ISSN: 2237-826X
PAPER | ARTIGO | ARTÍCULO

Informational engagement in online social networks: how to calculate?

Engajamento informacional nas redes sociais: como calcular?

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Submitted/*Recibido*: 18 de setembro de 2020; **Approved/*Aceptado*:** 21 de dezembro de 2020

Abstract

Introduction: this study highlights the insertion of online social networks in the current informational scenario of society, emphasizing the importance of analyzing the informational engagement of individuals in these social media as a way of understanding the informational behavior of the population through the access and use of the information made available by these communicational means. **Method:** it presents the proposed formulas for calculating informational engagement in online social networks by adjusting the quantification of existing interaction tools on social media such as likes, shares and comments. Thus, the suggested formulas assign weights based on the sample under analysis and which represent the level of relative engagement of a publication on online social networks. **Results:** it proves that the formulas presented are amenable to the application on the online social networks Facebook, Instagram, YouTube and Twitter for presenting a dynamic of weights for each type of interaction, thus reflecting the relative engagement made by people in a publication for each context analyzed. **Conclusion:** it contributes to the development of research aimed at analyzing online social networks and enables a better understanding of the factors that involve the individual's informational behavior through the use of social media.

Keywords: Informational engagement; Social networks; Informational Behavior.

Resumo

Introdução: *este estudo ressalta a inserção das redes sociais online no atual cenário informacional da sociedade, dando ênfase à importância da análise do engajamento informacional dos indivíduos nessas mídias sociais como forma de compreender o comportamento informacional da população mediante o acesso e uso das informações disponibilizadas por estes meios comunicacionais.* ***Método:*** *apresenta a proposta de fórmulas para o cálculo do engajamento informacional nas redes sociais online por meio do ajuste na quantificação das ferramentas de interação existentes nas mídias sociais como curtir, compartilhar e comentar. Assim, as fórmulas sugeridas atribuem pesos baseados na amostra em análise e que representam o nível de engajamento relativo de uma publicação nas redes sociais online.* ***Resultados:*** *comprova que as fórmulas apresentadas são passíveis de aplicação nas redes sociais online Facebook, Instagram, YouTube e Twitter por apresentar uma dinâmica de pesos para cada tipo de interação, refletindo assim o engajamento relativo realizado pelas pessoas em uma publicação para cada contexto analisado.* ***Conclusão:*** *contribui com o desenvolvimento de pesquisas voltadas para a análise de redes sociais online e possibilita uma melhor compreensão acerca dos fatores que envolvem o comportamento informacional do indivíduo mediante o uso das mídias sociais.*

Palavras-chave: *Engajamento informacional; Redes sociais; Comportamento informacional.*

INTRODUCTION

Technological advances have exponentially accelerated the construction of means and supports for production, sharing, and access to information. Among these means, online social networks stand out, which are easily accessible to a significant part of the population, simple to use, and with a geographic reach of the information made available.

Online social networks are conceptualized as "the digital environment organized through its own virtual interface (design/concept map) that is organized by aggregating human profiles that have similar affinities, thoughts and ways of expression and interest on a common theme". (Zenha, 2014, p. 10).

It is possible to notice that, due to these social networks, society has increasingly changed its informational behavior regarding the search, use, and dissemination of information. This behavioral change is a reflection of the construction of a more digitally participatory social body, a characteristic that integrates the web 2.0[1] and allows the free creation and availability of informational materials in these interactive structures.

This behavioral change is confirmed when analyzing the data from the Digital in 2019 (2019) from the website We Are Social[2], which presents a list with the 20 most used online social networks in the world, with only the

[1] Term coined by DiNucci (1999) to designate the web that allows social interaction.
[2] https://wearesocial.com/

top five standing out, which are Facebook with 2.271 billion users, YouTube (1.900 million), WhatsApp (1.500 million), Facebook Messenger (1.300 million) and WBXIN/WeChat (1.083 million). In Brazil, the ranking of the top 10 online social networks is established by, respectively: YouTube, Facebook, WhatsApp, Instagram, Facebook Menssenger, Twitter, LinkedIn, Pinterest, Skype and Snapchat (Digital in 2019, 2019)[3].

