Study of the Usability of the Private Social Network SocialNet using Heuristic Evaluation

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ABSTRACT

The purpose of this paper is the usability evaluation of the SocialNet, a private social network for monitoring daily progress of patients by their relatives. This work presents the first phase where it was used the double heuristic evaluation as a method of evaluating usability. It has proven to be a suitable method for finding usability problems associated with this type of social network where information privacy plays an important role. The evaluation has provided data about the origin of the usability problems of SocialNet, especially related to consistency, design and privacy. Findings have helped to redesign some aspects of SocialNet and to provide an effective, efficient interaction and satisfactory experience to the users. The use of heuristic evaluation will be complemented with a user test to be carried out in a second phase of the usability study, which is not addressed in this paper.

CSS concepts

• **Information systems→ World Wide Web→ Web applications →Social Networks**

•**Human-centered computing → Human computer interaction (HCI) → HCI design and evaluation methods → Heuristic evaluations**

Keywords

Usability; Heuristic Evaluation; Social network; Information System; Web.

1. INTRODUCTION

The use of new Information and Communication Technologies (ICT) is widespread, 46% of the world population are Internet users and 51% use mobile devices [3]. All these tools have provided a wide range of possibilities in all areas of life. In particular, Health network has used ICT tools not only to support the daily activities in hospitals and other health centers, but also to improve therapeutic efficacy. For example, in the case of psychiatric services, Internet has allowed the use of new therapies that otherwise could not be applied.

Psychiatric approaches differ much from other medical specialties treatments, because most of them are done outside of the hospital environment in Day Centers, Shelter flats or Community Rehabilitation Centers addressed to promote the recovery of severe psychiatric patients, using rehabilitation and social integration approaches.

Although there are patients without relatives or people nearby, most of them have people interested in their follow-up and wellbeing further than hospitalization. These links between relatives and patients are positive for prognosis of patient. Because of this, it is necessary to promote tools and methodologies for improving the communication and support between caregivers (families or friends) and users and professionals. In general terms, there are formal ways to inform to authorized persons of the patient about the evolution of disease, but this information only focuses on the medical treatment or contingences happened, but hardly on activities of the patient outside the health center or positive achievements. However, active inclusion of family members in the life of the patient has a positive impact in their process of improvement [2], and so, it will be necessary to promote the communication each other.

In the last years have arisen virtual communities in which patients, families and health professionals share information about a disease, a health problem or medical condition specific [4]. However, these tools do not provide an environment for sharing secure information

among users (patients), mental health workers (included formal caregivers) and people close to the patient and family (included informal caregivers).

SocialNet is an online tool that provides a private social network for each patient, their families and any person authorized by him [1]. Caregivers or others involved in the treatment and follow-up of the patient can share information about activities, meetings, achievements, etc., in a private technological environment called walls. The main difference between SocialNet and other existing social networks is that the patient is not only a user, but is the center of the interaction each other.

The goal of this paper is to evaluate the usability of SocialNet in order to make it a usable product, and so, promote an effective, and efficient interaction and satisfactory experience for users. Therefore it presents a first assessment phase which involves the application of a usability inspection method based on experts: the heuristic evaluation [6]. A functional prototype of SocialNet available at http://psiquiatria.grial.eu has been used to carry out the study of usability.

While the more robust approach for the evaluation of usability has to involve users, these will be the protagonists of a second phase (user Test) needed to complete the study of usability of SocialNet, which is not described in this paper because it is work in progress.

The paper has been divided into five parts. First and second part describes the heuristic evaluation and the procedure. Third and fourth part present the two phases of the study of usability. Finally, the fifth part provides the primary conclusions of this research.

2. SOCIALNET HEURISTIC EVALUATION

In order to carry out the heuristic evaluation of SocialNet have been used heuristic rules proposed by Nielsen [5]: (1) visibility of system status; (2) consistency between system and the real world; (3) freedom and user control; (4) consistency and standards; (5) error prevention; (6) better recognize to memorize; (7) flexibility and efficiency of use; (8) aesthetic and minimalist design; (9) helps users to recognize, diagnose, and recover from errors; (10) help and documentation. Besides, other heuristic have been added: (11) privacy, this heuristic proposed by Pierotti [7] has been considered necessary to include, because SocialNet is a private social network system for helping the user to protect personal information, both belonging to the user and his family.

