

Use of social network to support visually impaired people: A Facebook case study

Uso de redes sociais para suporte de pessoas com baixa visão: estudo de caso do Facebook

Gustavo Miranda CARAN¹

Rose Marie SANTINI¹

Jorge Calmon de Almeida BIOLCHINI¹

Abstract

The use of Information and Communication Technologies can be seen as an important factor for social inclusion in its different aspects - economic, social, relational and informational, among others. Inclusion potentiality is even more relevant for groups of people who face limiting life conditions which determine social barriers. This study investigated the social support offered to people with disabilities based on the social network analysis method. The research objective was to make the online support dynamics for low vision people, friends and relatives evident, having as case study the Facebook Low Vision group. The social network modelling and quantitative analysis were performed from user data collection, posts, comments and likes. Contents were classified according to the type of support (Emotional or Instrumental) and according to its intention (Offered or Requested), represented in graphs as indicators for analysis. Results pointed towards a larger use rate of Instrumental and Offered support although a more intense and comprehensive exchange of Emotional and Requested support was found. Data collection limitations indicate the need for more empirical studies on the social use of socio-technical networks for different types of social support. This theme points to a research agenda about the role of information and communication technologies as a possible condition for inclusion, life quality and well-being of people with disabilities.

Keyword: Social network analysis. Low vision. Visually impaired. Facebook. Social media. Social support.

Resumo

O uso das Tecnologias de Informação e Comunicação pode ser visto como um importante fator para a inclusão social em seus diferentes aspectos - econômicos, sociais, relacionais e informacionais, entre outros. A potencialidade de inclusão é ainda mais relevante para grupos de pessoas que enfrentam condições de vida limitadoras, determinando barreiras sociais. Este trabalho investigou o suporte social oferecido a Pessoas com Deficiência a partir do método de análise de redes sociais. O objetivo foi evidenciar a dinâmica do suporte online para pessoas com baixa visão, amigos e familiares, tomando como estudo de caso o grupo Low Vision do Facebook. A modelagem e a análise quantitativa da rede social foram realizadas a partir do levantamento dos dados sobre os usuários, publicações, comentários e curtidas. Os conteúdos foram classificados quanto ao tipo de suporte (Emocional ou Instrumental) e quanto à sua intenção (Oferecido ou Solicitado), representados em grafos enquanto indicadores para a análise. Os resultados apontaram para uma maior frequência de uso do suporte Instrumental e do Oferecido, porém, uma troca mais intensa e abrangente no suporte Emocional e no Solicitado. As limitações da coleta de dados indicam a necessidade de mais estudos empíricos sobre os usos sociais de redes sócio-técnicas para diferentes tipos de suporte social. O tema aponta para uma agenda de pesquisa sobre o papel da Tecnologias de Informação e Comunicação como condição de possibilidade para inclusão, qualidade de vida e bem-estar da Pessoas com Deficiência.

Palavras-chave: Análise de redes sociais. Baixa visão. Deficiente visual. Facebook. Mídias sociais. Suporte social.

¹ Universidade Federal do Rio de Janeiro, Escola de Comunicação, Programa de Pós-Graduação em Ciência da Informação. R. Lauro Muller, 455, Urca, 22290-160, Rio de Janeiro, RJ, Brasil. Correspondência para/Correspondence to: G.M. CARAN. E-mail: <gmcaran@gmail.com>.

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Introduction

According to the Pan-American Health Organization of the World Health Organization (PAHO/WHO), 0.5% of the world's population has some severe limitation related to the sight, and this group of people is characterized as Visually Impaired (Organização Mundial da Saúde, 2003). This is a heterogeneous group whose limitation type and intensity is variable. Among the Visually Impaired there is a subgroup of people defined by the WHO (Organização Mundial da Saúde, 2003), according to the International Classification of Functioning, Disability and Health (ICF), as Low Vision. These people are able to see with difficulties and this disability affects their performance of activities and social participation (Barreto *et al.*, 2008; Garcia, 2012).

The person with low vision, according to the ICF (Organização Mundial da Saúde, 2003), is an individual who can see, but with severe limitations to identify shapes and contours (visual acuity) or the ability to focus at one point and see the periphery (visual field). There are established metrics to determine the visual acuity and visual field of a person, based on their best eye, and the best possible correction. The person with low vision has a visual acuity between 20/70 and 200/400, or a visual field between 50 and 20 degrees.

Regarding the quality of life of the Visually Impaired with low vision, Kempen and Van Eijk (1995) and Kempen *et al.* (2012) highlight that the ability of the individual to perform day-to-day activities and social support are two fundamental aspects for the full exercise of autonomy (United Nations, 2006). Due to restricted activities and social participation of the Visually Impaired, social support reduces life impact arising from their visual limitations through external agents.