The number of online social networks spread throughout society is enormous. All of them present forms of interactions between individuals. In view of this, it is defined as the theme of this study the standardization in the calculations of informational engagement of online social networks. Thus, the objective is to propose a standardized formula capable of measuring informational engagement in online social networks as a way to establish a methodological standard, aiming to improve research in the area and contribute to the quality of the investigations that are being developed.

The choice of the theme and its deepening is justified because it seeks to assess, through the application of informational metrics in the area of Information Science, such as webmetrics and altmetrics, the characteristics and factors susceptible to research directed to certain interests, such as marketing strategies and data source in digital methods, for scientific studies of information produced by society.

The definition of a standard formula to calculate informational engagement will contribute to scientific research that seeks to demonstrate and evaluate the informational behavior of society in relation to the communications published on the aforementioned networks. In addition, to save the time of researchers seeking a methodology for their analyses of informational engagement and to give greater credibility to Brazilian and international scientific research that is working with the theme in question, of which we can cite Silva (2013), Silva (2018), Alves, Trindade, Souza, Mauro, and Baader (2018), Seco, Santos, and Bartalo (2016) and Presser and Menezes (2016).

That said, in order to better delimit the discussions, a brief theoretical-conceptual context about *online* social networks and informational engagement will be presented below as a way of grounding the understanding of the subject studied.

ONLINE SOCIAL NETWORKS AND INFORMATIONAL ENGAGEMENT

To begin the discussions on online social networks and informational engagement it is opportune to understand the terminological relationships that exist in this scenario, such as social networks, social media, and online social networks. Although these terminologies are used synonymously by society, they have different concepts and purposes.

At first, we start from the concept of Social Networks, which "are existing links between individuals who share the same interest and through their common connections allow relevant information to be passed on between individuals from that particular network". (Silva, 2016, p. 116).

Social Media, on the other hand, can be understood as a conglomerate of six communication categories, of which surround forums and message boards, review and opinion sites, social bookmarking, media sharing, logs and micro blogs, and social networking (Sterne, 2011). They are instruments for the creation of social networks between individuals, through the formation of bonds based on common interests. Thus, networks formed online are also called digital social networks (Souza & Cardoso, 2011).

Regarding online social networks or digital social networks, these are conceptualized by Marteleto (2010) as the symbol of the construction of human relationships on the web and are configured through applications and sites that allow relationships through virtual interactions. These interactions are related to the characteristics that each online social network presents - ways of building and making content available, receiving and sending messages, views, materials to be posted, audience to be reached, among others.

For Recuero (2009), one of the characteristics of the current online social networks is their ability to spread information through the existing connections between network actors, that is, between people who integrate the same informational interest. Through quali/quantitative analysis, researchers use these sources to understand the informational behavior of individuals or even institutional accounts, since "social networks on the Internet significantly change the flow of information in society". (Recuero, 2009, p. 25).

Each online social network offers a set of affordances that the media make available for the user to interact in different ways. In view of this, these properties need to be considered within the context in which users' actions were performed and with weight relative to their level of interaction. "an online social network is not formed by simply connecting terminals. It is an emergent process that maintains its existence through interactions between those involved." (Primo, 2007, p. 5).

These affordances direct the process of interaction and content generation of the social network, a space where users conventionally start following pages of their social interest to inform themselves about issues and interact

[3]Undated and unpaginated document.

with other users about what is published on those faces through interaction tools, such as likes - which in Facebook have been presented since 2016 as a set of options (Like, Love, Haha, Wow, Sad, and Angry, with occasional temporary additions like Thankful and more recently Care) also known as reactions. We will call this triad RSC (from "Reactions, Shares and Comments").

The analysis is not limited to these three tools, since all user behaviors within an online social network are susceptible to evaluation. According to DirectLabs (2009), among the informational metrics that can be applied to these networks are: visibility, influence, participation, and engagement.

