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A Macro Level Design Approach for Group Memory Information Systems

William Dave Haseman
University of Wisconsin -Milwaukee, daveh@csd.uwm.edu

Souren Paul
University of Wisconsin -Milwaukee, sousou@csd.uwm.edu

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Prof. William Dave Haseman(daveh@csd.uwm.edu)
Souren Paul (sousou@csd.uwm.edu)
School of Business Administration, University of Wisconsin - Milwaukee
P.O. Box : 742, Milwaukee, WI 53201

Abstract

Group memory is an important category of organizational memory. It can be used to support work groups engaged in collaborative decision making activities. This paper presents a macro-level design methodology for group memory information system (GMIS). Various considerations for the design are : *objective of using the group memory, type of group memory, its dominant dimensions and information processing models.* The design approach helps in outlining the information processing logic and the memory information representation mechanism for GMIS.

Introduction and Objectives

Organizational memory is an instance of collective memory which refers to the social process of articulating, exchanging and sharing information so that shared interpretation can be formed [Halbwach, 1950/ 1980]. An important category of organizational memory is group memory which can support work groups engaged in collaborative decision making activities. Group memory is expected to be useful in recurring/repetitive group decision making processes. A shared repository which can store knowledge of group members, retain organizational rules, policies & procedures and incorporate useful data/ information from external environment, is expected to provide significant support in group decision making process. Group memory can be used for [Jessup and Valacich, 1993] :

- Accessing a wide range of information which is internal and external to the group as well as the organization.
- Dynamically capturing, storing and integrating information generated by group interaction and about group process.
- Educating new group members when composition of group changes.
- Providing session continuity support.
- Supporting distributed groups.

Group memory can be implemented with the help of various types of information technology such as database management systems, knowledgebased systems, expert systems, hypermedia, multimedia, and group support systems.

Previous research on the design of organizational memory can be classified into two major categories : *broad, conceptual models* [Stein and Zwass, 1995; El Sawy, Gomes and Gonzalez, 1986; Walsh and Ungson, 1991] and *context specific approaches* [Nunamaker, Dennis and Valacich, 1991; Morrison, 1993; Sandoe, Olfman and Mandviwalla, 1991; Ackerman and Malone, 1990; Eden, 1989; Elofson and Konsynski, 1991]. The broad, conceptual models lack the IS orientation whereas the context specific approaches present diverse IT implementations of organizational memory.

The purpose of this paper is to propose a conceptual framework for group memory information system (GMIS) and its design. It is expected that these approaches can be followed in different applications of group memory.

Theoretical Background

The primary design considerations for group memory information system (GMIS) include:

1. Objective of using the group memory : *Integration of information, formation/monitoring of goals, environmental scanning, pattern maintenance.*
2. Type of group : *Horizontal, vertical.*
3. Dimensions of group : *Chronology, spatial integration, content, mode, accessibility.*
4. Information processing logic : *Availability, biased encoding, biased retrieval, incongruity biased retrieval.*

Common objectives of using group memory can be [Stein and Zwass, 1995] :

1. Integration of Information : This involves sharing of organizational knowledge across space and time.
2. Formation/Monitoring of Goals : This includes activities to identify goals, store information on goals, formulate strategies to achieve goals, monitor goal implementation processes and suggest alternative courses of action (if necessary).
3. Environmental Scanning : This involves activities to identify, acquire, retain and use knowledge about environment. The environment can be internal or external to the group.
4. Pattern Maintenance : The purpose is to preserve knowledge or expertise at individual and/or group level.

Two major types of group memories are : *vertical* and *horizontal* [Konda, Monarch, Sargent and Subrahmanian, 1991]. The *vertical memory* incorporates data and knowledge of any particular profession or function such as, accounting or engineering. The *horizontal memory* includes data and knowledge of multiple disciplines such as, strategic planning. *Horizontal memory* utilizes various languages and representations. Hypermedia, multi-media and cognitive maps can be useful tool for building *horizontal memory.*

Various dimensions of organizational/group memory are [Stein and Zwass, 1995].:

1. Chronology : Contents of the memory relate to *past, present or future* data or information.
2. Spatial Integration : Group memory data/information can be *fragmented or connected* over space.
3. Content : The content of the group memory can be *semantic* (rules and procedures) or *episodic* (events) in nature.
4. Mode : The group memory information can be stored in *procedural or declarative* mode.
5. Accessibility : Components of memory information can be *public* (such as, annual reports) or *restricted* (such as, strategic decisions).

The core functions of GMIS are *acquisition, retention, maintenance, search and retrieval* of information [Walsh and Ungson, 1991]. The design of GMIS involves identification of appropriate type of information processing logic to govern these core functions. Various types of information processing models for memory based judgment have been mentioned in the literature [Hastie and Park, 1986]. These are *availability-biased judgment, biased encoding, biased retrieval, incongruity biased retrieval.* Although these models relate to individual memory, the concept can be extended to the design of the GMIS. According to these models, memory information is first stored in a working memory. Subsequently, either the full or a part of this information is transferred to long term memory. Finally, information is retrieved from long-term memory to make any form of memory-based judgment. In *availability-biased judgment* model the entire set of memory information in long-term memory is available for making judgment. Other information processing models propose that some initial judgment is made on the set of memory information in working memory and the initial judgment biases the subsequent encoding of information (*biased encoding*) or its retrieval (*biased retrieval*) from long-term memory. In *incongruity-based encoding,* the incoming information is evaluated in the context of initial judgment and incongruent or contradictory information is stored in the long-term memory.

