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Creating a Knowledge Centric Information Technology Environment

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Abstract

Knowledge is a combination of information, contexts, and experiences. Information Technology organizations will become knowledge centric. They will fundamentally change from eliminating problems to acquiring knowledge. Problem solving processes, decision making processes, and communication processes will change to promote knowledge transfer and acquisition. Technology will be implemented to create and maintain the knowledge base repository. An Intranet and Web software can be the base for this technology. Rewards include the implementation of an ongoing knowledge base repository, more effective decision making, addressing the right problems, a rich source of knowledge that can be applied to work, and the possibility of greater and faster individual growth.

Creating a Knowledge Centric Information Technology Environment

Information technology (IT) organizations have a great resource in the knowledge the individuals in the organization possess. In order to effectively tap and maintain this knowledge, however, the organization needs to become a knowledge centric organization. The rationale, vision, and method for doing this are presented here. The first section contains a description of what knowledge is

and what the issues are in transferring knowledge from one person to another. The impact of not being knowledge centric in the IT environment is illustrated. In the second section, a vision of an IT environment that is knowledge centric is presented. This vision includes the driving requirements for a knowledge transfer support structure. Developing a vision can be an exciting activity. The vision, however, only becomes useful if it can be pursued. The third section contains a description of how the vision might be implemented. This section includes a description of the technology that could be used to implement the knowledge transfer support structure. The last section contains a discussion of the impact a knowledge centric approach may have on the people who use it.

Understanding the Impact of Transferring Knowledge

The Knowledge Age

Modern technology has made it possible for the average person to obtain information on almost any topic. Corporations are awash in information. The Internet, in particular, has exponentially increased the availability of information. This easy access to information has generated the common belief that society is now in the Information Age. Volumes of data are being transmitted daily creating an information overload. This phenomenon has been discussed at length. However, there has been much less discussion regarding the substance and practical use of the information (Stehr, 1994).

When information is used by a person and placed in that person's frame of reference, the information is transformed into knowledge. This knowledge becomes the product for many corporations. The worth of a corporation is increasingly harbored in their knowledge base (Stehr, 1994). Society is in a fast transition from the Information Age to the Knowledge Age. The structure of the economy is changing to be based more on knowledge and less on physical products (Stehr).

Knowledge Defined

The lowest level of known facts is data. Data has no intrinsic meaning. It must be sorted, grouped, analyzed, and interpreted. When data is processed in this manner, it becomes information. Information has a substance and a purpose. However, information does not have meaning. When information is combined with context and experience, it becomes knowledge.

Knowledge is the combination of information, context, and experience. Context is an individual's framework for viewing life. This includes influences like social values, religion, heritage, and gender. Experience is previously acquired knowledge. When knowledge is transferred from one person to another, the knowledge is drawn into the receiver's context and experience (Bohm, 1994; Gick & Holyoak, 1987). The new knowledge is interpreted according to the receiver's

context and experience. If the receiver does not have an appropriate background for interpreting the new knowledge, the new knowledge will not be interpreted correctly and the knowledge will have little or no value. For example, if a student does not have experience interpreting text, the student will not be able to learn from books (Brooks & Dansereau, 1987). At the same time, if the sender uses a poor symbolic representation of the knowledge, the receiver will be misled or may even be unable to understand the new knowledge (Mezirow, 1991).

Knowledge has several characteristics that affect the use of that knowledge. Knowledge does not rely on access to the original information. A symbol can be created to represent the original information (Stehr, 1994). This means the knowledge can be transferred from one person to another without having to transfer all of the information.

A Knowledge Centric Approach in the IT Environment

A knowledge centric approach in the IT environment would be characterized by a conscious effort to transfer knowledge rather than transferring information. To transfer knowledge, the receiver's context and experience must be taken into account. The intended result is information is transferred in context instead of with no context. If the sender uses a knowledge centric approach, the receiver's knowledge base, values, and feelings will be taken into account. The receiver's knowledge base, values, and feelings determine how the information being received will be integrated into the receiver's knowledge base (Mezirow, 1991).

A knowledge centric approach requires a blurring of the roles of sender and receiver. Each party must be aware of the other's context and experience. The transfer of knowledge becomes a participatory event where both parties will add to their knowledge base (Stehr, 1994). The result will be knowledge that is more than the knowledge that was to be transferred.

