Micro-NGO: Tackling Wicked Social Problems with Problem Solving and Action Planning Support in Chat

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Abstract

When a group of citizens wants to tackle a social problem online, they need to discuss the problem, possible solutions, and concrete actions. Instant messengers are a common tool used in this setting, which support free and unstructured discussion. But tackling complex social problems often calls for structured discussion. In this paper, we present Micro-NGO, a chat-based online discussion platform with built-in support for (1) the problem-solving process and (2) the action planning process. To scaffold the process, Micro-NGO adopts a question prompting strategy, which asks relevant questions to users in each stage of the problem-solving process. Users can answer the questions and vote for the best answer while they freely discuss in the chat room. For an informal evaluation, we conducted a pilot study with two groups (n=7). The participants held a discussion while collectively answering the question prompts and reached consensus to send a petition letter about campus issues to the related personnel.

Author Keywords

Social movements; E-deliberation; Question prompt; Chat.

ACM Classification Keywords

H.5.m [Information interfaces and presentation (e.g., HCI)]: Miscellaneous

Introduction

Modern social problems are often wicked (or ill-structured) problems that are "complex, unpredictable, open-ended, or intractable" [5]. For example, problems like "how to prevent secondhand smoking in public spaces" do not have one right answer. A quality discussion by stakeholders in online settings may be useful to reach a possible solution.

Citizens who wish to solve these kinds of problems can gather and discuss online using e-deliberation systems. ConsiderIt [6] uses the pros-cons axis as an anchor in the discussion to find a solution. Participants collaboratively develop a pro-con list and vote for their position on the topic in the continuous scale of support or oppose. MooD [8] is a solution-centered deliberation platform that collects alternative solutions with factual statements and source references. After the solution finding phase, participants vote to rank the alternatives and fill in forms to measure moral acceptability. While these platforms are specifically designed to support online deliberation, the entire problem-solving process is often not supported (e.g., only exploring options or voting for pre-filled options might be possible). Support for concrete action planning is missing from most platforms.

While some groups might use these platforms with built-in support for structured discussion (e.g., a facilitator guides the discussion flow [1]), others might use a group chat feature in messenger applications to discuss freely (i.e., unstructured discussion). One advantage of unstructured discussion in a chat room is the flexibility of the discussion and users' familiarity with the tool. While many protesters use messaging apps and other social media as a major communication channel [4], unstructured discussion suffers from several challenges in supporting deliberation in social movements.

First, regular messengers do not provide criteria for wicked problems. The wicked problem-solving process involves finding a solution that meets primary requirements with justifications [2]. Results from previous research suggest that solution quality was higher among the groups that were informed by concrete criteria (or questions) [2]. Furthermore, without the knowledge of such criteria, participants may lose focus on the problem-solving process.

Second, regular messengers do not provide systematic discussion flow. Sharing ideas alone may not be enough to reach a solution. Ideas should be shared, discussed, and developed. Phased (or staged) discussion approach is a way to promote co-creation of a solution [7]. Phased discussions with criteria have their advantages. They may lead to a higher consensus level, better decision making, focus on criteria, and less topic change [1].

To address these challenges, we introduce Micro-NGO, a platform that aims to attract ordinary citizens who are interested in a social problem to form small virtual interest groups, discuss shared issues, and take collective action with chat. In Micro-NGO, a group of intrinsically motivated volunteers collectively (1) generate a problem statement, (2) select the best solution, and (3) generate action plans.

Micro-NGO adopts chat as a primary interaction channel for the following reasons: (1) chat naturally affords discussion, (2) most users are familiar with online chat, and (3) it does not involve complex rules. To bring the structured discussion process to the chat-based discussion, we embed the problem-solving process and the action planning process to the chat room.

Micro-NGO employs the question prompt strategy to support the entire discussion process. Micro-NGO prompts related questions for the problem-solving process and the action planning process. Question prompt strategies can be
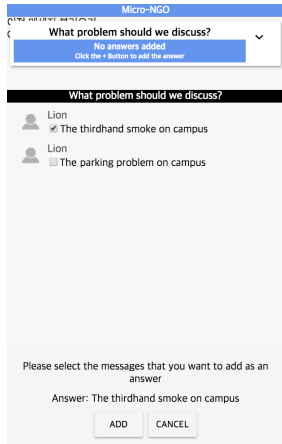
Figure 1: A user answers a question prompted by the system, and suggests an item to be voted by other members.
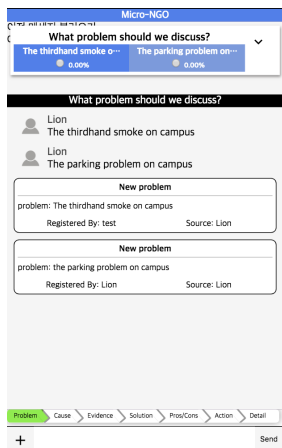

Figure 2: A user successfully added two answers as candidate problems to be tackled by the group .

used to direct "the efforts of the group more productively" and "balance between structure and flexibility to peers" [9]. The strategy aids members' meta-cognitive process and compensates the lack of domain-specific knowledge [9]. Micro-NGO embeds two question sets: the problem-solving question set is designed to support identifying problems and generating solutions; the action question set is designed to support the action planning process.

