Discourse Support Systems for Deliberative Democracy

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Abstract. The idea of deliberative democracy is to facilitate broad and deep public participation in systematic, constructive discourses about legislation and policy issues, so as to enhance the legitimacy, efficiency, quality, acceptability and accountability of the political process. By *discourse support systems* we mean groupware designed to support structured, goal-directed discourses. The paper discusses the importance of discourse support systems for deliberative democracy, provides a brief overview of the Open Source Zeno system and mentions several e-democracy pilot applications of Zeno, including the DEMOS project of the European Union.

1 Introduction

E-government is about redesigning or *reengineering* the processes of government, taking into consideration the opportunities and risks of modern information and communications technology (ICT). *E-democracy* is a special case of e-government: using ICT to support the core political processes of government, sometimes called *governance*: policy debates, legislation, executive decisions, the resolution of legal and political conflicts, and the election of representatives.

There are various conceptions of how to best make use of ICT to "reinvent" democracy. (See [3] and [6] for an overview and case studies.) Some emphasize the potential of *e-voting* to facilitate processes of *direct democracy*, via referenda, where public interest groups can propose legislation which is put to a popular vote and decided by citizens directly, bypassing elected representatives. Direct democracy is controversial and we will not address its many issues here, except to point out that even proponents of direct democracy emphasize the importance of adequate information and deliberation, before putting issues up to a vote [4]. For us, the main potential of e-democracy is to enable greater citizen participation in political discourses, whether or not the citizens or elected representatives make the final decisions.

There is much talk about overcoming the problem of *digital divide*, to assure that all stakeholder groups have effective access to e-democracy processes. While this is important, we should not forget that only powerful special interest groups have access to the traditional print and broadcast media, creating an even greater *analog divide* which already has been severely detrimental to democratic ideals. What has greater influence on the outcome of an election: a substantial donation to a politicial party's "war chest", so as to be able to afford media events, or casting a vote at the polls? The new media

of networked computers, especially the Internet, has given far more ordinary citizens an effective voice than any other technology in history. Consider, for example, the recent *weblog* phenomena, where thousands of ordinary citizens have begun publishing journals on the web [2, 1].

In addition to weblogs, other more established Internet and web technologies can and have been used to facilitate political participation, including email, instant messaging, mailing lists, newsgroups, and web-based bulletin boards and discussion forums [3]. Each of these technologies has its advantages and appropriate uses, but due to a lack of space we cannot compare them here. Rather, the focus of the rest of this paper is on presenting a new kind of system, called *discourse support systems*, which unlike these other technologies are designed specially to support deliberation and other consensus building and conflict resolution processes, and discussing some experiences in applying such systems in e-democracy pilot projects.

2 Conceptual Model of Discourse Systems

Examples of discourse systems in politics and public administration are not difficult to find: 1) If a city plans to build a new airport, the applicable building codes may require the plan to be subjected to a public discussion with affected citizens and interest groups; 2) The cities of a region may work together to revise the zoning laws and plans to find a balance between growth and environmental protection; 3) A political party will need to discuss its political program and strategy for the next federal election; 4) Last but not least, parliaments, city councils and other law-making bodies deliberate about legislation in party factions, subcommittees and in plenary sessions, with input from various experts, lobbyists, professional staff and the public.

According to Walton in [13], a *dialog* is a goal-directed conventional framework in which two or more participants or parties "reason together in an orderly way, according to the rules of politeness or normal expectations of cooperative argumentation for the type of exchange they are engaged in." We define *discourse* as dialog, in Walton's sense, about some language artifact, such as draft legislation, project proposals, or city plans. We use the term *discourse system* to mean a "sociotechnical" system, consisting of human and technical "components", for performing particular discourse tasks within an organization, or between collaborating organizations. Finally, inspired among others by the work of Sumner and Shum [11], by *discourse support system* we mean the system of information and communications technology used as part of the infrastructure of a discourse system.

Conceptually, the main components of discourse systems are: the *actors* participating in the discourse, in their various roles; the *document* being discussed, including the history of changes made to the document; the *dialog* about the document, the subject matter of the document, or the dialog itself; and the *norms* which guide or regulate the dialog and modifications to the document.

