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Procedia Computer Science 27 (2014) 158 – 167

Procedia Computer Science

5th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion, DSAI 2013

Web Scripts and Mediation Dialogues as a quality factor in the interaction of the deaf

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Abstract

The difficulty in reading and interpreting textual information interferes in the quality of the interaction of pre-linguistic deaf in the web. This article aims at determining whether the use of new communication strategies improves interaction of the deaf. The stage of data collection and observation involved the participation of eight volunteers. Two sessions of observation of interactions were held, one with the system original interface, and another with the use of new communication strategies, using the communicability evaluation method (CEM) of Semiotic Engineering. The survey results identified that the development of communication strategies meeting the specific language of pre-linguistic of the deaf improves the quality of metacommunication, thus encouraging accessibility during interaction with the system.

Selection and peer-review under responsibility of the Scientific Programme Committee of the 5th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion (DSAI 2013).

Keywords: Accessibility; Semiotic Engineering; Communicability; Deafness.

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Selection and peer-review under responsibility of the Scientific Programme Committee of the 5th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion (DSAI 2013).
doi:10.1016/j.procs.2014.02.019

1. Introduction

For being a vehicle of communication with the Internet, through which a variety of information is transmitted to people spread across various regions of the world [1], web interfaces should allow access to anyone, regardless of their physical perceptual and motor abilities, social and cultural backgrounds. In other words, they must be designed according to accessibility guidelines and focusing on usability [25-19].

However, to obtain interfaces that meet many users is not trivial, given the diversity of people with different needs [10-20]. For developing good interfaces, one should consider the concepts of usability, accessibility and communicability

The usability, important feature of information systems does not guarantee full access to all users [14, 15]. It is also necessary that systems are accessibility oriented [16]. To obtain an accessible site, is essential to follow the recommendations and accessibility guidelines, and to observe and analyze various ways in which users, with or without limitations, interact with systems, identifying their difficulties and skills [19].

The communicability, the ability of the designer to achieve the metacommunication with the users [5, 6] is a key factor for a friendly and accessible interface for some user profiles, such as pre-linguistic deaf bilingual. Pre-lingual deaf bilinguals are individuals who were born deaf or lost their hearing before the speech learning, not having thus, auditory memories. As a consequence, they don´t dominate the Portuguese (or heir country spoken language), and may have difficulties while performing simple tasks, due to the predominance of textual information on the Web [4].

Previous works showed that language barriers, such as difficulties in understanding Portuguese, are due to the process of signification of words [9]. The Brazilian Sign Language (Libras) does not have its own system of writing, so, when during reading and writing, deaf must use the written form of the Portuguese language as a second language [12].

The Semiotic Engineering (SemEng) is a theory of Human-Computer Interaction (HCI) in which the design and interaction are part of a communicative process. According to this theory, the designer communicates with the user through the system (interface) to tell them how, why and what they (and may need) to communicate with the system to achieve their research goals [5,6].

SemEng enables exploring new ways of user with limitations interactions. One of those ways is through the use of mediation dialogues with the tool "Web Navigation Helper " (WNH) , which enables to create adaptive dialogues that help users to achieve their goals in the web. The creator of the dialogues should know the skills, preferences and language of the end user and must be able to adapt the writing style of the dialogues to the language skills of the user [5,6] .

This present exploratory research, based on a single explanatory case study with multiple units of analysis, aimed to evaluate the adoption of new communication strategies improves the interaction of pre -lingual deaf bilinguals in an organizational context. To achieve the goal, the interactions of pre -lingual deaf people with the Intranet of an institution of science and technology in healthcare (Oswaldo Cruz Foundation - Fiocruz were analyzed. This institution has an agreement with the National Federation of the Deaf Education and Integration (FENEIS) and employs about 150 deaf workers [8]. The data collection and observation involved the participation of eight volunteers and it was used the Communicability Evaluation Method (CEM) of EngSem for identify communicability breakdowns.

The analysis was carried in order to investigate the understanding of the users of communication designers in two ways: (1) the interaction with the original intranet interface, and (2) the interaction by means of dialogue mediation. The dialogues were created by a Libras interpreter, that also provided instructions and familiar examples on how to interact with the system and report the requested data. The texts were written in Portuguese in a simplified way as an attempt to translate the signals from Libras to Portuguese writing.

2. Web Accessibility and Hearing

In the web environment, the resources most used, as assistive technologies for deaf, aim to remove barriers to access to information available in audio, through the use of subtitles or transcript of all audio content for Portuguese or Libras [13].

