

# Trust for Online Deliberation on Wicked Problems: implications for the design of Internet-based large scale collaborative platforms

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Online deliberation tools have become a means for solving wicked problems by gathering the contribution of individuals with different skills and knowledge. However they are not good enough in organizing knowledge. Therefore a better performing medium has been sought by researchers. Collaboratorium, initiated by the Center for Collective Intelligence at MIT uses argumentation theory to overcome this problem. We posit that trust should be taken into account in online deliberation tools to increase satisfaction and participation of individuals. Therefore trust is an important element of online collaboration media. In this respect, our objective is to compare Collaboratorium and two conventional deliberation tools (i.e. wikis and forums) and derive implications for the design of future online deliberation tools.

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## 1. Introduction

Recent research on trust in online media focused mostly on topics such as virtual teams, online shopping or P2P networks<sup>2</sup>. Lack of social cues and face to face interaction prompted researchers to better understand how trust is formed despite various risks as opportunism in online shopping, virus attacks in P2P networks or knowledge appropriation in virtual teams.

Different from previous researches, this exploratory paper elaborates on the influence of trust in online deliberation tools. These tools have the potential to contribute toward the solution of wicked problems. Unlike mathematical problems, wicked problems do not have true/false solutions. Due to the interdependencies among factors considered in the problem, requirements to solve it change throughout the process and the solution of one factor might lead to another problem (Webber & Rittel). Existing online deliberation tools such as interactive e-learning, online chat, blogging, forums, online deliberative polls (Iyengar, Luskin, & Fishkin) and wikis (i.e. Wikipedia) provide alternate methods to approach these problems. They gather the information dispersed in different locations and facilitate the solution of wicked problems. However they still lack the ideal design and structure to better organize the contributions of individuals in large online communities. Collaboratorium is designed for this reason and it is still in phase of development.

Forums and wikis are opportunities for the silent majority to express themselves and deliberate openly. However they are prone to redundant discussions (i.e. the same content of arguments is expressed in different words) and to conflicts caused by controversial issues (e.g. editing wars of Wikipedia). Collaboratorium makes use of the argumentation theory. It aims at attending a higher efficiency level than other deliberation tools. It lets the online community members define the set of questions, propose answers and support or oppose those answers (Malone & Klein). As Rahwan et al put it, tools like forums and blogs are not structured enough. A structure is considered weak when incentive, guidance and normative expectations of behavior are unclear or lacking, yielding to unshared goals among individuals (Barrick & Mount; Beaty, Cleveland, & Murphy). It is required to show how different statements are connected to each other and to the whole. By enabling better navigation and visualization, argumentation provides a better structure. Thus, online argumentation could be a viable alternative to make use of collaboration to solve wicked problems.

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<sup>2</sup> Peer to Peer platforms allow users to share files without a mediator such as a website.

By joining online deliberation media, people assume some risks as well. First, they might enter into conflicts with other individuals of the online community. Second, the information provided to them by the tool might be false. Finally the defects in the technology used might prevent good functioning of the tool. As mentioned above, different online deliberation tools have different structures. Thus the relation between trust and these tools would be different. This exploratory paper elaborates on the implications of trust in three different online deliberation tools; namely forums, wikis and the Collaboratorium.

## 2. Research and theoretical foundations

*Trust:* Jarvenpaa et al. showed that communication and trust had a positive influence on the satisfaction of virtual teams formed by students. Similarly, Kim et al observed a positive relation between trust and satisfaction for Korean college students. On similar lines, we first claim that trust can have remarkable implications for the design of an online deliberation tool. Second, we argue that it is important to compare the trust of users in a new tool with that associated with existing technologies such as forums and wiki.

In an online deliberation medium, trust can be defined as the intention of the online community member to be vulnerable (Mayer, Davis, & Schoorman) which is conditioned by his/ her positive expectations (Gambetta) about the outcome. Trust is dependent on the relationship between the trustor and the trustee which is shaped by the interaction between the attitudes and values of parties. Trust has been categorized in terms of various aspects covered by behavioral, economic, sociological, psychological and institutional views leading to three subcategories used here. Calculative trust is based on transaction cost theory where the trust is the outcome of rational cost-benefit analyses (Williamson). Experience-based trust is the trust that develops over time with the gain of more experience (Holmes). Finally institution-based trust is the trust in a third party which is expressed by norms, regulations and sanctions (Shapiro).

