A Qualitative Approach to Develop Niche Social Networks
A Reading Social Networks Case Study

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Abstract: The daily use of social networks is in growth around the world and this includes niche social networks, which have as a main feature an audience segmented by some kind of affinity that particularizes a group. This paper focuses on a specific type of niche social network, which are the reading social networks, aiming to perform a qualitative analysis of this type of website The goal is to understand how the qualitative factors can affect the users and also to serve as reference for the construction of new niche social networks, based on quality factors widely used for the creation of various types of software systems. Thus, this paper aims to fill a need for specific studies of niche social networks and also the influence of qualitative factors of software in websites, helping users and developers of reading social networks.

1 INTRODUCTION

A social network is a complex system where each node on the network interacts with other nodes, based on activities and social relationships (Musial et al., 2013). It can also be classified as a system or web service that provides the users the possibility to construct a public or semi-public profile, view and explore their own lists and lists of other users that are part of their connections and also have profiles on the same service (Ellison and Boyd, 2013). Nowadays, it is possible to notice a wide increase of the daily use of social networks by people around the world, being one of the most accessed websites and also where users spend more time (Nielsen, 2014). The importance of these systems is also noticed when the large communities created around them and the intense exchange of information on social networks allows new approaches to solve problems in different areas (Unankard et al., 2014; Cerqueira et al., 2015).

It is also possible to notice an expansion in the segmented use of social networks for all sorts of purposes and audiences, creating niche social networks that can be segmented on geographic, demographic or affinity of interests (Heidemanna, Kliera and Probstb, 2012). Thus, it is possible to find different types of social networks, among them, the reading social networks, which have the reader as target audience (Vlieghe and Rutten, 2013).

In the context of software systems, quality is a crucial point of concern, affecting everything from the personal satisfaction and the success in business to human security, with the aim of providing income and avoiding negative consequences for the users (ISO/IEC, 2011). As any other software system, social networks need to follow certain quality standards in order to promote a good experience to its users. So, given that social networks encourage the collaborative aspect where users are also content producers, information professionals must define and elaborate instruments that allow the optimal use of available resources.

The main objective of this paper is the study of software quality criteria and its application in the creation of a reading social network, named "MyLibrary", seeking to understand how these factors may contribute to the quality assurance of usability as well as support the development of this kind of system. Finally, "MyLibrary" is evaluated in order to analyse how such quality criteria affect the user experience.

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2 RELATED WORK

Millions of users add the daily access to social networks to their routines (Nielsen, 2014). Although there are a large number of variations of this kind of web system, an online social network basically consists of a set of profile pages that display a list of friends who also have profiles on the system, composing an actual network (Ellison and Boyd, 2013).

In this type of web system, it is possible to identify networks of general purpose as Facebook or Twitter, for example, where the users aim to share content and information based on daily experiences, without any specific topic. However, it is possible to notice the emergence and growth of so called niche social networks, where the goal of the public is also sharing information, but based on certain aspects that define a particular group of people and topics of interest (Heidemanna, Kliera and Probstb, 2012). It is possible to find specific networks like from information exchange on career and employability as Linkedin, among others.

The use of niche social networks can also be seen in even more specific environments, as the application of the sharing of medical information among patients on social networks (Lefebvre and Bornkessel, 2013), the recent growth in the use of Enterprise Social Networking - ESN for sharing information among people who share business interests and activities (Berger et al. 2014) and the introduction of social networks in Enterprise Resource Planning - ERP systems (Gao et al. 2014) are some examples.

