Interaction and communication resources in collaborative e-democratic environments: The democratic citizenship community

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Abstract. Social networks change the way users relate on the Web. One type of social network is the virtual community, which has a social structure that connects citizens and the government. Integrating consultation and deliberative environments for popular participation in democratic issues and creating virtual communities to enhance member relationships makes it possible to model decision-making processes. This was behind the development, testing and analyzing of the Democratic Citizenship Community (DCC). The DCC has interaction and communication resources such as citizens’ profiles, debate, voting, an information library, a social space and users’ help. An experimental analysis generated discussion about and suggestions for improving the interaction and communication resources.

Keywords: Social network, e-government, virtual community, Democratic Citizenship Community

1. Introduction

With the evolution of the Web, users have the ability to modify and create new content directly in browsers without the need for additional tools. By means of the so-called social software [22], people are connected, communicating share content and knowledge via computers and the Internet. Such software included blogs, microblogs and wikis, which allow for collaborative content creation. Blogger, Twitter and Wikipedia are examples of social software, respectively. Improved Internet speed and bandwidth has led to systems that use audio and video, such as YouTube and Slideshare. Other Web 2.0 technologies are the photo-sharing (e.g. Flickr) and audio-sharing (e.g. podcast).

A social network is composed of a set of actors and their connections [5]. One type of social network is the virtual community, in which users do not necessarily live in the same geographical region, as they do in communities based on physical space; rather, they share common interests. Orkut, Hi5, Facebook and MySpace fall in this category, which has proven attractive to Internet users. VCs have spawned changes.

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in society, modifying people’s social lives by bringing technological innovation to them to support the exchange of communication and experiences. A preliminary diagnostic evaluation [12] showed that today’s virtual communities (VCs) have many social characteristics, are not directed toward democratic debate, and do not stimulate citizen participation in decision-making with their government.

In light of these factors, the Government-Citizen Interactive Model [12] was proposed to address the different phases in a consultative and deliberative process.

The Democratic Citizenship Community (DCC) was projected [13], developed and tested [15] based on the Government-Citizen Interactive Model. The DCC proposes a specific set of interaction and communication resources: citizens’ profiles, debate, voting, an information library, a socialization space and users’ help. This paper comments on the DCC in a pilot case study [14]. The experiment analysis generates discussion on and suggests improvements for the interaction and communication resources employed.

2. Social networks, virtual communities and e-democracy

The web has proven to be an effective source of information and a powerful tool for communication in modern society. During the “Web 1.0” phase, the focus was on interconnecting documents, pages and machines. Now with “Web 2.0”, there is a focus on linking up people, organizations and concepts [19]. Web 2.0 allows all users to produce and publish content and gives them responsibility for it. These users are connected online according to their interests, giving birth to social networks.

A social network is a set of actors (e.g. people or organizations), which are the network’s nodes, and the relationships that link them [1]. The social network indicates the ways in which actors are related [8]. Boyd and Ellison [3] define “social network sites as web-based services that allow individuals to construct a public or semi-public profile within a bounded system; articulate a list of other users with whom they share a connection; and view and traverse their list of connections and those made by others within the system.”

As there is no established classification for social networks, Kazienko and Musial [8] propose the following taxonomy: dedicated (e.g. dating or business networks, networks of friends, graduates, fun clubs); indirect (e.g. online communicators, address books, e-mails); common activities (e.g. co-authors of scientific papers, co-organizers of events); local networks (e.g. people living in the same neighborhood); families; employees networks; hyperlink networks (e.g. links between home pages), and others. However, social networks can be classified not only according to the type of relationships within the network, but also according to the type of communication.

The evolution of social networks depends on the mutual experience, knowledge, relative interpersonal interests, and trust of human beings [8]. According to Boyd and Ellison [3], what makes social network sites unique is not that they allow individuals to meet strangers, but rather that they enable users to articulate and make visible their social network. The Social Web aims at considering special issues that arise with the formation of groups in such environments. As man is, in essence, a social being, his presence in the Web environment and the complexity of modeling systems that represent human relationships in the real world pose great challenges. Additionally, it should be remembered that the development of Information and Communication Technologies (ICTs) cannot be separated from issues of ethics and social commitment.