Visibility refers to the number of visits and the time the user stays on each page. Influence measures how many other environments are referencing the user's initiative or publication, by analyzing links, mentions or tagging the online profile. As for participation, it measures how much users are interacting on a given network or generating content through comments, photos posted, videos posted, and other ways of generating content. And engagement refers to how much the audience is interacting with the brand and its content (Macedo, 2014).

Among the four metrics mentioned, this study highlights the informational engagement, a term derived from the act of interacting, sharing information among users connected to the network (Terra & Carvalho, 2014) and which is composed of the sum of the RSC triad.

The discussion starts from the understanding that the analysis of the metric of informational engagement should not be performed by the sum of affordances, because the simple sum is not able to represent in a balanced way the engagement in its specificity. According to Recuero (2014), the tools "like," "share," and "comment" are the basis of networked conversation that can have implications for social capital appropriations. The author points out that the "like" button is used in communication without having to elaborate a response. There is, then, a minimal interaction, because the actor does not necessarily need to read everything that was said. The "share" icon, on the other hand, gives visibility to the publication, in order to expand its reach on the network; it launches the disclosure of something important.

In the end, Recuero (2014, p. 121) declares that:

> Commenting, therefore, seems to involve a greater engagement of the actor with the conversation and a greater risk to face because it is a more visible participation. This is because what is said can be easily decontextualized when it migrates to other networks through the tools of sharing, liking and even commenting.

Thus, in light of the need for an engagement indicator that takes into account the different characteristics that each online social media tool presents, this paper was developed with the intent of discussing the functionality of applying the informational engagement formula in social media and suggesting a standard formula.

Thus, in order to achieve this objective, we searched the scientific literature for studies that suggested a formula to define informational engagement on social networks. Then, the study by Biancovilli, Picanço, and Jurberg (2017) was identified, which analyzes the impact of information available on Facebook about cancer. The authors agree with the idea presented by Recuero (2014) and define the weighted average of likes/reactions or reactions, shares and comments from a formula with defined weights based on the relevance of each tool. Thus, they defined the sum of the RSC triad as an engagement indicator, assigning a weight of 0.05 for likes; 0.2 for shares; and 0.75 for comments. The sum of these metrics would define which publications provide the most engagement in the dissemination and impact of cancer information.

In the present study, we started from the premise that the establishment of weights would, a priori, go against the understanding of the different ways and frequencies in which the appropriations of the tools of social media sites occur. Thus, we sought to establish weights for each of these in a non-arbitrary way, delimiting congruent values with the relative importance of each tool and considering the specificity of the sample under analysis, as described in the following section.

METHOD

In order to establish a formula applicable to the different online social networks and adjust it to the different samples, it was initially necessary to define weights for each of the tools that make up the set under analysis, so as to determine an information engagement value that differentiates the characteristics of each of the affordances.

To better define the methodology, the RSC triad presented above was used. In this sense, it is understood that it is necessary to establish the Total Sample Engagement (TSE), which should be defined by the sum of the total of each item that makes up the triad, i.e., the sum of reactions plus the sum of shares and the sum of comments constitute the TEE, as presented in the formula below:

$$TSE = \sum reactions + \sum shares + \sum comments \quad (1)$$

Once the TSE has been defined, the RSC triad weights will be defined. It should be noted that the weight should be weighted by one third of the sum of the tool divided by the TSE, as described in the following formula.

$$weightofreactions\,(pr) = \frac{1}{\sum Reactions/TSE \times 3} \tag{2}$$

$$weightofshares\,(pcome) = \frac{1}{\sum shares/TSE \times 3} \tag{3}$$

$$weightofcomments\,(pcome) = \frac{1}{\sum comments/TSE \times 3} \tag{4}$$

If the sum of one of the tools is equal to zero, its weight is considered equal to zero. After defining the weight of each of the tools, we will move on to the final formula of engagement, which should be applied to each of the posts and list the values of reactions, shares and comments of a given post. Then, each one must be multiplied by its respective weight, where the sum of these three equations defines the engagement of each post, according to Formula 5, presented below.

$$Engagement = reactions \times (pr) + shares \times (pcomp) + comments \times (pcome) \tag{5}$$

Thus, the informational engagement proposed goes through a sequence of five formulas. **Formula 1** sums up all the likes, shares, and comments of all the posts, obtaining the Total Sample Engagement (TSE). Then **Formulae 2, 3 and 4** are applied, in which the weights for each indicator are defined, where the weight refers to one third of the sum of the tool divided by the sum of engagement. From this definition of weights, **Formula 5** will be applied, where each tool in each post is multiplied by its respective weight, and the sum of these three final formulas defines the engagement of each post.