In circumstances in which the reduction in visual skills negatively impacts their daily routine, the support of family, friends, neighbors or professionals and specialized institutions becomes essential to meet their needs since the individual is not able to meet them independently and autonomously (Sasaki, 1997; Garcia, 2012).

In a brief and objective explanation, social support can be understood as "what people use in an attempt to solve life problems. Social support is the transfer of advice,

information and resources to an individual" (Mikal *et al.*, 2013, p.46). Song *et al.* (2011) define that social support is the transferred process in a social relationship among individuals and it may be: financial, material, instrumental, expert or cognitive.

This transfer indicates a direction, one that offers support for the one who receives it. It can refer both to support through exchanges of practical inputs for performing activities (knowledge, labour, products, services etc.) and to support resulting in self-esteem improvement and sense of well-being (Kempen *et al.*, 1995). Social support is, therefore, the result of interactions (exchanges of inputs) of the individual with their relationship network and, according to Song *et al.* (2011), it can be understood through Social Network Analysis (SNA).

Several studies have been conducted in order to establish what the impacts of interpersonal relationships are in social support (Field, 2003; Moreno *et al.*, 2011; Manago *et al.*, 2012; Oh *et al.*, 2013). The number of relationships, their intensity and the social equity are evidences brought by the literature that can contribute to a greater perception of the social support on the part of the individuals.

Oh *et al.* (2013) claim that social networking platforms (Facebook, for example) are an important instrument for promoting social support, since they make it possible to overcome geographical barriers by forming a virtual network of mutually supportive relationships. However, literature still leaves gaps about how such online platforms promote social support of users and regarding the nature of support that is offered.

Based on these perspectives, the present research sought to identify dynamic characteristics of social support for the Visually Impaired through the collection and analysis of existing data in an online social network platform. Therefore, a case study of exploratory nature was conducted in a Facebook group created by users aiming to discuss issues related to people with low vision. In this context the authors observed the exchange of life experiences among its members, consisting of people with low vision, family, friends and health professionals.

The present research focuses on the observation of behaviors of individuals from their interactions

mediated by social networking platforms. It is intended, from these behaviors, to obtain evidence on the dynamics of groups of support to the visually impaired. Such dynamics reflect the informational behavior of members, since their participation in social networking platforms (content sharing and engagements) is caused by an informational need - according to Wilson (2000). The use of social network analysis in Information Science (field of knowledge that studies, among other aspects, the mediation of information and the informational behavior) is present in the following studies: Otte and Rousseau (2002), Matheus and Silva (2006), Araújo (2014) and Venâncio (2014).

The Social Network Analysis, according to Otte and Rousseau (2002, p.450) "has become an interdisciplinary approach with application in sociology, information science, computer science, in geography etc". The authors complement that this approach "[...] will find more and more space in information science", supporting and being supported by theoretical arguments about informational phenomena and behavior mediated by social interactions.

Methodological Procedures

According to Mikal *et al.* (2013), studies related to social support can take into account two perspectives. The first one considers the offer of support, observing what is offered (type of input), with what intensity and for whom it is made available/used - that is, the support offered. The second perspective considers the perception of support by those who receive it, through the investigation of perceived benefits - called by authors as perceived support.

The present research conducted a quantitative analysis of offered social support in a social network from the case study of Low Vision Group on Facebook <www.facebook.com/groups/5305113754/>. The authors adopted the static network analysis (network photography, according to Hanneman & Riddle, 2011; Borgatti *et al.*, 2013), using the bimodal structure based on affiliations (Borgatti & Halgin, 2011). The network vertices correspond to the users and publications (posts), and the edges to the interactions between user and publications - such as publication, comment or like.

After surveys were carried out on Facebook, the authors found that the Low Vision Group was best suited for conducting the case study. Active since 2009 and created with the objective of promoting the exchange of experiences and the dissemination of research and assistive technologies towards the person with low vision, almost one thousand users from all over the world joined the Low Vision Group (until the time of data collection). Reading the latest content pointed to a dialogue of varied and potentially valid themes for the purposes of this research. The combination between group size and content diversity was a decisive criterion for the definition of the Low Vision as the object of study.

The data were collected using the NodeXL software with data extraction from the module NodeXL Facebook Group Network (Smith *et al.*, 2009). The processing and analysis of data were carried out in Microsoft Office Excel 2010 and graphs were generated in the Gephi Viz Platform (Gephi Consortium, 2010). All publications, comments, likes and users were extracted from the Low Vision Group, but only the publications that had comments or likes were analysed. Thus, of 447 publications, only 247 (55%) had their contents analyzed and classified. The research considered the set formed by the publisher, the publication and users who liked or commented the publication as a Support Unit. The network was conceived by a set of Support Units, composed of groups of users who shared information with each other.