Notice that the dialog can consist of many different kinds of speech acts: questions, motions, claims or assertions, arguments, offers, votes, and so on. In a more elaborate model, one might want to define separate components for different classes of speech

acts. For example, there could be a component for managing claims and arguments and another for handling procedural issues.

Norms are of various kinds. They can provide mere guidance without imposing any obligations on the participants. Sources of norms are plentiful and varied, some general and some specific to the application. Example sources include social and linguistic conventions, rules of order, laws, regulations, administrative procedures, cases, principles, values, professional standards, and best practices. Norms may be conflicting and substantial reasoning may be necessary to decide which norms apply and how to resolve conflicts among them. Finally, norms are subject to change over time and may even change during and as a result of a particular discourse. For example, a participant might make an issue out of some rule of order.

3 Generic Use Cases

Having defined the relationship between discourse systems and discourse support systems, our next job is to consider what kinds of discourse tasks can be sensibly and usefully supported by modern information and communications technology. While a detailed requirements analysis would be possible only in the context of a specific application, we have been able to adduce some general requirements from our experience in several e-democracy projects. So-called "use cases" are a good starting point for identifying requirements. The use cases describe, at a very high level, the tasks and responsibilities of each role in the discourse.

We distinguish three main roles: *readers* browse the document and follow the dialog; *authors* write parts of the document or actively participate in the dialog; and *moderators* edit the document or moderate the discussion. Notice that we have used the same three roles for actors who interact with either the document or the dialog. This is because the protocol of a discussion can be conveniently viewed as a kind of complex, structured document.

Also, we have not distinguished between rights and obligations in these role definitions. For example, we leave it open whether authors have an obligation to make contributions to the document or only the right to do so if they want to. Here we are interested only in understanding the tasks which could be performed by each role, whether or not there is an obligation or even a right to perform such tasks in particular circumstances. This will ultimately depend on the norms appropriate for the particular application.

As usual, individuals may have several roles at once and several individuals may share the same role. For example, authors are typically also readers and several moderators may be responsible for some document or discussion. In a discourse, the moderators (i.e. editors) of the document being discussed need not be the same persons as the moderators of the discussion about the document.

Reader Tasks. Readers are interested in timely, relevant and accurate information about the participants and their roles, interests, background and activities; about the document and its subject matter; about the discussion; about the state of the proceedings in light of applicable procedures, about any other relevant norms; and about any background information helpful for understanding the issues. In particular, readers would like to be able to find information about similar past cases; to search for information

in documents using metadata and the full text of the documents; to browse documents conveniently, using tables of contents, indexes and references (links); to find documents which are similar, in some sense, to a selected document; to cluster a set of documents and to categorize such clusters. Finally, readers would like to be able to keep informed about activity in the discourse, without having to regularly take the initiative (notification services).

Author Tasks. Authors are responsible for adding information to the system, to share them with readers. They need to be able add messages, articles and other kinds of documents to the system or to insert bibliographic information, abstracts and other data about these documents into catalogs and other databases. Authors need ways to refer to other documents or, ideally, parts of documents and make relationships between documents explicit. Finally, authors need ways to keep informed about tasks for which they are responsible and the status of these tasks, such as due dates, whether or not they have been completed, priorities and task dependencies.

Moderator Tasks. Moderators have final resonsibility for the quality of the document or the discussion. They oversee and guide the entire process, helping other users to be aware of the applicable norms and thus their roles, tasks, rights and obligations. Their task is to assure that the discourse proceeds according to its purposes, so as to maximize the chance of achieving its goals. Moderators are responsible for applying appropriate moderation techniques to focus and guide the dialog. These include methods for broadening the dialog by gathering information about the problem and the interests of the parties, and brainstorming about possible solutions, and then narrowing the debate by clustering, categorizing and prioritizing options, and arguing about their relative merits. Relevant here is also the moderator's responsibility for opening and closing topics for discussion. Finally, moderators need tools for expressing, visualizing, presenting and analysing relationships between parts of the dialog. Moderators need support in applying relevant norms to guide and regulate the process. Moderators require resources and methods for motivating other users to perform their tasks well in a timely manner. Moderators need to be able to conveniently monitor the activity in the discourse for which they are responsible. They need to be informed about new additions or changes to the document and new contributions to the discussion, without having to manually search for this information.