According to Matt Webb [22], a social software is one that allows people to connect through Computer-Mediated Communication. As elements of a social software, the author mentions:
– Identity: each person in the system can be identified.
– Presence: you can see who is online, available or otherwise nearby.
– Relationships: it is possible to identify how two users of the system are related.
– Conversation: you can talk to other people through the system.
– Groups: communities of interest are built up (and explicitly represented).
– Reputation: you know the status of other people in the system (Whose opinion can be trusted? Who can be confided in?).
– Sharing: it is possible to share things that are meaningful to participants (like documents, photos or videos).

We have added to this list of elements another one:

– Recommendation: it is possible to indicate the quality of available content.

As social softwares, virtual communities must have these elements. Virtual communities are extensions of real-world communities. However, their members are not related geographically, but are bound by common interests. VCs enable and support communication between people who are in different places and on different schedules [23]. In relation to citizens’ sociability, VCs are used to reinforce human interaction in order to construct knowledge. Koh et al. [9] defines a VC as a group of people interacting predominantly in cyberspace for their own common interests, relationship building, transactions and fantasies.

According to Recuero [18], social networks in cyberspace can be studied based on their structure, organization and dynamics. Considering these factors, the author regards virtual communities as social networks. Wellman and Gulia [24] defend that the change from virtual communities into social networks happened irrespective of the creation of the Internet. Castells [4] adds that “the community becomes a network as an important manner to organize interaction.”

Virtual communities tend to establish an area of negotiation for different subjects/civil society groups and stimulate a reflective and collaborative audience [2]. Thus, they can support and enhance electronic democracy (e-democracy). E-democracy consists of using ICTs and Computer-Mediated Communication (CMC) to intensify citizens’ active participation and to support collaboration among actors (such as citizens, the government and civil society, among others) with the intent of elaborating public policies. The question of engaging large numbers of people in e-Voting and/or e-Participation is the central issue of most discussions and plans about the future of e-democracy [20].

Rowe and Frewer [21] define public participation as consultative practices involving the public in decision making through activities conducted by political organizations and political institutions. Countries may adopt different methods to promote citizen participation in decision-making, including referenda, public hearings/inquiries, public opinion surveys, negotiated rule making, consensus conference, citizens’ jury/panel, citizen/public advisory committee or focus groups [21].

Active citizen participation demands greater involvement by the population and is very likely to influence political decisions. The tools required for this kind of interaction include not only e-mails, which may contain unused information, but also online forums for public consultation and organization of society into social networks and/or virtual communities. Bibliographical studies reinforce the need for virtual environments specifically designed to foster good interaction between citizens and the government during the decision-making process. Considering that goal, Maciel [11] investigates studies and e-democratic applications, from forums to integrated participation tools. We therefore hypothesized that such communities could serve as a foundation for implementing e-Democracy in the form of e-deliberative processes.
Considering these references, as well as the others discussed in [15], this study investigates VC modeling for e-democratic purposes and conducts a case study using the DCC to test this model. The proposed model is shown in the next section.

3. Government-Citizen Interactive Model

This section describes the Government-Citizen Interactive Model [12], developed with a view toward organizing consultative and deliberative processes for e-democratic purposes. The main characteristics of this Model are its special debate structure, a role for moderator, resources for voting on the debated issues and the formation of a virtual community for social use by users.