However, there is no indication of technological resources that can help navigation of web pages by bilingual deaf people. In the web environment the autonomy of the deaf is limited; they need assistance of others to understand the text and they need a dictionary to search the meaning of unfamiliar words, what can generate even more doubts and frustrations [15].

Thus, it should be understood, in addition to various levels of deafness and their specificities, deaf culture and the libras linguistic structure in order to not standardize deafness as only, the lack of hearing [2].

For deaf Brazilians, the process of meaning of words comes from the translation of the Libras, natural language of the deaf, for Portuguese written [3,9]. This limits the reading and interpretation, since most of the portuguese language words does not exist in Libras, hindering the interaction of this group of users on the Web [4,21].

Libras does not have a structure based on articles, prepositions and conjunctions, possessing distinct verb conjugation of Portuguese. The concept of "word" or "lexical item" of the Portuguese language, called signal in Libras, is composed by the combination of five parameters: the setting, the movement the direction, the pivot point of the hand and facial expression. Most verbs are expressed in the infinitive form. There are no inflections of gender and number in nouns and adjectives. The notion of time is indicated by adverbs that indicate whether the action is taking place in the present, like today and now, in the past, like yesterday and the day before, or in the future as tomorrow. As in Libras there is no gender distinction as in portuguese, where necessary its textual representation, one should use the @ symbol to reinforce this idea, a written sentence is quoted in Libras: " Question : I INVITE YOU SEE ME @ HOME. YOU CAN D-A-Y? Answer: NEXT SATURDAY, I CAN" [7]. This example illustrates, even if briefly, the differences between the libras and the Portuguese language written.

The libras does not have its own system of writing, ie deaf individuals should use the written form of the Portuguese language in performing the activities of reading and writing [12]. Another difficulty is the case of Portuguese words that do not exist in libras, as names of people and places. In such cases, one should use the manual alphabet in order to represent such words [7,9] .

In Brazil, is considered deaf, people with severe and profound deafness who have, respectively, hearing loss between seventy and ninety decibels or more; generally they have impaired verbal comprehension and have difficulties in courses based on spoken and written Portuguese [23].

Currently, there are approximately 5.7 million Brazilians with hearing impairment, representing 3.38% of the population [11]; It is crucial to recognize the specificities of these users during their interactions with information systems in order to minimize that barriers that may impair or prevent the use of information systems.

2.1. The use of the Web Navigation Helper (WNH)

The Web Navigation Helper (WNH) is a Web browsing assistant that helps accomplish tasks, especially for those with limitations, through dialogues previously established that mediate the interaction with the interface [16]. The WNH is an extension of Mozilla Firefox, and the tasks are previously automated by CoScripter, macro recorder developed by IBM [16] . From the script, it creates the dialogues which are used in end-user interaction with the page's original site [16] .

Monteiro's research [16] indicates that the development of dialogues mediation can be done by volunteers, who are family or have a personal relationship with the person with limitations, because if the pages to which scripts are associated change, this can causes problems for the user that counts on the WNH, so they can ask for help from volunteers [16] .

When interacting with the help of the WNH, the user can browse the web more simply than in the standard (original) form. The tool enables the inclusion of an explanatory text that can assist the interaction. WNH also offers the possibility to access a page with questions specific to each dialog, where the end user can access the answers previously created for the dialogue in questions. The WNH behaves as an interpreter, not only for the page

that is associated, but for all the navigation through it. The end user, a priori , interacts only with the previously created dialogues , avoiding many page´s problems [16] .

In this research, the dialogues used in user interaction with the page 's original site, were created by a Libras interpreter volunteer, requirements for turning the communication appropriate to the user end [16].

2.2. Evaluation of interfaces - the perspective of Semiotic Engineering

To guide designers in developing accessible systems, there are recommendations and guidelines on how accessible systems should be designed. In the case of existing systems, it is necessary that the interfaces have their accessibility verified. For this purpose, programs were developed in order to evaluate automatically the level of accessibility of the systems [13].

However, the system accessibility validation process also requires that a validation must also be done with humans, experts and users with limitations. When engaging the user in the process, it is possible to observe, and analyze their difficulties and skills, enabling the alignment of usability requirements with accessibility guidelines, resulting in an harmonious interaction and ensuring a content understandable and navigable. [13]

The evaluation of interfaces, a systematic process of collecting data in order to examine how users access a system to perform their tasks [25], allows the detection of systems communication breakdowns. Among the evaluation methods that involve users, there are some that rely on Semiotic Engineering (SemEng), such as the communicability evaluation method (CEM), used in this research [5-6].

