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for *Vila Na Rede* system**

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Abstract. The main purpose of this document is to define the mechanism's functionalities and detailed elements. Starting from a more general description of the mechanism to be implemented, this technical report presents the meta-communication instrument instantiated at Vila na Rede – an inclusive social network system developed in the context of the e-Cidadania Project.

Key words: Computer Mediated Communication, Meta-communication, inclusive social network.

1. Introduction

Earlier investigations [5] have led us to conclude that Inclusive Social Network systems such as Vila na Rede (the deliverable resultant of the e-Cidadania project) asks for a meta-communication mechanism to support not only the novice users, but everyone interested in reaching the digital world of information by learning more about the systems' features and possibilities.

A generic and simple definition for meta-communication is “communication about the communication”. More specifically for the context of this research, we can adopt the definition provided by Capobianco and Carbonel [1], in which meta-communication refers to all exchanges of information that are related to the conceptual model of the system, i.e., the communication that takes place in order to clarify or overcome problems during the communication processes and the communication surrounding the system's concepts. That includes the communication between designers and end users, allowing designers to explain to the users what their intentions were when building the system and helping users to make sense of the system and its features.

The issue of designing a support tool that helps users to better understand the system - and thus to better use it - becomes a challenge in our context, as we can have users

that not only have low levels of literacy but also low familiarity with technology. Another aspect of this communication between designers and users lies on the fact that it should not be a one-way road. Users should be provided with means to express their feelings towards the system.

Previous activities had given us basis to support the concepts involved in this meta-communication mechanism, which would be composed of 1) communication tools; 2) a scaffolding system and 3) an affective response system.

The communication tool that will integrate Vila na Rede is to be described at a report to appear. This technical report presents the characteristics of the scaffolding and affective response systems and it is organized as follows: Section 2 presents the scaffolding system with its format (2.1) and content (2.2); Section 3 instantiates the affective response system and Section 4 concludes.

2. A Scaffolding System

In this section we present the scaffolding system and its surrounding issues. While the majority of the characteristics came from activities that actively involve the end users expected for this system, other decisions were based on results found in the literature - which should be evaluated within our context in future investigations.

As this system is to be used in the Vila na Rede inclusive social network by Brazilian citizens, it is necessary to consider the characteristics of this population, which has a vast diversity of backgrounds (socio-cultural, economical, etc) and abilities. This diversity demands extra efforts from the designers when thinking in interaction elements for the development of universal solutions, that is, design results that could be used by all.

The issues concerning usability and accessibility guided the definition of this system's format, content and elements, which are described in the following subsections.

2.1. Format

Help systems are found in many different applications and web sites and they are most often presented in written formats. For example, the web page of the Ministry of Work and Employment in Brazil (Fig. 1) has its help mechanism – a FAQ list –

available only in textual format. This could be a huge obstacle to be overcome by an illiterate user, for example, who is expecting to find support in this page.

At the online social network Orkut – vastly used by Brazilian citizens –, we can already find some tips in the format of a video. Sometimes only showing a sequence of steps with a musical background (no speech) and sometimes showing a real person talking and explaining something. This is already a good initiative to include the most number of people. Nonetheless, the videos are available for very few topics, leaving almost 90% of the information still in the written format. Another characteristic of the online help feature of Orkut is that its access point is almost “hidden”: it is found as a small–font sized written link at the bottom of the internal pages (Fig. 2); and there is no access point for the help pages in the entrance page of Orkut.



Figure 1 - Help page of the Ministry of Work and Employment in Brazil.