As variables of the present SNA, two properties were established for the Support Units: Support Unit Type, which may be Instrumental or Emotional (Song *et al.*, 2011); Support Unit Intention, which may be a request for information (Support Requested) or disclosure of information (Support Offered). For each user-publication relationship (edge), two properties were established: Participation Type, which may be publication, comment or like; and Intensity of Participation, indicating the amount of times that the user participated in a Support Unit.

Results

Of a total of 997 users who are members of the Low Vision Group, 305 (30.6%) contributed posting,

commenting or liking contents. From those active participant users of the group, most of them was English-speaking participants (77.0% from the United States, 10.0% from Britain and 1.0% from Canada), and others were from France, Germany, Spain, countries in Asia and Latin America - including Brazil.

For a panoramic view of the results, two graphs were generated, stratified by Support Unit Type (Figure 1) and by Support Unit Intention (Figure 2). The legends of the graph indicate each of the vertices according to their colour. In both graphs, the black vertices represent publications that did not receive comments or likes (out of scope). Although not analyzed, the latter were included in the graphs to enable viewing the participation of users in all the publications of the group.

The size of vertices (Figures 1 and 2) represents the breadth of the support unit (number of participants), and the thickness of edges indicates the intensity of participation (number of participations). The position occupied by the vertices in both graphs indicates its centrality - that is, the more central the publications or users in the graph, the more participations occurred. A post in a central position on the network indicates strong repercussions in the group, and a user in central position indicates having intensely participated in publications, comments or likes.

Comparative indicators were also raised to supplement the interpretation of graphs, shown in Table 1. Six basic indicators (items A through F) and 8 composed indicators (items G through N) were used. The indicators were stratified by Support Unit Type and Support Unit Intention to allow a comparative analysis between them.

The total number of vertices of the graph is composed of the Number of Users (A) and by the Number of Posts (B). The Number of Participations (E), in turn, consists of the sum of the Number of Postings (B), Number of Comments (C) and Number of Likes (D). The Number of Edges (F) represents the occurrence of interaction in a Unit of Support (Post). Density (G) indicates how much users participated in the group, having as a denominator the hypothetical situation in which all users participate in all publications (Borgatti & Halgin, 2011). The Mean Coverage (H) points to the arithmetic mean of the number of participants per posts, reflecting the average impact of the posts on the engagement of users in the group. Average intensity (I), in turn, suggests the intensity of posts from the volume of participations generated.

The Centrality in the Supports (J) is the indicator that represents the variation of participations in posts. Its calculation is based on Standard Deviation (STDEV),

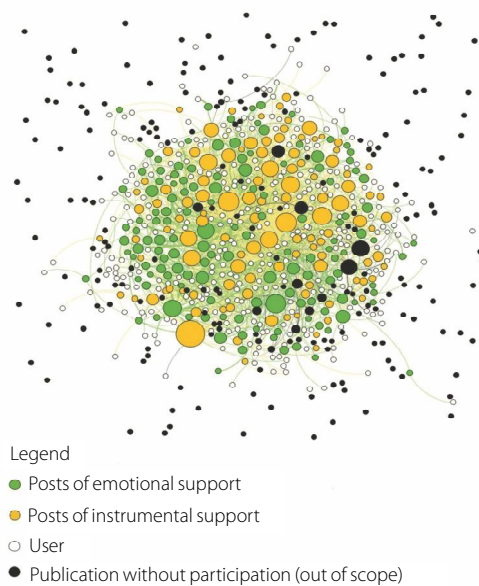


Figure 1. Graph for Support Unit Type.
Source: Prepared by the authors (2014)

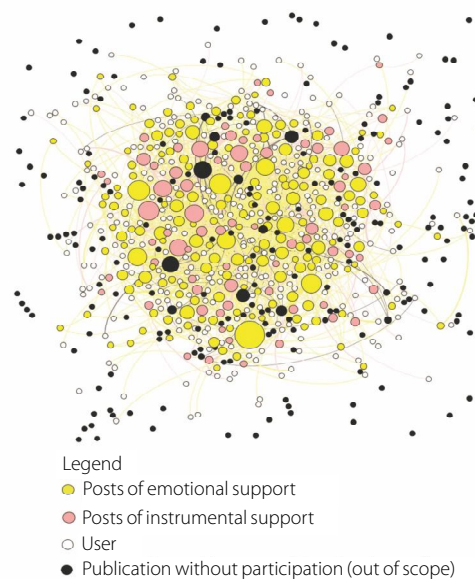


Figure 2. Graph for Support Unit Intention.
Source: Prepared by the authors (2014).