The type of niche social network that this paper focuses on is the reading social network, since the lack of studies on this kind of website is remarkable. In this context, the analysis of four reading social networks is proposed as follows:

- LibraryThing: It aims to provide users with the option to catalogue and organize books, besides visiting the catalogues shared by other users to exchange reading suggestions (LibraryThing, 2015);
- Shelfari: It aims to create a global community of readers. It is also possible to build a virtual bookshelf that becomes available to the public, to participate in discussion groups and interact with authors and publishers (Shelfari, 2015);
- GoodReads: It premises on the sharing of books among friends. It also allows the creation of a virtual bookshelf and also enables tagging of books that have been read, currently read or reading wish lists. It has functions to write reviews

and exchange opinions in discussion groups, as well as mechanisms for reading recommendation, based on the analysis of massive information in order to make appropriate suggestions for the reader's taste (GoodReads, 2015);
- Skoob: Brazilian website, it allows users to create a virtual bookshelf with the possibility of displaying what they have read, what they are reading and what they still intend to read. Sharing opinions and obtaining suggestions through review and discussion groups are other tools available in Skoob (Skoob, 2015).

The software quality criteria proposed in this study were selected based on two methods of analysis: the international standard ISO/IEC 25010 (ISO/IEC, 2011) and the quality analysis standard proposed by Hasan and Abuelrub (Hasan and Abuelrub, 2011). The selection of these two methods was made in order to ensure greater coverage of the analysis, since the international standard ISO/IEC 25010 own criteria applicable to any software system, being of general use; already the standard proposed by Hasan and Abuelrub is specific to websites, ensuring compliance with the particularities of this type of system. Therefore, it was considered that the combined use of these two methods of assessment is sufficient for the correct analysis of such system.

The international standard ISO/IEC consists of eight categories that provide a consistent terminology to analyse different types of software. Figure 1 shows the set of categories and their respective criteria.
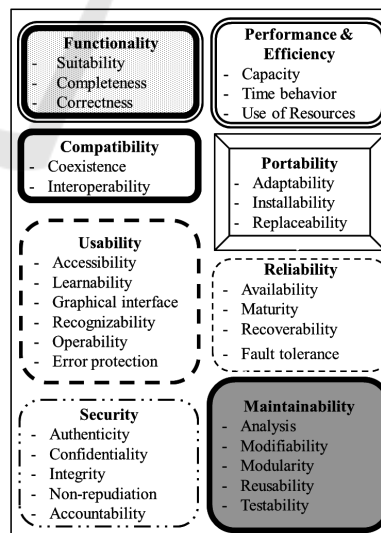

Figure 1: Quality criteria described in ISO / IEC 25010 (ISO/IEC, 2010).

The method described by Hasan and Abuelrub (Hasan and Abuelrub, 2011) consists of criteria

commonly used by web designers and developers to improve the image and the organization of their website on the Internet. Figure 2 shows the set of categories and their criteria.
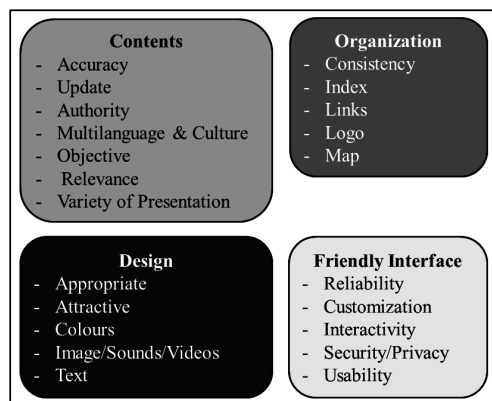

Figure 2: Quality criteria described in Hasan and Abuelrub (Hasan and Abuelrub, 2011).

In order to prove the efficiency and accuracy of these two methods of assessment, there are studies that use these two methods to evaluate different types of web systems (Cebi, 2013; Al-Khalifa, 2014). Based on this scenario, we see a gap in the literature regarding the quality analysis of social networks, more specifically the reading social networks.

Altough the quality analysis of a social network should consider sociological and user experience aspects (Olsina, Sassano and Mich, 2008), this paper highlight the technical parameters in detriment of social parameters, but without compromising them.

3 PROPOSED METHODOLOGY

On the creation of quality criteria, to support the decision on whether or not to select a given quality criterion, two inquiries were defined, both applied to each of the criteria established in the ISO/IEC standard and also in the method proposed by Hasan and Abuelrub, defined as follows:

- Verification of equivalent criteria among the methods considered: being a criterion of ISO/IEC equivalent to a criterion proposed by the Hasan and Abuelrub method only one was maintained in order to eliminate the observed redundancy;
- Verification of inadequate criteria to the analysis of reading social networks: all criteria that meet this requisite were discarded, regardless of which method contains the mentioned criterion. Different factors were considered for disposal, such as lack

of adherence to the context of social networks or the impossibility of access to the source code and server information.

