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Online social networks as a communication channel for open access journals

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Abstract

[ES] **Introduction:** Scientific knowledge is essential for the development of nations as well as individuals. Open access journals and online social networks (SN) have the potential to facilitate access. This research aimed to analyze the extent to which open access journals are using SNs as communication channels. **Method:** Using a quantitative approach, digital methods were used to analyze 3,448 open access journals indexed on Scopus. **Results and conclusions:** A) In total, 14.4% of the journals have at least one online social networking profile linked to their official websites; B) there is a significant difference between the proportion of first-quartile journals (Q1) having individual social network profiles and the volume of social network followers as compared to the rest of journals (Q2, Q3, and Q4). These results allow us to identify an important opportunity area around using SN and open access journals as tools for the dissemination of scientific knowledge.

Keywords

online social networks; open access journals; scientific production; digital methods; journals rankings; scraping.

Contents

1. Introduction and literature review. 2. Methodology. 3. Results and analysis. 4. Discussion and conclusions. 5. Limitations and future research. 6. Bibliography.

Translation by ENACO

1. Introduction and literature review

Knowledge has now become a competitive advantage for nations, organizations, and people (Bernal, Frost & Sierra, 2014). We live in a society where access to information and knowledge is vital for individual, commercial, and national innovation and development. Over the last few decades, Internet has ushered in new options for knowledge generation, storage, and exchange. Beginning at the turn of the last century, several authors (Tapscott, 1997; Drucker, 1998; Castells, 2001; Estefania, 1996; Suarez, 2001) agreed to recognize information and communication technologies (ICTs) as the driving forces of our so-called "knowledge society." Similarly, they agreed that knowledge and not brute force is the primary production factor in this economy and that the phenomenon of globalization is one of its manifestations.

At the United Nations (Wolfensohn, 2000), information plays a leading role in the economic sphere that is comparable to production factors of the past, such as steam or electricity. Given that information is the most basic source for generating knowledge in this economy, great emphasis is put on not only the creation and use of information but also its dissemination, and thus, on the importance of ICTs.

Although social netwoks are as old as humanity, in today's age, they are reaching new levels of social, cultural, and political organization in the technosocial environment of the digital era (Rheingold, 2004). The speed of information production and the variety of knowledge areas necessary to perform productive activities give digital SNs great potential (Valerio and Valenzuela, 2011).

Social tools such as Facebook, Twitter, and YouTube are some examples of applications highly integrated into the present-day society (Osterrieder, 2013). According to Area-Moreira and Ribeiro-Pessoa (2012), the Internet, and particularly the "Web 2.0," has disrupted the rules of play for the creation, distribution, and consumption of culture; printed publications, movie theaters, clubs, photographs, and other objects are disappearing. Millions of people per day use these SNs primarily for recreational activities. The capacity of SNs to facilitate the dissemination of information also converts them into a first-tier tool for professional purposes, which may include scientific endeavors. If they are used properly, social tools may become important allies for the dissemination of the academic intellectual products (Osterrieder, 2013; Bik & Goldstein, 2013; Darling, Shiffman, Côté & Drew, 2013).

Considering the large volume of scientific literature, the ability to quickly identify relevant information will drastically improve scientific progress (Lawrence, s/f). ICTs have favored the transformation of information production, storage, dissemination, and access mechanisms (Area-Moreira & Ribeiro-Pessoa, 2012). However, the consumption of scientific articles does not only depend upon the technologies that allow their dissemination but also upon having access to the specialized journals.

In addition to the scarcity issue, the traditional publication system presents the obstacle of pricing policies (Nazim & Husain 2013). A large percentage of the general public does not have a subscription to these publications. Open access journals present a potential solution to this problem. This system promises huge advantages for researchers, educational institutions, and libraries, particularly those with limited financial resources (Nazim & Husain, 2013).

"Open access" is a free, online, digital academic library that is free of the majority of copyright and licensing restrictions. This allows academic knowledge to be made available to anyone, anywhere, as

long as the person has an Internet connection. Open access extends academic knowledge beyond academia and places it at the disposition of all sectors (Morrison, 2009; Max Planck Society-Berlin Declaration, 2003; Gul, Shah & Nisa, 2014; Open Society Institute-Budapest Open Access Initiative, 2002).

The conversion of academic journals to open access format has increased due to the numerous associated benefits. The success of this measure has forced them to experiment with new and innovative technologies (Gul, Shah & Nisa, 2014; Hall, De Roure & Shadbolt, 2009). Moreover, sponsoring agencies such as the European Commission require open access publications in addition to dissemination activities. This normally includes scientific publications. Under this situation, the use of social tools for dissemination activities will gain more and more importance considering the ease of sharing content with others (Osterrieder, 2013).