Thus, the totals of likes/reactions, shares and comments represent one-third of each final indicator generated, valuing the less frequent actions, but which need a higher index in the formation of the informational engagement indicator generated.

This way, having the relation reached by applying the formulas, it is possible to build a ranking of the posts that caused more "impact", based not only on a simple sum of the different types of informational engagement, but from a completeness that takes into consideration some kind of weight for each of these tools, based on their relative frequency in the sample under analysis.

In cases of social networks where it is not possible to establish the triad, as is the case of Instagram - which does not allow the identification and stratification of shares, having access only to data related to comments and likes - it is suggested to apply the formulas with the data from existing tools, as described in the formulas adapted below:

Where:

$$TotalSampleEngagement = \sum reactions + \sum comments$$

Thus:

$$weightofreactions\,(pr) = \frac{1}{\sum Reactions/TSE \times 2}$$

$$weightofcomments\,(pcome) = \frac{1}{\sum comments/TSE \times 2}$$

It is concluded that for each post:

$$Engagemts = reactions \times (pr) + comments \times (pcome)$$

The adaptation of the formulas allows a better adaptation to the weights of the existing tools in each social network, whether they are dyad, triad, tetrad, pentad, hexad, or others, enabling a better representation of the informational engagement through the use of the resources used.

For the analysis of the applicability of the formulae proposed in this study, it was decided to collect the data related to reactions, shares and comments on posts of the profile of the "WebConCIB - Web Conferência em

Ciência da Informação e Biblioteconomia (WebConCIB)" (Web Conference in Science of Information and Library Science) on the social network Facebook[4]. For this purpose, data were collected from april 3 to may 15, 2020 and the Facepager[5] an OpenSource software that searchers and extracts posts from social networks liks Facebook, Twitter and YouTube with information about the interactions (likes/reactions, shares and comments) existing in each post. The application results are presented in the next section.

RESULTS

After collecting the 65 publications for the period presented above for Facebook, the number of likes/reactions, shares and comments of the posts were identified. The data was organized, applied to formulas, and the following values were arrived at:

$\sum reactions = 735$

$\sum comments = 49$

$\sum shares = 517$

Fórmula 1 TSE = 735 + 49 + 517 => TSE = 1301

Formulae 2, 3 e 4[7]:

$$weightofreactions\,(pr) = \frac{1}{\sum 735/1301 \times 3} => (pr) = 0,59$$

$$weightofshares\,(pcome) = \frac{1}{\sum 517/1301 \times 3} => (pcomp) = 0,84$$

$$weightofcomments\,(pcome) = \frac{1}{\sum 49/1301 \times 3} => (pcomp) = 8,85$$

Applying Formula 5 to the first publication of code PUB-FAC-29 in **Table 1** we find that

$$Engagement^{8} = 43 \times 0,59 + 4 \times 0,84 + 10 \times 8,85 => Engagement = 117,23$$

In the formula suggested by Biancovilli et al. (2017), which is based on the sum of the RSC triad, in which the weights of 0.05 are assigned for likes/reactions; 0.2 for shares; and 0.75 for comments, relatively low engagement values were noticed, with a high number of engagements below 1 (one) in the analyzed publications, as described in Table 1.

With the data presented, the two methodologies discussed in this article were applied: the first, suggested by the authors of this study (**Engagement with Weights Calculated for Sample**); and the second proposed by the authors Biancovilli et al. (2017) (**Engagement with Pre-Defined Weights**). Next, a *ranking* was established with the 65 posts, listing the differences found in the results, which were identified by codes established by the authors.

[4]https://www.facebook.com/webconcib

[5][6]ttps://github.com/strohne/Facepager

[7]The values of the weights were rounded to the second decimal place for ease of viewing, but in the calculations the unrounded value was used.