Table 1. Network indicators.

Indicator (n)	Calculation	Total	%			
			Emotional	Instrumental	Offered	Requested
Users	A	284	179 (63)	205 (72)	222 (78)	154 (54)
Posts	B	247	111 (45)	136 (55)	175 (71)	72 (29)
Comments	C	1.243	768 (62)	475 (38)	747 (60)	496 (40)
Likes	D	513	310 (60)	203 (40)	452 (88)	61 (12)
Participations	E = B + C + D	2.003	1.189 (59)	814 (41)	1.374 (69)	629 (31)
Edges	F	1.124	589 (52)	535 (48)	775 (69)	349 (31)
Density	G = F / (A * B)	0.0160	0.0296	0.0192	0.0199	0.0315
Mean Coverage	H = Engaged / Post	4.55	5.3	3.9	4.4	4.8
Average Intensity	I = E / B	8.11	10.7	6.0	7.9	8.7
Centrality in the Support	J = Standard Deviation (I)	16.8	16.8	5.8	15.5	5.5
Average Weight Participation	K = E / F	1.8	2.0	1.5	1.8	1.8
Posts per User	L = B / A	0.9	0.6	0.7	0.8	0.5
Comments per User	M = C / A	4.4	4.3	2.3	3.4	3.2
Likes per User	N = D / A	1.8	1.7	1.0	2.0	0.4

Source: Prepared by the authors (2014).

considering the entire population, using the STDEV formula of Microsoft Excel 2010 (Lapponi, 2005). The higher its value, the more uneven the network is - and more centralized the social support in a few posts. The Average Weight of Participation (K), in turn, demonstrates, on average, the intensity of participation of each user in each post. The Average Posting per User (L), the Average Number of Comments per User (M) and the Average of Likes per User (N) allow an analysis of their behavior in the group, stratified by the types of participation.

The Low Vision group's network was composed of a significant number of members (997), but only 28% (284) of them participated by liking, posting, or commenting. Considering only the posts within the scope, the density is 0.016, with an average of 4.55 users (including the author of the publication) and 8.11 comments and likes in each support unit. Each user participated, on average, publishing 0.8 posts, 4.1 comments and 1.7 likes. However, such participation was of little homogeneous intensity, showing a high standard deviation (16.8).

When comparing the types of support, Instrumental Support was 14.5% greater than the Emotional Support in number of participants and 22.5% greater in number of support units (posts). However, the average breadth and the average intensity of the support units were 35.9% and 78.3% higher in the Emotional Support, respectively.

In the distribution in participations, greater homogeneity in the Instrumental Support was perceived, with standard deviation of 5.8 in intensity versus 16.8 in Emotional Support. When analyzing the types of participation, it was found that the Emotional Support is more intense both due to comments (87%) and likes (70%).

When comparing support intention, Offered Support showed a higher number of support units, number of users and participations, in absolute numbers, when compared to Requested Support. However, when the breadth and intensity was investigated, Requested Support was 9.1% and 10.1% higher than Offered Support, respectively. When analyzing the average weight of each participation, the authors found that the two modes of support intention received similar contributions from each user.

In the results of each user's participation in support units, there was a high difference (five times higher) in average likes per participant, indicating that Offered Support tends to get a higher number of likes in relation to Requested Support. In addition, participation in the Requested Support was significantly more homogeneous than Offered Support, characterizing a standard deviation of 5.5 versus 15.5.

Finally, the frequency of posts per user was verified. Approximately half of the users (51.1%) have not

published any post, and 91.5% of the users published at most two posts in the Low Vision Group. Less than 10% of users showed more intense posting behavior (more than 2 posts).

Discussion

In a first critical analysis of the size of the network and its cohesion, bearing in mind the values obtained in the results of this research, the authors found a low performance of users through content production. The low participation in percentage terms confirms other studies about collaborative production, in which, on average, less than 10% of users of information sharing platforms are active contributors (Benkler, 2006). Network density (0.016), post sharing of 26% of the 997 members of the group, timely publication of about 40% of the users who commented or liked, and commented collaboration and likes in 55% of the publications (247 out of 447) may indicate a comparatively high degree of participation.