3. Methodology

This exploratory research was based on a single explanatory case study with multiple units of analysis, and aimed to evaluate the adoption of new communication strategies improves the interaction of pre -lingual deaf bilinguals in an organizational context. There were two sessions of observation of interactions, considering each session as a unit of analysis, which allowed a comparison between the results.

The research was conducted at Oswaldo Cruz Foundation (Fiocruz) and included eight volunteers. Since participants were pre-linguistic bilingual deaf, two Libra interpreters were required during the various stages: at the reception of participants, in the translation of the consent form, at the test scenario, at the interviews, and during the observations. In order to facilitate the performance of each interpreter during the different stages of the research, these were coded by Feneis-interpreter and Fiocruz-interpreter.

The research was done in four steps: (3.1) test environment preparation, (3.2) mediation dialogues development (3.3) observation of users' interactions, (3.4) analysis of the results through the Communicability Evaluation Method (CEM).

3.1. Preparation of test environment

Participants were chosen considering the following characteristics: profound pre-linguistic deaf, bilingual literacy, possess libras as a first language and Portuguese as a second, frequency of computer use more than three years and education level attending elementary school (or completed) (in order to guarantee an homogeneous knowledge of Portuguese language).

In order to guarantee the anonymity of the participants, their names were encoded as U-1, U-2, U-3, U-4, U-5, U-6, U-7, U-8. Five participants had completed high school, another in progress, one had elementary school, and another is attending university.

It was determined that testing would occur at Fiocruz, in a controlled environment, created specifically for the research. It was elaborated a scenario so that users could perform all actions sequentially, enabling the identification of failures in the interpretation of the information system. The task set was to update their registration, which consisted of 47 fields in filling data entry.

3.2. Mediation dialogues development

The researchers invited the participant interpreter-Feneis who assisted the tests concerning the first unit of analysis of the case study, where the deaf participants interacted with the original interface of the system, that is, without the help of the wizard WNH. The invitation was due to the fact that the interpreter working in Feneis and professional experience, with four years of work dedicated to the welfare toward the audience deaf.

The dialogues were created by Feneis_interpeter. Users should enter the proposed textual content regarding the 47 fields of data entry form directly in WNH. This activity lasted 125 minutes. Scripts of interaction were previously created by the researcher. It must be observed that to present signals in Libras verbatim, by convention, establishes that we use of Portuguese words must be capitalized[23]. Regarding the writing style, the participant decided to create short texts and goals, explaining exactly how the user should proceed.

The interpreter explained about the difficulties of creating texts, since Libras has no textual representation. She pointed out: "There is no written form fully accepted by them. We try to get the closest possible to the way they would understand. This is what I think during construction: how should I say this in Libras? ".

Then, some observations extracted from the performance of the task were pointed out, which are important for understanding the relevant aspects in the construction of the dialogues, which in turn seek to express the intention of the contents of each field of data entry.

In the dialog regarding the input field "undergraduate", the participant reported that recently was contacted by a deaf interested in going to college and that when seeking information on the Internet, was faced with unknown words, such as graduation, university , higher education, baccalaureate, graduate.

When creating the dialog for input field "orally," the volunteer said: "I think they also know that they know that word orally". In addition, created the dialog "ORALLY NEED CHOOSE YES OR NO".

Regarding the field "emergency contact" it is interesting to comment the attention of the interpreter when creating the dialog evolving the word emergency, since in Libras this word has more than one meaning. Creating this dialog lasted about five minutes, which was a long time in relation to the previously created dialogues, This can show the difficulty in creating mediation dialogues in order to define words of wide meaning.

The same attention was also observed while creating the mediation dialog for input fields related to "dependents". However, unlike the word emergency, this word is not in the vocabulary of Libras.

With respect to the dialog "degree of deafness" the participant said that many deaf people would not understand this question, because they ignore the classification of their degree of deafness. The interpreter pointed out: "There are two guidelines for deafness: one related to the clinical aspect, which assesses whether deafness is profound, or moderate, and other which is social- anthropological, where the degree of deafness is not important, but their level of identity, i.e., how much the difficult subject recognize themselves as a participant of this group and uses Libras as their language."

