

# Designing Inclusive Social Networks: A Participatory Approach

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**Abstract.** The Brazilian society is characterized by vast differences with regard to socio-economics, culture as well as access to technology and knowledge. In this scenario, Information and Communication Technology, especially hypermedia systems, could benefit citizen, allowing access to knowledge, communication and collaboration. Current social networks systems were not conceived to address the challenges of an inclusive society. In this paper, we discuss some relevant design issues, elicited from a participatory approach, to the design of such systems. The exploratory design process starts with the elicitation of the different views among users, designers and developers, passes through design concepts definition and gets to a first approximation to a user interfaces design.

**Keywords:** Inclusive social networks, participatory practices, design issues.

## 1 Introduction

Brazil, as other developing countries, is characterized by vast differences with regard to socio-economics, culture, geographical region as well as access to technology and knowledge. Social indicators presented by the Committee of Entities Combating Hunger and for Life (COEP<sup>1</sup> in its Portuguese acronym) show that in 2003, 34% of the population lived below the poverty line. Furthermore, approximately 26% of the population is functionally illiterate<sup>2</sup>, whereas functional illiteracy is defined by an age of 15 or higher and less than 4 years of formal education. Moreover, the last census of 2000 found that 14.5% of the population has impairments<sup>3</sup>. In this scenario, Information and Communication Technology, especially hypermedia systems, has the potential of benefiting citizens, allowing access to knowledge, communication and collaboration, and thus promoting the process of the constitution of a fairer society.

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<sup>1</sup> COEP. <http://www.coepbrasil.org.br>. Last census available.

<sup>2</sup> MEC. <http://portal.mec.gov.br>

<sup>3</sup> MJ. <http://mj.gov.br>

For this purpose, it is necessary to investigate how to design systems that consider the diversity of users taking the digitally excluded into account. Although there are many online social networks developed to aid people in activities of communication and cooperation, they were not built for diversity. They do not address access to people with different interaction abilities, including inexperienced users, elderly, illiterates, people with disabilities and others. A review about fourteen current systems to support social networks shows that the resources that social networks put available today are not enough to allow access to the variety of users cited above [1].

Social networks provide resources for maintaining social relationships, for finding users concomitant interests, and for sharing content and knowledge that has been contributed or endorsed by other users [5]. When a social network enables every person to integrate a group which is able to interact under a social protocol and a set of rules to promote the sharing of goods and subjects obtained through production and mobilization within these groups, it is called an inclusive social network (ISN) [2]. ISN can be especially useful in contexts of expressive disparity among people due its capacity to provide conditions of use despite of physical, social, economics or cognitive conditions.

Facing the challenge of developing an ISN that could be used by Brazilian citizens, taking into account their different needs and interaction abilities, this work presents a discussion about some relevant design issues and the participatory process used to elicit them. The approach is based on concepts of Universal Design [9] or Design for All and uses techniques from Participatory Design [7] to support an exploratory design process. The process starts with the elicitation of the different “views” (from the community, designers and developers) about systems to support ISNs, passes through design concepts and gets to an interface proposal that materializes the design solutions.

This paper is organized as follows: Section 2 presents the theoretical and methodological references and describes the applied techniques; Section 3 presents our approach to the design of ISNs; Section 4 points out some design issues that demand extra studies; Section 5 presents our final considerations.

## 2 Theoretical and Methodological References

The design of “Interfaces for All” aims at addressing efficiently and effectively the various interaction problems arising from different user abilities [8]. According to Stephanidis, the underlying principle is to ensure, during the design process, that the needs of elderly and people with disabilities are considered. To that end, it is important that these needs are known since the early stages of product and service design. This approach reduces the need for “a posteriori” adjustments and makes it possible to offer products that meet the demands of end users in the population.

Design for All means designing interfaces enabling access to users with diverse competencies in the population in a non-discriminatory way; this means to offer the possibility of interaction and access to the content in ways that make sense for people considering their different interaction abilities.