[8]Engagement values were also rounded to the second decimal place

Rank	Post	Comments	Reactions	Shares	Engagement PCA	Engagement PDW
1	PUB-FAC-29	10	43	4	117.23	10.45
2	PUB-FAC-41	6	28	52	113.24	16.30
3	PUB-FAC-54	7	21	10	82.73	8.30
4	PUB-FAC-14	4	19	29	70.94	9.75
5	PUB-FAC-02	3	18	37	68.21	10.55
6	PUB-FAC-03	1	13	49	57.62	11.20
7	PUB-FAC-28	0	36	43	57.31	10.40
8	PUB-FAC-47	2	18	28	51.81	8.00
9	PUB-FAC-08	3	7	9	38.23	4.40
10	PUB-FAC-37	0	19	30	36.37	6.95
11	PUB-FAC-05	1	9	17	28.42	4.60
12	PUB-FAC-01	0	18	21	28.24	5.10
13	PUB-FAC-58	0	13	23	26.96	5.25
14	PUB-FAC-36	2	8	3	24.94	2.50
15	PUB-FAC-12	0	18	16	24.04	4.10
16	PUB-FAC-22	0	18	14	22.36	3.70
17	PUB-FAC-59	0	12	18	22.18	4.20
18	PUB-FAC-18	1	14	6	22.14	2.65
19	PUB-FAC-24	1	15	4	21.06	2.30
20	PUB-FAC-52	2	4	1	20.90	1.90
21	PUB-FAC-60	0	4	18	17.46	3.80
22	PUB-FAC-38	1	11	2	17.02	1.70
23	PUB-FAC-39	0	15	7	14.72	2.15
24	PUB-FAC-06	1	8	1	14.41	1.35
25	PUB-FAC-57	1	8	1	14.41	1.35
26	PUB-FAC-34	1	5	3	14.32	1.60
27	PUB-FAC-65	0	17	4	13.39	1.65
28	PUB-FAC-04	1	7	0	12.98	1.10
29	PUB-FAC-26	0	12	7	12.95	2.00
30	PUB-FAC-51	0	14	5	12.45	1.70
31	PUB-FAC-19	1	6	0	12.39	1.05
32	PUB-FAC-56	0	15	4	12.21	1.55
33	PUB-FAC-42	0	14	4	11.62	1.50
34	PUB-FAC-49	0	15	3	11.37	1.35
35	PUB-FAC-62	0	13	4	11.03	1.45
36	PUB-FAC-33	0	12	4	10.44	1.40
37	PUB-FAC-20	0	13	3	10.19	1.25
38	PUB-FAC-64	0	15	1	9.69	0.95
39	PUB-FAC-44	0	13	2	9.35	1.05
40	PUB-FAC-16	0	12	2	8.76	1.00
41	PUB-FAC-61	0	13	1	8.51	0.85
42	PUB-FAC-63	0	10	3	8.42	1.10
43	PUB-FAC-07	0	4	7	8.23	1.60
44	PUB-FAC-35	0	8	3	7.24	1.00
45	PUB-FAC-10	0	9	2	6.99	0.85
46	PUB-FAC-31	0	9	2	6.99	0.85
47	PUB-FAC-30	0	10	1	6.74	0.70
48	PUB-FAC-45	0	10	1	6.74	0.70
49	PUB-FAC-13	0	11	0	6.49	0.55
50	PUB-FAC-43	0	6	3	6.06	0.90
51	PUB-FAC-55	0	10	0	5.90	0.50
52	PUB-FAC-21	0	7	0	4.13	0.35
53	PUB-FAC-09	0	5	1	3.79	0.45
54	PUB-FAC-15	0	5	1	3.79	0.45

