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Use of Twitter in Spanish Communication Journals

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Abstract: This is an exploratory study on the Twitter profiles managed by 30 Spanish Communication journals. The aim is to analyse the profile management, to identify the features of the most interactive content, and to propose effective practices motivating strategic management. The management variables considered were the following: the launch date of the journal and launch of the Twitter profile; published content and frequency of publication; number of publications in 2016; number of Twitter followers. The identification of the features of the most interactive tweets was performed in a 150-unit sample, taking into consideration the following factors: the number of retweets, likes, type of content (motivation), components forming the content, the date and time of publication, and origin of the publication (internal or unrelated). The results reveal notable practices and certain deficiencies in the strategic management of social profiles. Twitter represents an innovative opportunity in scientific dissemination, and it establishes an inalienable strategy for creating and maintaining the brand-journal while retaining the need to strengthen followers' reciprocity. Other potential uses are suggested.

Keywords: scientific communication; scientific dissemination; research; social networks; journal; social media; Twitter; scholarly journal; Spain

1. Introduction

Although Twitter (TW) is a relatively recent medium, first appearing in 2006, its use as a communication social network by scholarly journals has attracted research attention. As detailed below, numerous studies have examined the use of this social network in each scientific field, the user's profile, the elements conforming to the social content, the advantages and disadvantages of each medium, the interactivity, the opinion, as well as the possible correlation between social media and citation. However, TW management optimisation to increase the scope and coverage among scholars and the key to activating interaction merits closer research. Our findings on the topic are presented below.

The presence of scholarly journals in social media is low (21.5% is shared on TW and 4.7% on Facebook (FB)); however, Social Sciences and Humanities texts are more frequently located in social networks [1]. The use of social networks by journals differs depending on the scientific context [2–5]. The initial low presence of the journals on FB and TW, especially in the field of Communication, is notable; only 23% of journals had profiles in both social networks [4]. The journals' profiles on TW mean lower coverage than Mendeley, between 10 and 21%, depending on the study, scientific field, and corpus; Facebook has even lower coverage rates (between 2.5 and 10%), although access is limited to public profiles, distorting the results [6,7].

The most frequent article sections on TW are the title (42%) and summary abstract (41%). Authors are rarely mentioned, and the number of tweets created can indicate the popularity of an article; however, it is unlikely that they reveal their opinion or scientific reaction [8].

Among the advantages, TW is practical, useful, and convenient because it helps in the beginning of the life-cycle of a scholarly journal; the social network makes available a virtual community of researchers who can readily help to create, share, and refine new ideas. It also can provide an overview of less-developed research topics [3]. In this way, when a text is published, TW can reach a large community of researchers, makers, journalists, and the public within a single medium. As a result, the social and scientific impact increases, as studies by Chu et al. and Darling et al. have noted [9,10]. Although TW connects strangers with common interests, FB connects people already known to each other in some way [11].

The increase in authorship conflicts, the loss of intellectual property, and the under-representation of some scientific fields are among the disadvantages of the Internet [9]; one must also consider the relative youthfulness of the average audience [9,12]. Mentions on TW are not useful in evaluating the impact of the journals because, among other reasons, the audience on TW is broad, beyond the scholarly community; as such, the segmenting capacity is not easy [13]. As a result, some scientific results like cannot be effectively communicated in as synthesised a form as TW requires. Difficulties in the detection of opinion or scientific debate are visible on TW [14,15].

The correlation between social networks and citations shows that both citations and interactions on social media increase according to the number of co-authors and the number of references mentioned [7]. There are only moderate positive correlations between readership counts in Mendeley (a social research network) and citations in the Web of Science [7]. Editorials and the news are rarely mentioned, but they are the most popular documents on Twitter [1,16–21]. This suggests that the factors driving the social networks and the citations are different, displaying a low correlation between them.

Altmetrics is defined by Costas, Zahedi, and Wouters [22] as "social web metrics that mean mentions of scientific outputs in social web tools such as Facebook, Twitter, blogs, news media, or online reference management tools. Altmetrics also aim to go further in the analysis of scientific activities (p. 2003)". The altmetrics can function as a complement to citations.

Citation, impact, and interest do not always correlate. A tweet by a journal may be an indicator of the interest in or impact by a text [8]. The rise of the social conversation is challenging the quasi-monopolistic approach of journals as the predominant means of scholarly communication and citations [1]. From the perspective of the economy of attention, messages can be spontaneously reanimated by the social audience in a framework where each new piece of content competes because of the abundance of information [23].