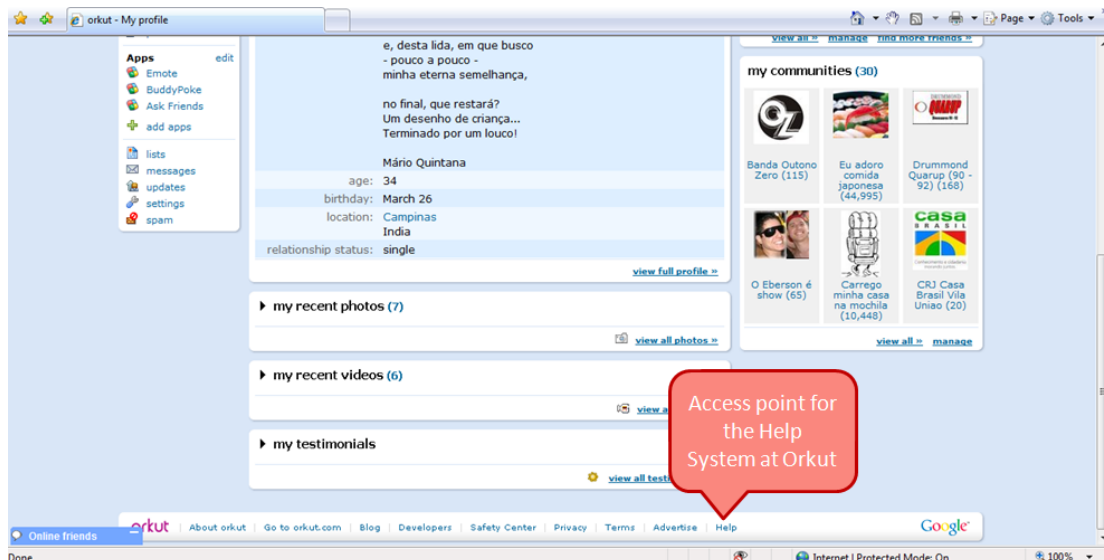


Figure 2 - An inside page of Orkut.

The scaffolding system that we are designing for inclusive social network systems has the following characteristics:

- *Multimedia*. It could be a video with subtitles, a sequence of cartoons, or a speaking head (or avatar), also with subtitles, present in all pages of the system. The video format solves the problem of users that are both illiterate and digitally illiterate. Furthermore, it is also a good option for those that are deaf (they would not be able to hear the avatar or person speaking, but would be able to read the lips or read the subtitles) or have limited hearing.

- *Provide text to speech*. Although most of the blind users are very familiar and already have installed a Screen Reader application in their machines, some users may find it very useful to have a text to speech facility in the site - for example, those with temporary sight restrictions (e.g. in a dark environment) or the digitally illiterate blind person.

- *Step by step video lessons*. As seen in previous activities [6], we noticed that users are very likely to inform and to follow step-by-step instructions. The content of these procedures would come from GOMS task analysis, as described in section 2.2.

- *Available in all pages*, close to the main content of the page. The user should be able to easily locate this material and it should be placed so that one could follow the instructions without scrolling or changing windows. The top right corner of the screen

was chosen because it is near the main content, is visible although not the place most in evidence (as the top left corner is) of the page.

The combination of these elements should cover most of the deficits that could be found among users, with the exception of the case of a person who is both blind and deaf. Other combinations are shown on Table 1.

Table 1 - Coverage of impairments.

constrain	illiterate	digitally illiterate	Deaf	blind
illiterate	- Text to speech - Avatar/talking head - Videos with instructions	- Text to speech - Avatar/talking head - Videos with instructions	- Talking head (lip reading)	- Avatar/talking head - Text to speech
digitally illiterate		- Avatar/talking head - Videos with instructions	- Talking head (lip reading) - Videos with instructions and subtitles	- Avatar/Talking head
deaf			- Talking head (lip reading) - Videos with instructions and subtitles	n/a
blind				- Screen Reader - Avatar/talking head

In order to let deaf users to read what is being said by the avatar, besides the subtitles, also a virtual presenter developed by Costa and De Martino [2] will be used. This talking head (the face of a real person) moves her lips according to the text and it is specific for the context of the Brazilian Portuguese speakers, where each facial movement is described by an algorithm based model.

While the image of a real person partially copes with the problem of lack of personality or excess of “coldness” in computer systems, the virtual faces might be less invasive for some users. Other investigations from the same research group of Costa and De Martino have similar presenters that are 2D or 3D representations of a person. The 3D is an animation based upon a tri-dimensional geometric model; while the 2D is an animation based on photographic images of key-postures that are overlapped to produce an animation [3,7,9]. Figure 3 shows some examples of work on speech synchronized facial animation.

