

Twitter communication of university libraries in the face of Covid-19

Sara Martínez-Cardama; Ana R. Pacios

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Sara Martínez-Cardama ✉
<https://orcid.org/0000-0001-7035-5884>

Universidad Carlos III de Madrid
Departamento de Biblioteconomía y
Documentación
Madrid, 126-128
28903 Getafe (Madrid), Spain
smart1@bib.uc3m.es



Ana R. Pacios
<https://orcid.org/0000-0003-2887-882X>

Universidad Carlos III de Madrid
Departamento de Biblioteconomía y
Documentación
Madrid, 126-128
28903 Getafe (Madrid), Spain
areyes@bib.uc3m.es

Abstract

Libraries have had to reorient their activities and services due to the closure of their physical facilities during the Covid-19 crisis. In the framework of higher education, educational institutions have transferred their teaching and research to the online environment. University libraries have always been an essential element in the development of teaching and educational activities, and their role has been crucial during the confinement period. This research aims to analyze how Spanish university libraries have communicated this new way of providing their services through *Twitter* during the first weeks of the state of alarm. A total of 11,867 tweets and retweets from 56 libraries were analyzed based on an ad hoc thematic categorization. The conclusions highlight the role of libraries in the face of the health emergency and the transformation and publicity of this new way of working, as well as their role as an important information point to keep up to date with the current situation of the pandemic.

Keywords

Academic libraries; Covid-19; Coronavirus; Pandemics; Communication; Corporate communication; Organizational communication; Social media; Social networks; *Twitter*.

1. Introduction

In Spain, as in most countries around the world, the Covid-19 pandemic crisis has driven measures to close companies and institutions as well as the confinement of a large part of society. After the *World Health Organization (WHO)* declared a public health emergency situation on 11 March 2020, the government of Spain immediately published *Royal Decree 463/2020 on 14 March, declaring a state of alarm to manage the health crisis situation caused by Covid-19 (España, 2020)* a legislative measure with the aim of containing the spread of the virus. Article 10.3 of this decree suspended public access to museums, archives, libraries, and other cultural spaces. Meanwhile, university libraries had already closed a few days before due to the suspension of face-to-face teaching and the closure of educational centers.

The consequences of this pandemic have not only been of a health nature, but also economic, social, and cultural, and have affected to a greater or lesser extent all layers of society. Activities with a strong face-to-face nature, such as leisure and culture, were relegated to the domestic space. Online cultural and educational offerings increased, while institutions, including libraries, expanded the dissemination of their collections to a greater number of users. In this regard, one can highlight the *#laculturaentucasa* campaign (*#cultureathome*) promoted by the *Ministry of Culture and Sports* (2020), which disseminated virtual visits to museums and theatres, online cinema, and of course the loan of digital books through public libraries. The same occurred with publishers, newspapers, and digital content providers, who offered their content for free during those weeks. In parallel to this increase in the supply of information, the pandemic

also became an “Infodemic,” a term coined by the *WHO* to describe the overabundance of fake news and the speed of its dissemination. This false information spreads in the same way as the infectious agent, but to an even greater extent, according to modeling studies on the diffusion of published disinformation (Davis *et al.*, 2020).

The multifaceted reality of the study of Covid-19 health pandemic justifies its investigation from different perspectives, with the communicative one being a priority. Focusing on corporate communication, it is important to determine how institutions have maintained their digital identity and transmitted the resulting changes in how they offer their services.

In this sense, although libraries constitute one of the information units best adapted to digital transformation, they are inexorably linked to their physical space. Following the conception of Oldenburg (1989), they constitute a third place in society, namely a space dedicated to attend educational or recreational needs and, above all, to the create and combine links in a community. Apart from its digital side, the physical space remains the axis around which many services and activities revolve, especially for public libraries, which are understood as local public services and, in times of crisis, have been an essential engine for employment, training, and empowerment (Caridad-Sebastián *et al.*, 2018a; Gómez-Hernández, 2010).

Although, among the different types of libraries, academic libraries provide the most advanced online developments and services due to their support for research and teaching, space continues to be an essential element within the university, not only to access its collections, but also due to issues related to the development of the university community (Whitley; Burger, 2019; Hurt, 2019). The social perspective of the university library space has been widely debated (Bryant; Matthews; Walton, 2009). Furthermore, with the adaptation to the learning and research resource center [*centro de recursos para el aprendizaje y la investigación* (CRAI) in Spanish], academic libraries have opened community meeting spaces, laboratories, and other types of areas to facilitate learning such as *makerspaces*.