It should be noted that, in order to facilitate the understanding of the website quality criteria used to analyse the reading social networks, it is stressed that the classification adopted as well as the proposed organization, prioritized the style established on the method described by Hasan and Abuelrub (2011), since this method is specific for the quality analysis of websites. Therefore, the following criteria were grouped into four categories: Contents, Design, Organization and Friendly Interface.

For the website analysis, a percentual scale of adherence to criterion was used, i. e., the higher the percentage score, the greater is the suitability of the analysed system to the criterion. Being adherent to a certain criterion means to meet, at least in part, what this criterion requires.

The analysis enabled the identification of deficiencies in the current reading social networks, as well as the essential features to this niche, in order to direct the development of a new website named "MyLibrary" so that it meets the established quality criteria.

The main features built into "MyLibrary" were: allow the user to add books to their bookshelves which have been read, currently read and wish lists; visualize a variety of book reviews; add any book and its information into the website database; locate users and interact with them through messages and profiles previews.

The main objective of creating this website was to benefit the users and developers of social networks. For users, the contribution is to improve the quality and usability of the proposed reading social network, in order to avoid discouraging experiences. For developers, the study and development of websites based on quality standards, not only reading social networks but any niche social network, can contribute to the achievement of a quality effective solution.

For the usability evaluation, two different groups of users were invited by e-mail, one of them called experienced users - made up of users accustomed to using reading social networks; and the other group called inexperienced users - made up of users who never had contact with this type of system before. Then, the website and the selected quality criteria were presented to the users, clarifying the purpose of evaluation and giving a three day deadline.

For each category evaluated, the user has assigned a rate, being: 1- when there is little or no adherence to the criteria of the category (met criteria $\leq$ 20%); 2- when there is partial adherence to criteria of the

category (20% < met criteria < 80%); or 3- when there is high or full adherence to criteria of the category (met criteria ≥ 80%).

4 RESULTS

The procedure followed for the selection of criteria from the ISO/IEC and the Hasan and Abuelrub method can be seen in the Venn diagram shown in Figure 3. As a result, the criteria for the analysis of reading social networks are presented in Figure 4.

The reason for the disposal of the criteria "Analysis" "Testability", "Modificability", "Modularity", "Accountability" and "Adaptability", is the lack of access to the websites source codes. For the criteria "Maturity", "Fault tolerance" and "Coexistence", there is no knowledge of the data from the servers.

The "Use of resources" criteria and "Capacity", besides the lack of knowledge of the data from the servers, the bandwidth where websites are hosted is unknown. It is also observed that the criteria "Integrity" and "Non-repudiation" of ISO/IEC 25010 (ISO/IEC, 2011) were complemented the the criterion "Security/Privacy" by Hasan and Abuelrub (Hasan and Abuelrub, 2011) and the criteria "Interoperability", "Reusability" and "Installability" were added to the category "Friendly Interface". To

present the results obtained through the analysis, a grouping by category was done, allowing a comparison between the results for each website.

To analyse the category "**Contents**" the following aspects were considered in each of the criteria:

- *Accuracy*: The presence of typing and grammatical mistakes in random pages of each website, disregarding users' texts;
- *Update:* Display of the date of updates done on the website;
- *Authority*: Presentation of information on the creators and employees of the website, as well as physical address and copyright identification;
- *Multilanguage and Culture*: It was established that the website would be available in its native language and in English. When the native language is English, it should also be available in another language. If the website presents discussion groups and do not provide explicit biased information, it will be considered that it complies with different cultures;
- *Objective*: Analysis of advertisements that can confuse the user as to the purpose of the website;
- *Relevance*: Analysis of the presentation of goals, customers, products, services and photos in order to reduce the fear of customer to perform any sort of transaction;
- *Variety of Presentation*: A higher score was awarded to websites which present information in different formats (text, video, audio).
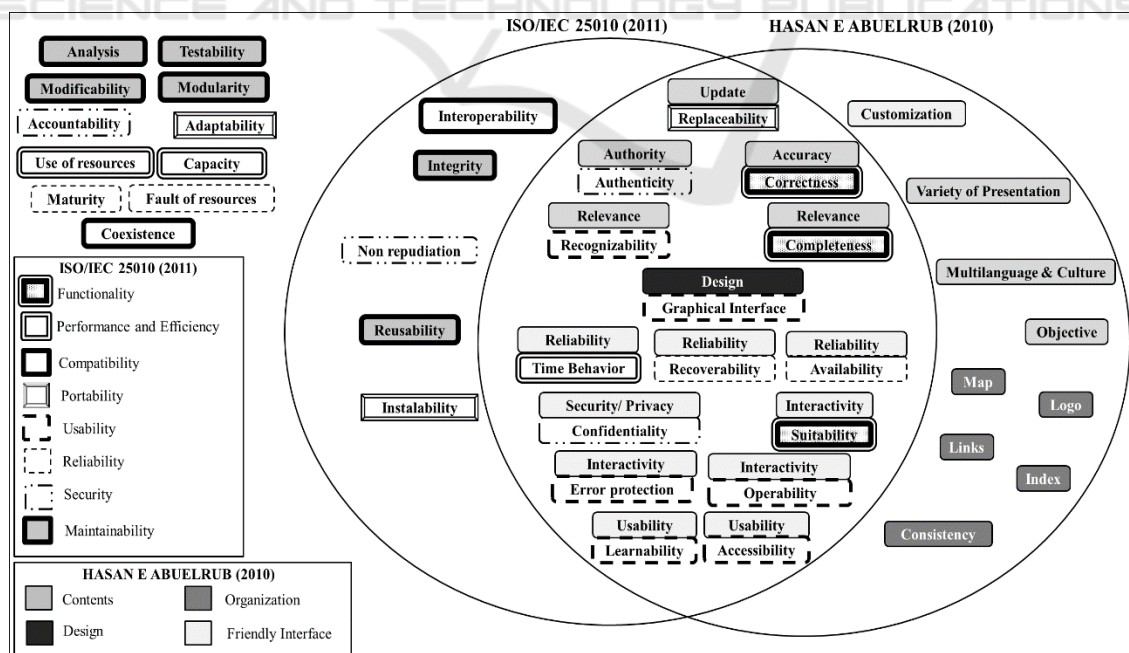

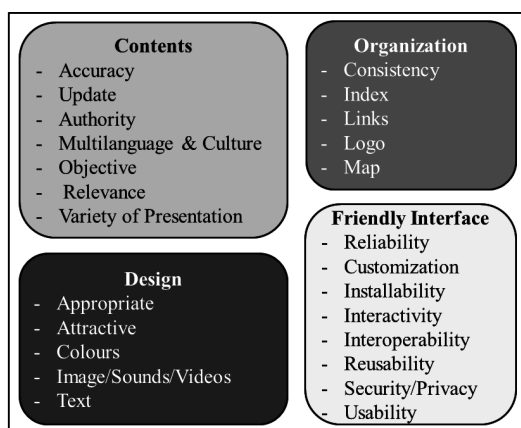Figure 3: Selection of Quality Criteria.

Figure 4: Selected Quality Criteria.

As a result, it was observed that all websites meet the "Accuracy" criterion. Skoob does not fully meet "Update" and "Authority" criteria, as it display the dates of its updates or information on its creators or physical address. Under "Multilanguage and Culture ", it is emphasized that LibraryThing is available in over 50 languages, while Shelfari and Skoob are available only in their native languages.

