Capturing Organizational Memory

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Abstract

Contemporary organizations have only a weak ability to remember and learn from the past, and are thus seeking to gain the capacity for "organizational memory." Networked computers might provide the basis for a "nervous system" that could be used to implement the capacity for organizational memory, but the technology (software and hardware) must provide for easy capture, easy recall, and learning. Moreover, for an organization to augment its memory it must shift from the currently pervasive document- and artifact-oriented paradigm (or culture) to one that embraces *process* as well. This process-oriented paradigm requires a new kind of computer system which integrates three technologies: **hypertext**, **groupware**, and a **rhetorical method**. Groupware allows the organizational record to be built in the course of everyday communication and coordination. Hypertext provides the ability to organize and display this rich informational web. And a rhetorical method, such as IBIS, structures the memory according to content, not chronology. In addition to the computer technology, a **shift in organizational culture** toward an appreciation of process is required to implement organizational memory.

1 What is organizational memory?

By "organizational memory" I mean the record of an organization that is embodied in a set of documents and artifacts. Note that collective memory (i.e. the pooled memory of individuals) is excluded from this definition. Organizational memory has become a hot topic recently due to the growing recognition that it appears to be so thoroughly lacking in contemporary organizations. (As M. Graham as pointed out in Graham 1991, organizations in the first half of this century were not so amnesic.) The problem is not a scarcity of documents and artifacts for the organizational memory, but rather the quality, content, and organization of this material. For example, an effective organizational memory would be able to answer such often asked questions as "Why did we do this?" and "How did such and such come to be the case?" Rarely is this possible now.

Organizational memory is perhaps most clearly missing in industries where large numbers of people engage in the design and construction of large, complex systems over long periods of time, such as defense, aerospace, utilities, pharmaceuticals, and telecommunications. Engineering organizations in these industries have serious limitations in transferring previous learning to current problems. The design rationale of large, complex systems is thoroughly and systematically lost. Such phrases as "reinventing the

From D. Coleman (Ed.), *Groupware '92*, pp. 133-137. Morgan Kaufmann Publishers.

wheel", "going in circles", "having the same discussion over and over," often heard in large engineering organizations, point to a striking phenomenon: while organizations don't seem to learn or remember very well, this limitation was, until recently, regarded as normal and inevitable.

2 Why is organizational memory so poor?

It is thus highly desirable to increase the capacity of organizations to remember and to learn. According to our definition, this means capturing more of the "documents and artifacts" of the organization in a way that they can be effectively recalled and reinterpreted. The growth of networked computers for all phases of information work promises to provide the "nervous system" that would support this increased capture and reuse.

However, within the current "artifact-oriented" paradigm (see Figure 1), the only thing we have to capture is that in which we are already drowning: more "data", documents, and artifacts. These are not what is missing from organizational memory -- what is missing is the *context* (i.e. the sense or rationale) that lay behind these documents when they were created. In short, organizations fail to capture any record of the *process* behind the artifacts.

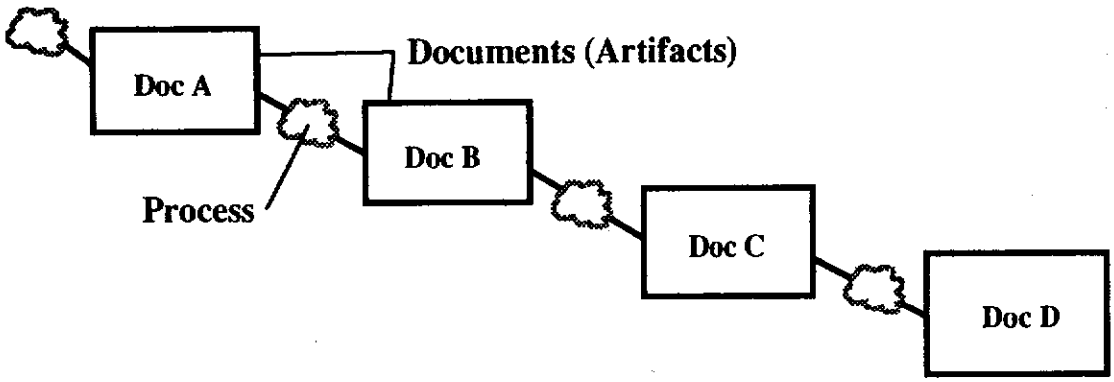

Figure 1: In the artifact-oriented view of work the artifacts (such as diagrams, documents, letters, reports, etc.) are the focus of management attention. Moreover, tools and methods are solely for the production and modification of these artifacts. The process by which this work is done is regarded as secondary.

This is because the current paradigm of work focuses almost solely on the artifacts (or products) of work. For example, in software engineering it is the documents (e.g. requirements, functional specifications, designs, code, etc.) that really count -- the process of creating and revising these artifacts is only recently receiving any attention.

This artifact-oriented paradigm is slowly giving way to a new "process-oriented" paradigm (see Figure 2). Organizations are finding the artifact-oriented way of capturing work to be too impoverished a model to support the complexity of work in the information age. They are turning to a richer, more complete view which embraces the messy (and sometimes chaotic) nature of *process*. No longer ignored are the

assumptions, values, experiences, conversations, and decisions which lead to and constitute the context and background of the artifacts. Still, few tools exist for supporting and capturing these elusive but critical aspects of design and action.