To socialise scientific knowledge, journals create social profiles to establish a new audience who can interact, opine, and become a potential spontaneous commentator. They represent a space affording a different connection with the audience. This alternative is rich in its visibility and in obtaining greater scope in its content, able to acquire the loyalty of followers because they find a conversational channel to share their interests.

The utility of this study lies in identifying effective practices motivating the management of these social networks.

2. Materials and Methods

An exploratory study was carried out to learn, analyse, and describe the social practices on TW by Spanish Communication journals in 2016, taking into consideration the breadth of journals (70 journals) presented in the Scientific Social Science Journals Centre. Only the 30 journals with existing profiles on TW were selected for the final sample (42.8% of current Spanish Communication journals).

The secondary objective 1 (SO1) seeks to value the profile management on TW by the 30 Spanish Communication journals which have a public and active profile. Should a large amount of published content over the lifetime of the profile (consolidation and firm intent) and a high and constant annual average (planned regularity in updates) be identified, a consolidated and consistent management approach will be taken into consideration. The management study took into account the following variables: launch date of journal and profile; published content and its frequency; content published

in 2016; and followers/fans. The oldest journals are those that have the highest number of years of activity as scientific publications. The oldest journals in TW are those journals that have had a TW profile for a longer period. The published content means number of tweets.

Starting from the relationship of these variables, the five following hypotheses can be deduced:

Hypothesis 1. *All Spanish Communication journals manage profiles in the social networks TW and FB.*

Hypothesis 2. *The oldest journals also have the oldest profiles on TW.*

Hypothesis 3. *The oldest journals on TW have more published content.*

Hypothesis 4. *The oldest journals on TW have more followers.*

Hypothesis 5. *The oldest journals on TW follow a wider extent of profiles.*

The aim of hypothesis 1 is to corroborate the previous coincident findings of Nason et al. [3], Priem, Piwowar, and Hemminger [7], and Haustein, Costas, and Larivière [1]. The hypothesis is an adaptation of the Spanish case not studied by the authors cited. The hypotheses 2–5 are original proposals of the authors that allow for the investigation, completion, and better definition of the secondary objective (SO1).

In this way, the project seeks to examine how scholarly journals attempt to introduce the dynamics of social and digital conversations and interactions to broaden the scope of their work and their authors' work by reaching new audiences.

To achieve the secondary objective 2 (SO2), i.e., to discover the features of the content with the greatest levels of interactivity in 2016, a 150-tweet sample with a previous selection of the five tweets with the largest number of retweets (subsequently referred to as RT) of the profile of each journal in 2016 was drafted. The RT is a reposted or forwarded message on Twitter. The framework was composed of 20,905 tweets published in the period studied. The number of RT was selected as the criterion for the sample because it largely coincides with the number of likes and it implies the greatest level of user interaction. The following variables were considered: number of RT, likes, type of content (motivation), elements conforming to the content (graph or visual elements accompanying the publication, forwarding to the journal website or other web resources), date published, time of day, and production of content publication (self or unrelated). In this case, the following hypotheses are presented:

Hypothesis 6. *The oldest journals on TW and with the largest variety of content achieve a higher number of likes to the profile on average.*

Hypothesis 7. *The profiles with the most followers also receive more RT.*

Hypothesis 8. *Content with more RT interaction coincides with the type of content.*

Hypothesis 9. *Content with more RT interaction is published on the same day.*

Hypothesis 10. *Content with more RT interaction coincides within a time slot.*

Hypothesis 11. *Content with more RT interaction is internally created (a tweet created by the journal itself).*

Hypothesis 12. *Content with more RT interaction has visual elements, URL, users' citations and hashtags.*

Hypothesis 13. *A typology of content with more RT interaction can be identified.*

Hypothesis 14. *There exists a correlation between content with more RT interaction and likes received.*

Hypothesis 15. *The number of mentions by users correlates to the number of tweets.*

Mention is a tweet containing another account's Twitter username, preceded by the "@" symbol.

The hypotheses 6–15 seek to contrast the previous findings of Thelwall et al. [24], although the current research has been supplemented with original approaches from the authors. The Pearson correlation and coefficient of determination (R^2), when data has a parametrical distribution and shows a linear relationship of quantitative and aleatory variables, was calculated to the statistical processing of data.

To contrast the variables of the hypotheses (H. 8–H. 15), two groups were created: Group A is comprises of journals with RT higher than the average (287), and Group B comprises the rest of the journals. The hypothesis contrast used the non-parametric Fisher test (*p*-Value). This test measures the degree of association between the categories of the qualitative variable number of retweets (A; B) and the categories of the variables, i.e., content of the tweet, day of the week, time of the day, and elements of the tweet, to identify which categories included in these variables appear the most often in journals belonging to Group A or Group B. This formula was applied to the contingency tables (see Table 1), which resulted from the crossing of each of the categories of the variables described above, i.e., the first variable is crossed with each component of its category and with the categories of the aforementioned variables, resulting in the following table format:

Table 1. Example of contingency table.