3.3. Observation of users' interactions

Observations and evaluation of communicability were performed by two evaluators, beginners in the use of CEM. The synergy between the experience and expertise of the evaluators, one with experience in usability and accessibility and another with extensive knowledge of deaf culture and information architecture, which is also interpreter Libras, enabled to identify breakdowns in the communicability of user interaction with the system. In this research identified as interpreter _Fiocruz.

There were two interviews: one prior to the tests aiming at collecting information about users' experiences in using computers and Internet access, another, post-test, users were asked to answer questions that could influence the tagging stage and elucidate the general impressions of the participant on the system. An interview with deaf consists of four steps: reading by the interpreter of the questions that are in Portuguese, translation of questions to Libras, also held by the interpreter, conducted in Libras, writing and translation into Portuguese of the responses of the deaf, a task performed by the interpreter.

3.4. Analysis of Results

The Communicability Evaluation Method (CEM) by EngSem was used, consisting in the following stages: tagging, interpretation and semiotic profile creation. This analysis is detailed in the next section.

4. Analysis of Results

This section presents the results of each of the units of analysis of the case study based on the Communicability Evaluation Method CEM.

4.1. Analysis of the results of users' interaction without the use of WNH

4.1.1. Tagging

This step consisted in identifying the failures in the original interface communication system with user, chosen from a set of thirteen possible expressions of communicability (tags) proposed by the CEM. Initially, the evaluators analyzed 106 minutes of video interaction between system and users together with the notes taken by the researcher. Then they were compared with the responses provided by participants when questions were conducted online, through the task of updating of their databases.

The figure 1 table shows the frequency of the tags present in the task, as well as the total number of tags per user. During the tagging stage there were no user behaviors that could lead to assignment of tags: 'Where am I? ", " I can do otherwise ", " Why does not work? ", " No thanks. " "Where is it?" Proposals by CEM method, not being shown in the table of Figure 1.

Tags	Total tags frequency
I give up!	45
Looks fine to me	34
I can't do it this way	8
What happened?	2
What now?	3
Oops!	5
Help!	54
What's this?	4

Figure 1 - Tags identified in users' interaction without mediation dialogues

An example on the label "looks fine to me" occurred in completing the field "Responsible for the sector", where two-thirds of the participants answered the name of the unit in which they work, as they did not know the word "responsible."

With respect to the five questions on leisure, present in the task of updating their registration data ("What do you like to do on holiday?"; "Do you practice some kind of sport?"; "Do you practice some other cultural, family activity?" "Would you like to know other subjects "; " Dou you have any suggestions for the social project? "), only the U-7 participant answered all the questions correctly. Only the participant U-2 and U-4 responded correctly to the question "What do you like to do on holiday?". However, they both answered at the second attempt, as the first they understood that the question was referring to their favorite month to go on vacations. After relecture and reflection, they deleted the wrong answer, including the correct one. The other participants did not understand the questions, not answering the five questions of the topic on Leisure.

4.1.2. Interpretation

The task of updating of the databases held the most relevant tags: "Help!", with 54 occurrences categorized as temporary failures, "I give up!", with 45 occurrences, and "Looks fine to me", with 34 occurrences categorized as complete failures, accounting respectively for 51% of occurrences.

The temporary failures raise issues relating to the difficulties of bilingual deaf users in dealing with words there

are not in the vocabulary of their first language. The label "Help!" is used when the user explicitly asks for help, as it occurred with all participants. As they did not get answers when help was requested, most participants left the input field blank, assigning the label "I give up" or trying to infer the meaning of the question, believing, mistakenly, that they had completed the task successfully, and to this behavior the label "To me, it's fine " was attributed..

4.1.3. Semiotic Profile Creation

Finally, the semiotic profile creation the analysis process was concluded with a characterization of the receipt of metacommunication messages, which is the interpretation of the data identified in the previous stage, seeking to rebuild the met message, which the designer wants to convey through search interface [6].

The message of the organizational system is: "In my interpretation, you are an employee user Fiocruz who has experience in interacting with computers and is fluent in Portuguese. Here is the system that I designed for you. I understood that you would like to use the intranet to solve specific problems such as updating your registration information in a practical and quick way. I also realized that the designer sought to reach only the listeners group, excluding the deaf, who are potential users of the system."

4.1.4. *Evaluation Results*

It was concluded that even the deaf experienced in using computers encounter difficulties in understanding the linguistic terms present in the interface of organizational systems that prevent them from performing simple tasks.

