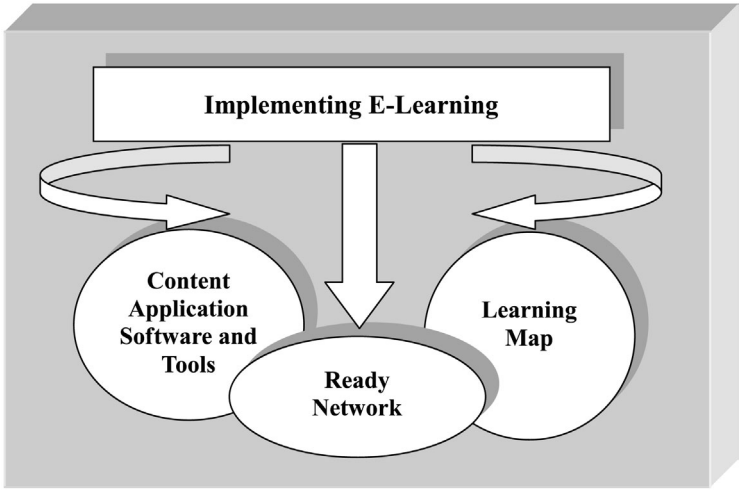
necessary to promote successful e-learning. The types of tools needed include, for example, software to design, develop, and manage online courses, software to develop online quizzes and conduct interactive lessons, content development software, and tools for integrating the various components of e-learning. The Appendix contains references to e-learning software packages and vendors.

Learning map

A learning map links the knowledge goals of the organization to the knowledge acquisition requirements of knowledge workers to meet the organization's knowledge goals. It helps to direct the e-learning process and assess its success. Considerations for creating a learning map to facilitate e-learning implementation include the following:

- Identify the learning goals and objectives of students and link them to the firm's goals for knowledge acquisition.
- Create the structure for the course. The structure for e-learning generally includes chat rooms, bulletin board conferencing, student presentation ideas, timed online quizzes, and e-mail.
- Adapt the information into notations that can be placed online (often the most time consuming or expensive aspect of using e-learning for knowledge management).
- Digitize information material (many software packages or consulting companies provide this service).
- Analyze course content and structure for effectiveness in achieving goals and objectives.
- Provide feedback loops.
- Develop an assessment instrument to determine if the e-learning system produces the intended results with respect to strategic knowledge management requirements. Ahmed *et al.* (1999) and de Gooijer (2000) provide methodologies for measuring the success of knowledge management initiatives that may be adapted to measure the success of e-learning initiatives relative to knowledge management objectives.

Figure 3
Implementation of e-learning



Committing to e-learning: conclusion

The challenges of implementing e-learning mirror those of conducting knowledge management and involve the development of a technical infrastructure, paradigm shifts in organizational behavior, design of a knowledge strategy, and economic investments, to name a few. Despite the challenges involved in creating a successful e-learning environment, it is clear that the benefits of e-learning complement and strengthen other knowledge management activities as recognized by corporations as diverse as Cisco Systems, United Airlines, and Dominos Pizza.

The importance of e-learning may be summarized as this: it incorporates the traditional pedagogy of education with the advantages of technology to capture, disseminate and share knowledge throughout an organization. Knowledge management is considered to be an important, and arguably necessary, tenet of modern day business strategy. The frequency with which knowledge workers change positions and jobs underscores the urgency for organizations to capture and distribute the knowledge of its intellectual assets to better position organizations to survive and thrive. E-learning is a promising means to this end; however, to be effective it requires careful planning. In this paper we have provided a framework for employing e-learning as a tool for knowledge management that addresses important planning and implementation considerations that will help ensure the success of organizations' e-learning initiatives.

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Appendix. E-learning Web sites and software options

Software packages

Commonly used software packages for developing e-learning sites are:

- WebCT (World Wide Web course tools) – aids instructors in the design and development of online courses, as well as, providing management and administrative tools for monitoring and adjusting course content.
- Hot Potatoes (found at Iweb.uvic.ca/hrd/hotpot) – creates web-based quizzes and format outlines.
- *www.quia.com* – Site with templates to develop online interactive lessons.

Content developers

The following is a list of e-learning content developers who ensure that their content applications and development tools can be integrated:

- gForce
- WatchIT
- Saba
- Activate
- Centra

E-learning integrators and consultants

A list of e-learning integrators and consultants includes:

- Cisco Powered Network Service Providers
- Digital Think
- Eduprise, Inc.
- IXL
- Acrosonic

Web sites

The following list of Web sites provide "ready made" business courses or consulting packages for developing e-learning sites for businesses.

- *www.digitalthink.com* – customizes content for *Fortune* 1000 companies.
- *www.saba.com*
- *www.epiclearning.com*
- *www.docent.coom*
- *www.skillsoft.com* – offers content delivery and training options. Provides testing.
- *www.click2learn.com* – offers courseware development and ready-made courses.
- *www.learn2.com*
- *www.hungrymindsuniversity.com*
- *www.knowledgenet.com*
- *www.headlight.com* – offers 3,000 online training classes for small- to medium-sized businesses.
- *www.EduPoint.com* – database of academic and business-related courses tied to accredited universities.
- *www.educateu.com* – classes for individuals and small businesses. A virtual university.
- *www.smartforce.com* – provides development and infrastructure support for online learning.
- *www.thinq.com*