Along with the question prompting strategy, Micro-NGO coordinates discussion flow via voting. Each question in the question set creates a phase in the discussion. Advancing to the next phase requires users' voting and consensus. Users can vote for an item or add a candidate at any moment of a phase. When a threshold consensus level is reached (e.g., more than 50% of users vote for a particular item), the system advances to the next phases and prompts the next question. The proposal-voting workflow helps the team to brainstorm candidates and select the best candidate [7].

We conducted a preliminary lab study (n=7) to test the feasibility of our system. Seven participants were divided into two groups and assigned to solve two different social problems. Both groups were able to generate a problem/solution statement and an action plan statement that involved filing a petition.

Preliminary Interview
To guide the design of structured discussion support online, we reached out to local NGOs to understand their problem-solving process. We conducted a face to face semi-structured interview with a staff member from a local NGO. Located in Daejeon, South Korea, the NGO is one of the well-known and active NGOs in policy monitoring. The NGO addressed three thousands of local issues

(small-to-large scale) in the 20 years of their history. For the request of anonymity, the names of the NGO and the interviewee are hidden. Our interviewee was the head of the civic participation division. We used a semi-structured interview process to gain knowledge of how the NGO works. The interview lasted about 90 minutes. The interviewee was asked to talk about their social movement cases, their problem-solving process, and challenges.

The problem-solving process of the NGO
The NGO's problem-solving process is similar to the ill-structured problem-solving process that Xun et al. described: "(a) problem representation, (b) generating and selecting solutions, (c) making justifications, and (d) monitoring and evaluating goals and solutions" [9]. A typical problem-solving process in the NGO starts with problem discovery. The interviewee emphasized that they have various problem discovery channels, such as news media, citizen reports, other NGOs, and their internal member channel. The most important source was news media. The problem representation process began when they recognized that there is the problem (a). The interviewee mentioned that there was an issue regarding the city's subsidy program for school cafeterias. They requested the status of all school's cafeterias in the city. However, not all schools fully cooperated on the request. Some schools sent poor quality reports. The NGO concluded that the quality of information that the schools disclosed was limited to investigate the problem deeper. The NGO also believed that some schools did not have an efficient process to respond to information disclosure requests. After the initial problem representation, they generated solutions (b). They discussed a plan to write a public statement and notify the press. They intended to criticize the quality of the information shared by the schools (c), and local news media quoted the statement. After the release of the public statement, they received feedback
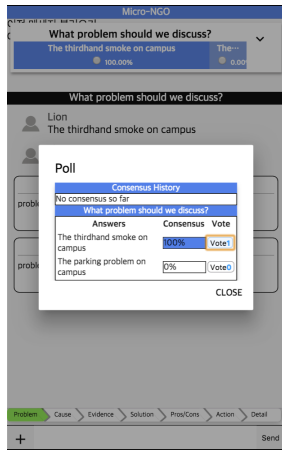
Figure 3: A user opens a voting window and votes for an answer candidate.

Problem
"So the first thing we are going to deal with is thirdhand passive smoking?"

Cause
"Lack of awareness and insufficient prevention system"

Evidence
"We all experienced thirdhand passive smoke, and in fact, we have seen a message in the community that appeals to such an inconvenience."

Table 1: The top-ranked problem representation from G1.

from the schools (d). Some school principals called the NGO and expressed their anger while others offered an apology.

After the interview, we noted one design consideration to transfer the NGO's problem-solving process to an online setting: a well-established process to identify the problem, solution, and action plan. To apply the design considerations, we designed Micro-NGO to embed the problem-solving process and the action planning process into the free-form conversation in chat.

Prototype Design of Micro-NGO
Micro-NGO embeds two types of discussion processes in the chat room: (1) problem-solving process and (2) action planning process.

Problem-Solving Process
For the problem/solution discussion, we adopted three processes from an ill-structured problem-solving process from what Xun et al. described [9] : (1) problem discovery, (2) solution generation, and (3) making justifications. To support the process, the system uses a question prompting strategy as externalized support. Micro-NGO prompts questions about (1) problems and causes for a problem discovery process, (2) possible solutions, and (3) pros and cons for making a more informed decision.

Action Planning Process
For our initial prototype, we prepared question sets for the following actions: (1) Express a petition, and (2) Run an online campaign. P. Hanna et al. [3] have compiled a comprehensive list of various types of social actions, which we refer to when adding support for more action types.