The development of Interfaces for All is still a challenge as design problems persist even if we consider some particular users groups (cf. Neris et al. [6]). In some cases, only the use of assistive technologies (such as screen readers or automatic translators) and adherence to the recommendations of accessibility found in the literature are not

sufficient for the effective interaction of these users [3]. Melo and Baranauskas show the need to bring these people into the design process to understand their needs and to design with and for them.

The PD approach has its origin in the promotion of the participation of workers and syndicates in the decision making processes related to development of new technologies for workplaces in the Scandinavia of the early 1970s [7]. PD proposes effective users involvement throughout the software lifecycle promoting benefits such as mutual learning between designer and user; leverage of comprehension of users characteristics, preferences and needs; and the democratic design of technologies [4].

In order to guide designers in choosing participatory practices to be employed along the software lifecycle development, Muller et al. [4] proposed a taxonomy of 61 participatory techniques. Two of these techniques are Group Elicitation Method (GEM) and BrainDraw. Within the GEM, participants write a design idea on paper and circulate to the next participant of the group. Upon receiving the ideas of another participant, each one has a short time (for about two minutes) to agree, disagree or put a new point of view. This phase continues until all participants have seen the ideas of the other participants at least once. In the BrainDraw, each participant starts a drawing in one sheet of paper (considering a defined interaction situation) and after a short time (for about a minute) every participant circulates the paper among the other participants. The short time to draw guarantees that no one will be able to finish a complete idea in their sketches, so that the final artifacts will be a mixture of ideas of everyone. Each design is unique because it has a different beginning.

### 3 Applying PD in the Context of ISNs

The development of a system to support ISNs demands a participatory and inclusive approach, as described in the following sections.

#### 3.1 Eliciting Design Concepts

A group of eight people - considering target community representatives and researchers with different focus such as design, development and media - was invited for the GEM activity. They were asked to write one design idea related to ISNs (e.g. allow collaborative edition, show interconnections in the network of adds and people, construction of a reputation system) and then pass the sheet to the next participant. After the round, the participants were asked to highlight the main concepts they found in their sheets. These concepts were then announced to the others and written down on a whiteboard. Connections between the concepts were draw and as a result, we obtained a conceptual map. We decided to use the conceptual map because it allowed us to correlate the contributions of each participant's main words (concepts) while discussing their meanings and relative importance. The importance of the concepts was determined considering the number of times the concepts appeared in the sheets of paper to the design situation.

Considering the relative importance of the concepts, we categorized them into five groups, being group A the one with the most important concepts. The groups and their concepts are shown in Table 1.

**Table 1.** Main concepts divided into five groups

Group	Concepts
A	Identity and identification, tailoring, privacy, reputation, coordination model
B	Different media, various needs of use, diverse interest groups
C	Awareness, means of representation and expression (e.g., pictures, avatar, videos)
D	Features (calendar, instant messenger, sharable areas, collaborative edition, forums, idea links, groups, visibility, people)
E	Physical (real) center (TeleCenter)

From the groups in Table 1, it is possible to realize that concepts such as identity, tailoring, privacy, awareness are more important for the participants than the tools/features themselves. This points out the need to make the system accessible independently of the communication tools it will present. Also, it is important to reinforce that the physical center was mentioned showing the importance of the public spaces in the context of ISNs. As many users do not have computers with Internet access at home, they need to use the services of a Telecenter. This also brings important issues for the design regarding environmental and personal constraints.

The concepts obtained with the GEM composed the basis for the scenario created for the next activity, the BrainDraw, which is described next.

### 3.2 Gathering Design Elements

Once we had the concepts (Table 1) elicited during the GEM, we proceeded to the application of the BrainDraw technique. This time, a group of 22 people took part of the activity, among them researchers, community leaders and end users. Among the users were people who have little or no contact with computers and the Internet.