In addition, the scope of the knowledge being transferred will need to be broadened to include the context in which the knowledge is placed at the group or organization level. In order for the knowledge to have meaning, the events that produced the knowledge must be understood as a whole (Mezirow, 1991).

In order to promote knowledge transfer within the group or organization, an effort to build a common context needs to be pursued. This would include ensuring the group or organization shares common organizational values, shares a common view of the organization's goals, and shares a common knowledge base. This could be expanded to include promoting common communication and decision making techniques. People act the way they think (Bohm, 1994). The more similar group members' thinking is, the more similar their contexts will be.

Problems With Current Approaches in the IT Environment

The typical environment in an IT organization supports the transfer of information, but does not consciously support the transfer of knowledge. Problems are addressed and decisions are made with little or no exploration of the organizational context of the problem, the personal context of each person addressing the problem, or the experience of each person addressing the problem. This leaves the problem solving participants relying on knowledge gained from their personal experience as the main framework for solving the problem. Inappropriate use of metaphors, theories, and heuristics results in errors in reasoning (Mezirow, 1991). If the participants consider the context of the problem and their experience along with available information, a more appropriate solution may be found.

The problems and issues IT professionals face today are ambiguous and multifaceted. There are usually anywhere from several to an infinite number of possible solutions. The problems presented do not necessarily have specific criteria for determining if a chosen solution is appropriate (Brooks & Dansereau, 1987). In order to deal with this situation, problem solvers use past experiences to help them decide what is important now (Mezirow, 1991). This, however, does not take into account the context or experience of the person who created the information that constitutes the current problem. The result is the problem now exists in a different context with a different set of experiences being applied to it. The result can be misidentification of the true problem or a solution that would be deemed inappropriate if the original context were known.

A common technique for addressing problems is to divide the problem into smaller pieces. This makes the pieces easier to address, but the combined solution may not solve the overall problem. This type of thinking breaks up ideas that should not be broken up (Bohm, 1994). In order for this technique to be used, the participants must accept assumptions that are made about the problem. This creates two problems: a) an unintentional result is produced that is the result of hidden intentions that were not explored, b) questions are not asked because things are accepted the way they seem to be (Bohm).

Information transfer in the IT organization is often a formal procedure. A class, a presentation, an email message, or another communication vehicle may be used to accomplish the information transfer. Informal transfers tend to be overlooked (Farhad, 1993). Yet, this is where knowledge transfer typically takes place. It is in the informal, day to day contact that organizational context, group context, and group experience are transferred to other people.

The Benefits of a Knowledge Centric Approach in the IT Environment

An IT environment that encompasses a knowledge centric approach will have an emphasis on knowledge transfer rather than problem solving. It is understood

that problems will be solved within the knowledge transfer activity. The difference is the emphasis and the approach. This approach produces several benefits. People interpret what they are learning within the framework of their experience. Yet, the purpose of communication is to reach an understanding (Mezirow, 1991). A knowledge centric approach encourages the participants to share their contexts and experiences. Their own experience is broadened by this sharing and the possibility of reaching mutual understanding is increased. This sharing also provides the opportunity for participants to examine their own thoughts. If they do not examine their own thoughts, they will not see the source of any decision they make (Bohm, 1994). If the source is not identified, it cannot be questioned. Sharing experiences may also uncover different views of the same information. Different expertise may produce successful application of knowledge even though there are differences in how the knowledge is interpreted and included in a particular person's knowledge base (Gick & Holyoak, 1987).

The major benefit of the knowledge centric approach, however, is the increase in corporate assets that can be produced. Unlike information that becomes obsolete almost as soon as it is produced, knowledge can be used repeatedly at little or no cost. Knowledge can be incrementally expanded with each use. There is no limit to the growth of knowledge (Stehr, 1994). It is through the knowledge centric approach that breakthroughs in IT thinking and processes will be achieved.

A Visionary Transfer of Knowledge Support Structure

To support the knowledge centric approach in the IT environment, a system needs to be implemented that will integrate knowledge transfer into everyday activities. The system needs to encourage use without being intrusive. The system needs to be flexible. As the system is used, the system will constantly change and evolve (Bohm, 1994).

The system needs to allow for different kinds of information and different contexts in which to view the information. The information in the system is a symbolic representation of the original data. Since these symbols can be ambiguous if taken out of context, the context for the information must be provided (Bohm, 1994). The information contexts need to parallel the contexts and experiences of the users of the system. Knowledge can only be transferred from one person to another if the user's context is structurally similar to the information's context (Gick & Holyoak, 1987).