Online government applications have a range of interaction tools with different functions [11]. In general, advisory processes have been carried out by e-mail, chat or discussion forums, even though these formats pose problems with regards to structuring discussion and information retrieval. Final determination, in turn, occurs only through inquiries, often on general subjects and without prior deliberation. Internationally there are online tools that address these issues [11], but although they integrate resources, many do not treat citizens as individuals responsible for collective decisions. Overall, applications for consultative and deliberative government purposes present problems, as follows: a) they do not offer social opportunities for citizens to engage as individuals responsible for community decisions; b) they must remain open during a certain time period and effectively be used; c) they lack discussion structuring mechanisms; d) they do not provide opportunity for deliberation to support joint government-citizen decision making; and f) they have no way to verify individual’s engagement maturity on the themes being discussed to ensure conscious deliberation.

The proposed Model is structured in stages and activities [12], which are not mutually exclusive, to be taken into consideration in the development of a web environment with such purposes. The proposed stages are: initiating the process, creating a virtual community of citizens, registering demands, conducting a consultative debate, clustering demands, voting and deliberating.

The model structures citizen participation in a community for a given e-deliberative process according to location and themes. These citizens may submit their names as moderators. Registered citizens will be allowed to post requests that interest them, which will be discussed in the debate environment, according to a previously-arranged schedule. The debate is organized as it is proposed in the Democratic Interaction Language – DemIL [11], which classifies opinions and their supporting arguments in the categories ‘for,’ ‘against’ and ‘neutral.’ Moderation activities in the debate are performed by the citizens who proposed to do so [14]. Due to the way it is structured, retrieving information in the environment is easy, as is quantitative and statistical analysis of data. After this phase, members are encouraged to vote, in specified turns. When the voting period is over, results are calculated. Ideally there is a socializing space for users to get to know one another. There should also be a digital library, which allows users to exchange information in other digital formats. In the proposed model, a governmental agency would be the preferred system manager.

It is very important to consider the participation model [21] used to adapt this model, as there are specific needs for carrying out a popular consultation like a referendum or a focus group, for example. The model must also have attributes that are critical for governmental applications, such as usability [17], accessibility, security and data privacy.

The components of the Virtual Community Model have clear functions [12], as presented in Fig. 1.
- Citizen Profile: The initial step is formation of the Community, which is simply introducing the individuals into the virtual world by registering their profile. This profile allows requests to be managed and distributed geographically and according to theme. Geographic and thematic distribution is predefined by the governmental management.

- Popular Representative and/or Requests: The individuals must represent the people and be partisan or advising representatives. The issues to be deliberated (debate topics), as well as the pre-established daily theme, will also be registered by the citizens.

- Information Library: Citizens need to have access to the information in different formats so they may reflect and vote conscientiously. Both the government and citizens can provide documents and links referenced in the discussions.

- DemIL Debate: Through this resource, citizens can exchange information, one of the primary characteristics of a democratic debate. The DemIL Debate component models a forum structured with specific characteristics [11]. The main feature of this model is it asks citizens their positions, to which they submit a text response of ‘for’, ‘against’ or ‘neutral’. A moderator can interfere in the posting of opinions during debate.

- Social Space: The inclusion of spaces for socializing, such as chat, mural or coffee-bar, where members get to know each other, can motivate and integrate the virtual community’s citizens.

- Voting: A request is submitted for discussion and vote – for, against, or neutral; there is a secret ballot and an anonymous argument supporting the vote. Votes are counted and the arguments for each request are incorporated into the deliberative report. The process can be conducted in n turns,
with each turn requiring time for discussion and choosing from the vote options, after which the outcome is determined.

– Deliberation: Each turn results in a determination of who/what/which will continue to the next phase of voting or who/what/which was chosen by the community.

The proposed model was tested in the Democratic Citizenship Community, presented in the next section. In order to model the application, we searched the Web for consultative and deliberative environments, analyzing both domestic and international e-government initiatives [11]. The e-participation proposed in this study is an original system that includes aspects of VCs.

4. Democratic Citizenship Community

Specifically based on the Government-Citizen Interactive Model, the Democratic Citizenship Community (DCC) prototype was specified [13], implemented and tested [15]. This section addresses the last two stages of the DCC system.