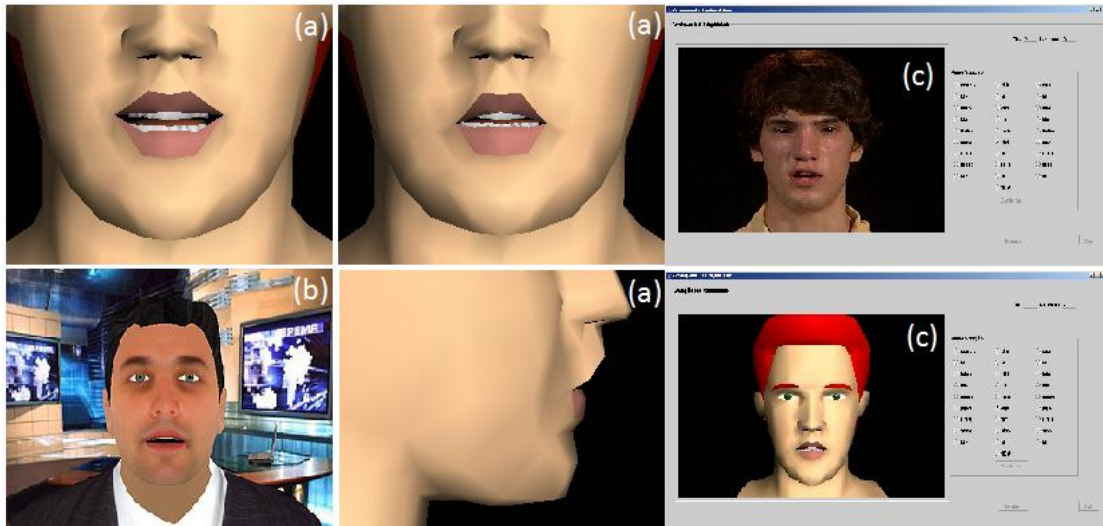


Figure 3 - (a) The posture of the synthetic face during the production of /a/ and /u/ [3]; (b) One of the faces of a Virtual Presenter [9]; (c) Screenshots of the frames of a real speaker video and of a facial animation [3].

This virtual presenter from Costa and De Martino [2] articulates her mouth according to the text, which is read by a Text-to-Speech conversion software. This software generates a list of phonemes and times that are used by the program from the virtual presenter to generate a sequence of images that will form a video. An extensive work to adjust the voice output of the intended software to the input image of the presenter was performed by fellow researchers from project e-Cidadania.

This talking head would transmit information to the users upon request (the user has to click the “play” button). The multimedia would include not only the talking head, but also screen sequences showing steps, interviews with real users, and even videos recorded by the users themselves explaining about the system. Figure 4 illustrates this multimedia interaction point at Vila na Rede.

The player is the same one that is used inside the announcements to reproduce the video for products/events/ideas. Just as any player, it allows us to play, forward or rewind, control the volume, stop and also allows full screen view. Most of the content will be pre-recorded, except those produced online by the feature that converts text to voice.

Next to the text-to-speech tool, a button will allow users to have that same text read by the virtual presenter. By default, the text to voice instrument would only read the text (present the audio file) selected by the user; but upon request, the user will be



Figure 4 - Vila na Rede and the meta-communication area.

able to hear it from the virtual presenter, with all the benefits that it brings (e.g. lip-reading and human presence).

For the instantiation of the meta-communication mechanism at Vila na Rede, we are using the virtual presenter from Costa and De Martino [2] combined with the Festival Text to Speech tool¹.

For the designers of inclusive social networks - or other systems - who are willing to provide similar meta-communication facilities in their systems, there are some other software options that we shortly present on Table 2 - noting that some of the solutions are commercial or proprietary. For the solutions that present voices that might be considered much artificial for their target public, there are commercial products available for purchase, for instance, the Natural Voices from AT&T² More on the content of the meta-communication mechanism will be explained in the next subsection.

¹ Festival (<http://www.cstr.ed.ac.uk/projects/festival/> last accessed in Oct. 2009).

² at <http://www.nextup.com/attnv.html> (last accessed in Oct. 2009).

Table 2– Software options for a meta-communication mechanism³.

Feature	Solution
Avatars/Talking Heads	SynFace (http://www.synface.com)
	SitePal (http://www.sitepal.com/)
	Johnnie Talker (http://digitus.itk.ppke.hu/~flugi/johnnie/)
	iFace (http://img.csit.carleton.ca/iface/)
	Xface (http://xface.itc.it/)
Text to Speech	Festival (http://www.cstr.ed.ac.uk/projects/festival/)
	eSpeak (http://espeak.sourceforge.net)
	odiogo (http://www.odiogo.com)
	(http://free-translator.imtranslator.net/speech.asp)
	NaturalReader (http://naturalreaders.com/)
	Text2Speech (http://sourceforge.net/projects/text2speech/)
	Festvox (http://www.festvox.org/index.html)
	PortaVoz (http://www.portalvoz.es/)
	FreeTTS (http://freetts.sourceforge.net/docs/index.php)
	MOBROLA (http://tcts.fpms.ac.be/synthesis/mbrola.html)
	Cyber Buddy (http://thecyberbuddy.com/)

2.2. Content

The information provided in this support mechanism will be related to:

- Description and explanation of the tasks that can be performed in the system (e.g. how to create a new account or how to help someone to create an account);
- The functionalities as they were meant to be used when thought by the designer (e.g. what are the arrows for) and overview of the system's possibilities;
- Tips, shortcuts and other advices for the novice user of internet (e.g. one may click on underlined words as they are links for other pages);

This content should include material produced by the final users, who could contribute by creating videos showing what they had learned to do in the system.