To analyse the category "**Design**" the following aspects were considered in each of the criteria:

- *Appropriate*: Balancing of the pages in relation to images, colours, texts and number of screens;
- *Attractive*: Existence of innovative aspects in the page design;
- *Colours*: Appropriate use of colours in order to not interfere in the reading of texts;
- *Images/Sounds/Videos*: There is presence of alternative texts for all non-textual elements. Elements displayed by third party websites were not considered;
- *Text*: Analysis of text display. Negative aspects of this criterion are the presence of whole texts written in capital letters, presence of a scroll bar that hides information, blank spaces and lack of standardization in the size of fonts.

In the category Design, it was observed that all the websites meet the criterion "Colours". LibraryThing does not meet the criterion "Appropriate ", as it presents too many screens per page. Shelfari got the best evaluation on the criterion "Attractive", since it was considered innovative for presenting bookshelves on users' libraries. Regarding the criterion "Images/Sounds/ Videos", it can be seen that none of the websites presents alternative texts for non-textual elements; in addition, Skoob does not have a well-defined pattern to the size of your images.

To analyse the category "**Organization**" the following aspects were considered in each of the criteria:

- *Consistency*: Use of the same layout for all pages of the website;
- *Index*: Presentation of an index or link bringing together all the website pages in its first pages;
- *Links*: Correct functioning of the links and checking colour change after accessing random pages. Presence of assistance links (home, top, back) and links to related websites;
- *Logo*: Verify if the site logo is visible on every page;
- *Map*: Verify existence of a website map or a navigation menu for the user to know which page he is currently visiting.

In the category Organization, it is emphasized that most websites meet established criteria, except for the criteria "Index" and "Links", due to the fact that none of the websites provide index or links to direct to the top of the page and also the fact that some links do not change colours after being clicked on.

To analyse the category "**Friendly Interface**" the following aspects were considered in each of the criteria:

- *Reliability*: Download time test. For testing, an Internet connection of 2Mb/s was used;
- *Customization*: The user is enable to modify the pages of the website;
- *Installability*: Verification of websites operation on mobile systems. For testing we used two operating systems - Android and iOS, with default mobile browsers;
- *Interactivity*: Analysis of the existence of pages with frequently asked questions and user feedback pages;
- *Interoperability*: It was observed if the website exchanges information with other systems, including other social networks like Facebook, Twitter, blogs and third party websites to buy books;
- *Reusability*: Provision of Application Programming Interface (API) for use in other systems;
- *Security/Privacy*: Presentation of mechanisms to make secure transactions and possibility to changes user confidentiality settings;
- *Usability*: The performance of each of the websites in three search engines on the Internet was analysed - Google, Baidu and Yahoo. Ease of use was also considered for this criterion.

In the category Friendly Interface, all websites obtained a good performance in "Reliability" criterion, with good page download times. It is important to point out the absence of any resource to meet the criterion "Customization" in three out of the four analysed websites, the exception being the Shelfari, which allows customization of the user bookshelf. Regarding the criterion "Reusability", only LibraryThing and GoodReads websites provide APIs for integration with other websites. The analysis of all categories can be seen in Figure 5.

4.1 Reading Social Network "Mylibrary"

"MyLibrary" website was built as a conventional web system, based on the functions of the studied websites, applying the selected quality criteria.

In order to meet all criteria in the category Content, measures were taken in order to avoid grammatical or typing mistakes in website texts. In addition, daily updates were performed and presented, as well as information on creation and copyright.

Through the use of a plugin provided by Google Translate, the website is available in over 70 languages. All sections of the website provide a description previous to any content and avoid biased information such as advertising not directed to the public of the website. Finally, links were also made available to third party websites that may interest "MyLibrary" users.

With the purpose of meeting all criteria in the category Design, images, colors and texts were balanced and there are few screens on the page. The design is suitable, since it follows the pattern of the analysed social networks.

To meet all criteria in the category Organization, measures were taken such as using the same layout for every page, an index on the home page as well as a link to the top of the page and a section of frequently asked questions (FAQ). Also, external websites open in new pages, visited links change color after being clicked on and the website logo is shown on every page.

