A Dashboard for Visualizing Deliberative Dialogue in Online Learning[1]

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Abstract: New and emerging online trends in group education, work and communication have led to a dramatic increase in the quantity of information and connectivity without always supporting—and sometimes sacrificing—quality. An important opportunity is that online systems can include tools that directly support participants in having higher quality and more skillful engagements. We are evaluating dialogue software features that support participants directly and "dashboard" tools that support third parties (mediators, teachers, facilitators, moderators, etc.) in supporting higher quality deliberation. We will focus on our work in educational settings (college classes) and on our development of a Facilitators Dashboard that visualizes dialogue quality indicators for use as facilitation tools or participant social awareness tools. The Dashboard makes use of text analysis methods to highlight indicators of dialogue quality. We are particularly interested in supporting the "social deliberative skills" that interlocutors need to build mutual understanding and mutual regard in complex or contentious situations.

1.   Introduction

New and emerging online trends in group education, work and communication have led to a dramatic increases in the quantity of information and connectivity without always supporting—and sometimes sacrificing—their quality. An important opportunity is that online systems can include tools that directly support participants in having higher quality and more skillful engagements. We are building and evaluating dialogue software features that support *participants* directly and "dashboard" tools (Few, 2007) that support *third parties* (mediators, teachers, facilitators, moderators, etc.) in supporting higher quality deliberation among participants. In this paper we will focus on our work in educational settings (college classes) and on our development of a Facilitators Dashboard that visualizes dialogue quality indicators for use by

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[1] A longer version of this short paper appears at www.socialdeliberativeskills.com/papers.

either third parties or participants. We are particularly interested in supporting the "social deliberative skills" that interlocutors need to build mutual understanding and mutual regard in complex or contentious situations (Murray et al., 2013A, B). Prior attempts to facilitate leaner dialogue using visualization and analysis tools, e.g. Asterhan & Swhwatz (2010) and De Groot et al. (2007), tend to focus on argumentation skills, and our work extends or complements this work by focusing on skills more related to mutual understanding and cognitive empathy. Communication, collaboration, and knowledge building have many facets; and we focus our research on a specific area: supporting the social deliberative skills and behaviors that allow interlocutors to build mutual understanding (or "negotiate meaning") in complex or contentious contexts. Recent advances in computational psycholinguistics allow for a more systematic and deeper analysis of dialogues, that is necessary to uncover subtle cues that might be diagnostic of critical deliberation characteristics. In Xu et al. (2013) we report on our work in developing computational methods to measure deliberative skills from online discussions, which have shown promising results. In this paper we will describe our progress and plans for displaying the results of such text analysis in the Dashboard.