Every page will have the multimedia (video or virtual presenter) located in the same area reserved for the meta-communication mechanism. The primary video would be associated with the main content of the page but it could also show other material that

³ All links were last accessed in Oct. 2009.

is related to the task the user is performing. For example, when clicking on any of the options of the “Enquete” (poll system), the video would be ready to display, upon user request, information on the purpose of the “Enquete”, as well as the sequence of steps to be performed in order to successfully complete the task of voting.

The GOMS model (Goals, Operators, Methods, and Selection rules) will be used to guide the creation of the material related to the tasks that can be performed in the system. The result of the GOMS analysis performed in [10] provided a list of the steps that should be taken in order to accomplish a given task at *Vila na Rede*. As seen in the activities performed within the target community of users and reported in [5], people are more familiar with the step-by-step way of conveying instructions.

Next we present the content that the meta-communication mechanism will treat for each area of *Vila na Rede*:

2.2.1. Every page of the system will have the meta-communication area, which will provide the video (virtual presenter, film or sequence of screens) to support users’ interaction with the system. Besides that, the virtual presenter will be able to read the text that the user will select to be converted into speech at the Text to Speech tool. At all instances it will be possible to add materials that are produced by the participants – registered users – of *Vila na Rede*.

2.2.2. Other elements that are present in all pages, and that can trigger the meta-communication from the same page are: (the other elements will only trigger the meta-communication area once taken to the destination page – for example: when one clicks at the “Entrar” button, the content on this feature will be available in the next page: the page that shows the first step to “Entrar”).

- Search engine. When the cursor is placed in the field of the search engine, the video will be changed to display the one about this feature.
- Accessibility controls. When the user clicks at one of the accessibility controls (e.g. font size control), the video will be ready to display information on this feature, explaining how it works and how to undo the action.
- Poll. Once an option of the poll question is checked, the video will inform about the poll, how to vote, how to contribute with a question, and how to see the results.

- Online user - ConversasOnline. When the icon next to an online user is clicked, the window for the ConversasOnline will be opened. With that, the meta-communication area will present information about what can be done and details of that screen. Due to the complexity of this feature, the videos will be divided and each will present further details: the first one should give an overview; the second more details on how that tool works; and the third, the differentials of this tool. Figure 6 shows how this sequence of videos could be presented. The user will be able to choose if he wants to proceed in viewing the videos. All videos can be stopped at users will, but if he chooses to watch it until the end, the options will be shown and he will click to see the further information. Other pages that demand for more than one video will work in a similar way, as shown in Fig. 6. The support itself should inform the users about all these possibilities of controlling the exhibition of the videos.
- Going back. For those tasks composed of more than one step, the system will present the "back" ("voltar") button. The videos about the tasks should include the information that the user can go back.



Figure 5- Accessing a sequency of vídeos.

- Scrolling arrows. Whenever a user click one of the scrolling arrows, the support area will be ready to inform about this feature (how to use it) and how it had been conceived (users' suggestion).

2.2.3. Home page – not logged in. The multimedia support area will display in the home page a sequence of videos consisting of: 1) an overview of what Vila na Rede is and what can be done and 2) an institutional video to announce Vila na Rede.

2.2.4 Terms of use. The support area will present a brief summary of what this document is about and its importance. It should be presented, as always, in a familiar way of speaking and in general terms.

2.2.5 Enter. There are basically two steps to be completed in order to enter the system with a valid user id and password. In the case of pictorial password, the two steps are composed of four screen sequences. Each screen will present a different support, showing what the user can do there and how to proceed in case of difficulty (e.g. forgot password).

2.2.6 Forgot password. In order to reset the password, the user has to go through three steps. Each screen will present the support according to where in the process he/she is.

2.2.7 Create new account. This process has three steps:

- User identification. There are six fields that can be filled in this step, being three of them mandatory. When the user clicks each field to enter the information, the support area will be ready to present a short information about that field. Before that, the support area will give a general idea about this page.

- Password. The video to be presented here is about the password in general: why it is needed, why it is necessary to confirm it; tips about saving it, and information about the possibility of resetting it; and about the possibility of going back to the previous step. In case of the pictorial password, this step will be composed of three screens. The video should inform that the correct sequence should be remembered.