Due to the size of the group, it was divided into five smaller groups and, inside each group, the BrainDraw technique was applied. For the generation of design proposals' phase it was described a scenario of use. This scenario, translated below, was read to the whole group and a projection stayed on the wall during the activity.

*“You are in front of the computer. In the screen, you see the website from the Inclusive Social Network that you are a member of. You see an advertisement (a product, service, social event or an idea) that you are interested in. You notice that the person who put the advertisement is present in that moment in that website. You get in touch with that person and immediately you ask that person something about the advertisement. The person answers your question. That makes you feel satisfied with that website and you keep browsing there...”*

As we would like to gather design elements that could represent the concepts obtained with the GEM, the scenario proposed included elements associated with awareness (*you notice the person is present, you get in touch*). Also the proposal of the advertisement can consider questions related to reputation and privacy. Further, the coordination model (*you are a member*), different media and communication (*you ask something*) among others were considered.

In addition to the BrainDraw technique proposed in Muller *et al.* [4] we performed another two phases after the generation of design proposals: discussion within the group to generate a consolidated design proposal with best accepted ideas from the

design proposals; and the exposition and discussion of the consolidated design proposals among all the participants. Figure 1 presents two of the five groups' consolidations. From this example it is possible to verify the diversity of ideas as the menu style, categorization of advertisements, presence indicator, and others.



**Fig. 1.** Examples of the consolidations of the groups' design proposals

With the drawings obtained from the consolidation phase and the subsequent presentation and discussion of those consolidations we conducted an analysis of the design elements. In the first stage of the analysis we identified the variation in presentation style, number of occurrences and localization in the screen. A brief summary is presented in Table 2.

From the analysis considering the presence or position of design elements, we can highlight some important findings to understand the community's context:

**Advertisements.** Four of the five consolidations proposed categories for the advertisements and different manners to represent them (menu, selection box). Again, 4 consolidations considered to present the advertisements of a specific category in some kind of list (tabs, sequential list, previous/next buttons). Finally, all the consolidations proposed the full visualization of just one advertisement at a time;

**Website sponsors.** Despite having appeared only once, the sponsors' area was well accepted by all during the presentation and discussion phase. This emphasizes the care about the sustainability of the website;

**Communication mechanisms.** Due to the scenario of use every consolidation presented communication mechanisms. The best ranked were telephone and chat. We believe this represents the lack of participants' experience with computers. People not experienced with computers suggested mechanisms of their quotidian life;

**Multimedia in advertisements.** We identified the frequent use of images while no other media was used to illustrate advertisements.

More than the syntactic aspects, referencing the presence and position of design elements, the drawings allow an analysis considering also semantics, pragmatics and social aspects of the design.

**Table 2.** Detailed individual analysis of the design elements from the groups' consolidation

Element		Nr of Times	Place	Media
Navigation menu		5/5	Left side (3/5)	Sequential vertical text (3/5)
Site's name		5/5	Top (4/5)	Text (4/5)
Logo		3/5	Left top (3/3)	Picture (3/3)
Communication mechanisms	Chat	3/5	Right side (2/3)	Text (3/3)
	Phone	4/5	Near the description of the advertisement (3/4)	Text (4/4)
	E-mail	1/5	Near the description of the advertisement (1/1)	Text (1/1)
	SMS	1/5		
	Message via site	1/5		
	Forum	1/5	Navigation menu (1/1)	Text (1/1)
Presence indication of online users		1/5	Left bottom (1/1)	Picture (1/1)
Advertisement	Various types of media	5/5	All five were different	Text and picture (5/5)
	Navigation	3/5	All three were different	Arrows pointing right (next) and left (previous) advertisement (2/3)
	Presence indication of the advertiser	5/5	Near the advertisement (4/5)	Picture (3/4)

Semantics aspects are related to the meaning of the interface elements for the community. All the groups used different colors to signalize the presence or absence of a contact. However, G1 showed the status of the advertiser even before the announcement details. This signalizes the importance that this group places on awareness. Also, G2 used a large picture of a community personage in the main page. During the discussion, they emphasized that it represents an interactive character that would present the community. G3 drew a logo in which a group of people are in circle with their hands attached, what shows the meaning of an ISN for them.

