
REFLECT: Supporting Active Listening and Grounding on the Web through Restatement

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Abstract

Interfaces for supporting public discussion on the web confound speaking and listening. We argue that we can design interfaces that make it easier for discussants/collaborators to find common ground by better engaging the motivations of listeners, and, in turn, help facilitate more meaningful large-scale discussions. In this paper, we (1) call attention to the potential of listening as a practical concept for CSCW design and (2) describe a novel interface called Reflect that nudges people to restate what others are saying.

Keywords

Discussion, Listening, Facilitation, Deliberation, Grounding, Summary, Restatement, Sensemaking

ACM Classification Keywords

H5.3. Group and Organization Interfaces: *Web-based interaction, Computer-supported cooperative work*

General Terms

Design, Human Factors

Introduction

Communication is central to productive activity. People must discuss what to do, how to do it, who will work on what, and how resources will be allocated, whether it is

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an open source project, a faculty meeting, or a planning process for a Department of Transportation. More and more of these discussions are mediated by web technology as social media becomes integral to our communicative ecology. Old institutional arrangements are being rethought as government explores new ways of involving citizens in decision-making, and enterprises try to motivate consumers and employees to provide creative input into the decisions they make [3]. And there are peer production efforts such as Wikipedia that hold deliberation and consensus seeking as core ideals to strive for in all decisions [22, 5].

We believe that these efforts at public deliberation, of tapping the creative energy, emotion, and intelligence of many, are important for moving us toward institutional and technical arrangements that enable us to confront difficult collective challenges effectively and to interact with each other more constructively. Unfortunately, our public discourse, particularly when political, is often hyperbolic. Our hypothesis is that reflective discourse's fragility and elusiveness on the web is partially a result of the lack of attention paid to supporting *listening* as a distinct activity from speaking. With attention to listening, interfaces might nudge people to establish more common understanding, even at the junctures where the discussion is heated and listening is often forgotten.

But even with reflective communication, it can be challenging to make sense of what is being said in large discussions and identify the takeaways. We believe that designing for the explicit elicitation and capture of acts of listening can simultaneously encourage a more reflective discourse as well as provide leverage for addressing sensemaking challenges. For example,

listener restatements of key points that a commenter made might help show the commenter that they are being listened to, while the restatement itself might be incorporated into a discussion-level summarization process (not to mention helping future readers understand different interpretations of the comment). This is the basic idea behind the novel interface we present in this paper, called *Reflect*. By returning to the basics of communication and developing an applied understanding of the role of listening we might be able to address a constellation of problems confronting participatory governance efforts.

Our goal in this paper is to draw attention to the potential of a deeper understanding of listening in CSCW. The second goal is to present preliminary work on *Reflect*, which illustrates just one point in the design space. We conclude by reviewing work in CSCW and related fields that engage similar themes. We want to spark a discussion about listening and grounding and why these concepts seem to have not yet been treated as fully as seems merited.

Interfaces for listening and grounding

Without listening, communication would not occur. Listening is not simply passive. It also requires listeners to provide *evidence* to speakers to show that they are being heard and understood [12]. Listeners operate a backchannel where they might nod, say "uh huh", tilt their heads, finish sentences, or preface their responses with a simple restatement of what the speaker said [18]. This evidence helps speakers debug their messages, as well as provide assurance that they are being recognized and heard [44]. And it helps listeners demonstrate their good faith as a conversation partner, where conversation partners who provide more

feedback through the backchannel will be perceived as more patient, polite, and attentive [41]. The process of going back and forth, speaking and listening, exchanging evidence and repairing breakdowns, is called *grounding* [12].

Though more and more of our communication is taking place on the web, our web interfaces have typically not supported backchannels for others to demonstrate evidence of understanding. Threaded forums allow us to respond by saying “uh huh”, or “do you mean...?”, but mixing replies and acts of listening can quickly make a discussion difficult to follow if many people are involved. On the other hand, we are often invited to hit a “like” or “thumbs up” button to signal some affinity for an utterance, but this act does not contain much information for grounding.¹ Our interfaces implicitly privilege speaking over listening (e.g. clicking on “respond”), creating a feedback chasm that may hinder formation of common ground. Prioritizing speaking over listening may bias toward emotionally-charged but shallow interactions, which, in turn, likely affects who is willing to participate.