4.2. Analysis of results of the users' interaction with the use of WNH

4.2.1. Tagging

During this stage there was identification of the failure of communicability of the mediator designer, i.e. focusing on mediation dialogues, taking into account only the mediation dialogues created with the division of the same sub stages of the tagging stage 6.1. A total of 200 minutes of video interaction between system and users and the notes taken by the researcher were analyzed, comparing the answers provided by users through the mediation dialogues with those provided by the users when the questions were asked by Feneis_interpreter.

At the end of the tasks, there was an informal interview with open questions, aiming at collecting information on: general impressions about the interaction with mediation dialogues, quality of mediation dialogues, the independence of the user with the continuous use of WNH and the use of the tool on the web.

The U-3 participant reported that he liked the "SMALL WINDOW", referring to WNH, and wished it could be used it on other pages, noting that if they did not understand the information on web page, they would use the "SMALL WINDOW" to understand it . With regard to the independence of WNH, the same participant reported that continued use of the tool for about a year, would enable them to avoid the use of the dialogues; they also said that they liked the quality of the texts, understanding the information present in the dialogues.

All approved the quality of the dialog created by the interpreter, highlighting the how easy was to understand the texts. The U-2 participant stressed the difficulty in answering the questions in Portuguese, although he understood the questions. The U-5 participant highlighted the easiness of understanding of the questions with the help of mediation dialogues. The participant U-6 compared the mediation dialogues with the special public telephones for deaf people using keyboards, where communication is done using Portuguese, and he also said that he had doubts in a few words.. Participants U-1, U-2, U-3, U-4, U-5, and U-6 reported that they would like to use the WNH in other sites. The user U-7 reported that the application of WNH would depend on each web page and that there are sites with very complex sentences, emphasizing the difficulty in reading the Portuguese language, highlighting the excellent quality of the subtitles and the use of examples as factors that facilitated the understanding of questions. This same participant and also the participant U-6 emphasized the importance of dialogues in preparing the answers, because during the test, unknown words on the original page of the Intranet, were understood with the aid of the text of "SUBTITLE", referring to WNH. Regarding the independence in using the tool, participants U-1, U-4 and U-5 reported that they would continue using the "SMALL BOX", referring to

WNH, because of the easiness of text understanding, while U-2 and U-3 said that the use of the tool would became unnecessary as soon as they learn to navigate in a particular page.

Figure 2 shows the frequency of tags present in the task of updating of the database with the use of mediation dialogues. During the tagging, there were no behaviors that would lead to the assignment of tags: "I can do otherwise.", "What now?" "I can't do it this way.", "Why does not work?", "Oops, what happened? "," Where Am I? ","Oops! Where is it"? Thus, these were not presented in the table of Figure 2.

Tags	Tags frequency
Looks fine to me	11
I give up!	4
No Thanks	6
Help!	4
What's this?	2

Figure 2. Tags identified in users interaction without mediation dialogues

4.2.2. Interpretation

It was identified that users have approved the interaction with the tool, and as a consequence, there were fewer breakdowns of communication. Figure 3 highlights some important observations, organized by mediation dialogues, extracted during the task analysis. It should be noticed that in order to present signs in Libras verbatim, by convention, it is used capitalized Portuguese words [23]...

Field in the form	Dialog created By the interpreter	Participant	Filling details	Interpretation
"Affiliation mother" Answered	NEED TO PUT NAME YOUR MOTHER	U-2	The user filed besides the full name of the name the information "IS DECEASED"	The user filled out the information in WNH as dialoguing with the tool, it is clearly noticed the presence of the interpreter in the dialogues.
"Do you practice any cultural family activity?"	" WRITE WHAT LIKES TO DO. EXAMPLE: WALKING TOGETHER FAMILY, GO SHOPPING, GO BEACH, NOT GO OUT OR OTHER.	"U-6"	SHOPPING AND GO BEACH VERY TASTE GOOD!"	The user understood completed the mediation dialog created by interpreter, filling out in WNH as dialoguing with the tool, and there is evidence of the attempt of the user in creation sentences

Figure 3. Observations on the interactions of users with mediation dialogues.

4.2.3. Semiotic Profile Creation

The meta message of the mediation designer is: "In my interpretation, you are an employee user of Fiocruz who has experience in interacting with computers and are not fluent in Portuguese, having Libras as first language and Portuguese as second language. Here is the system that I designed for you. I understood that you would like to use the intranet to solve specific problems such as updating your registration information in a practical and quick way. Since you have difficulties in reading and interpreting Portuguese I have used communication strategies respecting your linguistic abilities."