In a perspective based on usual participation of users in online social networking platforms, the results presented indicate cohesion above expectation. The Low Vision Group can be regarded as participatory and positively indicate the presence of social support promotion - from the 90-9-1 parameters of Li (2010). The 26% active users on social networking and the publishing of posts for 14% of them largely overcome the 9% and 1% indicated by Li as default behavior of users in online social networking platforms.

In order to establish a default behavior of users on the internet, Li (2010) identified three user profiles. The first, corresponding to 90% of total users, are just observers who do not collaborate at all or make any comments nor provide any other form of active collaboration. The second user profile represents 9% of the total, and indicates those who do not fulfill the role of publisher - they only contribute with comments or active collaborations in other users' publications. The third profile corresponds to only 1% of the total users investigated and they publish content and fulfill the role of curator, active voices at some point and in some specific virtual space.

Network cohesion can also be seen from the capacity of the support units (posts) in promoting the

interaction between users, as well as the intensity of dialogue. At this point, the average coverage (4.55) and average intensity (8.11) can be regarded as positive points of engagement and participation. The predominance of the comments in relation to likes (about 140% higher) leads to the understanding of a significant participation in explicit contents, which are positive indicators that highlight social support. Despite the scarcity of scientific literature that discusses the role of comments and likes in social support on Facebook, words (comments) express support among people and convey a richer informational content - particularly in publications where support is requested and characterized as instrumental.

In the analysis of intensity of exchanges as an indicator of social support (Moreno *et al.*, 2011), the emotional support and the requested support in the Low Vision Group are highlighted, since it presented a higher number of users and a larger number of contributions. However, the users' exposure of emotional issues and the action of requesting support occur less frequently, indicating a predominant social use of Facebook to deal with practical issues and place content for other users - characteristic of instrumental support and offered support. The constancy in participations among publications can also be observed, demonstrating greater homogeneity to instrumental support and offered support - with more constant and evenly distribution of participations among the publications. Thus, in summary, these supports (instrumental and offered) are performed more frequently, and result in a more homogeneous participation that involves fewer people and less flow in the exchange of information.

The participation of users with likes in the emotional support is 70% more intense (compared to the instrumental support). This fact raises the hypothesis that likes are potential manifestations of a kind of support expressed without words. It is possible that the likes, in the context of social support, are used in the same way as a single 'silent hug' is employed at times moment when the individual feels emotionally discouraged and needs comfort, feeling supported and cherished. Within this perspective of an emotional support expressed without words, the 'like' is understood as a support action from the one who likes towards the one who writes the post.

At the same time, in the offered support (presenting five times more likes in comparison to the requested support), the likes may take an indicative function of interest and affirmation of the relevance of that information offered to other members of the group. The like may serve not only as feedback for the one who offers support (author of the post), but also as a strategy for the latter to be informed of new comments and likes in that support unit (post), and consequently be able to stay up to date in the discussion. The 'likes' in offered support, from this perspective, play a double function: from the one who liked to the one who wrote the post and from all those who are part of the support unit (published, commented or liked) to the one who liked. The first function denotes feedback that indicates the relevance of the offered support; the second one denotes the support from the set of users to the offered support, which favors further participations and social interactions in the network.

Conclusion

This study points to preliminary evidences about the presence of social support in online social networking platforms. The results obtained do not allow generalizations about the dynamics of behavior of the social support networks on Facebook for people with low vision, nor does it outline their social implications. However, in the social network studied (Low Vision Group on Facebook) it can be observed that, among users who seek social support, there is a degree of engagement greater than those found in previous studies. From this research, a way is opened for understanding this type of online social networking as a community of practice that takes the form of a solidarity network - and points to the existence

of new forms of behavior and collaborative participation in the virtual environment.

Another point to be highlighted concerns the method of Social Network Analysis and its potential to diagnose the articulation of social support through socio-technical networks. The method of extraction and visualization of micro-data on the behavior of users allows mapping micro-regulations, micro-negotiations and everyday actions among members of certain social groups that have specific interests and demands for information. This methodological perspective of research suggests a new epistemological view of the field of social phenomena studied, to the extent that it can reveal a reality of production, dissemination and use of information through the Internet - and points to the contexts in which users tend to be passive or active, and the conditions of possibility to the production of credibility and informational relevance in networks.

For this purpose, the empirical results presented in this study can be complemented by studies that allow correlating social support, social network analysis and the person with disability as interdependent variables. Viewing the reality of the individuals and social and political aspects involved in the context also deserve attention in order to contribute to the explanation of other aspects of existing behaviors in social support. On the other hand, this research can be a starting point to further knowledge about the role of online social networking platforms (such as Facebook) for the promotion of social support, and how their reach and benefits can be increased.

Contributors

All authors contributed to the conception and design of the study, data analysis and final editing.

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