Before presenting the DCC system, it is important to note that the established functional and non-functional requirements for this kind of application were first identified and the interfaces designed and tested [11,13].

The system is accessed through the web address http://www.comunidadecdc.com.br/ (system interface in Portuguese, acronym: CDC). The original interfaces are in color.

On the homepage users can log in to the DCC or register as a new user. The opening text informs: ‘DCC is a place to discuss matters of common interest that supports voting. Get informed, post your opinion and help decide.’ See the DCC homepage in Fig. 2.

After registering or logging in to the DCC, the user is directed to his/her Profile. The DCC has interaction and communication resources, accessible by links on a tool bar, such as citizens’ profiles, debate (request registration and discussion), voting, information library, social space and users’ help.

The system administrator visualizes the DCC differently, since his role is different. He can register and manage the calendar using the schedule created in the environment; register the regions and proposed themes for consultation and deliberation; define the type of manifestation (referenda, public opinion surveys, focus group, among others) when the process begins; register messages to be sent to citizens,
notifying them of dates for the process and final result; and define data viewing strategies for discussion and voting. For such purpose, he also has the option “administration” on his tool bar, which gives him access to the users log register.

The citizen profile shows main personal information, such as profession, city and e-mail. The scheduled manifestation is presented in the citizens’ profile and requests are listed and divided into themes, so they may debate and/or vote during the previously scheduled period. This schedule determines the deadlines for opening the debate, voting and concluding the activities. See the citizen’s profile in Fig. 3.

In the “Debate” link, after choosing manifestations they are interested in, users can “Register a new topic” to be discussed at the DCC, ensuring the consultative process continues. Also in the “Debate” link previously registered requests are discussed. As an example of a citizen’s request, we have: “Although voting is an important opportunity to exercise citizenship, I believe that voting should not be mandatory and absentees should not be subject to punitive measures.” See Fig. 4.

According to the DemIL language, in the “New debate” box citizens must post their opinion or comment about the request in discussion by choosing from among the options: for, against or neutral. This is added to the end of the list of existing posts.

The moderator interferes with the debate process based on specific criteria: when he identifies unclear opinions, inconsistent argumentation, over generalizing, deviation from the theme or violation of the terms of use [14]. Such interference occurs by text chosen from a list of options. The moderator has access to a different view of the requests he moderates. In this case, there is a “Moderator” bar, which gives access to the grounds for interference and a field to justify it, as show in Fig. 5.

After the discussion period, when the voting process is opened, citizens cast their final votes through the “Voting” link. They may also post an explanation of how they arrived at their decision. At the end of the debate period, the system calculates the votes relative to each request, according to type, to establish the final result.

Citizens may obtain information relevant to their decisions through the Digital Library containing web links, which are registered according to theme. See Fig. 6. In the “Socialization Space” citizens visualize other members’ profiles, send invitations to potential new members, publish news on a board or simply visualize this board.
The DCC also has a help menu, structured by means of FAQs (Frequently Asked Questions), to clarify user doubts about using the environment.

5. Case study

This section presents the methodology used for implementing the DCC, as well as a data analysis of the pilot case study.
5.1. Methodology

Considering the Government-Citizen Interactive Model, a “Public Consultative Committee” was registered and a schedule made in the system for the phases of the consultative process. The following phases were defined for using the DCC: 1) Registration of participants; 2) Registration of participant requests; 3) Debate surrounding the issues raised; 4) Voting; 5) User satisfaction survey; and 6) Calculating the results. As suggested by users, the word “topic” replaced “demand” in the DCC interfaces. However, “demand” is kept in the analyses.

When users initially contact the DCC and enroll, they may register their interest in acting as moderator. After users register requests, the administrator assigns moderators according to themes. When enrolling, users must access and agree to the DCC’s terms of use.