Pragmatics aspects are related to the intentions behind the design, considering which type of communication and negotiation the interface provides. From the menu items that appeared in the drawings (e.g. net partners, school's projects, animals donation, among others) it is possible to realize which information the community intends to share using the system. Furthermore, G1's advertisement considers interface elements that allow the confirmation of an order, representing the seriousness in the relationship between the advertiser and the interested person. Another important aspect regarding the participants' intentions with the system is the disclosure of the community, i.e. the group of people that shares the social network. It appeared in different ways, e.g. G1 proposes videos about the community, G2 proposed the personage to present the community, G4 showed pictures of the neighborhood.

Social aspects are related to the effects of the system use and their impact in society. They include those related to commitments, beliefs, culture. In this sense, education was the main aspect pointed out in most of the drawings. The educational impacts of an ISN were emphasized by participants during the discussion phase and appeared in the drawing in different ways. G1 presented a link in the menu for educational videos. Also, they added a link for a web radio with educational purposes. G2 presented announcements for supporting classes. G3 presented announcements for courses. G5 presented links in the menu for education and social events (concepts). Also, they linked educational videos in some announcements, e.g. “learn how to recycle your trash” linked with an announcement of a returnable bag. The analysis of the consolidated drawings shows that the use of a participatory technique supports the design team with important information considering diverse aspects of the interaction with ISN systems. The results of the analysis were then considered in the proposal of a first approach for the design, as shown in next section.

### 3.3 Materializing Design Ideas

In this section we present how concepts, design elements, semantics, pragmatics and social aspects of the design, elicited from the participatory activities, were addressed in an ISN system prototype (*Vila na Rede*. available at <http://www.vilanarede.org.br>). Figure 2 presents the wireframe complemented by some clipping from the prototype.

The header is composed of three subareas: logo and website's name, random advertisement's images and accessibility resources. These subareas address relevant concepts raised in the GEM activity such as: identity and identification; visibility; and various needs for access. Moreover, the logo and website's name area appeared in every consolidation of the BrainDraw activity. We adapted a proposal that appeared in BrainDraw, that was a top bar displaying images of the local community, to join user identification with the visibility of his/her content, as illustrated in the random advertisement's area. At the right side of header there are some accessibility resources such as font size, contrast, and skip links. Despite of this specific area, accessibility is considered transversal to every interface element as pointed out in GEM. The footer contains the sponsors' area as presented in section 3.2.

In the left column there are two subareas: navigation and users' presence indicator. The navigation area situates the menus. The ISN proposed implements two kinds of menu - based on the BrainDraw results - a sequential and a circular. Both of them are supposed to be universally accessible and available at any time according to users' preference. Just below the navigation are located the users' presence indicator. This area presents a list of online users and their status (e.g., available, away, occupied).

The column on the right was brought by the designers who identified its need. The context in which *Vila na Rede* is immersed calls for a Meta-Communication area, aiding especially the digitally illiterate in the interaction with the system. This region should display a mechanism, e.g. an avatar, which will contain online help in diverse formats. For this same column, a tool to group participants' opinions was thought as a way to allow the community to express its view as a collective whole. These opinion polls would address a different topic each month and display the results.

Both the GEM and the BrainDraw technique highlighted the demand for multimedia content, which was provided in the central area, furnishing the advertisement feature

with audio-visual material. The designers complemented this idea adding the possibility of having Libras<sup>4</sup> - besides the text, image, sound and video - to be used in the advertisement. In order to navigate through the ads, different formats came up in the drawings, like horizontal arrows, tabs and dropdown menu. A horizontal navigation bar was adopted and thumbnails will be used to help this task. Besides these features, others are going to be included, that will help users to identify other's presence and broaden the possibilities of communication (e.g. instant messaging, text message to cell phone), which came from the GEM concepts. Other challenging design issues are discussed in next section.



