Hey, I Have a Problem in the System: Who Can Help Me? An Investigation of Facebook Users Interaction When Facing Privacy Problems

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Abstract. When users face problems while using social systems, they tend to expose these problems in the own system, by asking their contacts for solutions. The other users, in turn, interact differently with certain types of content. In this study, we conducted an experiment with 52 postings of Facebook users in order to investigate the user interaction regarding postings about system problems. The results show that most users interact by providing help and solutions.

Keywords: Human computer interaction · Facebook · Interaction

1 Introduction

There is a widely known concept in the use of interactive systems which is providing help and documentation. Such concept was proposed by Nielsen [19] on a set of ten usability heuristics. The author's idea was make the system easy to use, thus preventing user errors. However, in case of possible errors, it is necessary to offer help and high quality documentation, making it not very extensive, easy to find and with a focus on user task [19].

The amount of times the user has searched for help, the time it has taken to access it, whether it has been useful and whether it has solved their issue are examples of measures used in usability testing [10]. However, online help systems are typically used (if at all) as a last resource [25].

From the increasingly frequent use of social systems (SS) (e.g. Twitter, Facebook, MySpace, LinkedIn etc.), with features such as frequent exchange of messages and spontaneous expression of feelings, Morris et al. [17] observed that people turn to their friends, relatives and colleagues when they have doubts. The authors investigated the reasons why users make questions in SS, and found that 29 % of the questions were related to Technology. Sharoda et al. [24], in turn, analyzed questions made on Twitter and found that 4 % of them were about the own system. Mendes et al. [16] investigated

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that, in addition to questions, users praise, criticize, compare and give suggestions in the system being used.

Thus, this study aims to investigate the interaction of users arising from questions and problems about using the system, posted on an SS. More specifically, we aim to investigate the role of users in this case.

The research developed in this study used the context of Facebook Privacy as a case study, once that represents an aspect that has worried many users in SS[1], such that Facebook has recently invested in this resource. We used as data the authorized information of the participants (Facebook users), such as their contacts, postings, likes and comments and we interviewed some users. We used a descriptive and exploratory approach. Descriptive since it has focused on the identification and analysis of users data for determining the results, and exploratory since we needed the data to its characterization.

We analyzed 221 comments obtained from the posting of problems from 52 Facebook users and we carried out the following investigations: (a) analysis of users interaction when facing postings regarding doubts and problems about the use of the system; (b) analysis of the obtained comments and (c) analysis of the usefulness of answers.

This paper is organized as follows: in the next section, we approach concepts and other studies related to this work. In the third section, we describe the investigative studies and results. In the fourth and fifth sections, we present the discussion, conclusions and future work.

2 Background

2.1 Contents and the Interaction in SS

Several studies were performed in SS in order to investigate its posted content, relevance, popularity, credibility, interaction, sharing, recommendation etc. Cvijikj and Michahelles [5] conducted a content analysis of the messages shared on Facebook pages, and their results indicated that products, sales and brands are the three most discussed topics, while requests and suggestions expressing affection and sharing are the most common intentions for participation.

Java *et al*. [9] conducted a study of users intentions on Twitter and found that the main types of user intentions are: daily chatting, conversations, sharing of information and news reports. Newman *et al*. [18] investigated why and how people share health information in SS and found that participants used Facebook and online health communities for emotional support, motivation, responsibility and advice regarding weight loss and diabetes control.

In [17], Morris *et al*. interviewed 624 users of SS in order to investigate what and why people make questions in SS. In this investigation, they questioned about the motivation in asking and answering questions from users. Most users (28.9 %)

[1] Dazeinfo. Available in: http://www.dazeinfo.com/2014/09/08/facebook-inc-fb-tops-list-platforms-internet-users-worried-privacy/. Acessed: October 16th, 2014.

answered they asked questions because they rely more on friends than in search engines, and most of the answers (37 %) explaining why they answer the questions was justified by altruism: to try to help, to keep friendship or to improve social life. In this and in other studies reviewed, no investigation was conducted specifically on the interaction of users with respect to problems in the system posted by users while using it.

2.2 Facebook

Facebook[2] is, currently, the biggest online social network, with 1.3 billion active users[3]. Facebook's main purpose is to enable the sharing of contents of the following types: text, links, images or videos. The content is shared on the main Facebook page, which is called "wall" or "News Feed". The contacts of a Facebook user are called "friends". The postings of a user are visible to anyone with permission to view their full profile.