In the category Friendly Interface, the website "MyLibrary" presented download time under 4s. Its use is also possible via mobile systems. It is possible to customize the website according to the user's desire, who can select which shelf should be presented in the foreground on the user's profile (read, currently read or wish list).

The presence of a search box at the top of every page also influences the fulfillment of all the criteria in this category. Users may obtain their bookshelves in text format and the system database is available on request, meeting the criterion of "Reusability". It is possible for the user to choose what information should be viewed by anyone, meeting the "Security" criterion. Finally, "MyLibrary" is easy to use and understand, as it features a simple and intuitive design. Figure 6 shows a profile page example that demonstrates the fulfillment of the criterias.
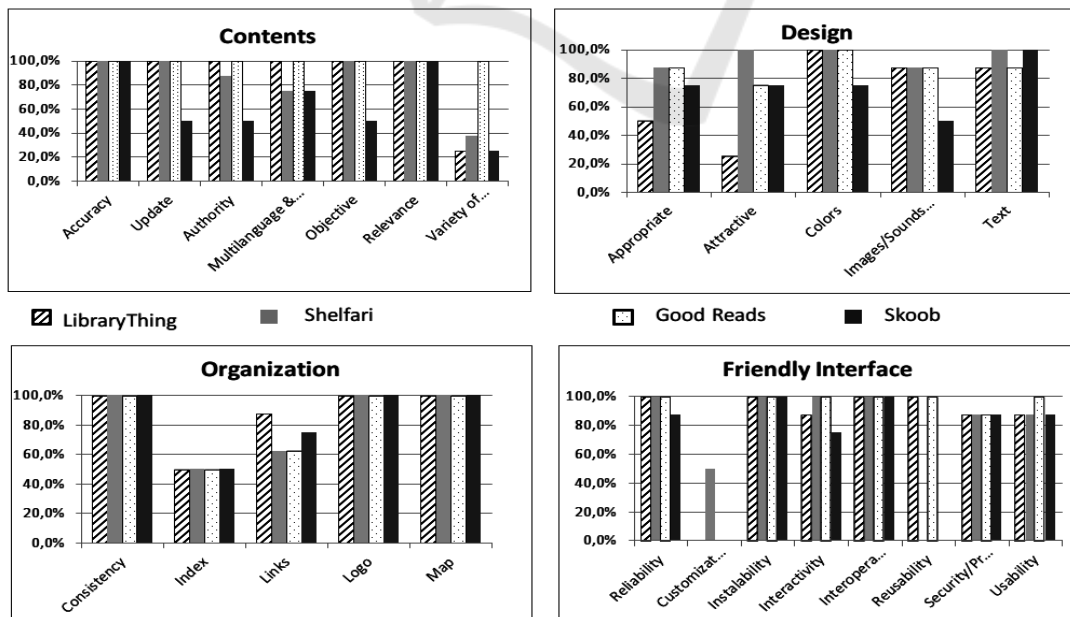

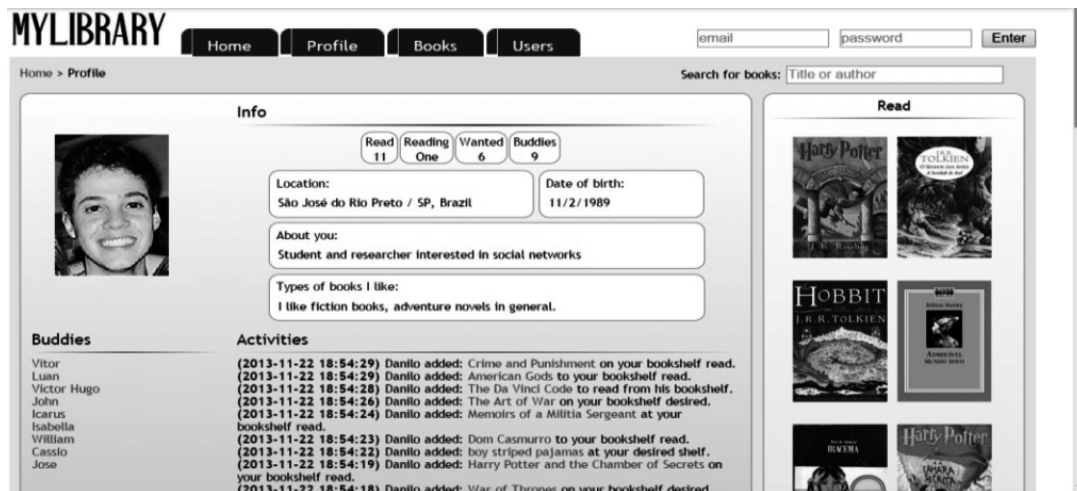
Figure 5: Analysis of the reading social networks.