Despite the importance of space, libraries have emerged as one of the institutions that has managed to maintain proximity with their user community during confinement, and have even expanded their traditional network of contacts by offering digital reading services to users without a membership card. This has consolidated services such as *e-biblio* (e-library), *Pregunte las bibliotecas responden* (Ask and the libraries respond), being widely demanded by citizens during the confinement (CCB, 2020).

“A study to determine the communication strategies that university libraries have adopted to remain relevant and useful to their communities during the first weeks of the crisis is of great interest”

In the case of university libraries, the link with the university community has been based on the development of specific communication plans to disseminate electronic resources and services, especially and intensively on social networks and via distribution lists (Rebiun, 2020). A study to determine the communication strategies that university libraries have adopted to remain relevant and useful to their communities during the first weeks of the crisis is thus of great interest. Apart from messages about their own activities (dissemination of resources, online training, etc.), it is important to determine what kind of information about the health crisis has been shared and whether they have joined public campaigns carried out via social media. Likewise, and considering the information disorder and fake news caused during this crisis, their possible role in addressing misinformation and the spread of hoaxes is also of interest, taking into account that studies have already shown the potential role of Spanish university libraries in the fight against fake news (Martínez-Cardama; Algora-Cancho, 2019).

Against this background, this article analyzes the activity of 56 university libraries on *Twitter* from March 15 (2020) to the second extension of the state of alarm on April 26, to determine in real time how they have monitored the pandemic. To this end, an analysis based on a thematic categorization of their tweets and retweets is proposed, providing an overview of the communicative activity of university libraries during the first weeks of the state of alarm.

2. Literature review

As this subject is still developing, it is difficult at the close of this research (June 2020) to complete a global study that addresses the role of libraries during the pandemic. This literature review is thus limited to two essential areas to provide understanding of the studied topic: the importance of studying Communication in times of Covid-19, especially through the platform chosen for this study, *Twitter*, and the initiatives developed by libraries during this period.

2.1. *Twitter* as a platform to study communication related to Covid-19

Social media have always been platforms of interest to study the information generated during health pandemics, e.g., those caused by

- the H1N1 flu (Chew; Eysenbach, 2010);
- the Zika virus (Sharma *et al.*, 2017; Glowacki *et al.*, 2016; Vijaykumar *et al.*, 2018); and
- Ebola (Suau-Gomila *et al.*, 2017).

All the above-cited studies share their use of *Twitter* as an analysis platform to detect the main interests or concerns of society, the thematic coverage by the media, or the main institutional or personal sources from which such information

arises. Indeed, due to its speed, popularity, capacity for interaction, horizontality, and appropriateness for data-mining studies, *Twitter* is one of the main platforms that can provide a snapshot of a specific situation.

The international dimension of the Covid-19 pandemic has multiplied the generation of studies that use *Twitter* as a platform to analyze the pandemic from different perspectives. **Thelwall and Thelwall (2020)** thus analyze the attitudes of the *Twitter* community towards measures against Covid-19, such as social distancing or confinement, through a thematic analysis of tweets in English published from 10 to 29 March. Other authors have analyzed *Twitter* messages to confirm their ability to predict morbidity rates in each region and provide useful information to decision-makers responsible for health (**Jahanbin; Rahmanian, 2020; Park, Park; Chong, 2020**).

Apart from such thematic analyses of messages, the use of tweets as a content analysis unit allows one to evaluate the emotional component of the current access to and use of information in greater depth (**Cooke, 2017**). The complexity of the current information phenomenon has resulted in the appearance of terms such as post-truth, disinformation, fake news, or alternative facts, which overlap to describe the current informational disorder (**Wardle; Hossein, 2017, Del-Fresno-García, 2019**). All these concepts help to describe the current situation regarding information in a large section of society, where objective facts have less influence on public opinion than those based on emotions or feelings. The consumption of information via social media, characterized by their virality and speed, is precisely what favors the massive appearance of these distorted stories.

During the weeks that followed the declaration of Covid-19 as a global health emergency, hoaxes and fake news increased substantially during the quarantine period. In the case of Spain, the greater use of social networks during the weeks of confinement led to an increase in fake news, from 170 daily news stories in March to 253 by the beginning of April, according to sources from *Deusto Formación (Infolibre, 2020)*. Such disinformation about health is not a new phenomenon that emerged because of the coronavirus. Indeed, previous studies indicated that 40% of the medical news stories published on social media between 2012 and 2017 were fake (**Waszak; Kasprzycka-Waszak; Kubanek, 2018**).