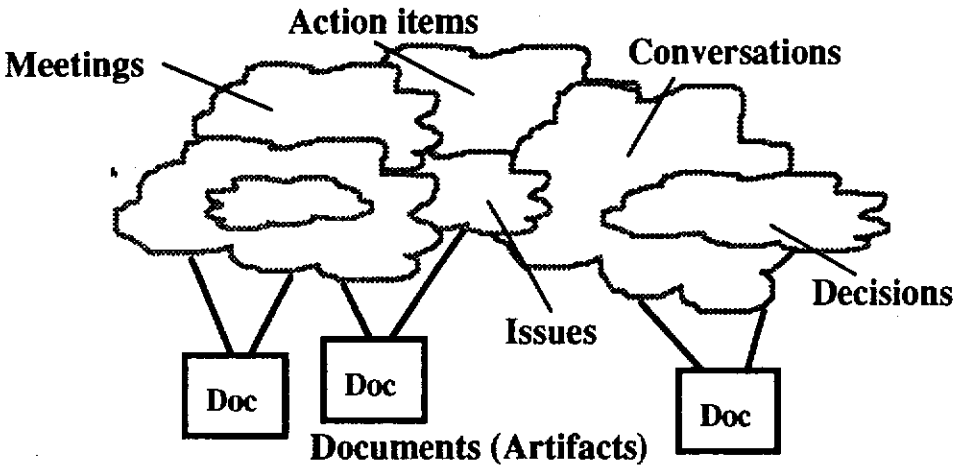

Figure 2: In the process-oriented paradigm there are still artifacts, but they are seen as being no more important than the interactions between *people*.

3 Tools for organizational memory

The most immediate barrier to capturing more of the process of work and making it part of organizational memory is that it seems to present an insurmountable and onerous documentation burden on the people doing the work. *The key to overcoming this perception is to shift the notion of capturing the process data from being an additional documentation burden to "tapping into" the flow of communication that is already happening in an organization. Not surprisingly, this shift is also a shift from an artifact-oriented to a process-oriented perspective.*

For example, one might argue that electronic mail (email) already provides a kind of organizational memory for organizations which use it, and that it does so at no additional documentation cost to the members. While email does indeed have an acceptably low capture cost, it does not provide an effective record because email messages are strictly personal and are stored that way, and because the email record, even for an individual, is so poorly organized and structured that it cannot effectively augment even an individual's memory. So, with email the cost of capture is low, but so is the value of that record for organizational memory.

During 6 years of research on gIBIS (in the MCC Software Technology Program) we learned much about the necessary characteristics of a technology that could provide acceptable capture *and* recall costs for organizational memory (Conklin & Yakemovic 1991). This technology embraces hypertext, groupware (or computer-supported cooperative work), and a rhetorical method. In addition, we learned that computer

technology is not enough -- the organization itself must embrace the technology adoption process as part of a larger shift in the corporate culture.

The first element of the computer technology is **hypertext**, because the nature of the process-oriented approach is essentially non-linear, so the representation for capturing and organizing it must also be that rich. Moreover, as time goes by and the organizational record grows more convoluted and complex, the unlimited flexibility of hypertext as a representational medium is essential for ongoing restructuring and summarization.

The second element is **groupware** -- for the same reason that email is a natural first step toward easy capture of organizational process. An MCC/NCR field study showed clearly that it is critical that the technology of used to capture rationale be as transparent as possible, and that it must closely fit the existing practices and tools of the organization. Groupware by its very nature is not focused on capture, but rather on communication and coordination. The secret to capturing organizational memory, then, is to "tap into" the existing flow of process interactions between the members of the organization, and to crystallize this, ongoingly, into the key elements of the organizational memory. Groupware can provide the medium for organizational dialogues which, because they occur via the computer, create a computable record of semi-structured documents. The ability then exists to manipulate, distribute or share this information and intelligence throughout the organization or team, effectively and ongoingly creating a memory and learning tool.

The third element of the technology for capturing organizational memory is the use of a **rhetorical method**, or conversational model, for structuring the conversations occurring with the technology. The reason for this is twofold. A simple rhetorical method provides a structure for discussion of complex problems which can immediately improve the quality of the dialogue process. The IBIS (Issue-Based Information System) method (Kunz & Rittel 1970) provides this kind of process improvement. Secondly, such a model provides a basis for structuring the conversational record which is not simply chronological (as in an email or bulletin board type system). For example, conversations in the IBIS method are structured according to the *issues* being discussed. This provides a *content-based* indexing structure within which the cumulative record of the organizational process is preserved and organized.

The technology for organizational memory must, at a minimum, incorporate hypertext, groupware, and a rhetorical model. But this computer technology is not sufficient to create an effective organizational memory. While the technology must be very good and the user interface transparent, the ***organization must also shift*** to making capture and use of organizational memory an important and natural practice. This shift towards a process-oriented paradigm and culture requires organizational commitment, and it is the most challenging part of establishing a capacity for memory and learning in an organization.

However, this shift is consistent with the trend already under way in organizations toward quality, customer service, reducing time to market, and all of the other forms of process awareness and improvement. Thus, a new symbiosis is emerging between the human and technological aspects of work: tools for

organizational memory and learning can support and maintain a beneficial culture shift, and the culture shift highlights the value of the new tools and promotes their use.

Corporate Memory Systems, Inc. is now offering CM/1, which combines software and consulting technologies based on our MCC gIBIS experience. CM/1 is a groupware system developed to support organizational learning, better decision making, and collaborative work group productivity.

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