Despite the advantages of open access, finding a particular article depends heavily upon the effort made by the end user with an active search (Eysenbach, 2008; Allen *et al.*, 2013). The impact of research depends primarily upon how well publications are disseminated (journal articles, conferences, and books) to the end user (Allen *et al*, 2013).

Research on the process of dissemination of scientific knowledge suggests that passive processes are less efficient than active processes, regardless the audience. According to this research, the interaction between researchers and their audiences is important in explaining why some research work is used more than other work (Lavis *et al.*, 2003). To this end, the popularization of social tools such as Facebook and Twitter has positioned them as fundamental tools for information dissemination (Allen *et al.*, 2013).

It is important to mention that not all journals enjoy the same level of fame. According to Salvador-Olivan y Agustín-Lacruz (2015), the quality of a journal is measured using indicators of popularity and prestige, where factors such as citation methods and the size of the scientific community might be mentioned. According to Rúas-Araujo, Campos-Freire and Puentes-Rivera (2016, p. 1191), "bibliographic databases come from focused management of scientific and specialized journals in order to market these directly to universities and libraries around the world." According to these authors, the two most influential groups are Thomson Reuters (WOS) and Elsevier (Scopus). Although WOS was the first to arrive on the scene, Scopus maintains a more representative database due to greater coverage of scientific journals and a wider geographic range (Aguardo-Lopez *et al.*, 2014).

By combining social tools and open content, the potential for access to recognized quality academic journals multiplies. Given their widespread use, online SNs such as Facebook and Twitter are excellent for disseminating content (Procter *et al.*, 2010; Gul, Shah & Nisa, 2014). However, despite the potential that these tools have as distribution channels for open access content, we certainly cannot know the extent to which this potential has been utilized. Under this situation, one of the research objectives was to analyze the use of online SNs by the open scientific journals included in Scopus.

2. Methodology

This study attempts to analyze the potential of digital SNs as a communication channel for open journals. Given the nature of the subject, a quantitative transversal study was proposed that would allow measurement of the presence of open academic journals on digital social platforms. The concept

of "presence" also includes the existence or absence of official social networking accounts as well as the respective amount of followers.

The research questions that guided this study were the following:

- 1. What kind of presence do open academic journals have on digital social networking platforms?
- 2. Does an association exist between the academic quality of the journal and its presence on digital social networking platforms?

This research is based on the digital methods concept. Rogers (2015) defines digital methods as techniques for the study of social and cultural phenomena using the data available on the web. These techniques utilize digital objects such as websites, URLs, hyperlinks, tags, likes, and tweets, among many other devices that have originated from various Internet platforms (for e.g., content managers, blogs, social networking websites, search engines, and directories). Upon describing the role of digital methods on the research carried out on the web, Rogers makes a distinction between native and digitalized methods. The former were explicitly created to handle digital objects, as is the case with techniques such as crawling, scraping, and clouding, while the latter implicate the importation of social science and humanities methodology into the digital medium, such as interviews, surveys, and participatory observations.

The present research intensively used the technique called web scraping for online data capture (Marres & Weltevrede, 2013). Modern websites have an underlying hierarchical structure comprising tags. This structure allows for the automation of data gathering using a command sequence executed by a program. In general, data can be found in the form of lists or charts. Digital objects of interest were identified in both the research questions, specifically, links to digital social networking sites and follower counts for the respective accounts were found. All the data used in the analysis was gathered in May 2017.

3. Results and analysis

1. What kind of presence do open academic journals have on digital social networking platforms?

The list of analyzed academic journals comes from the Scopus bibliographic database (n.d.); only publications active through the last update available (October 2016) were selected. This directory provides exhaustive information on each journal, which includes details such as the publisher, thematic focus area, and geographical region. To identify the URLs of each journal, information was reviewed from Scopus, SCImago (n.d.), and the Directory of Open Access Journals (DOAJ) (n.d.). Next, a scraping platform was used on the URLs to identify links on social networking sites. Finally, a manual revision of the SN links was performed in order to determine if these led to profiles for the journals or other types of sources.

The SJR 2015 academic journal ranking, created by the SCImago research group, was used as an indicator for academic quality. This ranking groups the journals into quartiles with regard to their quality and impact, the first quartile being the highest rank.