The choice of Facebook as the SS for this investigation was because it allows a greater social interaction among its members[4]. The way a user can interact on Facebook from a content posted are: like, comment and share. This investigation examines two forms of interaction: like and comment.

3 Investigation

3.1 Participants

This research was conducted in the first half of 2014 with 52 participants, undergraduate students of Computer Sciences, 37 men and 15 women, aged 20–26 years old.

3.2 Procedure

We planned to apply this investigation throughout three investigative sessions, as follows: (a) the first meeting aimed to identify privacy issues on Facebook; (b) in the second meeting, we proposed them to post those issues on Facebook, with a due date of one week and; (c) in the third meeting, we discussed the results with them. These steps are better explained below.

(a) Identification of Privacy Issues on Facebook
This step consisted in identifying potential issues which might affect the privacy of users on Facebook. For this step, we conducted an investigation session with all the participants, addressing the theme: Social Systems. At this session, we presented the main features, ways of interaction and the main concerns of use in SS, mainly focusing on privacy issues. We questioned them: "*What would a privacy issue on Facebook be*

[2] Available on: https://www.facebook.com.
[3] Available on: http://www.statisticbrain.com/facebook-statistics/.
[4] Available on: http://www.nngroup.com/articles/definition-user-experience/.

to you?". The participants interacted by suggesting what would represent privacy issues to them. This moment was a brainstorm, in which all participants reported problems and stories that happened to them.

From the first session, we identified 10 main privacy issues on Facebook. Such issues focus on features that they did not know how to set up, and we present them as questions in Chart 1.

Chart 1. Privacy issues on Facebook

1. Access to personal information, profile, contacts, photos and postings on the wall of users is of public domain (can it be configured and controlled?);
2. Being tagged by friends in photos (can it be configured for authorizing the tagging before it is published, or can a tag be removed?);
3. Being added into discussion groups without permission (can this be configured?);
4. Facebook users can post any content on the wall of friends and strangers (can this be avoided?);
5. Sharing postings with unknown contacts (can this be configured?);
6. Friendship request and comments from strangers (how can this be controlled?);
7. When posting on Facebook via mobile devices, the current location is sent along with the postings (can this be solved?);
8. Hiding postings of users depends on the platform used, so it does not work for mobile devices (can this be solved?);
9. Publication of user profile in marketing actions related to Facebook (can this be controlled?);
10. Blocking friends can be noticed (can this be solved?).

(b) Posting Privacy Issues on Facebook

In the second session, we explained how they should post the problems on Facebook. The aim of this step was to investigate how the contacts of the participants would react to a problem posted by their friends.

In order to contextualize the posting of privacy issues on Facebook, we used the scenarios technique of describing situations in which those problems usually happen. Thus, we defined a scenario for each problem identified. According to Rosson and Carroll [23], a scenario is a story about people running an activity. A scenario should describe the context of use in which a certain problem affects users' privacy.

Therefore, we described ten scenarios. Some of these were stories told by the participants during the brainstorm of problems. We named the scenarios according to their theme. Chart 2 shows the scenarios created to represent the problems of Chart 1.

We presented the scenarios above describing the privacy issues to the participants, and they were free to choose a scenario according to their preferences.

Their activities consisted of:

1. Rewriting the scenario in their own words and posting it on their Facebook wall in the first person, as if it was something that happened to them;
2. Interacting, commenting (responding to contacts) and storing all comments (by using screen shot);

Chart 2. Scenarios (S) for the privacy issues on Facebook

(S1) Only those I want! Maria wants to post photos of her birthday on her Facebook profile so that only her parents, who live in São Paulo, can see what her party was like. Since she is very reserved, she does not want others to see these pictures. She publishes the photos and tries to restrict their view only to her parents.

(S2) Don't tag me! Luana was tagged on a photo on Facebook by her friend but she did not like the picture. So, she would like to prevent others to tag her in pictures.

(S3) How have I joined this group? Today, as I logged onto Facebook, I realized I'm taking part in the "rock group", but how have I got into it since I don't even like rock?

(S4) Not on my wall! Lucia always publishes prayers on her friends' walls, but one of her friends, Claudia, did not like this habit and decided to block Lucia. However, she does not know how to do that.

(S5) But I don't even know this person... The other day I saw a message from Célia telling everyone that her grandmother had died. "***Oh no, how sad!***", I thought... Then I realized I don't actually know Celia, but certainly one of my friends does. How can I prevent friends of mine from sharing content from their contacts that I don't know?

