8-15-1997

Issues in the Design of Organizational Memory Systems

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Abstract

Organizations generally make use of two kinds of knowledge: formal and informal. The two can be distinguished based on the extent of documentation. Formal knowledge is usually contained in books and manuals. On the other hand, informal knowledge could include assumptions, ideas, and viewpoints. From an organizational perspective, it also includes the culture, the shared beliefs, the core values, and very often past experiences or contexts in which decisions were made. Examples of informal knowledge can be seen in answering questions like: "Why did we do it that way?" "What happened the last time we tried this approach?" "Who would I go to solve this problem?" "How are things done around here?" and so on. The label of organizational memory collectively describes both formal and informal knowledge primitives. Stein and Zwass (1995) define organizational memory as "the means by which knowledge from the past is brought to bear on present activities, thus resulting in higher or lower levels of organizational effectiveness". Those systems that have been designed to store such a type of memory are being referred to as organizational memory systems (OMS).

The informal part of organizational memory, if captured and used can be a tremendous organizational asset. Jennex (1996) suggests that users of OMS "will have higher precision and recall rates than those who use only their own memories and paper documents". While there is no evidence yet of the above, it is clear that there is potential for such systems. OMS can enable a group to share a common schema or conceptualization attained by prior experiences with a new individual. Given the problem of personnel turnover, the OMS may be particularly useful in creating a virtual reality based training system for new employees. This problem could be acute in knowledge intensive firms (such as auditing firms) which have a large percentage of knowledge workers or specialists (Starbuck, 1992). Designing a useful and accurate organizational memory system however requires a better understanding of the dynamics of the formation, evolution, stabilization, and dissipation of organizational memory. A significant barrier to the successful creation and use of OMS might be that there is no clear estimate of how long the development effort might take. With no clear short-term benefits in sight, organizations are less inclined to expend valuable organizational resources. In addition to such a lack of commitment, there are also difficulties in the acquisition of such knowledge. While informal knowledge exists everywhere, it is by no means easily accessible. The difficulty in capturing informal knowledge may partially stem from evidence that such knowledge primitives frequently reside in hard to capture procedural memory (Cohen and Bacdayan, 1994). Unlike declarative memory, which stores facts and propositions, procedural memory stores processes and actions. Organizational learning which is the product of individual (or employee) learning results in individual procedural memories developing in the form of chunks. Successful usage reinforces the chunked rules. This is similar to the chunking of production rule knowledge described in the SOAR model of cognition (Laird et al., 1983). However the problem with capturing chunked organizational rules is that some of the individual rules which form it may have decayed or may not be applicable in the current context. Thus, it is not just important to capture the memory but also to evolve and update it. Prior organizational experience when applied in the right context can be useful but if applied in inappropriate context will risk failure. Since organizational memory can reflect conflicts between organizational sub units (Levitt and March, 1988), the OMS would then also have to have a conflict resolution mechanism to decide which rules can be dissipated. If not, the organization must then have a conflict resolution policy. While some informal knowledge, such as that pertaining to culture, is public to the organization, there are other informal primitives that might be private or restricted to the scope of the individual or the group. Notwithstanding the problem of acquiring knowledge from an individual, a group can complicate the process because of multiple perspectives. Further, individuals who possess informal knowledge acquired through experience might be unwilling to share it as they might lose a perceived competitive advantage. In other words, there might be resistance due to the perceived fear of a shift in power status, and this could impede the transfer of informal knowledge. Beyond the knowledge acquisition process, there is the problem of representation, maintenance, and finally the ability to effectively mine this database of informal knowledge. From a systems integration perspective, there is the issue of how to maintain the interaction

between the more conventional transaction processing and decision support systems to the informal knowledge primitives found in OMS. It also makes sense to associate various data elements with informal knowledge primitives such as the decision-making context in which they were used. Techniques and tools based on social science and artificial intelligence paradigms such as network analysis (Stein, 1992), semantic networks (Chorafas, 1992), and ethnographs (Seidel and Clark, 1984) have been successfully used in the analysis of expert knowledge and appear to hold promise for the acquisition and representation effort in OMS.

The successful design and use of organizational memory systems requires a better understanding of the process by which informal knowledge is created, used, evolved, and then dissipated. There is potential for research in several promising directions. A few are outlined below. First, as mentioned before, informal knowledge can be public or private and could vary in terms of its scope (i.e. individual to group to organization). A taxonomy of the various kinds of knowledge prevalent in organizations would be useful. Second, more research needs to be done to explore the potential of tools such as network analysis as well as some of the tools used in earlier studies in qualitative sociology. Many of these earlier tools can be updated using modern artificial intelligence techniques based on neural networks or genetic algorithms to extract and classify informal knowledge. Third, the form and function of informal knowledge primitives may vary from one domain such as software engineering to other domains such as auditing. This in turn would affect the design and development of the OMS. Fourth, a distributed interface should be designed on corporate Intranets so those organizational actors can effectively mine the OMS. Finally, the OMS should be integrated into the family of other organizational systems for transaction processing and decision support.

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