Table 1 shows the presence of academic journals on seven digital social networking platforms (Twitter, Facebook, Google+, YouTube, LinkedIn, Instagram, and Pinterest). The section named "Journals with a social network" shows whether the journal's website contains links to a profile on the platforms

mentioned above, independently of whether this is the profile for the journal, publishers, international organizations, research centers, universities, or researchers. Slightly more than one third of the journals are connected to other sites, and the majority of these links are from Facebook and Twitter.

The second section of the table describes the distribution of links to social networking sites dedicated exclusively to the respective journal and the subsequent breakdown of the journals in relation to their SJR 2015 quartile, region, and thematic focus area (one single journal may fall into several thematic focus areas).

Finally, the last line of the table adds the average number of active account followers for the journals in each of the platforms monitored in May 2017. On an average, Facebook and Twitter accounts have the highest following from journal audiences.

	e of open a n/N	%	% Twitter	% Facebook	% Google+	% YouTube	% LinkedIn	% Instagram	% Pinterest
		Total							
Journals with a social networking profile	1236/3448	36.6%	31.0%	31.9%	13.5%	11.5%	17.3%	1.0%	1.2%
Journals with their ow	vn social netwo	orks							
Total	495/3448	14.4%	10.9%	7.8%	0.8%	0.1%	0.5%	0.1%	0.1%
SJR 2015 Quartile									
Q1	164/641	25.6%	23.1%	11.7%	1.9%	0.5%	0.5%	0.3%	0.2%
Q2	125/897	13.9%	9.9%	7.7%	0.3%	0.1%	0.3%	0.0%	0.0%
Q3	110/1074	10.2%	7.1%	6.3%	0.7%	0.0%	0.6%	0.2%	0.1%
Q4	65/654	9.9%	6.6%	6.1%	0.6%	0.0%	0.5%	0.0%	0.2%
Uncategorized	32/181	17.1%	11.6%	9.4%	0.6%	0.0%	0.6%	0.0%	0.0%
Region									
Africa	13/51	25.5%	21.6%	2.0%	0.0%	0.0%	2.0%	0.0%	0.0%
North America	81/428	18.9%	15.7%	11.2%	1.4%	0.2%	0.2%	0.2%	0.2%
Latin America	67/461	14.5%	7.8%	12.6%	0.2%	0.0%	0.7%	0.0%	0.0%
Eastern Europe	35/447	7.8%	4.5%	5.8%	0.4%	0.0%	0.4%	0.0%	0.0%
Western Europe	236/1192	19.8%	16.6%	7.8%	1.0%	0.5%	0.3%	0.2%	0.1%
Middle East	17/321	5.3%	3.7%	2.8%	0.6%	0.0%	0.9%	0.3%	0.0%
Asian Region	37/430	8.6%	6.3%	7.0%	0.9%	0.0%	0.5%	0.0%	0.2%
Pacific Region	8/116	6.9%	5.2%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%
Uncategorized	1/2	50.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Thematic focus area									
Life sciences	158/946	16.7%	14.2%	7.7%	1.4%	0.1%	0.5%	0.1%	0.0%
Social sciences	134/920	14.6%	9.8%	9.1%	0.7%	0.2%	0.4%	0.2%	0.1%
Physical sciences	138/1018	13.6%	10.7%	6.0%	0.4%	0.0%	0.4%	0.1%	0.0%
Health sciences	199/1313	15.2%	11.7%	8.4%	0.8%	0.1%	0.5%	0.1%	0.2%
General	4/28	14.3%	7.1%	14.3%	3.6%	0.0%	0.0%	0.0%	0.0%
Average number of followers on active accounts (S. Deviation)			3,332 (8,776)	5,032 (15,009)	454 (818)	554 (751)	267 (213)	137 (82)	1,706 (2,494)

2. Does an association exist between the academic quality of the journal and its presence on digital social networking platforms?

The chi-square test for independence indicated the existence of a statistically-significant association between the quartile that a journal belongs to and if the journal has a social networking profile $\chi^2(4,$

N = 3,447 = 92.473, p < 0.0001. A large part of this deviation is because the first-quartile journals report a greater propensity for having a profile on these platforms.

Subsequently, only the journals with a profile on SNs were analyzed. The idea was to compare the effect of the quartile on the number of SN followers of the journals on the platforms monitored until May 2017. The result demonstrated the presence of a significant effect F(4,494) = 5.63, p < 0.0001. Following that, multiple comparisons were performed with the Fisher LSD method (Table 2) on the mean of SN followers. According to the comparisons, the first quartile (Q1) has a significantly greater number of followers than the numbers attributed to the lower quartiles. The mean for the lower quartiles was concentrated into one group.