4 Overview of Zeno

The Zeno system, an Open Source groupware application for the Web written in Java, has been designed specifically for use as a discourse support system. This includes managing both the communities of users and groups who participate in the discourses and the content which is created and used in the discourses. A simple but powerful role-based access control scheme connects the two functional parts of Zeno: users and groups managed by the directory service are assigned access roles in journals where the content of discourses is stored. Discourse management functions for session management and event monitoring (logging, notification, discourse awareness, etc.) as well as communication services (messages to users and journals) provide the necessary support during a discourse.

Zeno's features are implemented in an extensible, object-oriented system architecture with easily customisable user interfaces, using the Velocity template engine and Cascaded Style Sheets.

4.1 Data Model

The design goal of Zeno led to a simple but general data model with a rich set of data structures and operations. The core of this data model is a persistent content store for *hyperthreads* of journals, articles, topics and links. *Journals* are container-like objects that can be used for many purposes, including shared workspaces, discussion forums, calendars, task management, and as a collaborative editing environment for complex, structured documents and content management. *Articles* are similar to email messages and support multiple MIME attachments. The contributions to a discourse are stored as articles. *Topics* are thematic collections of articles, that is, sets of articles which deal with the same subject. Topics and articles are contained in journals. When used as discussion forums, journals support both the threaded and the linear (topic-oriented) style of discussions. Journals, articles and topics, collectively known as Zeno *resources*, form a hierarchy or tree called the *compositional structure* of the content.

Typed links allow resources to be connected, which results in an arbitrary graph structure with labeled directed arcs called the *referential structure* of the content. A *link* connects a *source* resource with a *target* resource. A resource can be the source or target of any number of links. Thus, links can be used to create arbitrary directed graphs of resources. Links are typed with *labels* chosen from the set of *link labels* in the journal containing the source. The referential structure models non-compositional relationships between resources. Such graphs are much more general than the essentially hierarchical data structures typically used by file systems, shared workspaces, outliners or threaded discussion forums. We call the connected subgraphs of the referential structure *hyperthreads*, since they can be viewed as a generalization of the threads of discussion forums, replacing the reply relation by Zeno links.

Operations of the data model include full text search and powerful support tools for moderators: moving, copying, deleting, publishing and unpublishing articles, opening and closing topics, ranking or ordering articles and journals, and labeling articles and links to build conceptual graphs and visualize relationships. Automatic link management helps moderators to preserve the referential structure when they restructure the content of a discourse.

Journals are composed of a partially ordered sequence of any number of resources. Topics are composed of a partially ordered sequence of any number of articles. Articles are composed of any number of *attachments*. An attachment can be a file of any MIME type, such as word processing documents, spreadsheets, or image files.

Attributes describe the properties of resources, attachments and links which are relevant to the system or to the users. *System attributes*, such as the *creator*, *creation date* and *modification date* of a resource, are not modifiable by users, but rather set by the Zeno system. *Primary attributes* are standard attributes which may be modified by users, such as the *title*, *rank* and *note* of the resource. Finally, *secondary attributes* are ad hoc attributes defined by users for application-specific purposes.

All resources have the following system attributes: *id*, *creator*, *creation date*, *modifier* and *modification date*. All resources also have these primary attributes: *title*, *rank*, and *note*. The rank, an integer value, can be used for many purposes, such as prioritizing tasks or ordering the sections of a document. The note of a resource is a plain text string. Depending on the application, it can be used as the main part or body of a document, for example when journals are used as discussion forums, or as an abstract or description of files attached to the article, for example in journals used as content stores or shared workspaces.

Additional primary attributes of journals include, among others, *article labels* and *link labels*. They define the set of labels which can be used to tag articles and links. This feature enables journals to be used for *concept mapping*, *mind mapping*, *idea processing* and other approaches to modeling knowledge using labeled, directed graphs. For example, to model argumentation as in Issue-based Information Systems [7], one could define *issue*,*position* and *argument* labels for articles and *pro* and *con* labels for links.