López-Borrull (2020) categorized the different types of fake news about the coronavirus depending on their content, classifying them into the following subtypes:

- the origin of the disease;
- the appearance of new cases, care and prevention; and
- containment measures.

Salaverría et al. (2020) took the same approach, categorizing a sample of 292 hoaxes. *Twitter* was found to be the second most important platform for the spread of fake news, only behind *WhatsApp*. In this regard, they also add that a substantial part of such content is disseminated with a clear desire to misinform, through false accounts or bots. Among others, the recent studies by **Cinelli et al. (2020)** and **Kouzy et al. (2020)** should be mentioned when considering the analysis of *Twitter* as a platform for the study of fake news and disinformation.

Another vein of work enabled by *Twitter* considers communication by institutions during the pandemic. Thus, for example, it constitutes an excellent platform to evaluate the opinions of the different political groups or institutions involved in the management of the health crisis (**López-García, 2020**). Such studies of the performance of organizations during the crisis and the analysis of their reputational brand have been encouraged from the point of view of corporate communication (**Xifra, 2020**). In this sense, libraries constitute a social agent of interest for the analysis of such communication, not only alone or taking into account how they have adapted to the new circumstances imposed on their activities, but also in their external communication, by analyzing what type of messages related to the health crisis are transmitted or shared and their consequences, thereby strengthening relationships with their community.

2.2. Libraries in the face of Covid-19

Once again, given the recency of this crisis, we find that most of the debate regarding the role of libraries in times of Covid has still been generated outside the traditional academic world. At the closing date of this study (June 2020), few contributions are found in scientific journals, with most of them being editorials. Generally, most contributions are presented in professional or informative blogs, offering ideas and recommendations and summarizing activities carried out by libraries to address the closure of their physical space, followed by recommendations for reopening.

The initially reactions and measures certainly came from professional associations. Thus, associations such as the *International Federation of Library Associations and Institutions (IFLA)* or *American Library Association (ALA)*, and in the case of Spain, *Rebiun* for university libraries, quickly collated initiatives carried out by different libraries, to establish a centralized point of information to serve as a guide. This is the case of the IFLA, whose report entitled "Covid-19 and the global library field" (**IFLA, 2020**) brings together key resources regarding the response of libraries to the pandemic. All of these are regularly updated and based on shared information gathered through a specific email address. The resulting compilation deals mainly with the

- mechanisms of library closure applied around the world;
- health and safety at work;
- how to offer library services remotely; and
- the gradual reopening of centers.

Meanwhile, the ALA (2020) developed an extensive resource entitled “Pandemic preparedness: Resources for libraries,” which includes specific resources for the management of health emergencies in general, and Covid in particular. Using this resource, they share communications, articles published in *American Libraries*, recommendations for policymaking within individual libraries, and various training resources and webinars. The content of these sessions generally deals with the virtual transformation of activities such as reference services, information literacy, or remote management of library staff. The *Public Library Association (PLA)*, the branch of the ALA focused on public libraries, also collated the main activities of 2,545 libraries in Spain via a survey, confirming that the actions adopted by libraries were aimed at expanding their digital assets, launching virtual programs, and coordinating with different agencies and local authorities. Moreover, 76% of those surveyed indicated that they had extended their loan renewal policy.

This line of research also includes academic libraries. In Spain, *Rebiun* (2020) collected the main measures carried out by Spanish university libraries from the early days of confinement, focusing mainly on telework, maintaining the telematic attention of users, and the development of services in a virtual fashion, among others. Likewise, it provides a list of web pages created by universities to share specific information on the measures adopted. For its part, the *Association of College and Research Libraries (ACRL)*, the branch of the ALA dedicated to university libraries, offers very similar information. Through a *LibGuides* resource entitled “Pandemic resources for academic libraries (ACRL, 2020)”, it shares updated information and resources for the development of library staff during the pandemic. The organization of specific webinars is also of interest. Like the PLA, the ACRL promoted an *Academic Library Response to Covid-19* survey in the early days of the pandemic, to obtain real-time information (during the first 24 hours) regarding what was happening in academic libraries. The results convey the same priorities in relation to the closure of libraries, teleworking, and the maintenance of online services (Hinchliffe; Wolff-Eisenberg, 2020).

