VERN: Facilitating Democratic Group Decision Making Online

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ABSTRACT
VERN is an online collaborative tool that coordinates and distributes the process of finding optimal meeting times across the members of a group. The system combines the underlying democratic process inherent in email chain conversations with a remapping of the voting process to a calendar-based graphical user interface. As an alternative to existing forms of constrained democracy in which members vote from a previously defined set of options, we offer VERN[1] as a case study for the potential of using a visual interface to enable all group members to contribute equally without constraints to the group decision making process.

Categories and Subject Descriptors
H.5.3 [**Information Interfaces and Presentation**]: Group and Organization Interfaces - *Organizational Design, Web-based Interaction*
H.5.2 [**Information Interfaces and Presentation**]: User Interfaces – *Graphical user interfaces (GUI), Screen design*
H.4.1 [**Information Interfaces and Presentation**]: Office Automation – Groupware, *Time management*

General Terms
Performance, Design, Experimentation, Human Factors.

Keywords
Group decision support systems, groupware, deliberative democracy, computer-mediated communication, computer supported cooperative work.

1. INTRODUCTION
Group coordination efforts fall upon a single person to manage, track, research, and decide on an optimal solution, leading to an "informed dictatorship" style of decision-making. The individual has to solicit sufficient group feedback and determine a solution. Group members often do not reply or fall victim to the black hole phenomenon[2], feeling that their voice has no impact in the outcome.[3] VERN is an online collaborative tool that coordinates and distributes the process of finding optimal meeting times across the members of a group. The system combines the underlying democratic process inherent in email chain conversations with a remapping of the voting process to a calendar-based graphical user interface. The result is increased speed and efficiency of voting on meeting times to the critical level necessary for mass adoption among groups of users currently using incompatible calendaring solutions.

The asynchronous nature of the VERN scheduling process reduces the demand on the meeting coordinator, replacing the task of information consolidation with a voting process. We hypothesize that democratic participation will increase, both online and face-to-face, in proportion to the speed and ability with which a participant can interact with the online system. Providing a democratically driven scheduling system will result in improved best-fit meeting times and accordingly, higher participation amongst group members.

This paper will discuss the design of VERN as a case study for online unconstrained democracy. All group members can share an equal voice and each opinion is included and weighted equally within the group. Our goals are therefore two-fold: to evaluate the success of VERN as a standalone meeting scheduling system as well as to consider future implications for applications other than

[1] VERN was originally developed by five students at UC Berkeley's School of Information Management and Systems as part of Marti Hearst's User Interface Design and Development course. For more information see: http://www.sims.berkeley.edu/academics/courses/is213/s05/projects/vern/index.html

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[2] Black hole phenomenon: If people's input falls into a "black hole", they will not want to participate. They must see the impact of their participation to avoid becoming discouraged with their voice in the process.

[3] Our survey results showed a variety of methods people use to coordinate meetings with small groups. The most common method was a single user volunteering to collect and consolidate individual availabilities, with the group sending emails to the coordinator. Several iterations of communication were often necessary among various group sizes before the coordinator reached a decision, sometimes after repeated attempts to elicit a response from the majority of meeting attendees. Both attendees and coordinators expressed dissatisfaction with the existing process.

meeting scheduling systems based on principles of unconstrained democracy in group decision making.

2. RELATED WORK

2.1 Groupware

Groupware is loosely defined as an "application written to support the collaboration of several users" [1]. It refers to multi-user software that is designed to help team members coordinate and track joint projects. Groupware supports effective communication and collaboration through a number of means, including email, document or database sharing, group calendaring and scheduling, threaded discussions, and audio and videoconferencing. It can be classified in a number of ways, including where and when the individual participants perform the cooperative work, the function of the system, and the structural support function of the software. Structural support involves computer-mediated communication, meeting and decision support systems, and shared applications and artifacts [1]. Groupware has traditionally been used to refer to organizational improvement within the field of computer supported cooperative work [2]. However, we suggest that groupware be reframed as a mechanism for enabling a more democratic process of group decision making, whether among organizations, peers, or random groups of users.