Articles also have additional primary attributes, e.g., *label*, *keywords*, *begin date* and *end date*. The *label* is chosen from the set of the *article labels* of the journal containing the article. The *begin date* and *end date* attributes allow articles to be used to describe tasks, appointments or events, which can be used to generate reminders or displayed appropriately in calendar views.

4.2 User and Group Management

Zeno includes a directory service for managing users and groups of users. The directory maintains passwords, contact information, in particular email addresses, and user preferences. The directory can also be used for mailing lists.

For security and administration purposes, the directory is partitioned into a set of subdirectories, called *community directories*. A community directory can be configured so as to allow new users to register themselves in the community directory, without the assistance of an administrator. To allow self-registration, an administrator of the community directory gives *guest* users permission to register as new users if they meet the admission criteria stored in the community directory. The right to register new users is limited, and doesn't imply the right to view or modify existing records.

4.3 Role-Based Security Model

Access rights are controlled in Zeno by assigning the roles of *reader*, *author* or *moderator* to users and groups for each journal. That is, these roles are assigned for journals, but not directly for articles, topics or links. The access rights for an article or topic are those of the journal which immediately contains the article or topic. The access rights for a link depend on the access rights for the source of the link. Anyone with the right to view an article may also view the links from this article. Similarly, anyone with the right to modify an article may also modify the links from this article.

The rights of each role are fixed by the Zeno system. They cannot be redefined by users. Moderators have the most rights; with few exceptions they may do anything which can be done with a journal and its contents. Only moderators of a journal may create subjournals.

The readers of a journal may access and view every article in the journal which is published. Like moderators, readers may also access and view the identifiers and titles of subjournals. Further rights to a subjournal are controlled by the roles defined in the subjournal. The authors of a journal have the right to create new articles and topics in the journal. Participants in a discourse will often be both readers and authors.

4.4 Moderation and Editing Facilities

Based on feedback from users of prior versions of the system, Zeno provides a significantly richer set of features for moderating a discourse and editing its web of contributions. Only a few can be mentioned here.

Articles can be modified by editors at any time. The modification date and user id of the editor who made the changes are recorded in system attributes, to make it transparent to readers that the article has been modified, but Zeno does not currently keep a copy of the original version or provide any other version management services. Several articles, topics and journals can be selected and then, preserving their links, moved in a single transaction from one location to another in the compositional structure. Several articles and topics can be selected and then copied in a single transaction, in which case any links between the original articles are also copied. Resources can be deleted, recovered (undeleted) and permanently removed from the system.

Other features allow editors to close and re-open topics or journals, to publish and unpublish articles, to (partially) order direct components of journals (articles, topics, subjournals), and to define labels and qualifiers for articles.

5 E-democracy Applications of Zeno

The first version of Zeno was developed as part of the European GeoMed project, which integrated Zeno with a Geographical Information Systems so as to enable citizens to discuss city plans on the Web [5, 10]. This tradition has been continued; the current version of Zeno has been integrated with the CommonGIS system [12]. Zeno was recently used in an extensive e-democracy pilot application at the City of Esslingen, as part of the German Media@Komm project [9]. Finally, Zeno is being used as a part of the foundation of the DEMOS system [8]. DEMOS stands for Delphi Mediation Online System and is an e-democracy research and development project funded by the European Commission (IST-1999-20530). DEMOS offers innovative Internet services facilitating democratic discussions and participative public opinion formation. The goal is to reduce the distance between citizens and political institutions by providing a socio-technical system for moderated discourses involving thousands of participants about political issues at the local, national and European level. The vision and long-term goal of DEMOS is to motivate and enable all citizens, whatever their interests, technical skills or income, to participate effectively and actively in political processess which are both more democratic and more efficient than current practice. The DEMOS system is being validated in pilot applications in the cities of Bologna and Hamburg.

6 Conclusion

Many of the use cases we have identified for discourse support systems are not (yet) implemented by Zeno. There is a great deal of work remaining to be done. If there is one point we would like readers of this paper to remember, it would be that current tools only begin to scratch the surface of what is conceivable in the way of support for consensus building, conflict resolution and other core processes of democracy.

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