We do not believe that this situation is a fundamental limitation of the web, but is rather due to a lack of exploration of design possibilities. Can we design interfaces that help nudge people toward more reflective interactions by emphasizing the common experience of listening? Can these acts of listening be repurposed to help link together and summarize discussions so that participants can better make sense

¹ Twitter retweets are an interesting case of listening and projection.

of what is being said? We believe so and contend that an attention to listening may:

1. Enable people to see evidence that they are being heard, improving their communication satisfaction and willingness to participate further.

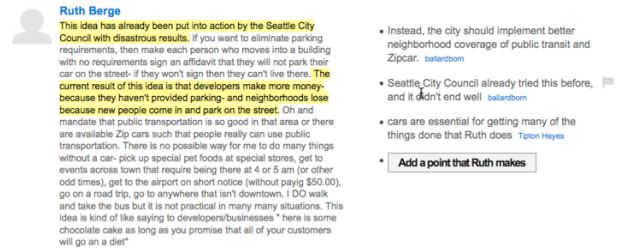
Consider our own frustration if we do not think we are being heard. One reaction is to restate what we just said more forcefully, possibly by yelling, further deteriorating the situation. A second reaction is to disengage. Being responded to is a determinant of whether people continue contributing in an online forum [2], and a similar dynamic may exist for perceiving that one is being heard.

2. Empower participants to use and hone their active listening skills to guide the discussion and demonstrate their own worth.

Acts of listening impact the direction that a conversation takes [41, 26]. Consider some of the positive motivations for active listening: first, a listener might try to demonstrate understanding before responding (such as by restating), a commonly recommended technique for effectively interacting with someone about a controversial or complex issue (e.g. marriage counseling or dispute mediation in Wikipedia [6]). Second, a listener might provide feedback that helps teach a speaker how to better frame their points. Third, someone might provide evidence that they heard something in order to draw other people’s attention to its importance. All of these actions help demonstrate to everyone involved that the listener is a valuable participant. Recent research in neuroscience indicates that people’s likelihood of engaging in empathetic activities like perspective taking is sensitive to experimental manipulation [28]. We may be to

leverage this by embedding cues for empathetic listening in our interfaces. Through their visible structuring, web interfaces can continually remind people to actively listen, even when the discussion is heated, and re-present these acts to other participants to bolster the listener’s conversational status.

Figure 1: When a user mouses over a summary bullet point, the text in the original comment that the summary draws from is highlighted.



Reflect is shown running here on the IdeasForSeattle website as a GreaseMonkey script. The comment is real, but the summaries are not. Reflect is also available as a WordPress plugin, MediaWiki extension, Django extension, and a Ruby on Rails plugin.

3. Help other discussants make sense of what is being said and why by showing active listeners’ demonstrations of understanding (or misunderstanding). In an examination of how speakers and listeners work together to coordinate a conversation, Kraut found that while an active listener is the one whose understanding of what a speaker is saying is most positively affected when interacting with the speaker, eavesdroppers also benefit [26]. We are all familiar with this effect: consider a twenty-person meeting where your colleague succinctly rephrases your overly long and convoluted expression of an important point. Your colleague has demonstrated that she has understood, and, in doing so, also helps everyone else understand better. These are acts of *facilitation* that lead others to say, “Ahhh, I see!” Can we do a better job eliciting, capturing, and exposing these “ahh” moments for all future participants to benefit from on the web? Through careful design, these acts of listening might even form the building blocks for creating higher-level summaries and interlinked

statements that help synthesize the thoughts of many into coherent expressions without losing the voice of individuals.

These three propositions – effect on speaker, effect on listener, and effect on other discussants – encompass our thinking to date on the theoretical outcomes of enabling explicit listening mechanisms.

It is unclear, however, what the possibilities and pitfalls of asynchronous listening on the web are. Much of the research cited thus far comes from studies of synchronous dyadic face-to-face communication. But we know that asynchrony, even delays in synchronous message exchange, can disrupt speaker/listener coordination [43]. It is unclear to what extent these disruptions can be ameliorated (or be amplified) through creative design.

REFLECT: listening through restatement

In this section, we present a novel interface we designed and built, *Reflect*, which embodies the listening perspective by explicitly introducing a backchannel that cues people to act as listeners. Reflect takes one strategy for grounding (restatement) and encapsulates it in a lightweight augmentation of online comment boards that strongly suggests restatement as a primary mode of participation. Every comment is accompanied on the right hand side by a list of concise summary bullet points (Figure 1). Other readers/discussants add these summary bullet points. Every summary bullet point represents an act of listening. Reflect also provides an opportunity for the original commenter to respond to each bullet point to

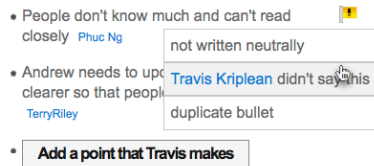


Figure 2: Anyone can dispute the neutrality, accuracy, and validity of any summary bullet point.