2.2 Group Decision Support Systems

VERN was built on the underlying principles of Group Decision Support Systems (GDSS). GDSS is a combination of computer, communication, and decision technology designed to assist problem-solving teams [3]. GDSS enables parallel communication within groups, including more participants, fewer conflicts with taking turns, and less domination by certain group members. It also allows for anonymous submissions. Group members may be more likely to express their views, have more equal influence, and focus on content rather than group member status. We hypothesize that VERN will encourage group member participation by facilitating both parallel communication as well as anonymous submissions.

2.3 What is Constrained Democracy?

VERN differs from existing meeting scheduling systems because it offers an unconstrained democratic voting process. In other software systems, such as Outlook, Meeting Wizard, or Meet-O-Matic, meeting organizers must suggest one or more meeting times, to which meeting invitees "vote" on their preferred choice. Using VERN, the meeting organizer simply proposes a new meeting to a group of individuals and each individual enters the system and votes on any and all meeting times that he or she prefers. Without predetermined voting options, VERN gives the user an opportunity for unconstrained selection.

The term "constrained democracy" does not appear to be clearly defined in any body of literature. However, one definition refers to it as a state in which officials are publicly elected, but are relatively unconstrained by formal rules concerning what policies they may pursue [11].[4] We suggest constrained democracy to embody an opposing meaning in our application. Rather, one "official", the meeting organizer, is self-designated, but then grants meeting attendees the full opportunity to vote on their own selections, regardless of other attendees' choices.

3. Methods

3.1 Interviews and Personas

We designed the initial feature specifications for VERN based on the results of seven interviews we conducted with potential VERN users. In order to maintain a manageable scope for the initial design, we limited our user pool to our immediate academic community. We identified four categories of users: Professors, PhD students, Masters students, and Administrative staff.

We created four personas that represented likely composites of the preferences expressed by the interviewees. We found that many people had very busy calendars as well as multiple calendars and that coordinating the different calendars was a real issue for them. There were also multiple interfaces, with some people using character based email clients, and others using graphical clients. Interestingly enough, despite the high technical expertise of our interview population, none of them used PDA's, but at least one of them expressed a desire for one - but only if it had the full list of features such as Wi-Fi, Bluetooth, keyboard as well as ease of use. All of the personas depended on a schedule, with a range from Addison being the intense and highly technical "power user" to Gabriela, the non-technical and relatively relaxed user.[5]

3.2 Heuristic Evaluation

We received a formal heuristic evaluation of the VERN prototype, including about fifty recommendations for design and usability improvements. All suggestions were fixed or addressed in our subsequent design iteration. The heuristic evaluation recommendations suggested improvements based on five high-level concepts[6]: poor visibility of information, needing more help and instructions, unclear position of links and buttons, too many inconsistencies, and poor use of drop-down menus.

3.3 Pilot Usability Study

The purpose and rationale of our pilot usability study was to observe the ease with which our test subjects navigated through the various functions of our prototype. This was especially important given that VERN had evolved into a more complex system requiring greater clarity of function than we had originally anticipated. Three proposed user task scenarios were used to test VERN. We were particularly interested in how intuitive the language, icons and design were to our users and what complications or confusion might arise.

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[4] This definition is then contrasted to a "constitutionally constrained democracy", in which a constitution establishes limits to government power and authority. It limits the scope and the content of the law. Regardless of popular vote, desires of politicians and bureaucrats, or special interest groups, government behavior cannot go beyond these established constraints [11].

[5] See our website for more information: http://www.sims.berkeley.edu/academics/courses/is213/s05/projects/vern/assign2.html.

[6] See this website for more details: http://www.sims.berkeley.edu/academics/courses/is213/s05/projects/alumniui/index.html.

3.3.1 Test Measures

We used time as our primary test measure. We recorded how long it took for each user to complete a task. If the user made an error, we recorded their choices and behavior. We chose to measure time because VERN is supposed to make meeting scheduling simple and fast, with a minimal interaction required from the user. Thus, a fast time would indicate a positive correlation with our goals for VERN.

