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# Design issues for VREs: can richer records of meetings enhance collaboration?

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## **Abstract**

Technologies for collaboration have advanced significantly in the past ten years. Through tools such as the Access Grid (AG), it is now possible to conduct multi-site meetings involving large numbers of participants interacting using high quality and video and sharing data. Virtual Venues within the AG toolkit store data, documents, applications and services which can be accessed across multiple sites. These documents might include records of the meetings themselves. We discuss ways in which such records can be made navigable and re-usable so that collaborators can achieve a shared understanding of meetings' work.

## **Keywords**

Collaboration, usability, Access Grid, meeting memory, media affordances.

## **ACM Classification Keywords**

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous. See [3] for help using the ACM Classification system.

## **Introduction**

'Meetings are where organizations come together. (They) remain the essential mechanism through which organizations create and maintain the practical activity of organizing. They are, in other words, the interaction order of management, the occasioned expression of management-in-action, that very social action through

which institutions produce and reproduce themselves.’  
[1]

The meeting is a pervasive feature of everyday work life and, not surprisingly, there have been numerous attempts to support meeting activity with technology. One of the most important of emergent technologies within the global e-Science community is the Access Grid (AG) [2], an open collaboration and resource management architecture providing many of the capabilities associated with so-called Virtual Research Environments (VREs).

AG is based on the metaphor of persistent virtual spaces. Just as face-to-face collaborations and meetings take place in a physical room, laboratory, lecture theatre, etc., so collaborations between participants who are geographically distributed take place in a virtual venue. A team of researchers collaborating in a laboratory would expect to find there a set of tools available to help their work; so in a virtual venue, as well as video and audio feeds of all participants, there also resides data, applications and services to aid a specific virtual organisation to work together remotely. The philosophy underlying AG is that each group of collaborators has their own virtual venue in which they can store shared objects such as documents and data, together with shared applications, perhaps to aid access to a physical resource.

This paper presents the work of the Memetic project [3] which is developing an Access Grid (AG) collaborative environment for recording a ‘natural history’ of the meeting and the decisions made therein and making these available to participants in a (re)usable manner. The core issue is getting a sense of

what has been achieved in the meeting, how decisions have been made and by whom.

It should be stressed that this is not simply a means of creating electronic minutes from meetings. The aim is to allow users to access the constitutive activities that lead to decisions – the very component that is often left out of minutes. This allows the realization of a shared understanding of the meetings’ work and the capability of mapping dimensions of issues raised therein.

Two modes of interaction visualizations are being investigated: argumentation-based concept maps to elucidate the conceptual structure of the discourse using a particular interactional language; and multiple event timelines generated from the meeting metadata. Participants will be able to navigate the ‘natural history’ of decisions and thereby make them accountable.

Specific research questions can be summarized as follows:

- How far does the technology support naturally occurring interactions: where can it be seen to augment these and where does it just get in the way?
- What is the relationship between naturally occurring references to the technology made by end-users during meetings, and their more ‘official’ accounts when asked by us as researchers (we are helped here because all meeting interactions are recorded)?
- Which parts of the toolkit that the Memetic project is developing will be used, and how will they be deployed?

## Supporting Collaboration

Consider the following scenario:

**Setting up the meeting venue.** A project meeting is convened to review the results of an experiment. The person convening the meeting loads the datasets into the virtual venue and checks that the groupware analysis and visualization tool is working and rendering the data. She arranges a Compendium map with links to the data, three key questions she wants to focus on in the meeting linked to some images which set the context, and two slides for a conference talk that she wants to prepare with the team.

**The meeting.** The team members, who are in different physical locations, arrive at the virtual venue. On logging in they are immediately presented with a customized information environment. All follow the link to the meeting and the convener introduces the agenda on the Compendium map. As the meeting unfolds, the convener adds key ideas and so on as nodes on the Compendium map. Participants work with the shared data visualization tool, and then record decisions in Compendium. One issue has come up before, so they revisit the discussion map from 2 months ago to reconstruct why they had made a decision, and link to this to explain why they are changing their minds.

**After the meeting.** Participants receive an email with a web link to the meeting record (also added to the AG virtual venue), and a summary of the agreed action points. One member who could not attend the meeting is able to log onto the AG virtual venue and to use Meeting Replay to show the point at which a decision was made. The replay rewinds to 20 seconds before the

action item was captured, and allows a view of attendees using the visualization tool as they discuss the data, revisit an old discussion, and then change their minds.

Memetic provides an environment in which these collaborations can take place. Before discussing the usability challenges and how we address these in more detail we want to briefly look at the Memetic toolkit.

## The Memetic Toolkit

The Memetic toolkit is composed of the following elements:

- **Access Grid (AG):** the philosophy underlying AG is that each group of collaborators has their own virtual venue in which they can store shared objects such as documents and data, together with shared applications, perhaps to aid access to a physical resource such as a radio telescope or electron microscope. AG supports the recording of meetings that can be played and stopped as digital video streams. Our task in the Memetic project is to implement and evaluate extensions to this replay by improving the video replay functionality, and indexing it using Compendium and the Meeting Replay tool.
- **Compendium:** a hypermedia software tool for authoring and publishing issue-based Dialogue Maps: concept networks that structure Issues, Ideas and Arguments as 'nodes' in a discussion, linked as required to supporting and background multimedia documents and internet resources. Compendium is best thought of as a knowledge management environment for supporting

personal/group deliberations and memory, combining hypermedia, modeling and mapping skills

- Meeting Replay: integrates the videos, Compendium database and other meeting indices. The key addition to basic videoconference replay which the Meeting Replay tool brings are the interactive event timelines, providing a visual index to get an overview of the video, and navigate around it by clicking on an event. Meetings can be navigated using either an interactive event timeline within the tool or via Compendium 'nodes' (for example in order to see where a decision was made).

### **Usability in Memetic**

As set out above, our central concerns in designing the Memetic toolkit turn on the ways that technology can support naturally occurring interaction and the extent to which it augments these and how far it can be seen to be intrusive. As a toolkit, components of Memetic may be used independently and we are interested to examine how this happens and the reasons users choose to make use of these components.

Our methodological approach takes a twin track: first, workshops with end-users and developers; second, a series of site visits to observe meetings 'in the wild', linked with an ongoing commitment to observe meetings over time via AG and to discuss issues arising from these meetings with developers and end-users. Our approach is predicated on Participatory Design 0 wherein involvement of end-users in the design of technologies and tools has become accepted practice.

The aim is to develop tools in co-operation with those who will use them, and to do so over time.

### **Conclusions and Future Work**

In this paper we have described the toolkit which we are developing and integrating: video of participants and shared presentations, issue-based discussion maps, and event timelines. Each of these has specific affordances for navigating and 'reading' off information about what happened in the meeting which we have described based on our understanding of them from previous case studies. At present, the Meeting Replay tool has a design created in the project that preceded Memetic. In this context, there was only one video source and one shared screen, recorded from a co-located meeting. The Memetic project is now tackling a more complex scenario of multiple video streams, possibly multiple shared screens, in an online setting. Future papers will report the results of the participatory design engagements with end-user, and the results of the deployment and evaluation of the tools in use.

### **Acknowledgements**

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### **References**

- [1] Boden, D. (1994). *The Business of Talk*. Cambridge: Polity.
- [2] <http://www.accessgrid.org>
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