Group Memory Information System and Its Design Issues

Group memory information system consists of *group memory management system (GMMS)* and *group shared repository (GSR)*. GMMS controls the core functions of memory such as, *acquisition, maintenance, search and retrieval.* Design of GMMS involves identification of appropriate information processing logic for the core functions of memory. GSR is the storage of group data, knowledge and information. Memory information in GSR can be represented in various forms and stored in various types of repositories such as, database, knowledgebase, hypermedia, multimedia. The primary objective of designing GSR is to identify proper mode of representation so that shared interpretation can be formed by group members about the memory information.

A macro level methodology for designing GMMS and GSR has been shown in Figure 1. The first step in the design is to identify the objective of using the group memory. Based on the objective, appropriate information processing logic, type and dominant dimensions of group memory can be identified. The information processing logic can lead to the design of the GMMS. The type and dominant dimensions can be mapped to have a good understanding about the representation to be used and other design features of GSR.

For example, let us consider a group engaged in forming goals of an organization. Various types of information may be generated during this group process. The group would possibly like to store only those information in the group memory which satisfy the organizational mission and constraints. Alternately, if the group stores all information in the group memory, it would retrieve only those which relate to organizational mission. The information processing logic for organizational goal formation can, therefore, be *biased encoding* or *biased retrieval.*

Organizational goal formation usually involves horizontal groups which consist of members having diverse functional background. Memory information is likely to contain past, present and future data relating to goals; it may be dispersed in different units of the organization and may be accessed by multiple users. The dominant dimensions of the GMIS will be *chronology, spatial integration* and *accessibility.* The combination of the type and dominant dimensions will outline the basic features of the memory information such as:

- The information should be represented in a form which can be understood by group members having diverse background.
- The information should be indexed on time, location and other key words.
- GMIS should have features like concurrency control, security to ensure proper functioning when it is accessed by various members of a group.

Following these design considerations, it is possible to sketch an outline of the GMIS for organizational goal formation activities. A hypermedia based representation of the memory information can be understood by group members having diverse functional background. It can allow indexing of information on time, location and different keywords. Distribution of this information in an intranet framework will allow easy access of group members to this information. whereas unauthorized access from outside the organization will be prohibited.

Conclusions

A broad design approach for group memory information system (GMIS) is discussed in this paper. It integrates various design criteria for group memory and presents a framework which can be used to specify macro level design specifications for *group memory management system (GMMS)* and *group shared repository (GSR).* Next steps of research involve development of a prototype of GMIS and assessing its effectiveness in group decision making situation.

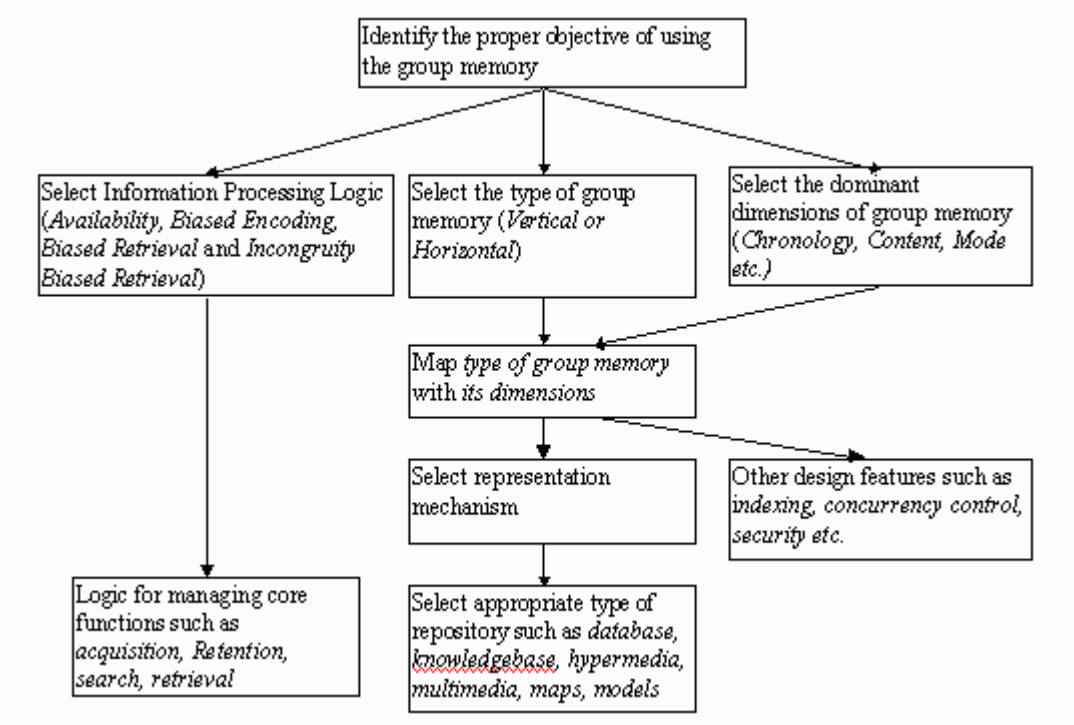

Figure 1 Methodology for Designing Group Memory

References available upon request from authors