(S6) Come on, do I know you? Alice is upset because people she has never met in life have come to ask her to add them on Facebook... and, once they have mutual friends, she is afraid not to accept those requests, but she does not want to accept them. How should she proceed in order to limit friend requests?

(S7) Where are you? Joana traveled with her family to a very beautiful place and she wants to post a photo on her profile so her friends can see it. However, for security reasons, she does not want her location to be revealed.

(S8) Is Facebook different on mobiles? Lana spends all day posting on Facebook about every little thing she does. I got tired of so much nonsense and hid her publications so I don't see them anymore. However, when I access Facebook from my mobile I still see those postings because this option (hide messages) doesn't work.

(S9) Poster Girl? Peter got shocked when he saw a picture of his wife published on a website with a notice saying. "***Hey, Peter, a sexy single girl is waiting for you!***". The announcement was from a service that promoted encounters (not only virtually). Peter decided to seek explanations about how the photo of his wife had ended up there.

(S10) I block him, but does he know that? Paulo always publishes advertisements of products he is selling on his friends' timeline. However, one of his friends, Luis, did not like this habit and decided to block Paulo, but he does not know how to do so that Paulo does not find out he has been blocked.

3. Providing us with the following details of their Facebook page: amount of likes and comments of their 10 most recent postings (the latest published).

Collecting the data of item 2 allowed us to analyze the postings made and investigate the interaction from each scenario. Item 3 aimed to calculate the average interaction ("likes" and "comments") of the 10 latest postings of their page before posting the scenario and comparing it to after posting the privacy issue. We requested such data from the participants at the time of application of the activity through a questionnaire. The delivery time was one week.

Given this, we analyzed, from the interaction between Facebook users, the participant who posted the scenario and the other users who interacted from the posting.

Each participant adapted their scenario according to their personality, though without affecting the context of the problem described. The number of participants for each scenario was as follows: S1(6); S2(6); S3(10); S4(4); S5(8); S6(2); S7(4); S8(5); S9(2); S10(5). Chart 3 illustrates an example of a posting related to Scenario 1 adapted by a participant.

Chart 3. Scenario adapted by a participant

"Hey guys, how can I set up Facebook so that only my friends would see those who are my relatives? I mean, my mother just added me as her son here, but I want only my friends to be able to see it, got it?"

(c) Analysis of the Interaction of Contacts When Facing the Posted Scenario
We conducted three analyses to investigate the interaction of contacts when facing the scenario: (A) Analysis of the forms of interaction: "like" and "comment"; (B) Analysis of the obtained comments; and (C) Analysis of the usefulness of answers.

For the first analysis, we calculated, for each participant, an average for the two forms of interaction, "like" and "comment", of their last ten postings before posting the scenario. Then, this average was compared to the average number of "likes" and "comments" obtained from the scenario posted.

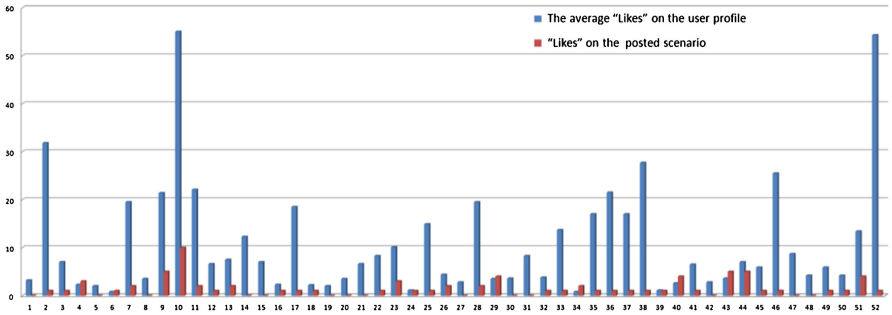
For the second analysis, all comments obtained with the 52 posted scenarios were classified according to their main characteristics.

For the third analysis, we observed whether the obtained comments helped solve the problem posted by the participant.

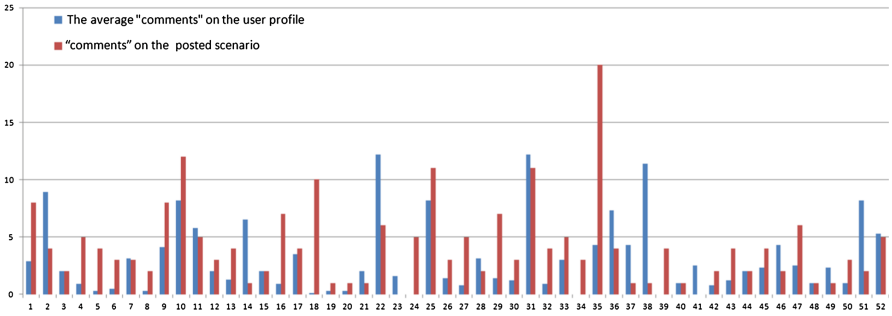
3.3 Results

The results are presented according to the analyses carried out.