Fig. 2. Mapping concepts and ideas from GEM and Braindraw to an ISN system design proposal

## 4 Discussion on Design Issues

The use of participatory techniques throughout the design process of ISNs enabled the identification of design issues to be overcome so these systems can be effectively used by all. Thus, issues regarding tailoring, privacy and security, reputation, coordination model, awareness, meta-communication and physical place should be considered.

Tailoring is the activity of modifying a computer application within the context of its use. By using tailorable applications, communities and the users themselves could adapt and maintain the system according to individual and collective interaction requirements. Regarding tailoring, it is still necessary to investigate how to model the different interaction needs in such a way that they can be managed and supported by a software application. Further, how to present the possibilities of tailoring in the interface, in a way that makes sense for all users especially for those that are novice in the use of computers, still need to be addressed.

<sup>4</sup> LIBRAS - Portuguese acronym for Brazilian Sign Language.



Concerning privacy and security, more specifically the user authentication method, the usual options are password, predefined questions, biometry, and images. In the context of ISN, it is important to provide more than one authentication method due to the diversity of possible functional restrictions. At *Vila na Rede*, we are evaluating the use of password and also login through images.

As in real life, when people interact through an ISN system they usually want to know if they can trust in the person (or group) they are interacting to. However, to determine reputation is a very critical activity because of impacts in how a person feels in relation to others and how people choose who they want to interact. Therefore it is necessary to think about metrics and strategies to assign or deliberate on a certain reputation and how they will evolve through the time.

On the subject of coordination model, we believe that users' groups should be able to define their own coordination models according to their needs and preferences. Therefore, decisions like "who can do what" and "what is right and what is wrong" can be made by the group members supported by the system.

Another relevant aspect of social networks it is the feeling of "being part" of a community. To make viable this sensation it is necessary mechanisms to provide information about users' actions and status, objects, groups, tasks, etc. When a user is capable of understanding that information and use them to establish and maintain communication and to collaborate we say he/she is aware. However, when constructing an ISN it is necessary to provide different awareness information to address different needs and preferences. Currently there are questions that demand research: How to present awareness information considering users diversity? What is relevant awareness information in each presentation style (e.g., text, sound)? How to keep communication even in situations when users choose very different system views? How to make these scenarios possible in inclusive context?

Moreover, the establishment of a communication channel within the ISN, through which users can find help to overcome obstacles in the interaction with the system, is very important especially when considering the digitally illiterate. This communication about communication must be carefully designed. Further research is still needed in order to present this information, how to do it and when to do it - considering the diversity of the communities that will make use of it. That involves considerations not only about the tasks that one can perform during the use of the system but also language and metaphors that make sense to them.

Finally, our research indicates that people want to use ISN systems as a way to establish contacts in the real world and to give more visibility to their community, products, events and ideas. In addition, our target community is characterized by low computer literacy. Due to these facts, besides the ISN system, it is necessary to provide a friendly physical environment, a place where people can extend their social interaction and get training in the use of computers.

## 5 Conclusions

In this paper we pointed out some of the major challenges to the design of systems to support online ISNs. We employed a participatory approach to the design of such systems. The approach involves participatory practices, such as GEM and BrainDraw,

and collaborative activities for the identification of requirements and for the formulation of a design proposal. We presented and discussed major questions and contributions that resulted from this work.

Considering the challenging social context we have, the involvement of the user as “part of the team” provides to designers and developers the possibility to better know the differences present in the social context. This knowledge coming from the source and the participation of users in the design proposals legitimize the obtained solutions.

This work is a first step in an endeavor to contribute to the proposal of new methods that could deal with the difficulties of designing for diversity and collaboration with special focus on systems to support online ISNs. Future work involves other participatory activities within the target community, when it will be possible to experience the design solutions.

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