The schedule for the “Public Consultative Committee” was designed to be completed in 20 days: 15 days to debate and 5 to vote. Invitations to participate in the experiment were sent by e-mail based on the graduation and post graduation discussion lists of the institutions involved in the study. During the deliberative process, the system sent four notifications to participants’ mailboxes in an effort to stimulate participation in the discussions, explaining the moderators’ role, reminding people of the dates for the voting period and asking users to complete the satisfaction survey. Throughout the process, many responses were sent to user e-mails addressing general questions about the application and expressing appreciation for compliments, criticisms and suggestions sent to the administration.

This study tested two different ways to conduct structured deliberative processes, including consulting and voting: 1) conducting online surveys by stages, and 2) using a Web application, creating virtual communities to strengthen relationships among members (related in this case study). In general, online surveys have proven to be satisfactory, because this approach structures the discussions in a way that users find helpful. Nevertheless, there are issues that warrant further attention, including the role of the administrator in configuring the survey, the need for having a moderator for the discussions and increased sharing of posted information. The results of using surveys were published in [16].
5.2. Data analysis

The sample group was composed of volunteer undergraduate and graduate students from the universities participating in the study: UFF and UC. It applied to a consultative and deliberative process, according to interests of the institutions. As the application presented the option “Invite a friend” in the socialization space, there were also external participations.

Seventy-six individuals were interested in learning about and taking part in the DCC and filled out the enrollment form. Among them, 67 were from Brazil and only 9 from Portugal. This is probably attributable to the voluntary nature of participation, to individuals’ particular interests on specific issues and to differences in school calendars. Another factor is the “social presence”: most of the Brazilians who were personally involved knew the research coordinator.

After implementing and managing the DCC in a practical case, the data was analyzed by means of usage statistics, complemented by analysis of log registers in the administrator’s view, Google Analytics tool and a survey among participants upon conclusion with regards to their satisfaction with the DCC.

Data included the DCC users’ demographic profiles, degree of interest in debating, voting and other environments and how satisfied they were with using the DCC. The full data analysis is shown in [15].

The moderator’s role in the debate is specifically analyzed in [14]. With regards to grounds for moderator interference (unclear opinions, inconsistent argumentation, over generalizing, deviation from the theme and violation of the terms of use), they do seem to enhance debate quality, although participants may have difficulty understanding them. Future works will aim to evaluate whether the proposed moderator interference categories were well assigned [14]. From a technical perspective, future studies could address how moderation could be partially automatized, perhaps using ontologies and semantic web for to structure debate, and how debate content could include a recommendation system based on a social network analysis.

Here we will discuss user satisfaction, and in the next section present the interaction and communication resources employed.

5.3. User satisfaction survey

Thirty users (39.48% of the participants) filled out an online user satisfaction survey about their experience using the DCC.

The Model was designed to structure a deliberative process in stages to facilitate decision-making. By means of the DCC, users tested this structure and 91% said that it made decision-making easier, while merely 9% said that it did not. The opportunity to participate in a scheduled debate with other participants was beneficial for their deliberations. One user commented, “...I think an interesting option would be to allow a person to select topics of greater interest and receive periodic e-mails notifying them of any opinions posted on these topics; otherwise it becomes too loose and the user forgets to keep checking.”

When asked if ‘the participant positioning him or herself ‘for,’ ‘against’ or ‘neutral’ benefits from the posting of comments,’ 83% agreed, 13.4% disagreed, and 3.3%, i.e., one user, expressed no opinion. On the other hand, 73.4% did not think this system inhibits them from expressing their views on the topics discussed, while 26.6% have the opposite opinion, i.e., that taking stances may inhibit the posting of comments.