	Variable A: Category Ai		
Variable B: Category Bj	**Present**	**Absent**	**Total**
Present	a	b	a + b
Absent	c	d	c + d
Total	a + c	b + d	N
i = 1, 2, . . . , k; being k the total number of categories of variable A			
j = 1, 2, . . . , m; being m the total number of categories of variable B			

If the Fisher test value is less than 0.05, the initial hypothesis must be rejected

$$H\_0{:}P\_a = P\_(a + c)$$

against the alternative

$$H\_1{:}P\_a > P\_(a + c) \text{ or } H\_1{:}P\_a < P\_(a + c)$$

being

$$P\_a = a/(a + b) \text{ and } P\_(a + c) = (a + c)/N$$

in which case there is statistical evidence to state that the probability of the presence of category Ai is higher (lower) when category Bj is present than the overall probability. Otherwise, it would be unfavorable to the presence of this characteristic.

The estimated confidence level was 95%. The statistical package used was Statistical Package for the Social Sciences (SPSS).

3. Results

3.1. Identification of Strategic Nature of Twitter Profiles in the Analysed Journals (SO1)

The 43% (n = 30) of Spanish Communication journals have a public and working profile in the social network TW. These also have profiles in FB. The H.1 meant that the use of TW was a general practice in such related fields as Communication, but the data do not confirm this.

It was not possible to confirm hypotheses H. 2, H. 3, H. 4, and H. 5 because there was no correlation between the number of years with active profiles on TW and the starting year of the journal ($R^2 = 0.02$), the total number of tweets ($R^2 = 0.21$), number of followers ($R^2 = 0.22$), or the number of profiles followed ($R^2 = 0.1$). Time on TW does not, as expected, affect the latter. A possible improved management is identified.

Journals showed an average of 4.1 and 13.7 years of life with a profile on TW and continued existence of editorial publications, respectively. There was no correspondence between the year of creation of the journal and its year of creation on TW ($R^2 = 0.02$). The oldest journals, Anàlisi: Quaderns de comunicación i cultura (1980), Mediatika. Cuadernos de Medios de Comunicación (1984) or Comunicación y Sociedad (1988), in their presence of years on TW, did not surpass those journals that were subsequently created. Although it is true that any journal with such an extensive history as Comunicación y Sociedad (1988) also has a long history on TW (6.9 years), these data are not in line with the presence of the oldest journal, Anàlisi: Quaderns de comunicación i cultura (1980), whose profile on TW is only 2.2 years old. The relationship between the length of existence of the journal and the years of having a TW profile is not relevant because there has been an increasing incidence of new journals being created simultaneously with their social profiles. Such is the case for Revista de la Asociación Española de Investigación en Comunicación (2014), which is three years old, and it has been interacting for 2.2 years on TW or Compé. Revista Científica de Comunicación, Protocolo y Eventos (2013) is 4 years old and has been active for four years on this social network. The launch of this journal more or less coincided with its communication activity on TW.

20.905 tweets were published dating from the creation of profiles (the earliest was in 2009), an average of 5.098 tweets over the average period (4.13 years) of life of the social profile, with an average of 170 tweets annually per journal. The journals with the largest presence on TW are El Profesional de la Información (March 2009; 7.9 active years) and OD: Obra Digital (February 2009; 7.1 active years). The relationship between profile years and the amount of content is positive only in the case of El Profesional de la Información, with 3.881 tweets in 7.9 active profile years on TW; an annual average of 491 tweets. In all other cases, there is a degree of randomness in TW management. Hence, Obra Digital displays 188 tweets in 8.5 years (a low activity taking into account its theme), an annual average of 22.1 tweets. On the contrary, other younger journals reveal a higher activity. This pertains to Comunicar. Revista Científica de Comunicación y Educación, with 3.130 tweets published in 6.7 years (467.2 annual average); LOGO. Revista de Retórica y Teoría de la Comunicación (with 2.276 tweets in 4.9 years; annual average of 464.5); or Sphera Pública (with 927 tweets in 1.7 years, average of 545). The years of experience on TW do not affect the frequency of the activity on the same social network.