3.3.2 Results

During the usability study, we asked the testers to describe what they were doing, thinking and observing. We therefore received enormous amounts of qualitative information and were able to engage in a dialog with users to explore further design possibilities. We found that user times increased significantly after the first use of VERN. Their second and third uses of the system were intuitive and efficient. From this, we gathered that context-aware help is essential to guiding the user through his or her first experience in the system. However, it need not dominate the entire process because users quickly become acclimated.[7]

4. The VERN Solution

The VERN system, unlike other web-based scheduling tools, allows meeting attendees to quickly and intuitively select meeting preferences for a variety of meeting styles, then displays the results visually with text overlays for quick scanning. The calendar style interface allows users to vote on a given meeting through an intuitive click-and-drag drawing interface[8] that paints preferred, inconvenient, and unavailable times onto a weekly calendar representation. We designed VERN based on consensus decision-making processes - look for general agreement between each individual's decision then offer visual representations of best meetings times. By permitting both anonymous and non-anonymous group decisions we promote individual expression and democratic egalitarianism. Based on these principles, we designed VERN with the following features:

4.1 Login/Logout

Existing users may log in by entering their registered emails and passwords. If they forget their passwords, they can request the passwords to be sent to them via email. New users need to register first before they can use VERN and are taken directly to the Meetings Page after registration. Logged in users may choose to log out of the system at any time. Meeting invitees who do not already have a login account are automatically added to the system and emailed their username and auto-generated password.

4.2 My Meetings

VERN remembers the user's weekly schedule and can auto-populate new meeting forms and meeting invitations with suggested times. Users can view a list of their weekly meetings by browsing along the sidebar of the Meetings Page. The meetings are grouped into the following three categories: awaiting your vote, awaiting your decision, awaiting others, and confirmed. Meetings initiated by the users are marked with yellow stars.

4.3 Propose Meeting

Users can propose a new meeting by specifying the meeting's title, location, and invitees. They may input additional information, such as the duration and voting deadline for the meeting. The data entry process is facilitated by an auto-complete feature in the attendees field.

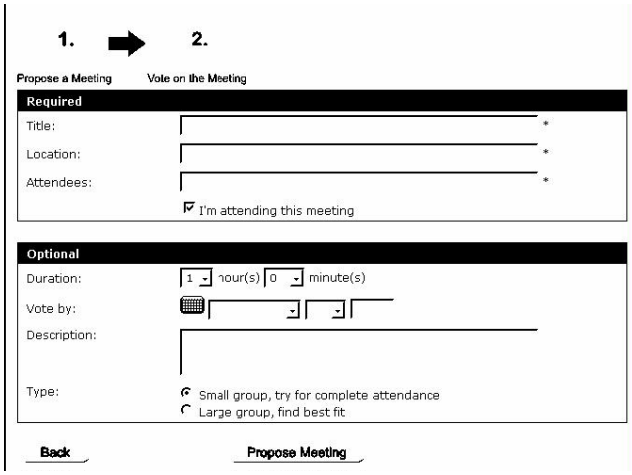

Figure 1. Propose Meeting

4.4 Vote on Meeting

After a new meeting has been proposed, the initiator and invitees can vote on the appropriate meeting times by indicating their preferred and possible times on the scheduling interface. They can also specify their weekly commitments to avoid having to repeatedly mark these schedules as unavailable times for future meetings.

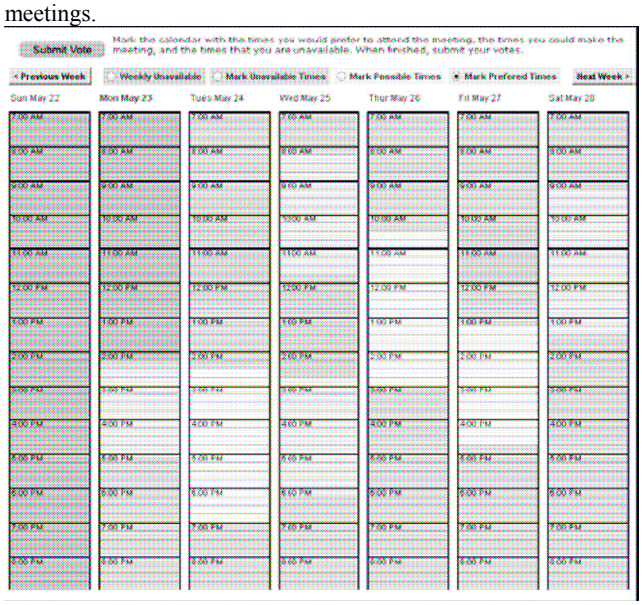

Figure 2. Visual drag and drop interface to select preferred and possible meeting times.

