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Computer Augmented Learning: The Basis of Sustained Knowledge Management

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Abstract

The term "learning organization" (Senge 1990) has come into wide use. Watkin (1996) reported that 300 organizations professed to be learning organizations, although many were not. Now the Knowledge Management movement has superseded the learning organization fad. In abandoning the learning organization, the fundamental importance of learning may also have been given short shrift. The purpose of this paper is to reinforce learning's preeminent role in the building and sustaining of the knowledge management philosophy. The emphasis should be on the process that enhances knowledge: the capacity for effective action. New computer augmented learning applications can enhance the individual's knowledge that leads to effective task performance. The technology embodied in user interfaces, computer memory, and data bases (or knowledge bases) has evolved so that it is now capable of doing what Doug Englebart (1963) envisioned with his term "intellectual augmentation."

New learning applications have been developed that have a critical and basic role in the achievement of knowledge management. Several examples of applications in widespread use are provided as evidence of the maturity of computer augmented learning systems. Many leading firms are employing systems that are aimed at capture of critical knowledge, placing it in knowledge bases, and facilitating access for those in the organization who need to learn from that knowledge. A review of some of these knowledge management developments underway and in research underscores the importance of this foundational approach.

Keywords: Computer augmented learning, knowledge management, intellectual capital management, knowledge acquisition, knowledge base

ISRL Categories: GA, HA04, AL04, AA06, ACO303

Introduction

Over the past decade there has been an awakening of awareness that the organization needs to properly manage its intellectual capital or more commonly termed knowledge. The movement has gained momentum from the managerial fad that was labeled as the learning organization following the publication of Senge's book, *The Fifth Discipline* in 1990. The upswelling interest in knowledge management may be viewed as an extension of the learning organization concepts by some. Savage (1996) states that the accelerating pace of change signals the shift from the Industrial Era to the Knowledge Era where the primary source of wealth creation is human imagination. Regardless of the source, the idea has taken hold and there are increasing conferences, workshops, dialogs, etc. to promote knowledge management. The requirement goes far beyond building a knowledgebase with some means of access (See Vogel,1996). To

sustain the knowledge management efforts, the systems implemented need to support not only just-in-time learning, but long-term learning that continuously builds individual competency. To achieve computer augmented intellect, the applications must be firmly grounded in learning theory, individualized, and provide supplemental memory. Leading organizations are now building new data bases to hold this supplemental memory. The access to relevant knowledge will soon present significant challenges as the data bases are growing exponentially.

Our contention is that knowledge management is vitally important to the organization,, but that it all begins with individual learning. Without a focus on individual learning, the organization can not hope to sustain any competitive advantage from knowledge management efforts. This means that simply implementing a Notes-based best practices repository falls short of true knowledge management.

Knowledge Management

Davenport (1996) has attempted to differentiate among the terms knowledge management, organizational learning, and intellectual capital. He finds distinctions in the types and titles of people in the senior knowledge role. The title of Chief Knowledge Officer is likely to be used where there is capture and leverage of structured knowledge, using information technology as the enabler. The Chief Learning Officer is likely to be focused on training and education and involve the human resources function more than information systems. The third title that includes "intellectual capital" is seen to be a hybrid of the previous two, with an emphasis on converting knowledge into revenues and profits. While the distinctions may not be verifiable, they appear to have some utility for initial differentiation as the entire field gathers momentum.

Knowledge is a term that most of us think we understand, however, this seemingly simple term is the topic of a great deal of debate and discussion. This debate is a clear indication that we still have a long way to go in developing sound theory about knowledge and its components. One example of the difficulty in arriving at an operational definition is the multiple postings to the ISWORLD Web site in early 1997 attempting to wrestle the definitions of Data, Information, and Knowledge into some consensus (see, e.g., Mahling@LIS.PITT.EDU, 26 FEB. 1997; Kyrst, jkryt@ACS.RYERSON.CA, 26 FEB. 1997). The debate will continue for some time to come, however we need to move forward with a tentative definition of knowledge. We can define knowledge as the capacity and competency to perform. According to Manville and Foote (1996), knowledge management implies that there is a systematic process for assembling and controlling organizational knowledge as a resource. It is useful to adopt the belief that there are different types of organizational knowledge such as the multiple epistemology of Spender (1993).

The idea of explicit and implicit or tacit knowledge is widely accepted and is has utility in our discussion. Explicit knowledge is that held in the conscious of the individual and is relatively easy to communicate and capture. On the other hand, tacit knowledge is closely held by the experienced individual and remains in the unconscious. One can postulate that it is the vast reservoir of tacit knowledge that an expert can bring to consciousness in a situation of need that makes him/her an expert. So, simply put, a major task of knowledge management is the requirement to provide access to explicit and tacit knowledge that exists in the organization. Of course, the need is to be able to elicit and formalize the tacit knowledge of the experts so that the knowledge can be made available to those who need it in the organization. The ability to capture and store the tacit knowledge of experts and make it available to individuals on an as needed basis is at the core of computer augmented learning.

Computer Augmented Learning

The logic behind the contention that knowledge management efforts are not sustainable unless the organization implements a means to enhance individual learning is relatively simple. First, the individuals in an organization must learn in order to possess the requisite knowledge to perform tasks. We can assert that this is the *sine qua non* of knowledge management. Unless the individuals are able to learn performance related tasks, there can be no effective collective performance. Without collective

performance, in teams, for example, there can be no organizational unit performance that translates ultimately into organizational effectiveness.