The average number of followers presented by the 30 journals is 979.2. The journal with the most followers is El Profesional de la Información (7969), followed by Comunicar (4787) and Comunicación y Sociedad (2194). In addition to the above, other five journals exceeded 1000 followers when the study was carried out: Revista Latina de Comunicación Social (1917), Revista Mediterránea de Comunicación (1466), LOGO. Revista de Retórica y Teoría de la Comunicación (1451), Index Comunicación (1130) e ICONO 14. Revista científica de comunicación y tecnologías emergentes (1002).

The level of following other accounts (reciprocity) is heterogeneous. 29% of the journals exceed 500 profiles followed. In this sense, Index Comunicación (1350 following) y Revista Mediterránea de Comunicación (1280 following) are highlighted. 31% of the journals follow less than 100 profiles. 40% of them follow between 100 and 500 profiles. There are cases in which, surprisingly, only one account is followed. Reciprocity between followers and followings is an unspoken rule of the social network, showing the understanding of the operation of this network. Following others is a strategy whereby an account can acquire more followers.

3.2. Features of Greatest Interactivity Content (SO2)

TW has diverse interactivity actions with different degrees of commitment. A reply to a tweet with a simple affection of personal commitment (like) is not the same as appreciating its value and sharing it within the personal contact network (RT: main action to spread messages). Comments imply time investment, the effort in providing an opinion, and preparedness to respond, but comments are not always dealt with. Tweets which refer to a user through the use of the character "@" ensure its notification and it increases response probability. Out of all these options for interactivity, RT means a greater level of implication and it describes its scope.

The data revealed no relationship (R^2 = 0.18) between the active profile years on TW and the number of likes. In addition, the relationship between content variety and likes (R^2 = 0.03) was not significant (H. 6). There was no correlation (R^2 = 0.06) between the active profile years on Twitter and the number of RT (H. 7).

To contrast the remainder of the hypotheses (H. 8–H. 15), two groups were created: Group A is comprised of journals with a higher RT than the average (287) and Group B with the rest (see Table 2):

Table 2. Journal classification according to number of retweeted tweets.

Journal Name	Number of Retweeted Tweets	Group
El Profesional de la Información. International Information, Documentation, Library Science and Communication Journal	2193	A
Comunicar. Media Education Research Journal	1354	A
ICONO 14. Scientific communication and emerging technologies journal	704	A
OD: Obra Digital	533	A
Sphera Publica. Social Science and Communication Journal.	508	A
Mediterranean Journal of Communication	419	A
Mediatika. Mass media journal.	396	A
I/C. Scientific Information and Communication Journal	319	A
Anàlisi: Communication and Culture Journal	304	A
Comunicación y Hombre. Interdisciplinary Journal of Communication Sciences and Humanities	289	A
Index Comunicación	174	B
Communication Papers	142	B
Revista DOXA. Interdisciplinary Journal on Communication Sciences and Humanities studies	127	B
Redes.com: Social Development Communication Studies Journal.	109	B
Commons. Communication and Digital citizenship Journal.	95	B
RAE·IC: Journal of the Spanish Association in Communication Research	86	B
Journal Latina of Social Communication	62	B
Fonseca Journal of Communication	58	B
Miguel Hernández Communication Journal	41	B
Revista AdComunica	35	B
Communication & Society	32	B
Secuencias. Cinema history Journal	29	B
LOGO. Rethoric and Communication Theory Journal.	19	B
Catalan journal of communication & cultural studies	17	B
Etic@net	3	B
Compé. Scientif Journal in Communication, Protocol and Events	0	(*)
L'Atalante. Cinema studies Journal	0	(*)
Pangea. Journal of the Ibero-America Communication Scholar Network	0	(*)
Mediaciones Sociales	0	(*)
Quaderns del CAC	0	(*)
	8048	

(*) Does not display retweet (RT). Hence, these are excluded from the interactivity study (SO2).

Table 2 shows that only 38.5% of the total of content (n = 8048) received a RT. Analysis of the profiles reveals an average of 287 RT per journal, showing low commitment among followers. El Profesional de la Información (2193 RT), Comunicar (1354 RT), and ICONO 14 Revista científica de comunicación y tecnologías emergentes (704 RT) were prominent among the results. Only 33.3% of the

active profiles on TW exceeded the above average value, against 66.6% which remained below. Table 3 presents the results of the various qualitative variables.

Table 3. Tweet type of content in both categories of RT (A/B) *.

Tweet Content	Group		Total
	A	B	
Published article	13	27	40
Call for papers (CFP)	4	17	21
Guide for authors	0	5	5
Interview	2	0	2
Event	22	33	55
Attribution/Acknowledgment	1	3	4
Issue	17	32	49
News Field	14	5	19
Other	17	10	27
Awards	9	8	17
(blank)	1	1	2
Total	**100**	**141**	**241**

A* = Journals with above-average RT; B = Journals with below-average number of RT.