*Trust in different contexts:* Trust is context dependent as pointed out by Rousseau et al. We may judge individuals as being a good person but not reliable at work. This categorist view of contexts is expressed by “relations” by Sheppard and Sherman. We define context as a contingent space of action determined by a set of social, technological and environmental constraints. When applied to an online deliberation tool, the environment is given by the information space developed by the participants, the technological constraints are dependent on the technological characteristics and functions of the tool and the social constraints refer to the rules followed by the community.

## 3. Trust-based Comparison of Tools

IT systems are not risk-free and being a design component, we believe that argumentation has influence in trust formation. It is shown that the perceived credibility of a website may depend on visual appearance and design (Fogg & Tseng). Kim and Benbasat show the influence of Toulmin’s argumentation model in developing trust for online stores<sup>3</sup>. People trust more in statements with more backing and information. In a similar vein, Gregor and Benbasat posit that information systems that use Toulmin’s model in their explanations will receive more trust from their users. To support the trustworthiness of an automated medical care system Gorski et al. use a UML based argumentation structure. Consequently, we expect to see a positive affect of complete argumentation structures on people’s trust on the whole system and among the three tools tested, Collaboration has the most complete argumentation structure.

**Proposition:** People’s trust in Collaboratorium will be higher than their trust for wiki and forum.

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<sup>3</sup> Toulmin’s model is based on three elements of arguments; namely data, claim and backing. Data is the ground that the claim is based on and backing supports the credibility of data (Toulmin, 1958).

We want to test whether - and to what extent - the Collaboratorium outperforms wikis and forums in each trust dimension (i.e. calculative, experience-based, and institutional). Measures on each trust dimension can provide useful indications for the improvement of the design of the Collaboratorium.

Table 1 develops the discussion in section 2 and gives different aspects of trust in an online deliberation environment. It also shows that an online deliberation tool can be conceived as a matrix of contextual constructs (information, technology and community) and trust types. Each cell corresponds to a different context-trust category dyad and gives its implications for online deliberation tools.

	<b>Calculative</b>	<b>Experience-based</b>	<b>Institutional</b>
<b>Information</b>	<p><i>Benefits</i></p> <ul style="list-style-type: none"> <li>• Expected information gain</li> <li>• Expected development of critical thinking</li> </ul> <p><i>Risks</i></p> <ul style="list-style-type: none"> <li>• Expected loss of private knowledge</li> <li>• Probability of conflicts, disputes</li> </ul> <p><i>Costs</i></p> <ul style="list-style-type: none"> <li>• Expected time required for research before posting and to post the ready knowledge</li> <li>• Expected time required to find desired knowledge among present postings</li> </ul>	<p>Frequency of information postings that are</p> <ul style="list-style-type: none"> <li>• unrelated</li> <li>• unsupported</li> <li>• one sided</li> <li>• wrong</li> <li>• related</li> <li>• backed (by an authority, experiment etc.)</li> <li>• objective</li> </ul>	<p>Perceived effectiveness of sanctions in case of disinformation:</p> <ul style="list-style-type: none"> <li>• Cancellation of user account</li> <li>• Temporary prevention of access</li> </ul> <p>Perceived effectiveness of incentives:</p> <ul style="list-style-type: none"> <li>• Rewards on quality postings</li> <li>• Giving responsibility, assigning editorship</li> </ul>
<b>Technology</b>	<p><i>Benefits</i></p> <ul style="list-style-type: none"> <li>• Advantages of learning a new tool: career, facilitating real world experiences (homework, researches etc.)</li> </ul> <p><i>Risks</i></p> <ul style="list-style-type: none"> <li>• Efforts turning out be useless due to inaccurate computing technology (i.e. algorithms of rating calculation, voting mechanisms)</li> <li>• Inefficient deliberation method used</li> </ul> <p><i>Costs</i></p> <ul style="list-style-type: none"> <li>• Expected time to spend to learn using the tool (ease of use)</li> <li>• Expected time to spend to understand mechanisms (voting, editor election)</li> <li>• Expected time to spend and money paid to install the software (if necessary)</li> </ul>	<ul style="list-style-type: none"> <li>• Frequency of abuse of flaws in technology, mechanisms</li> <li>• Perceived efficiency of the tool</li> <li>• Good functioning of the tool</li> </ul>	<p>Perceived effectiveness of sanctions in case of abuse of flaws in</p> <ul style="list-style-type: none"> <li>• technology</li> <li>• mechanisms (rating, voting for decision making...)</li> </ul> <p>Perceived effectiveness of incentives to use the mechanisms (i.e. voting) and technology (the tool itself):</p> <ul style="list-style-type: none"> <li>• Obligation</li> <li>• Help support</li> </ul>
<b>Community</b>	<p><i>Benefits</i></p> <ul style="list-style-type: none"> <li>• Image gain from the good reputation the community might have in the future</li> <li>• Self satisfaction by community citizenship</li> </ul> <p><i>Risks</i></p> <ul style="list-style-type: none"> <li>• Image loss due to the bad reputation the community might have in the future</li> <li>• Future conflicts and disputes (i.e. editing wars)</li> </ul> <p><i>Costs</i></p> <ul style="list-style-type: none"> <li>• Time lost for disputes, governance (for editors)</li> </ul>	<ul style="list-style-type: none"> <li>• Frequency of conflicts, propagandas, social interactions</li> <li>• Good functioning of community relationships</li> </ul>	<p>Perceived effectiveness of</p> <ul style="list-style-type: none"> <li>• preventive social norms: praising cooperative culture, constructive deliberation, democracy, respect to others' thoughts...</li> <li>• sanctioning norms: flaming<sup>1</sup>, neglecting</li> </ul> <p>Perceived meritocracy in the functioning of mechanisms (voting for decision funneling, electing editors...)</p>