(a) Analysis of the Forms of Interaction "Like" and "Comment"
Graph 1 shows the results obtained for the interaction "*like*", and Graph 2 shows the results for the interaction "*comment*". In blue, we show the average of each interaction



Graph 1. Results of the interaction "*like*" for the scenarios applied



Graph 2. Results of the interaction "*comment*" for the scenarios applied

obtained from the last ten postings of each participant, and in red we show the amounts obtained for the posted scenarios.

From the 52 participants who made the postings, for only 6 (11 %) of them the interaction "like" was greater than the previous average obtained in each profile (Graph 1). One possible reason for this may be the actual concept of the interaction "like". According to Facebook, clicking the like button in a posting is a way of telling a friend you have liked their posting without leaving comments. Once the scenarios posted referred to questions and problems, that concept would not have been appropriate. This has been widely discussed on the Internet, even leading to the suggestion of creating a button called "sympathize"[5], alternative for "like" when facing sad or unpleasant news.

As for the interaction "*comment*" (Graph 2), more than half (67 %) received more comments on the scenario applied than the average of comments of each profile. The feeling of help and the particularity of the scenarios (questions and complaints) provide evidence of the contacts that provided solutions.

[5] Available in: http://www.huffingtonpost.com/2013/12/05/facebook-sympathize-button_n_4394451.html. Acess in January 15.

(b) Analysis of the Obtained Comments
We obtained 221 comments, and then we divided them into four categories, as shown in Table 1. The percentage for each category is shown in Graph 3.

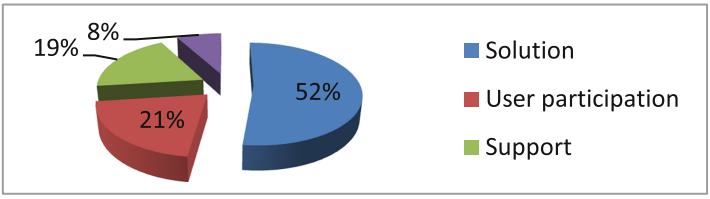
Table 1. Description of the categories of the comments

Category	Description	Examples
Solution	Comment intending to help, indicating ways how to solve the problem	*"Go to 'about'> 'Family'> 'edit' and choose 'only friends'..."; "Go into settings and then just below Privacy there is the "Timeline and marking settings", then you choose one of two options that you have there :)"; "Just uncheck the News feed for that person by placing the cursor over their name and then a friends button will appear.: Do the same with this button and it will appear that the News Feed is marked. Then just clear it, and that's it! The timeline will be clean!"*
User participation	Comment posted by the own user attempting to stimulate the participation of others	*"But isn't there a way to choose it when posting?"; "but how can that be controlled?"; "but can't that be avoided?"; "Thank you";*
Support	Comments showing support, agreement or even describing a similar problem	*"I also don't know."; "I also have doubts"; "That privacy thing is quite bad, they should improve it."; "I also wanna know, please tell me if you find a solution"; "I don't know how to do this, but it would be nice if I could do that."; "I don't know how to do that, but I'm gonna search it and I'll tell you in a minute"*
Teasing	Response having nothing to do with the question, just teasing the person	*"LOL"; "Try deleting your account"; "That's quite simple, just delete your account"; "Stop having a Facebook account and that will finish! :D"*

As shown in Graph 3, the highest percentage of comments (52 %) is classified as solution, followed by the participation of the user who posted the scenario (21 %), messages of support (19 %) and teasing (8 %).