Regarding the importance of other people’s opinions in influencing the final vote, 16.7% strongly agreed with this statement, 30.0% agreed, 33.3% disagreed, and 13.3% strongly disagreed, while 6.7% expressed no opinion. In the former statement, users were divided; however, concerning the statement
Table 1

Difficulties generated by request phrasing

<table>
<thead>
<tr>
<th></th>
<th>Difficult to</th>
<th>Yes</th>
<th>No</th>
<th>I don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understand</td>
<td>46.7% (14)</td>
<td>50.0% (15)</td>
<td>3.3% (1)</td>
<td></td>
</tr>
<tr>
<td>Discuss</td>
<td>30.0% (9)</td>
<td>66.7% (20)</td>
<td>3.3% (1)</td>
<td></td>
</tr>
<tr>
<td>Vote</td>
<td>26.7% (8)</td>
<td>66.7% (20)</td>
<td>6.7% (2)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2

General evaluation of the DCC

<table>
<thead>
<tr>
<th>Evaluated items</th>
<th>Excellent</th>
<th>Very Good</th>
<th>Good</th>
<th>Regular</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layout</td>
<td>23.3% (7)</td>
<td>26.7% (8)</td>
<td>43.3% (13)</td>
<td>6.7% (2)</td>
<td>0.0% (0)</td>
</tr>
<tr>
<td>Usability</td>
<td>20.0% (6)</td>
<td>20.0% (6)</td>
<td>53.3% (16)</td>
<td>3.3% (1)</td>
<td>3.3% (1)</td>
</tr>
<tr>
<td>Administrator</td>
<td>20.0% (6)</td>
<td>63.3% (19)</td>
<td>13.3% (4)</td>
<td>0.0% (0)</td>
<td>3.3% (1)</td>
</tr>
<tr>
<td>Moderators</td>
<td>13.3% (4)</td>
<td>50.0% (15)</td>
<td>36.7% (11)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
</tr>
</tbody>
</table>

‘The participant may change their opinion during the process,’ 93.4% agreed, which leads us to believe that the consultative process may indeed influence the final vote.

For 89% of users, the time spent in the consultative and voting processes was sufficient for deliberation; in other words, there was enough time to make a decision about the debated issues. One user stated that, ‘The debate intensifies with time and with the relationships built between people due to their posted opinions.’

An 80% agreement rate was recorded for the statement ‘The information library allows users to learn about what is being discussed in real time, so they can form their opinion,’ attesting that this space is useful for debate. As for the statement ‘The social space makes it possible to know who the other community members are and to seek means to socialize with them,’ 80% of users expressed agreement.

Table 1 presents user answers to the question about whether the phrasing of certain requests created difficulties. In general, participants did not encounter difficulties, though a rate of 46.7% for the category ‘understanding’ is high and indicates there were some problems. We believe that during discussion and voting, which both obtained a rate of 66.7%, this problem was mitigated, since discussion allows users to clarify their doubts by exchanging ideas with other users.

Participants evaluated the project and use of the application for debating and voting, as presented in Table 2. Most users approved the layout of DCC interfaces and expressed satisfaction regarding the application. One user posted the following comment: “I found the system very interesting and useful. I assessed the layout and user-friendliness as just ‘good’ because I believe that it can be improved and evolve. With time, I imagine a very complex website, full of voting and topics being discussed. For instance, I think this tool could be used in schools – the results would be interesting.”

The administrator’s participation was considered very good by 63.3% of the users, while 50% of them said the same about the moderators. The moderators’ participation in the DCC is analyzed in [14].

Most users approved DCC usability. See the DCC usability evaluation, according to Fig. 7. When asked, “Does a virtual community make it easier to discuss and vote in group?” 96.7% of the users answered “yes.” This evaluation supports the conclusion that the strategy adopted for deliberation in a VC was satisfactory.

6. Discussing interaction and communication resources in the virtual community

The experiment analysis made it possible to discuss and suggest improvements to the interaction and communication resources. In this section, we identify aspects in which the DCC could be improved,
considering layout, data privacy, usability, function, moderation and administration [11], reflecting the lessons learned and practices to consider when planning collaborative e-democratic environments.