Taking into account that heuristic evaluation is an standard created over 20 years ago, many evaluators have found that the original list of Nielsen [5] does not always meet the specific needs for every study, and because of this it is often required new patterns or some re-interpretation of the original descriptions of Nielsen for every heuristic [8].

3. PROCEDURE

Based on the general recommendations, the number of experts to drive a heuristic evaluation is from three to five evaluators. In this sense, Zazelenchuk [8] remarks that an heuristic evaluation consists of one or more experienced assessors applying a set of heuristics for reviewing a given system. Based on this, a single expert has made a double review of the web SocialNet application. Though heuristic evaluations carried out by a single expert evaluator face often criticism for the reliability of their findings and recommendations. However, if multiple evaluators are involved in an heuristic evaluation, the risk for obtaining false positive is high, because they find difficulties for interpreting reliably guidelines and identifying the same usability problems [8]. Our option has been to perform the heuristic evaluation just with one expert evaluator, which is an alternative little used, but accepted and viable in the field of usability, proposing a double heuristic evaluation.

Initially, the expert run the website of SocialNet as a new user. For each of the user profiles the expert provided a brief description of the errors found and selected for each error the heuristic applied.

After this first usability report was carried out a redesign of the app based on the analysis of the results obtained.

Once improved the early design, was conducted a second heuristic analysis involving the same expert evaluator. However, this time from a different point of view, as a user with experience on SocialNet, because he had obtained experience after first review.

4. STUDY 1

For this first study, the expert evaluator ran the website of SocialNet as a novel user receiving only a general explanation on the functioning of the system and its features. Taking into account that it is a private social network addressed to improve the communicative relationship among patients, families and caregivers, there are different application roles creating a hierarchical structure linked to different permissions for everyone of them. So, the evaluator carry out the heuristic assessment with every role (General Manager, Caregiver Manager, Caregiver, Family Member/Authorized, Patient), with the only exception of the patient. He patient is usually a passive user and cannot publish or comment, though can read the publications and comments made by caregivers or relatives. Besides, it was taken into account that patient and family member/authorized roles are similar.

4.1 Results

As results of the first expert assessment, the number of errors found using a heuristic evaluation was obtained (see Figure 1). As can be seen, the heuristic that present greater number of errors are on 4, 8 and 11, which correspond to consistency and standards (16 errors), aesthetic design and minimalist (7 errors) and privacy (9 errors). The rest of heuristic obtained 1 or no error.
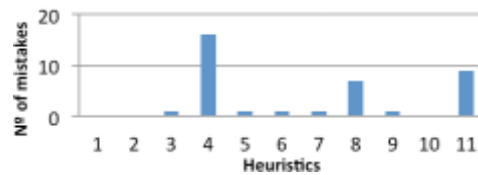

Figure 1. Number of errors found by heuristic in study 1

Besides, the number of errors found by user profile and heuristic was obtained, and we found that the heuristic with greater number of errors detected were the profile of general manager and caregiver manager. The exception happened in heuristic 11 which showed more mistakes detected by the caregiver.

On the heuristic 4, consistency and standards, the profile with greater percentage of errors is the Manager general (56%), followed by caregiver manager (28%) and caregiver (16%), but not found errors in the profile family/authorized.

Heuristic 8, aesthetic and minimalist design, the profiles with higher percentage of errors were the general manager (46%) and caretaker manager (46%), however caregiver profile presented only 8% of the errors.

Related to the heuristic 11, privacy, the profile with greater percentage of errors was the caregiver (45%), followed by caregiver manager (33%) and general manager (22%).