Rank	Publicação	Comentários	Reações	Compartilhamentos	Engajamento PCA	Engajamento PPD
55	PUB-FAC-27	0	5	1	3.79	0.45
56	PUB-FAC-23	0	6	0	3.54	0.30
57	PUB-FAC-32	0	6	0	3.54	0.30
58	PUB-FAC-40	0	5	0	2.95	0.25
59	PUB-FAC-17	0	3	1	2.61	0.35
60	PUB-FAC-46	0	3	1	2.61	0.35
61	PUB-FAC-25	0	3	0	1.77	0.15
62	PUB-FAC-11	0	2	0	1.18	0.10
63	PUB-FAC-50	0	2	0	1.18	0.10
64	PUB-FAC-53	0	2	0	1.18	0.10
65	PUB-FAC-48	0	1	0	0.59	0.05

Table 1. Informational engagement ranking of WebConCIB Facebook posts using the formula with calculated sample weights (PCA) compared to that with predefined weights (PPD) by Biancovilli et al. (2017).
Source: research data (2020).

When analyzing the results presented, it is possible to deduce that the news, despite being in close positions, would not compose the ranking in the same order. In the formula presented in this study, shares are relatively less favored and comments are more favored in relation to what establishes the weights attributed by Biancovilli et al. (2017). Because the calculation balances the importance given to each affordance, favoring those that were less frequent in the sample, if we were to use the same weight format assigned by the authors, we would have 0.86 for comments (versus 0.75); 0.08 for shares (versus 0.20); and 0.06 for likes/reactions (versus 0.05).

It is important to note that the proposed formula generates weights that are dependent on what is found in the sample under study, thus balancing the characteristic appropriation of affordances that occurred for that set of posts. In this sense, the importance attributed to the forms of interaction (likes/reations, shares or comments) will be given according to the existing frequency in the thematic sample, which will balance the interaction rates of individuals when using each of these tools.

That said, the calculation of informational engagement is considered to solve the problem identified regarding the correct quantification of informational engagement, allowing a standardization of the methodology to be applied in research on online social networks.

FINAL CONSIDERATIONS

The proposal of this form of calculation differs from the one presented by Biancovilli et al. (2017) in that it is a definition of values for non-arbitrary adjustments that are consistent with the engagement value of the interaction tools with Facebook posts or other social media *sites* relative to the data set under analysis. In the case of comments that represent greater informational value in terms of the exposure of ideas and exchange of knowledge, for example, these generally present lower numbers when compared to the simpler ways of reacting to a publication or clicking to share a given news item. As such, the calculation proposed here aims to emphasize the value of the less frequent events in the samples, thereby balancing the engagement score performed on the posts in terms of their form.

By attributing weights to each of the components of social media engagement, relativizing their importance based on the frequency in which they occur in a given sample, we have a correction of the engagement originally proposed by social media sites where a mere sum of the components is made without qualifying their different levels of involvement, the result of which is dependent on the characteristics of the set of posts under study. Furthermore, because it is a defined calculation that does not privilege, "*a priori*", any category of engagement, neutrality is maintained in the attribution of the weights that each of these elements should have. The formulas are also adaptable to different social media sites, as exemplified for two of them.

The scientific relevance of this study lies in the improvement of the research developed in the area through the contribution of methods and procedures suitable for the development of studies focused on the quantification of information on social networks and the engagement of society through new forms of communication that are occurring in the virtual environment. Thus, the possibility of properly analyzing the informational engagement existing in social media favors the understanding of the informational behavior that occurs in the virtual sphere, providing more detailed investigations on the production, access, and use of information.

Therefore, the application of the formula in further studies will be of importance for research in the area, in order to contribute to a better understanding of the dimension of the different types of interactions present in social media sites and to favor the development of new analyses focused on the informational engagement of society through the application presented here.

Acknowledgements

This work was supported by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brazil (CAPES) - Funding Code 001 and Conselho Nacional de Desenvolvimento Científico e Tecnológico, Processo 430982/2018-6, chamada universal MCTIC/CNPQ nº28/2018 and the institutions UFG, UFRN and FIOCRUZ for the partnership of their researchers.

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How to cite this article (APA):
Silva, I. O. & Gouveia, F. C. (2021). . *AtoZ: novas práticas em informação e conhecimento, 10*(1),

141 – 149. Retrieved from: http://dx.doi.org/10.5380/atoz.v10i1.76633