6.1. Layout, data privacy and usability

Registering requests for discussion is a central point in these environments. It must be done as clearly as possible so that other users can more easily express their opinions. An interesting proposal is to include a wizard during the typing of requests. The wizard would support the users’ activities, maybe even reinforcing the importance of reviewing the request text. An example of possible verification could be: “Does the way you elaborated your request allow participants to vote by choosing for, against or neutral?”

In order to minimize spelling and grammar mistakes that can generate confusion, we suggest adding an automatic corrector applicable to both requests and opinions.

So as to motivate people to use the environment, at the time of registration users could be offered options about whether they want to receive e-mails from the system, for example notification when other members post regarding n pre-selected events. Thus the DCC can be personalized according to user preferences.

With a view to helping beginner users, the design could contain a splash screen, a wait window shown upon entering the system explaining how to use the environment. If necessary, the splash screen could help them navigate. Therefore, it would be important to add a tutorial with animated illustrations of the help menu functions. An animated interface agent may also be helpful for encouraging user participation and stimulating interaction.

Privacy of user information is a crucial issue, since some of their information can be easily found by search engines, like Google, linked to their name or e-mail. Another important concern is securing database information; Since users are identified by their government issued ID or voter registration number, to strengthen information reliability and to ensure there is one identity for each individual, it is essential to provide mechanisms to guarantee user privacy and security.

The DCC social space must be made more attractive and useful, like a meeting place for cultivating social bonds. To this end, the design must include a synchronous communication chat room as well as a resource for exchanging personal notes. The socialization space must structure relationships also, so that members can expand their interaction by viewing others interested in a given request, when they registered in the system and the last time they logged in. Another possible feature would indicate which users are logged in. Note that the application has a political, not entertainment, focus, but nevertheless a strong social component is warranted.

Fig. 7. Usability evaluation.
6.2. Functions of the model

The model’s design, with questions like, “What is the best post-graduation course in Computer Sciences in Cuiabá (MT)?” is not a subject for discussion, because there is no need to be for, against or neutral; it is enough to state an opinion. Thus the model requires an additional component that would compile pre-selected options, such as a polling tool. This would make it possible to conduct theme-based surveys or those on matters of common interest. A top-down menu for the link ‘debate’ might be created with the following options: register topic, discuss topic and participate in a poll. The latter could be subdivided into two options: register for poll and vote in a poll.

Some of the issues regarding how opinions are posted and how users vote ‘for,’ ‘against’ or ‘neutral’ are discussed below.

In the model, a qualitative question must be answered quantitatively, due to the fact that users have only 3 choices. In order to solve this problem, we intend to add more flexible options, such as an answer line or scale along which the user can move the cursor. This line would begin from 100% for (or 0% against) and end in 0% for (or 100% against), with the central mark indicating a neutral vote. This would allow users to register a very specify view, such as 70% for.

Some users chose ‘neutral’ to express doubt, to reinforce something previously stated or to add new points to the debate. It did not always indicate the user had no opinion; sometimes it worked to contribute to the debate, but not directly expressing an opinion. Users who had already voted ‘for’ or ‘against’ seldom registered additional comments labeled ‘neutral.’ This last problem could be solved by enabling users to post subsequent comments hierarchically in the interface, connecting them to their earlier comments. Nonetheless, the feature for expressing opinions must be kept so that users can change their minds.

The debate could be spurred applying the “singularity of opinions” concept created by Ludford et al. [10]. This strategy can be put into practice by means of an opinion attribute that notifies users about contrasting opinions other members have posted. Such a feature could stimulate discussions in the environment.

The voting process is currently secret in the DCC, and not even the system registers the user choices, only their participation. For users to feel voting is safe, there must be computational devices to assure reliability when submitting votes.

One of the phases set in the DemIL is data clustering. There must be a method for classifying similar opinions, which requires criteria for selecting, collecting or eliminating them. The proposed model encompasses this phase, but the virtual community was not created with this function. Opinion summaries or statistics on the clustered data could be used for this purpose. Eventually, these data should be summarized and classified in the technical report on popular participation.