4.2.4. Assessment Results

From the characterization of the meta message, it was verified that the use of mediation dialogues improve the development of accessible interfaces for pre-linguistic bilingual deaf without the exclusion of those listeners' users using the system.

The participants understood most of the dialog mediation, but showed limitations while writing. In these cases communicability tags were not assigned. The use of mediation can be considered as a tool to encourage reading, allowing the interpretation of texts, making them more autonomous and participatory.

The constancy of similar results obtained during the analysis indicates that many of the flaws present in communicability in mediation dialog could have been minimized with the implementation of a pre-test to evaluate the quality of the dialog created by the volunteer interpreter.

There is mention to the example "orally" where the performer did not create a mediation dialog supposing that this was a known word to the deaf. The word "ORAL" contained in the web page of the dictionary of sign language could have been used by the interpreter in order to create the following dialog: "ORAL KNOW? MUST CHOOSE YES OR NO "Instead of" ORALLY MUST CHOOSE YES OR NO."

At the end of the tasks, there was an informal interview, with open questions, aiming to collect information about users' general impressions on the interaction with mediation dialogues. All participants said they loved using the WNH; participants U-2 and U-7 emphasized the importance of WNH in accomplishing tasks.

All volunteers the quality of the dialogues created by the interpreter, highlighting the easiness of comprehension of texts. The participant U-2 stressed the difficulty in answering the questions in Portuguese, although he understood the question. The participant U-6 compared the mediation dialogues with the special public telephone for deaf who use keyboard, where communication is done in Portuguese; he also said that there was doubt on few words he didn´t know. It is noteworthy that the participants U-6 and U-7 referred to the tool as "SUBTITLE".

5. Conclusions

This exploratory research relied on a single case study with multiple units of analysis, in order to evaluate the use of mediation dialogues in the interaction of profound pre-linguistic bilingual deaf in an organizational context, in order to identify if the adoption of a new communication strategy improves the quality of the interaction of pre-linguistic bilingual deaf. The participation of deaf people in corporate environments implies the need for detailed studies on the specific interaction of these users, aiming to identify barriers that may impair or prevent the use of corporate information systems on the web .

There were two sessions of observation of interactions, with and without the use of mediation dialogues. The data collection and the tests involved eight volunteers. It was the method to evaluate the communicability (CEM) Semiotic Engineering , to compare the user's interaction in browsing activities and data entry in the organizational system, investigating the quality and communication breakdowns of the interactive system.

The development of mediation dialogues was done with the help of a libras interpreter, that had the knowledge to perform an adequate communication to the end user. Her main function was to translate the communication to Libras, just as she would do if she was helping a deaf user interaction in person, to communicate in Portuguese written following the grammar of libras, which is the main feature in this communication mediation dialogues. The table in Figure 4 shows a comparison table of the results of evaluations of communicability with the original interface of the system and the use of new communication strategies through WNH.

Total Tags	Original Interface	Mediation dialogues
I give up!	45	4
Looks fine to me	34	11
I can't do this way!	8	-
What happened?	2	-
What now?	3	-
Oops!	5	-
Help!	54	4
What's this?	4	2
No Thanks	-	6

Figure 4 - Results of evaluations of communicability with and without the use of new communication strategies

The interaction without WNH was very difficult for all users. Using WNH, despite some difficulties, all users completed the tasks successfully. Interaction with WNH revealed interesting issues related to communication between creators and users dialogues.

For example, as the interpreter knew all users, she was able to give real examples and contextualized for users, allowing them really help during the tests. It was also observed the impact of mediation WNH in the communication process. The text of the dialog was a way of the self-representation of the interpreter through software. Many evidences were gathered on their self-expression and self-representation, observing how users could communicate directly with her, as if she were "there." Another study WNH is dedicated to discuss this matter thoroughly [17].

Compared with the most commonly assistive technologies for deaf, the WNH stands for guiding navigation by linking web pages dialogues with automatic scripting of interaction. Once on a page rich in information and navigation options, but not necessarily accessible, WNH serve as a guide, leading the user to the necessary information to perform a specific task, with fields to be filled, choices to be made, etc. . all assisted by help texts previously defined .

The results showed clear evidence about the needs of this audience, especially in relation to language, which must be considered in the development of systems, improving the quality of metacommunication, promoting accessibility during interaction with the system.

As future work we propose to conduct research using the mediation dialogues at sites rich textual information

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