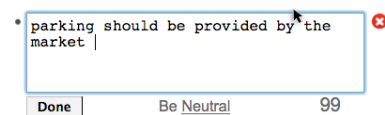


Figure 3: Anyone except the commenter is able to click “Add a point [name] makes” and then enter a 140 character or less summary of a point the commenter made. Depending on the backend implementation, an email may be sent to the commenter notifying them of the summary.

make sure that the summarized points accurately portrays the point they were trying to make, supporting one iteration of grounding. Future readers are able to observe this process (and potentially participate), learning more about what was being said and how other people interpreted what was said.

Though Reflect is simple, there are many subtleties to the design. First, we walk through a scenario to illustrate the various mechanisms at play. Then we briefly present design rationale, explaining why we made some of the more important decisions. The section ends with a short description of two small, preliminary deployments of Reflect.

Scenario of use

Pretend that you submitted an idea to the Ideas for Seattle website a few weeks ago, suggesting the elimination of an ordinance requiring real estate developers to provide for future tenant parking. You do not think this requirement is smart policy because it is too rooted in the assumption that city dwellers need a car. You received immediate responses, but did not return to the discussion until now.

You arrive at the page for your idea and start browsing the comments. You glance over the first one and then read the summary points others have written. When you hover over a summary bullet, the relevant text in the comment that the bullet refers to is highlighted, allowing you to jump in between the commenter’s own words and the listener’s interpretation (Figure 1). This particular summary is interesting because it reframes a point the comment author was making about the free-market implications of your idea, which the commenter was implicitly critiquing.

As you read further, you come across a comment left by Travis. You notice that the first bullet point seems to be a misinterpretation of what Travis was saying. You flag it as inaccurate (Figure 2). You recognize the next commenter, Lisa. She was the one who had added a bullet point that reframed a point a previous commenter made, and you appreciated her insights. You read her comment carefully and note that no one has summarized any of her points. You decide to add a bullet point so that she knows someone is listening and so that her comment is not lost in the mix. After clicking “Add a point that Lisa made”, you type in your interpretation of her main argument in the 140-character limited text field (Figure 3). After hitting submit, you are asked to connect the point that you summarized to the part of Lisa’s comment to which it refers. After clicking two sentences, you hit done, whereupon the bullet is added. When you mouseover your bullet, the sentences you clicked on in the comment are highlighted and the option of deleting or modifying your bullet is available.

Scrolling down, you come across one of the comments you left a few weeks ago. Several people have added bullet points. You recall having received an email about that earlier, but had not had time to check it out then. The interface presents you with the option of responding to each bullet point, asking if the bullet accurately reflects what you were trying to say. You can also add a short text response. The first bullet is right on. You click yes and write “exactly, you said it better than I did”. The second bullet is wildly inaccurate. You click “no” and clarify what you were trying to say (Figure 4).

Design rationale

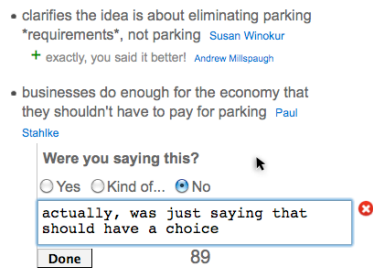


Figure 4: A commenter who is summarized is offered an opportunity to respond to a bullet point. They can select whether the bullet is accurate, somewhat accurate, or inaccurate. They can also provide a short free text response. The response is shown to future readers beneath the original summary, with a colored +, - or ! which indicates the commenter's perceived accuracy of the bullet.

There are hundreds of choices that went into Reflect. Here we describe four of the most significant.