The H. 8–H. 15 hypotheses did not obtain a significant *p*-value in Fischer's test and, therefore, could not be corroborated. The following indicates the significant relationships found between variables.

The most frequent contents informed on scientific events, editions, or isolated published articles. The Fischer test only provided significant results in the following case: Tweets with more RT (Group A) are mainly characterised by their lack of Call for Papers (p-value = 0.023 < 0.05), offering news (podcast publications, advertisement of monographs, and unrelated information on the publication), and they are distributed on Tuesday nights. Group A was characterised by having "Own static image", being internally produced (97%), and linking to their own URL as a main content strategy.

Table 4 shows tweet components identified and their frequency of occurrence:

Table 4. Tweet components in both RT categories.

	Group		
Tweet Components	**A***	**B***	**Total**
User /institution citation	22	22	44
Linked static image	1	0	1
Own static image	16	11	27
Hashtag	3	1	4
No (just text)	0	9	9
External URL	29	16	45
Internal URL	26	79	105
Combined URL	1	0	1
Linked Video	0	1	1
Own Video	1	1	2
(blank)	1	1	2
Total	**100**	**141**	**241**

(A/B)** A = Journals with above-average RT; B = Journals with number of below-average RT.

The greater the number of RT, the greater the number of likes (R^2 = 0.61; >0.6). The greater the number of tweets, the greater the number of mentions (R^2 = 0.59; <0.6).

4. Discussion

The study sought to compare our results with the findings of the literature described in the introduction of the text. Thus, the presence of Spanish Communication journals analysed on TW was low and it was not a general practice (43%), which is consistent with the results from Nason et al. [3], Priem, Piwowar, and Hemminger [7], and Haustein, Costas, and Larivière [1] detailed in the introduction. In addition, the lack of substantiated interactivity is in line with the results of Thelwall et al. [23] because the authors were rarely mentioned, and comments or interactions were unlikely and sparse.

The initial aim, as stated, questioned the style of profile management on social networks carried out by journals and sought to identify elements confirming the consolidated feature of profile management. This entailed displaying a large amount of published content over the life of the profile (consolidation and commitment) and high and constant average of annual content (planned regularity in updating).

The results reveal that the experience on TW (active profile years) does not accord with the age of the journal, the volume of published content, the number of followers gained, or with the number of following profiles. In addition, a makeshift, clearly inconsistent management approach, indicative of a lack of strategy, was identified. More recent projects have shown an increasing tendency to emerge simultaneously with their social profiles.

The maintenance of a social profile on TW does not appear to be a priority activity for the editorial teams of most Communication journals. As a result, journals are neglecting a relevant tool in current communicative branding strategies for other types of brands.

The second stated purpose sought to analyse the content features generating greater interaction. A positive correlation was found between the number of likes and RT as well as between the number of tweets and the number of mentions by users. Interaction was not marked in the activity of profiles of scholarly journals, implying a neglect of the inherent benefits of this social network that should explain the lack of virility on the Internet for this type of scholarly and scientific content.

The study reveals that the link to both internal and unrelated websites is a recurrent practice in the design of tweet content. The configuration of the message with visual elements or the use of content grouping tags (hashtag) is not standard practice.

The most successful content (shared) was that which provided information on the publication of new editions (post-publication strategy). TW was mainly used to communicate a call for papers (pre-publication strategy).

However, it was rarely used for other purposes, such as directly addressing those groups whose users were likely to be interested in publishing in the journal and/or in reading its content. Future desirable practices could include citing authors or coordinators with a greater impact on TW who could increase the scope of the tweets. This is in addition to practices which could include attending specialised events and conversations through hashtags whose audience is similar to the audience profile of the journal or updating an article published in the past.

The use of TW with a purely informative function emerged over other possibilities of the social network.

Only a small group of journals displayed outstanding management with very positive results. TW is not the sole resource for disseminating journal content and a relatively new interest in this form of scientific dissemination as well as a degree of inexperience has been identified. This combination could explain the detected under-use and the lack of a strategy management style.

The following are among the suggested methods that could improve the activity of profiles on TW: incorporating authors in the writing of tweets, mentioning (@) authors' profiles, illustrating the post with audio-visual material, responding to the interactions, linking the articles with current socio-economic topics, introducing the hashtag with proper key words, and managing followers' reciprocity.

The generation of effective management patterns of social media for scholarly journals based on continued analysis and the regular quantification of results, with the aim of identifying improvements fields that could promote increasing strategies and contribute to the creation of brand-journal, is in progress.

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