Figure 6: Profile page of "MyLibrary".

4.2 "MyLibrary" Evaluation

Following the proposed methodology, the usability evaluation was carried on by users invited by email, which used "MyLibrary" for 3 consecutive days. Fifteen people were selected from a sample of college students, forming two groups: Group 1 – 5 inexperienced users; and Group 2 – 10 experienced users.

Figure 7 shows the results with the scores granted by the users.
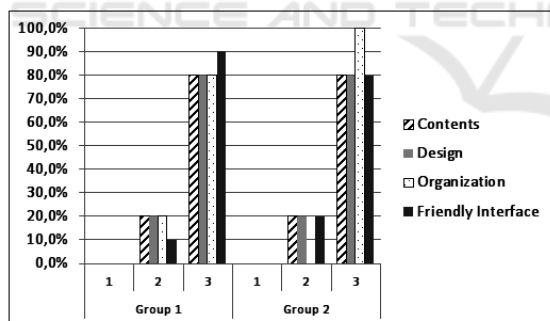

Figure 7: User analysis about MyLibrary in each category.

From the analysis of the scores given by the users to "MyLibrary", it is observed that there was no significant difference between the responses of the two groups, which enables the conclusion that the usability of "MyLibrary" was guaranteed. Both groups evaluated the proposed solution very positively. For the rates equal to 2, the evaluators' explanations were mainly focused on two aspects: the simple and intuitive design is however, unattractive; and lacks of customization options. Suggestions for improvements, such as the creation of a dynamic

guide for the moment when user signs up and also extra options, such as the inclusion of a book while viewing other shelves, will be considered for a future version of "MyLibrary".

5 CONCLUSIONS

The objective of this paper was to contribute to the users and developers of niche social networks through the study of quality criteria for websites. Given the widespread use of social networks and the trend of new niche social networks being presented, the reading social networks were chosen, a niche that had not yet been analysed from a qualitative perspective. For this purpose, two goals were set: to analyse reading social networks used in different situations and locations, based on criteria selected from the study of quality analysis methods, in order to understand their strengths and weaknesses; and to develop a reading social network which should be able to meet the quality criteria and thus address the gaps identified in the social networks of similar purpose previously analysed.

Regarding the first goal, four websites with a large number of users, which are used in different countries, were selected: LibraryThing, Shelfari, GoodReads and Skoob. The analysis of these websites guided the subsequent creation of a website not only based on functions widely used by the users of this type of system, but also on quality criteria that had not been currently met in the analysed scenario. In relation to the development of a website that would both meet the quality criteria and be able to serve as a reference for building similar websites and increase user satisfaction, it can be said that it was

accomplished by "MyLybrary", based on the results of the performed evaluation. As previously stated, over 80% of users have granted maximum satisfaction scores regarding the fulfillment of "MyLibrary" quality criteria. Therefore, considering that the criteria selected from ISO/IEC 25010 (ISO/IEC, 2011) and Hasan and Abuelrub (Hasan and Abuelrub, 2011) were followed during the construction of "MyLibrary" and the result has met the expectations of users, it is hereby proved the efficiency of the use of these criteria in creating new websites, especially when it comes to niche social networks.

In future works, we aim expand quality analysis of reading social networks and niche social networks including other quality standards with greater focus on content (Olsina, Sassano and Mich, 2008), and also considering the social behavior of the users of this type of system as a way to quality analysis (Jiang et al., 2013).

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