1. *Content.* The original idea was to encourage "civil" online discourse by asking people to neutrally rephrase what a commenter said. However, we settled on summaries because an early paper-prototyping activity showed that rephrasing made people feel that their hands were being held ("I'm an adult, I can deal with what they're saying"), and did not result in more concise statements ("I might as well read the original comment"). The voice of a more neutral summary appears to be a different enough representation of the comment to add value, while still affording the ability to "civilize" the comment in the restatement if desired.²

2. *Articulating the work of comment summarization.* There are other ways in which we could support comment restatement besides short bullet points. For example, our first design employed a single summary restatement per comment, implemented as a wiki. However, in early testing, this proved problematic. People felt that with a wiki, they must commit to summarizing the whole comment (many of which can be quite long). We moved to bullet lists and discovered some additional affordances: (1) we could more naturally include more people in the listening and grounding activity, (2) enhanced support for clarifying singular points, (3) facilitating multiple interpretations of the same text, even at different levels of meaning, (4) easier for commenters to respond to the summary and clarify their points, (5) easier to skim the

² Other content could go in the second column (e.g. responses, tags, relevant links, translations). These are valuable directions to explore, but fall outside the scope of listening via restatement.

summaries and connect them to the comments, (6) the ability to identify similar points being made in other comments, and (7) the ability for listeners to highlight the points they found most salient in what the commenter said.

3. *Connecting summary text to comment text.* After someone summarizes a point that a commenter makes, we ask him or her to click on the relevant sentences in the original comment where the point was being made. There were two reasons for doing this. First, accountability: listeners are committing to identifying exactly where the commenters made the point they believe them to be making, pinpointing their data source. For those who are malicious, it adds a step whereby they are forced to essentially acknowledge their maliciousness. Second, readability: this data is used later to aide readers in figuring out the relevant parts of the comment to which the summary refers. If there is a breakdown in grounding between speaker and listener, the speaker may be able to more easily see where the misinterpretation occurred. Others can judge whether the listener accurately represented the point. If someone maliciously writes a bullet, it's relatively easy to verify what that the sentences actually said.³

4. *Speakers are privileged to respond to summaries.* Because Reflect prominently places the summaries next to comments, an inaccurate summary might overly influence what later readers believe about what

³ We considered letting listeners first select text in the comment and then hit "summarize" from a pop-up menu, but we decided against it because the functionality would be less discoverable. Moreover, the interface wouldn't visually nudge people toward more reflective engagement with what was being said.

someone said. Therefore, we added responses such that the original speakers would get the final say about what they were trying to say. But we intentionally did not go so far as to allow speakers to change or remove summaries. They are far from neutral parties and cannot be trusted *a priori*. The response mechanism balances this tension by explicitly and visibly giving voice to the speakers' approval or disapproval and their rebuttals without giving the commenters full control of the process. Furthermore, responses facilitate grounding and bridge the speaker-listener gap by opening up a space for a closed discussion around an accurate portrayal of what was said.

Use in the wild

We report briefly on two preliminary uses of Reflect. This is meant to add color to the description of Reflect, not to provide any kind of rigorous evaluation of the design hypotheses underlying Reflect.

Wikimedia's Strategic Planning Initiative. In 2009-10, Wikimedia (the non-profit organization behind Wikipedia and sister projects) ran a Strategic Planning Initiative for gathering input from wiki participants around the world about the strategic directions the organization should take.⁴ Near the end of the initiative, the professional facilitators contracted to run the initiative came across Reflect and wanted to use it internally to process and summarize the input they had been receiving. "I'm about to start a Herculean summarizing task on strategy wiki, and this will help tremendously". In particular, they saw Reflect as an answer to the problems that they had motivating users to write thread-level summaries. They believed that

⁴ <http://strategy.wikimedia.org/>

comment level summaries were more manageable, and could be used as an intermediate step to write the thread-level summaries.

Over the course of a month and a half, five facilitators and volunteers installed the Reflect Greasemonkey script and used Reflect to create 212 unique summary bullets to aid their collaborative process of summarizing. They found Reflect to be useful, the lead saying "Your implementation is very, very clever. I keep discovering subtle, but cool capabilities. I'm really interested to see what impact this has on community discourse." Clearly this is not an evaluation, but Reflect's use and feedback are encouraging.

Living Voters Guide. Reflect was deployed for use in the discussion section of the Living Voters Guide, a website that enabled any Washington State voter to help write a voters' guide for the nine state-wide ballot measures on the 2010 election. We designed, built, and deployed the Living Voters Guide in partnership with Seattle City Club, a local civic organization. While we had a great deal of use of the site itself (10k+ unique visitors, 500 registered users, 6 minute average time on site), the discussion section was not the focus of the participation, and we saw few comments. Consequently Reflect saw only modest use. However, Figure 5 shows the first "in the wild" use of Reflect. The interaction illustrates the basic grounding functionality Reflect is intended to support.