The system must allow for the extension of previous knowledge. This is where the real power of the knowledge centric approach is implemented. The extension of previous knowledge can lead to new insights and new uses for the knowledge on an individual and group basis (Stehr, 1994). There is no limit to how far

knowledge can be extended. It can be incrementally added to indefinitely (Bohm, 1994).

The system must allow for the declaration of the context of the original knowledge, as well as the context for each increment. If learning depends on what has already been experienced (Mezirow, 1991), the system must capture the experience of the person who created the knowledge; Otherwise, the person using the knowledge will put the information into a context based on their own experience rather than the experience of the creator. The context of the original knowledge needs to include relevant thoughts, feelings, and values (Bohm, 1994).

The system needs to help the user differentiate between: a) what is or has-to-be and b.) what may-be or may-have-to-be. The system also needs to allow the user to question what has been previously declared as has-to-be (Bohm, 1994).

Although the system needs to be knowledge centric, the system still needs to support problem solving. IT professionals are rewarded for producing solutions to problems (Bohm, 1994). This reward system will not easily change. However, the system needs to help its users make better decisions based on knowledge and help its users understand the mistakes that have been made that created a particular problem.

The system needs to be easily accessible in the IT environment. This close proximity to the workplace enhances knowledge transfer (Farhad, 1993).

Making the Transfer of Knowledge Support Structure Possible

To integrate knowledge transfer into everyday activities, the support structure needs an organizational component, a process component, and a technology component. The organizational component includes the implementation of adjustments to management philosophy, group member interaction, and individual responsibilities. The process component includes changes to problem solving processes, decision making processes, and communication processes. The technology component requires the implementation of the technology that will become the knowledge base repository as well as any other required support technology.

The Organizational Component

In the organizational component, management philosophy needs to be adjusted to make knowledge acquisition a primary goal. Problem solving and decision making are still primary goals. But, the focus of activity needs to change to an accumulation focus rather than an elimination focus. If knowledge acquisition is a primary goal, then the goal is to accumulate knowledge and add to the knowledge base. The purpose of most problem solving and decision making

activities is to eliminate a problem or eliminate a roadblock that is preventing progress. This is an elimination focus. If knowledge acquisition, problem solving, and decision making are all primary goals, the focus becomes an acquisition focus. Within the problem solving and decision making activities, information is gathered and knowledge is generated. If this new knowledge is included in the knowledge base, the problem has been eliminated or the decision has been made, but the overall result is the acquisition of knowledge. This adjustment in primary goals must be reinforced with an appropriate change in the reward structure. To achieve effective and prolonged knowledge transfer, knowledge acquisition and transfer must be rewarded (Farhad, 1993).

Group member interaction must be adjusted to include consideration of the contexts and experiences of the group members. Being able to transfer knowledge depends on information being placed in the same or a similar context as the information goes from the sender to the receiver. In order for this to happen, the contexts and experiences of the sender and receiver must be known. Group members must be willing to share their contexts and experiences that relate to or influence the knowledge being transferred or developed. When acquiring knowledge, group members must also be willing to consider the contexts and experiences that influenced the creation of existing knowledge. Considering the original and influencing contexts and experiences allows the validity of assertions to be tested (Mezirow, 1991). In the ideal environment, all group members will share a common group context and group experiences.

Individuals may need to adopt new responsibilities. A greater emphasis needs to be placed on critical thinking and reasoning skills to supplement the communication and technological skills they already have (Schmidt & Kirby, 1995). Especially when the knowledge being transferred involves a skill, the individual needs to consider what knowledge they have that will help them learn the new skill. Skills transfer is more successful when the individual's existing knowledge helps them transfer the information they are receiving into a skill (Brooks & Dansereau, 1987).

Management, group members, and individuals need to recognize that knowledge transfer and reinforcement of the transfer take place primarily in the workplace; not in a structured training setting. Often the training setting is blamed for the lack of transfer, when the problem relates more to the actual workplace (Farhad, 1993). Everyone involved needs to understand and personally support informal knowledge transfer.

The Process Component

The process component includes changes to problem solving processes, decision making processes, and communication processes. The technology component requires the implementation of the technology that will become the knowledge base repository as well as any other required support technology.