Suppose a group concluded that they need to send a petition letter. Although the group agreed on a high-level col-

lective action, it is not an actionable plan yet. They need to disambiguate the plan by making concrete decisions. The question sets in Micro-NGO are designed to guide the generation of actionable task descriptions. For example, the "Petition Letter" question set consists of the following questions:

- Who should receive our petition letter? (name of the person)
- What is the title of the person?
- What is the best petition letter delivery method?

Voting Workflow
Once a user enters a chat room, they see the chat room UI with a voting summary bar at the top. The bar (Figure 1) shows the last question that was prompted and a vote status graph. When a user finds a possible answer to the current question in the chat messages, the user can register the message as a candidate for others to vote for.

Figure 1 shows how to register a vote item. The user presses the plus (+) button at the bottom left of the screen (Figure 2) to add an answer. The user can also select a message that contains a possible answer to the current question and click the "ADD" button to register an item. Once a vote item is added (Figure 2), anyone in the group can vote for the item (Figure 3). Users can add candidate items and vote until the voting is over. The voting ends whenever one of the items gets more than 50% of all members' votes, or the vote passes the deadline (e.g., 24 hours).

Pilot Study
To test the feasibility of Micro-NGO in guiding a group's discussion, we conducted a pilot lab study for informal evaluation. We recruited seven students from KAIST and divided them into two groups (G1: four, G2: three participants). We asked the groups to discuss a social problem using

Solution
"1. Change the perception of smokers → Campaign
2. The process of institutionalization to prevent thirdhand passive smoking → install mouth washers, deodorant, etc.
3. making requests for improvement to nearby smokers"
Pros
"Prevent and reduce thirdhand passive smoke, create sound smoking culture, and raise awareness"
Cons
"Uncertainty of resolution due to non-coercion, the presence of other factors such as outsiders, and limited budget"

Table 2: The top-ranked solution answers from G1.

the Micro-NGO prototype. We assigned an issue of "secondhand smoking on campus" to G1. All participants in G1 were non-smokers. G2 discussed issues about the school cafeteria. While they sat in the same room, they were asked not to talk to each other verbally. They were first briefed on how to use the prototype, and they were asked to discuss the topic for 50 minutes.

Results

Both groups were able to answer all the prompted questions via the voting process. Both groups discussed the problem, suggested a solution, and chose to send a petition letter about the solution. G1 changed their assigned problem to a thirdhand smoking problem on the campus. The message logs suggest that the majority of the participants rarely observed secondhand smoking due to the well-established smoking booths on campus, but they identified the thirdhand smoking problem on the campus.

We conducted an informal discourse analysis after the lab study to extract design considerations for the next prototype. We found the following behaviors of participants.

F1. Self-regulation of off-topic messages. One of the participants in G1 mentioned a con of the solution when the prompted question was to find pros of the solution. Immediately after the utterance, the participant regretted that he posted an off-topic message.

- (about the solution for thirdhand smoking) "I just thought that if you share oral cleansers with others, would you feel uncomfortable?"
- (two messages from other participants omitted)
- (four seconds later) "Oh, I think it's better to talk about it again when we discuss the cons of the solution."

F2. Action selection reminded participants of pros and

cons of the action. When G1 was prompted the question "What should we do to take action?", they had to choose an action from the two pre-selected actions provided by the system (*send a petition letter* or *start an online campaign*). The members of G1 discussed the pros and cons of each action, even though the system did not prompt questions about pros and cons. One of the participants argued that "From a long-term perspective, online campaigns seem to be good for changing smokers' perceptions, but in the short-term, it would be more effective to file a petition to the school and regulate smoking". After this message, a majority of the members voted for a petition letter.

F3. Participants discussed solutions in the problem discovery phase. For the first question ("What problem should we discuss?"), the members of G1 and G2 discussed solutions along with the problem. After the first question, they followed the discussion process with less off-topic messages.

Discussion and Future Work

The lab study helped us identify areas for improvement. While F1 and F2 imply the benefit of the structured discussion in a chat room, F3 presents a challenge. Furthermore, the long solution answer may imply that extract a single answer through the voting process may not enough. G1 presented several items as a solution. (see Table 2).

For future work, we plan to add more direct instructions to encourage users to remember and follow the discussion process (e.g., "If you found a related answer to the current question in a chat message, please add it as a candidate."). Also, we will change the voting process to support candidate composition systemically.

We also plan to conduct a lab study at a larger scale along with a post-survey, interview, and discourse analysis. The

Action
"Send a petition letter"
Receiver name
"Yes, then should we go for student association?"
Receiver title
"The president of the student association"

Table 3: The top-ranked answers for the action plan from G1.

survey will be designed to measure participants' perceived debate experiences and recall of collectively derived results. Quality of discussions and its consensus level will be measured by the discourse analysis.

Acknowledgements

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