4.2 Discussion

The outcomes of the quantitative analysis of the data allows to infer that SocialNet is consistency in terms of the names of the sections, buttons and content thereof. Problems that the expert related to the heuristic of "Consistency and standards" are detailed as: the existence of names of sections that do not match the page where we are, or the presence of buttons that lead nowhere. A homogenization of the names is necessary because situations like these generate the feeling of having made a mistake.

Errors for the heuristic of "Aesthetic and minimalist design" describe situations as: the presence of information that has no utility to the user, or checkboxes not aligned with the text to which is linked. The presence of strange information is a distraction that interferes with navigation.

Related to heuristic "Privacy", the problems found make mention to: allowed access to profiles that are supposed to have no permission to access. This is a key point of the social networking information for generating confidence in users, and because of this should be protected as much as possible.

In terms of application profiles has been observed that the profiles with more errors found are linked to more tasks assigned, as caregiver manager or the general manager. These profiles need more permissions and because of this it is necessary to carry out more complex tasks and interface. These data have been taken into account to carry out the redesign of SocialNet.

4.3 Redesign

The analysis of the results made necessary to carry out changes on the interface of SocialNet. The following problems were detected and the solutions adopted in the different heuristics:

Heuristic 3 (freedom and control of the user): non-existence in the form of publication of the wall of the patient and so, the possibility for solving errors easily. The solution implemented was a button for allowing "undo" or "cancel".

Heuristic 4 (consistency and standards): existence of confusing labels so a homogenization of the text has been made:
• Add content link appears hidden in a drop-down menu as unique alternative, and so it was decided to show it as a fixed link.
• A button that leads to nowhere is decided to delete it
• Duplicate links that lead to the same site so it was decided to dispense with one of them.
Heuristic 5 (prevention of errors): appearance of an error message that does not clarify the type of error to the user. It was amended for clarifying the error to the user.

Heuristic 6 (better recognize that memorize): a button that leads to the other two options, one of which is the same one that indicates the button, but another one is difficult to relate. The solution was to develop two flaps for being watched easier by the user.

Heuristic 7 (flexibility and efficiency of use): the function "Edit" is very accessible in the list of users but other functions as lock, unlock or remove have very complicated its use. In this case the solution was linked to make accessible all of these options, just close to every user.

Heuristic 8 (aesthetic and minimalist design): buttons and checkboxes were out of margin so they were changed for not to break the design. There were buttons in user profiles with functions without permission, and so it was chosen to remove these buttons.

Heuristic 9 (helps the user to recognize and recover from errors): in the registration form, there were fields without specifying the meaning of them. The solution was to specify their meaning on the top of the page.

Heuristic 11 (Privacy): there were errors in terms of permissions and routes corresponding to the different roles. A review of it was carried out to adapt them to each user's profile.

5. STUDY 2

After amending the found mistakes, a second study was conducted. For doing it the profile selected was a user with experience on the web and high knowledge of the tool. Similarly, the evaluator carried out the heuristic evaluation with every role.

5.1 Results

In the figure 2, the number of errors found by this second heuristic evaluation is showed. Only four of the eleven heuristics had errors, specifically in the heuristic 3, 4, 8 and 11, which correspond to freedom and control of user (1 error), consistency and standards (5 errors), aesthetic design and minimalist (3 errors) and privacy (12 errors). No error was found in the others of heuristics.
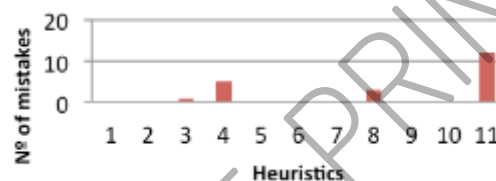

Figure 2. Number of errors found by heuristic in the study 2

Besides, the number of errors found by user profile and heuristic was obtained too. The most detected errors profiles are general manager and caregiver manager. The exception, as it happened in the first study, arises in heuristic 11, because in this case, the user profile with more detected mistakes is the caregiver manager.

In heuristic 3, freedom and user control, is found one mistake, shared with all profiles.

On the heuristic 4, consistency and standards, the profiles with higher percentage of errors are general manager (45%) and caregiver manager (45%), but caregiver profile only presents 10% errors.

