Public Spheres: Ideas Taking Shape

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Abstract
Public Spheres is an asynchronous online deliberation web prototype inspired by argument maps. The interface allows creating a hierarchy of nested supporting and opposing arguments in a discussion and separates the evaluation of an argument's constructive writing quality from agreement with its content. A pilot study suggests strengths of the prototype, e.g., allowing accountability while maintaining anonymity of contributors, as well as weaknesses, e.g., a missing “neutral” category and not enough reuse of existing arguments.

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Online deliberation; argument maps

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H.5.2 [Information Interfaces and Presentation]: User Interfaces; H.5.3 [Information Interfaces and Presentation]: Group and Organization Interfaces

Introduction
“As deliberation raises expectations that are feared or hoped for, public argument is a way to share in the construction of the future.” [2] The process of public argumentation involves people exploring solutions to problems, but face-to-face discussions of this sort are often repetitive, ephemeral, and allow only a single person to talk at a time. We designed an asynchronous online interface to allow participants to break down complex arguments into nested supporting and opposing sub-arguments that can be further responded to and compared side by side. Inspired by argument maps [1], Public Spheres is intended for ongoing conversation about public policy, allowing people to learn about and contribute broadly and deeply about areas that interest them. Users can contribute, organize, and vote on arguments for the benefit of themselves and others.
Argument Maps
Argument maps visualize supporting and opposing responses to a problem in a hierarchical manner, showing how arguments connect and branch out, and enable more complex arguments and derivative paths. Keeping a persistent record of the arguments, splitting them to pros and cons, and visualizing connections between them, argument maps were shown to improve debate quality[1] and critical thinking[5].

We initially created a paper prototype (Figure 1) to explore the concept of nested arguments as a way to focus debaters’ attention to a specific area of the discussion, reducing overload caused by neighboring arguments and topics. Each argument can be responded to with opposing and supporting responses, each of which can further be responded to with supporting and opposing responses. Using a Wizard of Oz technique, five individuals walked through the paper interface and created arguments and responses around the debate of “reducing taxes and spending will fix the economy”. The discussions that emerged through the prototype demonstrated that users split complex arguments into smaller units and compared the points made from each side. Confirming our concept, participants commented that the tool allows delving into and exploring arguments related to public policy issues in an informative and organized manner.

Public Spheres Design
The digital version of Public Spheres implements the idea of nested arguments in a web interface, with additional features, including searching for existing arguments and voting on argument constructiveness (Figure 2). The prototype was developed with JavaScript, PHP, and CSS in the front end, connecting to a MySQL database in the back.

Nested arguments
Public Spheres organizes various topics being discussed simultaneously into categories (e.g., the discussion “health care is a human right” is in the “health and medicine” category). Discussions can be responded to positively or negatively by entering an argument in the text box at the bottom of the interface and clicking “support” or “oppose” respectively. Each response can be recursively supported and opposed into deeper levels of deliberation. Organized spatially in two columns under the argument they respond to, supporting responses are colored green and opposing responses are red. Background color saturation of an argument is determined by the support/oppose ratio of responses to it, with high saturation indicating more supporting responses. This surfaces information about the controversy of an argument in deeper levels of the discussion.

To reduce rehashing existing arguments, a search feature enables finding existing arguments to reuse them as responses in new contexts. A reused existing argument brings along any responses to it to preserve the chain of argumentation that follows it.

Voting
In addition to responding with supporting and opposing responses to contribute new perspectives, we designed a feature to evaluate the degree to which an argument is constructive or not (similar to Amazon’s “Was this review helpful?”). Voting an argument up or down is done by clicking the respective triangles on its left and can only be done once by each user. Responses are sorted based on their voting score, such that the most
constructive arguments are at the top. The goal is to motivate meaningful deliberation rather than spamming the system with opinionated responses without valuable contribution to the discussion. Together with keeping all contributions anonymous, this also allows users to contribute arguments that may be against their personal opinion, directing focus on the arguments rather than to the person who made them [4].

**Preliminary Study Results**

We created a discussion on “health care is a human right” and seeded it with 49 responses from healthcare.procon.org. Five students who claimed an interest in public policy or deliberation were invited to a 1-hour session. They responded to a poll about their level of support (1-5 scale) to the discussion topic before and after using the tool. They were then presented with the different features of the interface and how to use them, and were then asked to read arguments, vote on them, and create responses to the arguments while thinking aloud. Afterwards, participants filled out questionnaires about their experience using the tool and received a $10 gift card. We left the responses and votes made by each participant for the following participants to demonstrate how the discussion grows over time as more users engage in the discussion.

In total, 35 responses were made, of which 21 were in line with participants’ personal opinions about whether ‘health care is a human right’, and 14 were against their opinions. The latter suggests that the tool encouraged users to think on both sides of an argument, similar to ConsiderIt [3]. Two of the responses were reuses of existing arguments. Most responses (29) were made at two levels under the primary argument (the level shown in Figure 2).

One issue participants pointed out was that they were forced to make a decision of whether their response was positive or negative because there was no neutral

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**Figure 2.** Web prototype of Public Spheres. Each statement, whether it supports (green) or opposes (red) the statement it descends from, can then be responded to with additional supporting and opposing statements. Clicking on an argument opens it with its nested arguments. Clicking on a title enables quick navigation back up the hierarchy. The text box at the bottom allows entering new arguments as well as searching for existing arguments. Up and down triangles allow voting for the constructiveness of each argument.
option: "I'm very indecisive, so being forced to say "support" or "oppose" felt weird especially when I found my ideas to straddle two sides." Participants suggested that neutral statements could be used for moderate opinions or questions.

Users voted a total of 50 times (33 up, 17 down), bringing arguments to voting scores that ranged between 3 and -2. One participant said that this feature was interesting "because I was encouraged to rate arguments for their argumentative value rather than on just my perception of them." Yet another felt that "the distinction between opposing an argument and pressing the down arrow and agreeing with an argument and pressing the up arrow wasn't that clear initially." This presents a design challenge and opportunity, to decouple a user's agreement with an argument from their evaluation of its contribution quality.

At the same time, the voting feature together with anonymous argument posting was seen as a safe way to express ideas and participate in the discussion, providing and receiving feedback about arguments without attribution to a specific individual: "[it] forces focused critical thinking rather than criticism on character/morality." Overall, participants reported that they liked the ability to comment and vote on any argument, participating in the conversation and being able to compare "the pros and cons of any argument easily."

Future Work
Our ongoing efforts include improving the design of the prototype based on our initial user study, such as adding a neutral category of responses. We are also exploring how to increase reuse of existing arguments in order to prevent effort being spent rehashing arguments in different areas of the discussion. For example, as the user types a response, existing arguments that are similar to what the user is typing could be surfaced on the side of the interface, allowing the user to choose one of them instead of typing a new response.

We also plan to expand the user study by deploying Public Spheres broadly and soliciting engagement with the interface and its content outside of a lab setting. This could show, for example, how users engage with the interface when they come back and see how others responded to and voted on their arguments. We already contacted our university's speech and debate organization to be involved in helping us improve Public Spheres.

During the interactive posters session at CSCW, we plan to demo Public Spheres, to elicit responses from the CSCW community on the design, and to deepen and broaden the discussion base on a number of arguments seeded in the system.

References