The uses described in this section give some hints as to how Reflect might be used, but it is a work in progress and we cannot yet make strong claims. We are working on several other Reflect deployments, which will be described in future work.

Figure 5: This is the first truly “in the wild” use of Reflect, enacted by a user with no affiliation and no prompting. Vin Hill first summarized a point that he thought James B was making, and then responded to James’ comment. James B followed the link in the autogenerated email in order to clarify his point and correct Vin’s misinterpretation.

The exchange also nicely illustrates the challenges with asynchronous listening: Vin replied to James’ comment before James came back to verify and correct Vin’s restatement of his point. On one hand, anyone browsing the forum after James responded to Vin’s summary would benefit from the exchange and better understand James’ original point. On the other, Vin’s reply makes less sense afterward.

This interaction took place on the Living Voters Guide. The platform we designed and built that supported the Living Voters Guide, ConsiderIt, will be described in a future publication (for now, see [27]).

Con :: The constitutional right to bail is critical for many poor defendants.



James B

But the only people that this amendment would apply to-- those charged with crimes that might put them away for life, AND who have demonstrated a propensity for violence--are already having their bail set at extremely high levels. Which means that only the poor defendants are waiting around in jail, the rich ones get bailed out.

• Are you saying that you believe this law would not be applied to wealthy and poor defendants equally? Vin Hill

- I meant that CURRENT law does not treat the wealthy and the poor equally, since the wealthy can afford levels of bail that the poor cannot. James B

Summarize what James says

reply to James



Vin Hill

This amendment would allow wealthy defendants to be denied bail. The applicable laws spelled out in WA RCW Chapter 10.21 that go into effect with the approval of the resolution stipulate the denial of requires the court to find "that no condition or combination of conditions will reasonably assure the safety of any other person and the

Summarize what Vin says

Related design work

Reflect introduces a second dimension into online comment boards, breaking the standard linear vertical layout, introducing a backchannel intended for people to demonstrate evidence of listening by restating the points that they hear the commenter making. Inspired by Wikipedia, Reflect nudges people to strive toward neutrality in some aspects of a typically hyper-subjective space. Even if people cannot agree, maybe there’s space for supporting some degree of consensus over what is being expressed (grounding). Moreover, Reflect can signal what is appropriate for that community. Second, Reflect introduces a dimension for identifying salient points to help address problems of sensemaking. People new to a conversation may be able to get up to speed faster and find important takeaways in a discussion by browsing the summary

bullets. Lastly, the summaries give leverage for future systems intended to support the production of discussion summaries. Implicit in this claim is the assumption that people are more likely to “listen” to points that are worth reading, where the summaries act as a form of “read wear” [23].

While we argue that *listening* has not received adequate applied attention in CSCW and HCI, there are some rich lines of research that touch on related themes or attempt to address similar problems. In this section, we non-exhaustively review the literature in order to better clarify the space of problems, approaches, and theoretical sensitivities we are trying to motivate through our emphasis on listening.

Interfaces for grounding. Clark's contribution theory of common ground [12] has been used widely in CSCW and HCI, but typically as an analytical lens to understand the affordances of the communication medium [21, 7, 29, 39, 15] or how communication strategies change under pressures of scale [42]. Systems that are designed specifically to support grounding tend to be for distributed teams coordinating their activities [16]. We argue that grounding is a rich concept to design web-based communication interfaces around. The strongest claim we make about Reflect is that it is the first interface that makes the process of content grounding, of seeking mutual understanding about what is being expressed, a first-class activity in web-based discussions.

Annotating others' words. Reflect is similar to a number of annotation tools that allow individual or group annotations on documents (like MS Word or anchored discussions [8, 11]). The custom design around grounding, however, significantly differentiates Reflect from annotation and anchoring.

Nudging toward reflective dialogue. MetaViz [4] is similar in spirit, if not method, to Reflect's ultimate goal of fostering more reflective online discourse. MetaViz attempts to trigger critical thinking about what is being talked about by using computational metaphor identification to expose the political metaphors that people are drawing upon in blogs. The evaluation of MetaViz demonstrated promising patterns of reflection and creative thinking, even when the computational metaphor identification algorithm contributed an erroneous metaphor.

Restatement in system design. The only piece of work that we have found that calls out restatement is ThoughtSwap, a classroom tool for supporting colocated anonymous discussion [17]. Students submit ideas in response to a prompt, and then other kids can pull ideas out of the "hat" and re-present those ideas.