[7] For more details about our pilot usability results, see http://www.sims.berkeley.edu/academics/courses/is213/s05/projects/vern/assign8.html.

[8] We built VERN with PHP, mySQL, JavaScript, and CSS, the interactive calendar GUI components with Java applets, and the backend communication through Java servlets.

4.5 Finalize Meeting

The meeting organizer can view the results of group members' votes, which are ranked according to number of preferred and possible votes at any given day and time. The meeting organizer can select which time based on the rankings to confirm the meeting. An email is then sent out to all meeting attendees confirming the meeting time.

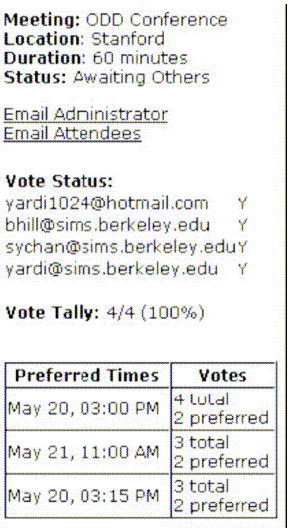

Figure 3. Finalize Meeting

4.6 Other Features

4.6.1 Manage History

The History Page lists all the meetings that have been created before and allows users to reuse such past information to create new meetings.

4.6.2 Manage Contacts

The Contacts Page enables users to create and edit individual contacts and groups.

4.6.3 Help

Context aware help makes it possible for users to get assistance when and where it is needed quickly and easily.

5. FUTURE IMPLICATIONS

We released a beta version of VERN in May 2005 and are continuing development and testing throughout summer 2005. Our first external test of VERN occurred during our presentation at the 2nd Conference on Online Deliberation: Design, Research, and Practice / DIAC-2005 at Stanford University. Audience members submitted their email address at the onset of our presentation and we invited them to a meeting, tallied their votes, and confirmed our meeting at the date and time that received the highest number of votes. VERN was received enthusiastically by the audience members, many of whom suggested other applications for group democratic decision making.

During summer 2005, we have been utilizing our local academic community as trial users of VERN. Because of the significant interest in actually using VERN within the SIMS academic community of faculty, staff, and students, we plan to release a stable version by Fall 2005. We will then conduct both quantitative and qualitative studies of VERN users to inform further research into the following three questions:

1. Does VERN actually make the meeting scheduling process faster for groups of users?

2. If so, how should VERN be released outside our local academic community and what is the feature scope that other users may request?

3. How can VERN be used as a model for the development of future online group decision making systems to encourage unconstrained democratic participation? We encourage testing and feedback. VERN beta is located at http://www.sims.berkeley.edu/academics/courses/is213/s05/projects/vern/prototype.

6. ACKNOWLEDGEMENTS

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7. REFERENCES

[1] Bowman, B., Debray, S. K., and Peterson, L. L. Reasoning about naming systems. *ACM Trans. Program. Lang. Syst., 15,* 5 (Nov. 1993), 795-825.

[2] Ding, W., and Marchionini, G. *A Study on Video Browsing Strategies.* Technical Report UMIACS-TR-97-40, University of Maryland, College Park, MD, 1997.

[3] Dix, A., Finlay, J., Abowd, G., Beale, R. *Human-Computer Interaction (Second Edition)* Prentice Hall. 1998.

[4] Gerardine Desanctis , R. Brent Gallupe. A foundation for the study of group decision support systems. *Management Science*, v.33 n.5, p.589-609, May 1987.

[5] *American Heritage Dictionary*, *The.* Office edition. Boston: Hougton Mifflin. 1983.

[6] Innes, Judith E., and David E. Booher. Consensus building and complex adaptive systems: A framework for evaluating collaborative planning. *Journal of the American Planning Association* 65 (4):412-423. 1999.