(c) Analysis of the Usefulness of the Answers
Table 2 shows the amount of answers of the type solution and the number of correct answers, those actually solving the issues of the participants. The average percentage of

responses that solved the problem was 19.8 %. Many responses gave solutions that did not solve the problem or signaled a private answer, such as, "*I'll tell you in person/by phone/by e-mail.*"



Graph 3. Percentage of the categories of the comments

Table 2. Validation of the problems found by the heuristic evaluation

Scenario	Number of responses classified as solution	Number of responses solving the problem
S1	17	7
S2	13	7
S3	15	0
S4	11	3
S5	16	0
S6	10	1
S7	6	2
S8	6	0
S9	3	0
S10	12	4

4 Discussion

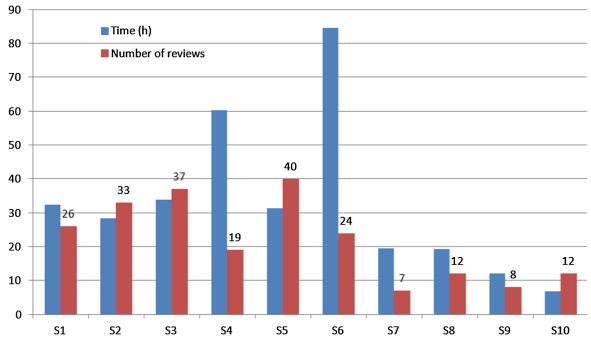
After analyzing the interaction with the scenarios, we conducted a group interview (focus group) with all the 52 participants. At this point, we suggested the participants to investigate their contacts who had interacted with the scenarios, whether by clicking on *like* button or by making a *comment*. The goal was to investigate their motivation to like, to comment or to privately answer the posted scenario.

The answers of the contacts who *liked* the scenario (about why they had *liked* it) were: identification with the problem and support to their friends. Those who *liked* it but did not comment justified they did not know the answer. Those who commented on the scenario said they did it because they felt need to help. Those who left a comment with a wrong answer were sure their answers were correct or justified that the problem had no solution. Those who responded privately had two concerns: either their answers might be incorrect or they did not want to be exposed.

Some of the scenarios posted in this research had actually no solution, such as scenarios S3, S5 and S8. As for S3, Facebook does not provide a warning for addition

into groups before the user is added into the group; As for S5, the user cannot block postings of a friend's contact without blocking also the friend's postings. They can either block all postings of a contact or none; and, as for S8, some applications have different settings for mobile phones.

In the following paragraphs, we discuss some factors that could influence the results presented in this research. The first factor refers to the period for data collection regarding a posted scenario, which had a delivery time of one week. However, this period ranged from a minimum of 4 min to a maximum of one week. We considered the possibility of deleting postings sampled after a very short time (such as 4 min), but we then noticed that the time factor was not actually decisive for the amount of interactions obtained. The previous expectation was that the longer a scenario remained available, the more comments it would have. However, as shown in Graph 4, reality was quite different.



Graph 4. Time and number of comments at the moment of sampling the scenario

Another factor that could influence the results would be the participant's influence on the posted scenarios, which refers to the participant's popularity, with the following question: *Would the participation of users be influenced by the participant's popularity?* Some authors [2, 20] have classified a Facebook user as popular for the amount of friends added into their contacts list. Leitão *et al.* [12] adds the number of comments and likes in postings for classifying a user as popular, besides the freshness (frequency) of their postings and the amount of shared postings. In this investigation, we did not evaluate either the freshness or the amount of shared postings. However, we evaluated the average number of interactions "*like*" and "*comment*" for the previous 10 postings published by each participant, which provided us with the relative popularity of each participant before posting the scenario.

After completing this experiment, Facebook has provided a new functionality that allows users to ask questions about the system[6]. The most popular topic had 2,304 questions and, for each of them, there were around 600 comments, confirming the characteristics of users investigated in these experiments: commenting about the system on the own system.

[6] https://www.facebook.com/help/community/?view=top.

5 Final Considerations and Future Work

The objective of this work was not to evaluate privacy on Facebook. This topic was already discussed by a number of authors [1, 3, 4, 6–8, 11, 13, 14, 21, 22, 26–28]. Our goal was to investigate how users interact from problems and questions posted by other users, since this represents a frequent practice in SS.

In this research, we analyzed two main forms of interaction on Facebook: *like* and *comment*. The interaction *like* was not higher regarding scenarios, though the interaction *comment* was, thus representing a greater share of this form of interaction for a scenario. The highest percentage of type of comments obtained was *solution*. Such comments were characterized for containing details of use of the system.

Some studies have already been carried out from the Postings Related to the Use (PRUs) of users in SS. In [24], we investigated a new form of assessment of Usability and User Experience in SS through the PRUs of users while using the system. In [15], we proposed a Evaluation Model of the User Textual Language. We intend to continue this work by studying characteristics of PRUs and how they can be useful in order to obtain user perceptions regarding the system.

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