2.   Dashboard Diagram Pane: Visualizing Key Indicators
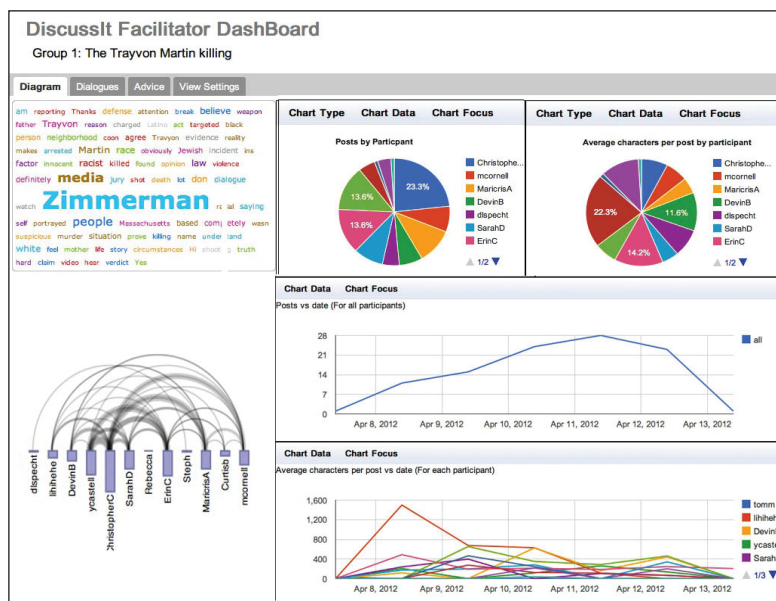

Figure 1: Facilitator Dashboard: Diagram Pane

We have prototyped a Facilitators Dashboard that provides parties a "bird's-eye view" of the state and flow of online engagements. See Figure 1 which shows tools in the "Diagram" tab of the Dashboard. Similar to Iandoli et al., De Groot et al., we visualize user, interaction, and content information, including participation levels, reply networks, and content or theme overviews—in both static and trend (timeline) visualizations. At a more ambitious level, we also use text analysis to identify skillful (or non-

skillful) deliberation, emotional tone or sentiment. Further, we have made early forays into automatically identifying dialogue phases (e.g. introductions, deliberation, impasses, persuasion) and turning/infection points or opportunities for intervention (e.g. silences or non-responsiveness, changes of phase or tone, sudden emotional tensions in multiple participants) (Xu et al. 2013).

Figure 2 shows data from a classroom discussion about the fatal shooting of Trayvon Martin by George Zimmerman which was a hot topic in the news during the time of this activity. When the facilitator begins using the Dashboard they select from a list of the deliberation projects, classes, or discussion groups registered with the Mediem software and the Dashboard (not shown in the Figure). Pie and bar charts show participation levels (number of participant posts and average size of posts). Timelines show trends in these same metrics. A social network diagram shows who is replying to whom, with the thickness of the lines proportional to the number of replies. A "word cloud" graphically shows word frequencies through font sizes (the color and location of the words has no meaning in this representation).

3.   Dialogue and Advice Panes: Text Analysis

As mentioned above, one component of our project is researching automatic text analysis and machine learning algorithms (and soon also relationship networks) to identify deliberative skill, other indicators related to dialogue quality, and trends or opportunity points (and see Rosé et al. 2008). Text analyses methods have advanced significantly in recent years. According to Graesser et al. (2009) the "increased use of automated text analysis tools can be attributed to landmark advances in such fields as computational linguistics, discourse processes… , cognitive science…, and corpus linguistics…" (p. 34). We are using three types of technologies. The first two, LIWC (Pennebaker et al, 2007) and Cohmetrix (Graesser et al., 2009), are pre-existing text analysis tools that take text segments as inputs and output dozens of measurement or classification metrics. The third technology is a set of machine learning methods we are using that take text, reply and demographic information, and some of the LIWC and Cohmetrix out-

Figure 2: Dashboard: Dialogue Pane

puts as input or training features, and output classification analysis (e.g. whether a segment of text demonstrates good "deliberative skill" or "self reflection").

4.   Conclusions

We have described a novel Facilitators Dashboard tool that visualizes dialogue quality indicators for use as facilitation tools or participant social awareness tools that includes textual analysis and described our initial attempts to use it in educational settings. We are particularly interested in supporting the "social deliberative skills" that interlocutors need to build mutual understanding and mutual regard in complex or contentious situations. Developing methods to scaffold SD-skills in online deliberation, for participants and third parties, could have an impact in many online contexts; e.g. knowledge-building, situated learning, civic engagement, and dispute resolution. Students engaged in extended collaborative knowledge building, discussion, or problem solving eventually encounter moments of tension in which they are challenged to understand each other's perspectives and opinions. Engaging with others on complex topics requires not only learning the relevant facts and concepts and making logical inferences but also, engaging with the perspectives and opinions of others who may not share one's views or goals. Doing so requires skills that can be systematically supported. Our work points to how such skills can be supported in online deliberation, collaboration, and dispute resolution—in educational settings and beyond.

5.   References

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