<sup>1</sup> Flaming means angry messages sent by online community members which can function as a sanction method showing the reaction of the community to someone's inappropriate act.

### **Table 1 Trust - Context matrix of an online deliberation tool**

First an online deliberation tool's technology needs to earn people's trust to the extent it relies on computational mechanisms and algorithms (e.g. voting mechanisms in online stores, selection of editors in open source projects). In a technological context, people look at the tool from a calculative perspective by comparing the benefits of using a new tool (e.g. gaining a new skill) versus learning costs. From an experience-based point of view, one would evaluate the good functioning of the tool in the past (i.e. occurrence of technical failures, computational errors etc.). The institutional trust for technology relies on the support given for use of the new technology (e.g. efficiency of the help menu) and sanctions in case possible defects in the tool are abused. Information constitutes the second context. An online deliberation tool is a point of reference for information seekers. Expected gains from using the information, contributions of the formerly used information and sanctions or incentives about information sharing correspond to calculative, experience-based and institutional trusts respectively. Finally community constitutes the third context. According to calculative reasoning, people expect benefits from membership. Experience-based view evaluates the past membership experience and institutional trust assesses the reliability of control measures on members' behaviors.

The trust levels corresponding to the cells of the matrix will be measured through a survey. Survey items are developed in the light of previous works in areas such as virtual teams, online shopping, online reverse auctions and organizations (Ratnasingam, 2005; Compeau, Higgins, & Huff, 1999; Ridings, Gefen, & Arinze, 2002; Pavlou & Gefen, 2004; Hsu, Ju, Yen, & Chang, 2007). While this helps us found the work on an experimental basis, the results of this study will extend the research on online trust to online deliberation tools. Collaboratorium is in the phase of development. Thus the results will help improve the design of future versions of this tool. We will have knowledge on which trust types will be essential in which context.

## **4. Future work**

A field experiment to be held in April 2008 shall provide us with the opportunity to compare the three types of online deliberation tools, two of which are taken from traditional examples (forum and wiki). The third tool is Collaboratorium. To test the above proposition, three groups of about one hundred students each, will be formed. Each group will deliberate on the same wicked problem by using a different deliberation tool selected from one of the three above.

This study will have three major contributions. First, it will help us develop our understanding of trust in a different online environment. Second, it will provide a comparison of the three deliberation tools. Third, we will develop a methodology to measure on-line trust taking into account its contextual nature. Hopefully it will serve as a reference point for the design of future online deliberation media.

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