Related to Heuristic 8, aesthetic and minimalist design, the profiles with errors are general manager (50%) and caregiver manager (50%).

And finally, on the heuristic 11, privacy, the profile with greater percentage of errors is the caregiver manager (72%), followed by general manager (18%) and caregiver (10%).

5.2 Discussion

Analysis of data from this second study reveals, as expected, a substantial reduction of errors compared to the first study (Figure 3). Indeed, errors have only been found in four of the eleven heuristics. For example, the problems found by the expert related to the heuristic 4 "consistency and standards", were reduced in a 70%, and so the found errors were minimal, being mainly related to the names given to certain buttons, headings or tab, which could improve the user experience.

On the heuristic of "Aesthetic and minimalist design" the errors were reduced in a 60%. Most of them were referred to a simpler and usable design for some elements of the interface, which should be good for the navigation.

Related to the heuristic "Privacy" found problems were increased by 25% with respect to the first study. This increment occurred especially in the profile "caregiver manager" which, could be due to the greater knowledge of evaluator about the SocialNet after the first study. The found errors were linked to the permissions for different user profiles. So, after correction of these mistakes, the level of protection available to the data has been increased. It is necessary take into account the key point of the social networking information for generating confidence in users is the security.
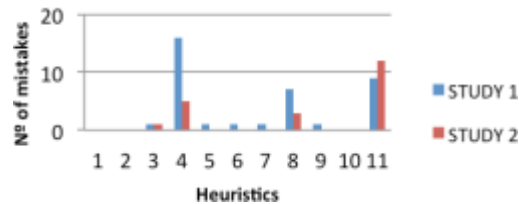
Figure 3. Comparison of the number of errors found by heuristic in studies 1 and 2

On the other hand, the profiles with more errors are linked to more tasks assigned, as caregiver manager or general manager.

Although the mistakes have been reduced substantially, after this second study continue appearing errors. The goal of performing several studies of the same technology is to detect errors that at first trial could not be found, perhaps because in a first approach to SocialNet was difficult to take in consideration. Besides, it is necessary to underline the difficulties for evaluating the security and privacy of information or the hierarchy of permissions. Because of this, in the first stage the assessment was performed at a superficial level because the evaluator hadn't enough knowledge of the software. However, after obtaining experience, the evaluation can be more accuracy. So, and from our point of view, the results obtained with just one evaluator who re-assess the application can be better than several evaluators evaluating it just one time.

5.3 Redesign

After the second report, changes were carried out on the interface of SocialNet. The following are the problems and the solutions adopted in each case relating to the different heuristics:

Heuristic 3 (freedom and control of the user): non-existence in the form of publication of the possibility of rectifying errors. This error was already found in the first study, but was not solved. It was decided to implement a button "Cancel".

Heuristic 4 (consistency and standards): existence of tags whose text may be confuse. A correction of the text is carried out.

Heuristic 8 (aesthetic and minimalist design): some features of the admin user show a tangled appearance. Reorganization was proposed, so that their appearance improved visually.

Heuristic 11 (help and documentation): emerged errors regarding permissions and routes corresponding to the different roles. All of it was reviewed in order to adapt them to every user profile again.

6. CONCLUSIONS

The goal of this study was to evaluate the usability of SocialNet. The intention from the outset has been that all users regardless of their profile may have an effective, efficient interaction and a satisfactory user experience. In this study, an assessment of the usability through heuristic evaluation has been carried out for improving the accuracy and desirable of the software, a method of inspection based on experts.

In this paper, we have described an assessment based on a double study carried out by a single evaluator. The results suggest that the heuristic evaluation methodology involving just one evaluator with a deep and thorough understanding of the application is very useful and practical. This technique has provided us data about the SocialNet usability problems specially related to consistency, design and privacy.

At last, this set of data has enabled redesign some features of SocialNet, and make easier the use of this application for potential users. The use of the heuristic evaluation should be complemented with a user test that is being carried out and it will make possible to observe the real problems of users and evaluate their experience using SocialNet.

7. ACKNOWLEDGEMENTS

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