Table 2. Comparison by Fisher LSD pairs								
Quartile	Ν	Mean of social media followers	Group					
Q1	164	19,959	А					
Q4	65	8,752	В					
Q3	110	5,654	В					
Q2	125	5,083	В					
Uncategorized	32	4,848	В					

Note: Any means that do not share a letter on the grouping column are significantly different, with a confidence level of 95%

4. Discussion and conclusions

The results of this study reveal that there is still a considerable percentage of open access journals indexed on Scopus that have not penetrated the new channels of digital social communication. Slightly more than one third of these journals (36%) are connected to a profile of one of the SNs analyzed (Twitter, Facebook, Google+, YouTube, LinkedIn, Instagram, and Pinterest) and less than 15% of all the journals have an individual profile (the rest of the profiles are associated with entities linked to the journal, such as the publishing company that prints it or the university storing it). Even if the tools studied in the research by Gul and colleagues (2014) are not the same as those analyzed in this study (they included tools such as the RSS feed), the results are quite similar. After analyzing the Agriculture and Food Sciences Journals used any kind of Web 2.0 tool. However, the tool utilized most often was the RSS feed, and the use of SNs such as Facebook and Twitter was better described as marginal. In addition, Haustein *et al.* (2014) found that less than 10% of the articles published between 2010 and 2012 on PubMed had been mentioned on Twitter.

Similarly, in the study by Gul, Shah and Nisa (2014), it was also found that Facebook and Twitter are the online SNs most frequently used by open access journals indexed on Scopus in the three categories analyzed here: link to the social network, an individual account on the social network, and average number of followers. A much lower percentage of journals use the other SNs that were monitored. The distribution of this usage preference probably is a response to factors such as the number of users on the given SN, familiarity of use, and the type of content the SN specializes in.

In addition, it was found that approximately one fourth of the first-quartile (Q1) journals have an individual profile on one of the various SNs, which is higher than the figures for lower quartiles (Q2 = 13.9%, Q3 = 10.3 y Q4 = 9.9%). The explanation for a higher rate of individual profiles on online SNs belonging to first-quartile journals is probably in response to higher professionalization of these journals. Despite the criticism surrounding the system of classifying journals by their respective rankings, these rankings continue to be fundamental, considering that they tend to be used to measure (1) the quality of the research performed and (2) the assignment of funds (Rosenstreich & Wooliscroft, 2012).

Regionally, two different groups can be observed with regard to individual social networking accounts. Those with higher rates of individual accounts are Africa (25.5%), Western Europe (19.8%), North America (18.9%), and Latin America (14.5%), and those with lower rates of individual accounts are Asian region (8.6%), Eastern Europe (7.8%), Pacific Region (6.9%), and the Middle East (5.3%). Cultural aspects of each region probably explain a great deal of the online SN adoption levels.

In addition, no relevant differences in the rates of individual accounts on online SNs were found for the knowledge areas covered by the different journals. Similar levels of adoption were found in the four areas analyzed. It bears to mention that this study only analyzed possible associations between different knowledge categories and levels of usage of SNs. Although no significant difference exists between the usage levels, it is possible that differences exist in the way in which these SNs are utilized by journals from different knowledge areas. Holmberg and Thelwal (2014) and Haustein *et al.* (2014) found that significant differences exist in the way in which different disciplines utilize Twitter. The research by Holmberg and Thelwal, for example, found that biochemistry researchers retweet significantly more than researchers in other disciplines; digital humanities and cognitive science researchers participate in more conversations; and economics researchers share more links than average.

In general terms, the study allows us to recognize the areas of opportunity for the adoption of digital SNs as channels for communication and dissemination of scientific knowledge by open academic journals. This conclusion is derived from the fact that a considerable growth margin still exists with respect to individual social networking accounts, and also because the highest-quality academic journals as well as those that receive the largest following on social networking platforms are the ones that are penetrating this medium. This being true, the current results are not sufficient to determine the exact nature of a possible causal relation between the academic quality of the journals and their digital presence.

5. Limitations and future research

As maintained by Rogers (2015), one of the primary limitations associated with the study of web environments is their volatility and the ephemeral nature of many digital objects. In this particular context, this implicates a need to continuously monitor the digital presence of academic journals. It would also be valuable to comprehensively explore the specific patterns of communication used by journals on SNs, for example, frequency of use, publication formats, engagement metrics and impact on social network followers, and the use of informative vs. scientific language.

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