- Secret questions. It is important that the support area makes it clear to the user that the images chosen here are not the password, but the questions that will be asked in case they forget their password. There will be two screens (one for each secret question). The first video will end by asking the user to choose the option that best answers the First question. The video for the second question would then inform that, in order to reset the password, it will be necessary to remember the answer for both questions.

- Confirm. The support area for this screen might suggest the user that he/she can take note of this information for future reference.

2.2.8 Contact us (Fale conosco). The video will inform about this feature, making it clear to the user that this is a channel of communication between him/her and the development team. It should be clear that if he/she expects to receive an answer, he/she should provide an e-mail. Each field of this form will trigger a short video informing about that specific field. The use of the media will trigger the videos as detailed in 2.2.13.

2.2.9 Products and services/ideas/events announcements main page. The support area in these pages will inform the user about the ads, how to navigate throughout the pages, how to order the ads (by most viewed, most commented or by date), how to see detail of one ad.

2.2.10 Page of an announcement. Once in the page of an advertisement, the video will inform about the information that is seen there (e.g. how to know who had posted it), and about the actions that can be taken from there: Collaborate, Comment, and - if the user is the owner of that ad - Edit.

2.2.11 Create a new announcement.

- Home (list of categories): The video will inform the three possible categories and the differences between them, giving simple examples for each: products and services, events and ideas.

- Create an announcement for products and services/events/ideas. The first video will inform about the category (products and services, events or ideas) and what can be done in that page. Then, for each field, an extract of video will inform about that field, and, as always, the user will be able to navigate through the videos, as shown in Fig. 6. Whenever the user clicks on any of the icons for the media, the video will be shown as detailed in 2.2.13.

- Confirmation message. In this page, the support area will inform the user that the ad has been created and that he/she can now see how it looks. It will also advise the user to review the announcement and inform how to proceed in case he/she wants to edit it.

2.2.12 Hedonic poll. When the user clicks the "sair" button (as detailed in section 3), the video in the next page will explain about the pictures and the purpose of that poll. There will be three screens for this voting, and each will present a video related to the step in place at that moment. The final video will thank the user for his participation and welcome him to come back and to spread the news to his/her acquaintances.

2.2.13 Media. Every page that allows the insertion of media (e.g. create new announcement, contact us, comment, contribute, etc) will display this video once the user has made a click in one of the icons representing the media. Accordingly to the icon he/she has clicked on, the video will give a brief overview about the insertion of that specific media and the two possibilities: upload an existing file or produce one at that moment. The next videos will be available for each field that the user clicks on, or according to the navigation buttons as shown in Fig. 6.

2.2.14 Text to Speech. Whenever the mouse is placed in this field, the video in the support area will contain explanation about this feature. Also it will indicate how the same talking head that is speaking at the moment can read that text for them (as seen in section 2.1).

3. Affective feedback

In order to allow users to express their affective state towards the system, a hedonic poll tool will be used. This tool differs from the opinion tool that is found in every page of Vila na Rede: the opinion poll is about questions that inspire conversation about curiosities of daily life and let users know each other, or questions that help researchers to know more about the system's participants. The questions of this opinion poll change frequently. The hedonic poll will be permanent and accessible every time the user clicks on the "sair" button (leave the system). Users leaving the system will be invited to rank their feelings, by choosing from one of the pictures representing their emotional states. There will be two sets of pictures to be chosen from. The result will be presented, showing the users how the community of users is feeling in general. Figures 7 through 9 illustrate this tool, which uses the SAM (Self-Assessment Manikin), as proposed in [8], and which has been successfully employed previously in the Brazilian context [4]. This pictorial format of poll was chosen, having in mind the accessibility issues as presented before (e.g. illiterate users). The blind users or users with vision impairment of some degree will not be excluded from

this format, since they are equally accessible by using either screen reader software or the meta-communication resources described in Section 2. SAM was chosen from other tools developed to measure affective response from users (to appear).



Figure 6 – Step 1 of 4 of the hedonic poll: “how did you enjoy Vila na Rede today?”



Figure 7 – Step 2 of 4 of the hedonic poll: “how excited were you about Vila na Rede?”



Figure 8 – Step 3 of 4 of the hedonic poll: “how did you feel: small and helpless or big and powerful?”



Figure 9 – Step 4 of 3 of the hedonic poll: result displaying the average of the votes for that week.

4. Conclusion

This technical report presented some detailed description of the meta-communication mechanisms to be used at an inclusive social network system. This tool is part of the

ongoing research on Communication and Expression Tools in Inclusive Social Network Systems and it was instantiated at Vila na Rede, from the e-Cidadania Project. This work intends to collaborate in the creation of web systems that work towards the creation of digital cultures among Brazilian citizens.

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