In recent years there have been significant advances in computer technologies that make the idea of computer augmented learning the cornerstone of knowledge management. For example, the improved computer interfaces, ready availability of high capacity data storage, improved access algorithms, advances in knowledge engineering approaches, and computer aided systems engineering have provided the required infrastructure to allow viable, cost-effective computer augmented learning to be a possibility. The advent of Electronic Performance Support Systems (EPSS) underscores this achievement (See Gery, 1991 for a description of EPSS). In the most advanced EPSS applications, the user becomes a learner. The learner actually learns by doing a useful task with the on-call availability of an expert. The expert's tacit knowledge has been captured and placed in the application such that the learner has on-demand consultation and coaching by the system.

One firm has demonstrated the capability to deliver such products and the products are now in daily use around the world. Formerly, conventional wisdom held that the only way to elicit tacit knowledge was in a face-to-face dialog with an expert (See Gorey and Dohat, 1996 for a discussion of explicit and tacit knowledge from an organizational perspective). Now, with the new tools, the expert knowledge can be elicited and formalized in a software program and made available to learners across the organization. The computer is thus capable of augmenting the intellect of the learner. Such a system requires that the knowledge be accessible, understandable, and storable by the learner. The individual has access to captured organizational knowledge that is placed in the software itself. Each use of the system builds the individual's data base automatically through its embedded intelligence. Thus, the individual builds a history of use, decisions made, and the database is portable. The approach here is in contrast to the efforts to build a data warehouse of "best practices." Rather than a sophisticated reference library, these systems are and should be focused on performance. Through the widespread use and sharing of such learning resources, the organization can build a learning infrastructure that can sustain its knowledge management efforts.

Achieving Sustainable Knowledge Management

We have evidence that learning support systems are the basis for individual performance. This leads to collective performance by teams, and ultimately to organizational performance. Some of these systems have been deployed and are in daily use in over 4,000 organizations worldwide. There are several case examples that provide evidence of the efficacy of these systems. Our current research is aimed at perfecting and testing the computer aided software development environment that will enable the knowledge engineer to elicit and formalize an expert's tacit knowledge and generate the learning applications. The individual's knowledge base can be continuously up-dated and can be taken to any part of the organization making it a part of the continuous learning process.

Conclusions

Individual learning is the foundation upon which the concept of knowledge management must ultimately rest. New tools are appearing that promise to deliver computer augmentation to human intellect. Leading firms around the world are starting to implement this sort of learning support system as an integral part of their knowledge management efforts.

The new learning tools provide the mechanism for building truly sustainable knowledge management systems by increasing the learning rate and decreasing the knowledge decay and loss to the firm. Capture, storage, and providing access to an organization's knowledge presents a major challenge, but the individual learning resources are available now. Computer augmented intellect systems can provide the basis for long-term organizational effectiveness of firms that wish to institutionalize knowledge management.

Bibliography

- Amidon, D.M. *The Ken Awakening: Management Strategies for Knowledge Innovation*, Boston: Butterworth-Heinemann, 1997.
- Davenport, T. "Knowledge Roles: The CKO and Beyond," *CIO* (9:12), April 1, 1996, pp. 24,26.
- Drucker, P. "The Information Executives Truly Need," *Harvard Business Review*, January-February, 1995.
- Englebart, D. "A Conceptual Framework for the Augmentation of Man's Intellect," In Howerton, P. Ed., *Vistas in Information Handling*, 1963.
- Gery, G. *Electronic Performance Support Systems: How and Why to Remake the Workplace Through the Strategic Application of Technology*, Boston: Weingarten Publications, 1991.
- Gorey, R.M. and Dobat, D.R. "Managing in the Knowledge Era," *The Systems Thinker*, (7:8), October 1996, pp. 1-5.
- Koch, C and Fabris, P. "Fail Safe," *CIO* (9:5), December 1, 1995, pp. 32-36.
- Kryt, J. "Re: Data, Information and Knowledge," posted to ISWORLD@LISTSERV.HEA.IE, 26 Feb. 1997.
- Mahling, D. "Knowledge Data," posted to ISWORLD@LISTSERV.HEA.IE, 26 Feb. 1997.
- Manville, B. and Foote, N. "Harvest Your Workers' Knowledge," *Datamation*, (42:13), July 1996, pp. 78-83.
- Savage, C. *Fifth Generation Management: Co-creating through Virtual Enterprising, Dynamic Teaming, and Knowledge Networking*, Boston: Butterworth-Heinemann, 1996.
- Senge, P. *The Fifth Discipline: The Art and Practice of the Learning Organization*, Doubleday/Century Business, 1990.
- Spender, J.-C. "Competitive Advantage from Tacit Knowledge? Unpacking the Concept and its Strategic Implications," *Academy of Management Best Paper Proceedings*, 1993, pp. 37-41.
- Stewart, T.A. "Brainpower: Who Owns IT...How They Profit From It," *Fortune*, (135:5), March 17, 1997, pp.104-110.
- Tsoukas, H. "The Firm as a Distributed Knowledge System: A Constructionist Approach," *Strategic Management Journal*, (17: Special Issue), December 1996, pp. 11-25.
- Vogel, P. "Know Your Business: Build a Knowledgebase," *Datamation* (42:13) pp. 84-87.
- Watkin, E. "Learning is More Than a Label," *Beyond Computing* (5:6) July/August 1996, pp. 54-55.