The processes used for problem solving and decision making need to change to incorporate contexts and experiences. When engaged in problem solving, the result will be better identification of the problem and a better solution. When making decisions, the result will be a more rational decision. The problem solving and decision making processes need to include the identification of new knowledge and ensure that knowledge gets included in the knowledge base.

The communication processes need to be open, consensus building, sharing processes. This will assist in the sharing of contexts and experiences, temper personal convictions that may prevent knowledge acquisition, and support effective knowledge transfer.

The Technology Component

The knowledge base repository needs to be a multi-user information retrieval system. Information retrieval systems include text retrieval systems, data base management systems, electronic card file software, hypertext systems, and expert systems (Bawden & Blakeman, 1990). The repository needs to allow easy retrieval, easy updating, and the ability to include any kind of input including word processing documents, graphics, spreadsheets, pictures, diagrams, and program code. Consideration needs to be given to the differences between retrieving information and updating information when the system is designed.

The repository needs to be built on technology that can change as the system is used and new technology becomes available. Technology changes rapidly and is difficult to track. The system designers need to be farsighted and look at longer term trends (Garrett, 1995). Once the system is implemented, ongoing monitoring, auditing, and evaluation will be required (Bawden & Blakeman, 1990).

Consideration should also be given to making the system similar to tasks that need to be completed. For example, if the knowledge being transferred involves project management, a project management type tool should be used to present the knowledge. Creating this similarity will make the knowledge transfer more successful (Gick & Holyoak, 1987).

Implementing this support system requires a flexible and manageable system that can accommodate various inputs, produce various outputs, accommodate different contexts and experiences, and be easily adjusted and upgraded. This is all achievable using an Intranet and current Web based software. A Web browser provides a common user interface that can access many different information retrieval systems and types of input including all of those listed above. Web pages are easily developed using Web development tools. Individuals can develop their own Web pages to document their contexts and experiences. News group software can provide and capture the communication required to provide incremental knowledge acquisition. And, Web technology is keeping pace or

surpassing other new technologies. It is anticipated that as individuals want to use new information retrieval systems or include new input, Web technology will be able to handle these changes.

The Effect the Knowledge Centric Approach Will Have

Implementing the knowledge centric approach will take commitment and time. However, the rewards to the corporation, the IT organization, groups within the organization, and individuals are many.

The corporation's reward is the implementation of an ongoing knowledge base repository and more valuable employees. Knowledge gained will no longer leave when a person is reassigned, transfers to a new position, or leaves the company. Individuals will have a personal knowledge base that incorporates the contexts and experiences of the corporation as well as of other individuals. Better decisions, better solutions, and incremental knowledge acquisition will result.

The IT organization's reward is similar to the corporation's, but has an IT organization focus. An additional reward is a system will be in place that will help outsourcers and contractors quickly get up to speed on the context within which they should be working.

Groups within the organization will be rewarded with more effective decision making, being confident the right problems are being addressed, and a rich source of knowledge that can be applied to their work.

The individual's reward is to work in an environment that promotes knowledge acquisition both for the individual and the corporation. This could result in far greater, far faster career and individual growth than that achievable in an environment that is not knowledge centric. Although a knowledge centric environment promotes knowledge acquisition for the good of the corporation, the reality is the individual is the pivotal component in this environment (Farhad, 1993).

Conclusion

Knowledge is a combination of information, contexts, and experiences. As IT organizations come to understand the value of knowledge, a knowledge centric approach needs to be adopted. This approach requires a support structure that will support the transfer of knowledge between individuals, support the acquisition of new knowledge, and support the incremental growth of knowledge. The IT organization will change to be a knowledge centric organization. A fundamental shift will occur from being an eliminator, eliminating problems and roadblocks, to being an acquirer, acquiring new knowledge.

Becoming a knowledge centric organization will require organizational changes, process changes, and the use of technology. Management philosophy, group member interaction, and individual responsibilities will need to be adjusted. Problem solving processes, decision making processes, and communication processes will need to be changed to promote knowledge transfer and acquisition. Technology will need to be implemented to create and maintain the knowledge base repository. An Intranet and Web software can be used as the basis for this technology.

The rewards to the corporation, the IT organization, groups within the organization, and individuals are many. Rewards include the implementation of an ongoing knowledge base repository, more effective decision making, being confident the right problems are being addressed, a rich source of knowledge that can be applied to work, and the possibility of far greater, far faster career and individual growth.

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