Navigating and visualizing discussions. A number of interfaces for navigating threaded discussions have been invented, such as interfaces for visualizing the social behaviors and semantic associations [31, 38], or focus+context interfaces for reading threads [40]. OpinionSpace [19] deals with non-threaded, independent comments, plotting them on a two-dimensional map. The location of the comment on the map is determined by the speaker's responses to a short value-based questionnaire they fill out when submitting the comment. Other participants are invited to rate comments for how much they (1) agree with it and (2) respect it. The size of the dot grows when people with different values than the speaker respect and/or agree with it. These interfaces present novel methods for aiding users in navigating discussion spaces. They can help set the context for listening or synthesizing, but they do not go beyond the typical rating of comments when it comes to engaging with what is being said.

Distilling takeaways from discussions and public comment. One of the motivations for capturing evidence of listening is to repurpose it to provide leverage for summarizing and clarifying salient high-level takeaways from a discussion. Ackerman and colleagues have been addressing this goal by building collaborative tools for incremental distillation of discussions, so that the takeaways of a large discussion

can be found in the resulting “bramble” [1, 30]. In a similar vein, some digital government researchers are building “tools for rulemakers” to sort through public comments, applying automated techniques for identifying near-duplicate comments, and code them for interesting content [25, 34]. However, both of these lines of research are focused on expert systems for post-processing comments. Underlying each of these approaches is the stance that the ideal case would be automatic summarization (see e.g. [30, p. 139]). While automatic summarization would be very useful, the orientation toward that ideal precludes the potential efficacy outcomes that participants may experience if they are involved in the process of listening and demonstrating listening. We believe that we should explore these possible benefits of participating actively as a listener.

Collaborative sense-making and argument mapping. Perhaps the most relevant body of technical work is computer-supported argument visualization and mapping [35]. This line of research focuses on formally structuring a discursive space based on argumentation theory. Consider gIBIS [13], the seminal implementation of a hierarchical, typed design language for representing discussion on complex policy problems: “issues” that require action, “positions” resolve issues, and “arguments” provide perspective on positions. Nodes can be semantically associated through links. Positions “respond to” issues, arguments “support” or “object” to positions, issues can “generalize”, “question”, or “suggest” other issues. And so on. Users are asked to break up their utterances in terms of this structure, collaborating in the production of a map of interwoven issues, arguments, and positions that explore the issue. This line of work was

largely abandoned within the CSCW/HCI community by the mid-90s, as grave challenges to its adoption were found [36, 24, 32]. For example, there were unclear future payoffs for doing the extra work entailed in formalizing knowledge [20], difficulty in learning the formalized schemas, breaking up their narratives into the required fine chunks, and agreeing on classifications. Some researchers recognized that successful application of such a formalized and foreign method of discourse required professional facilitators experienced in the mapping techniques to provide immediate value [14].

Perhaps the most promising direction for usable argumentation systems is that which supports incremental formalization [33], where people speak freely and then gradually add formalized structure (see [37]). This approach might profit from the listening perspective, where someone else can demonstrate listening by experimenting with different ways of incorporating an utterance into a dialogue map. Regardless, argument mapping is a relatively narrow part of the design space that seems to be useful in some very contentious situations where stakeholders are highly invested in the outcomes and resources are available to hire facilitators. Wider exploration and experimentation is warranted if we are to improve the deliberative and reflective affordances of communication interfaces throughout the web.

Conclusion

We have made the following contributions:

1. Suggested that acts of listening should be a subject of applied research in communication interfaces for CSCW systems on the web.

2. Sketched preliminary theoretical propositions on the importance of listening on the web.
3. Presented Reflect, a novel design centrally concerned with listening and grounding.
4. Discussed related work in HCI/CSCW that touch on similar problems that listening might help address.

Scattered throughout this paper are many claims about how interfaces might be designed to impact how people behave in large discussions. These claims need to be empirically investigated. But how can studies be designed, executed, and analyzed in a way that maintains ecological validity while still being able to make claims about the affordances of the discussion interface? Listening complicates the empirical task further: how do we evaluate the impact of a particular way of being listened to, or listening to someone else?

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We are attempting to conceptualize the impact of listening and grounding from the perspective of efficacy [9], using an experience sampling technique modified for use on the web. It remains to be seen whether this will provide analytical power. But we believe that CSCW researchers need to work together to develop better methods for distinguishing a discussion interfaces' effects from the vagaries of the multiplication of particular individuals, the topic, and other contextual factors, otherwise we will remain relatively silent on an important topic for CSCW.

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