At the end of the process, a deliberative report is generated. This requires greater attention, since it is the technical report on popular participation that will provide feedback and transparency for citizens and the government.

6.3. Moderation

The current model is promising with regards to moderation. However, we suggest that an e-mail be sent to the author of a post any time the moderator interferes with it, so they are aware of this before they return to the environment.

All moderator intervention is intended to keep up the level of the debate, but some members may have a hard time with it. So far in the DCC, we displayed in the ‘help’ menu examples of each kind of
moderator intervention. Furthermore, we believe that more studies on the proposed phrasing, as well as icons representing each type, may prove helpful.

6.4. Administration

The administrator’s view could also be improved, for example with an automatic e-mailing tool to advise when moderators enter or leave, a database with standard texts for e-mails, a list of e-mails sent and a print option in some tabs of the DCC.

Interaction and communication resources discussed in this section can be gradually added to the DCC, raising new analyses on performance and user satisfaction. The evaluation of the DCC prototype is an initial experiment with virtual community concepts applied to e-deliberative environments. Based on this experience, we are now improving the design’s interaction and communication resources and developing new studies, as described in the conclusion.

7. Conclusion

Analysis of the DCC’s use upon completion of the experiment allowed us to discuss and propose improvements for the communication and interaction resources employed. Important points were identified for improving the DCC, reflecting the lessons learned and practices that benefit collaborative e-democratic environments.

The model presented alone does not ensure quality government-citizen interaction. The interface designer can enhance the quality by considering aspects of computer-mediated communication like usability and socializing among members, among others. Moreover, it is essential to consider contributions from other social theories, including possible empowerment ascribed to systems, everyone’s right to access information (transparency) and limitations imposed by digital illiteracy. Thus, it is necessary to discuss criteria and identify evaluation parameters and tools to guide designers developing applications in specific areas.

Our future studies will investigate how the DCC works after introducing other elements of the Social Web, such as presence, reputation and recommendation. Research studies on ongoing VCs also add value by considering issues like methods to inspect usability, accessibility and sociability; the moderator’s role; and the moderator’s impact on the decision-making. Issues of trust and security in e-democracy, information protection and privacy are essential in e-government applications and must be investigated more closely in connection with the DCC. It is also suggested that another study be conducted to identify which components are indicated for different means of participation. This would help identify components not yet included in the platform design.

There is also ongoing research dedicated to developing a framework for social web applications for the government, as well as components to be used in them. The framework and components designed can be used by interested parties, such as city governments, ministries or other public institutions that require social participation on issues of public concern. The components will be built based on the Government-Citizen Interactive Model [12], which proposes phases and methods that enable citizens to participate more actively in consultative/deliberative processes. This platform also considers features of social networks.

Further research is working to apply the Semantic Web to the DCC. The Semantic Web represents one of several attempts to solve problems related to information manipulation on the Internet. We believe that by applying Semantic Web techniques and technologies in the DCC we can organize information
in the virtual community and enhance its usability. This strategy, involving ontologies and agents, will help refine the search system, which will find more relevant results for the users. Additionally, it will help improve the information recommendation system, with a view to stimulating popular participation in the debates.

We also believe the proposed environment can be adapted to different media and digital devices. Above all, we identify digital TV and mobile phones as two important environments for research and adaptation.

Finally, it should be noted that the DCC is used as the test application of the Maturity in Decision-Making method (MDM) [11], which uses a set of indicators to measure participation of individuals in deliberative groups. This method can be indirectly used to measure the reliability of citizens who participate in this sort of virtual community. Since building trust is difficult, the architecture must encourage it among participants in consultative and deliberative electronic government processes. This will impel society to participate more actively in strategic decision-making and help democracy move into the future.

The DCC for citizen interaction on government issues allows us to monitor the effectiveness and continuation of a consultative and deliberative online process using the MDM method, which allows us to assess citizens' behavior in the decision-making process. We consider that its transferability to other countries, with different cultural backgrounds, warrants further investigation.

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References