Another of the factors that has altered the way in which university libraries offer their digital collections up to now has been the offering of databases or journals on a free basis or under special conditions (upgrades) by publishers or providers of information resources. Generally, these publishers offer free access for a period of time, as in the case of *Aenor* or *Ingebook*, or under advantageous conditions for educational material, for example *Cambridge* and its *Text books* collection, or *Aranzadi*, which allowed content to be disseminated through virtual classrooms. Other providers such as *Ebsco* have allowed unlimited user access. Apart from these initiatives, publishers have also supported open access to specific collections on Covid-19 to show solidarity with the health emergency. This is the case of *Covid-19 Cambridge*, *Covid-19 Ebsco*, *Covid-19 Emerald*, or *Covid-19 Springer Nature*, among others. These new conditions for access to scientific resources pose a challenge for their dissemination by university libraries among their community. One of the most popular strategies is to design a website or subject guides to bring together all the resources and increase their visibility.

Apart from activities focused on the dissemination of their collection or services, university libraries have been very proactive agents in the face of the health crisis, promoting the creation of personal protective equipment [*equipos de protección personal* (EPIS) in Spanish] through their makerspaces and using their own resources (3D printers).

University libraries are also committed to offering reliable and high-quality information about the virus, while helping to debunk hoaxes or false information, for example, the rise of the spontaneous initiative #Ayudabiblioteca (#Helplibraries) by libraries specialized in health, including the library of the *University of Alcalá*. The result of this work is a resource page entitled Covid-19, divided into specialties and topics.
<https://sites.google.com/view/covid19-por-especialidades>

Another type of collaborative response based on crowdsourcing can be found in the North American academic libraries in the creation of the “Academic library *LibGuides* related to Covid-19” guide (Ford, 2020), which brings together thematic guides made on the *LibGuides* content management platform based on reliable resources on the coronavirus. This collaborative database focuses not only on the content of the guides themselves, but also on the target audience and the licenses under which they are published.

Libraries are becoming part of the movement against fake news and in favor of fact checking. These institutions have always exercised infomediación tasks, and their role in promoting the critical thinking of citizens is widely established. This information-gatekeeper role, or what we now call content curation, has expanded to include the management of digital information (Carridad-Sebastián *et al.*, 2018b). Library associations such as the *IFLA* encourage libraries to take a position in debates about the quality of information in the media and to defend their role in the new multiliteracies. The specialization and importance of university libraries also make them a necessary element of this debate (Martínez-Cardama; Algora-Cancho, 2019), from areas such as the management and development of collections (Anderson, 2017) to participation in initiatives to support teaching and information literacy (Rose-Wiles, 2018; Caufield, 2017). In this regard, the information crisis caused by Covid-19 may constitute an opportunity to reinforce the role of libraries.

“One of the activities with which the university libraries have been committed is to offer reliable and quality information about the virus, helping to disprove hoaxes or false information”

It is thus clear that libraries have adapted their services and activities during this period, not only limiting their activity to the usual services, but also expanding them to maintain communication during the pandemic.

Analysis of the activity of university libraries via social media has been a constant throughout the years in terms of participation, content, and influence (Shulman; Yep; Tomé, 2015; Carrasco-Polaino; Villar-Cirujano; Martín-Cardaba, 2019), as well as its widely studied benefits in terms of communication, marketing, and improved access to information (Phuong-Chi, 2020). It is therefore pertinent to understand how university libraries have been communicating their activity through *Twitter* during the first weeks of the pandemic, and whether they have become useful platforms to obtain contextual information on this topic. The present study thus aims to solve the following research questions:

Q1. How have the activities and services of university libraries been communicated since their closure due to Covid-19, and how is this reflected on *Twitter*?

Q2. Have university libraries become up-to-date information points to monitor the evolution of the pandemic?

Q3. Given the current problem of misinformation, have they shared content that transmits reliable scientific information or that combats fake news and the spread of hoaxes?

3. Approach

The fundamental objective of this study is to determine the frequency and content of communication by Spanish university libraries through *Twitter* since the declaration of the state of alarm on 15 March until the date of the end of its second extension on 26 April 2020. Their performance during these early weeks can be deduced from this analysis based on these publications. To achieve these research objectives, a study based on quantitative and qualitative methods was carried out. Tweets produced by 56 university libraries on *Twitter* were quantified in the first stage of the research. Using the *Rebiun directory of social networks*, those that had a centralized library account and that remained active and updated were chosen (Table 1).

<https://www.rebiun.org/directorio-redes-sociales>

Table 1. Selection of *Twitter* accounts of Spanish university libraries

University	Twitter username
Universidad Europea de Madrid (European University of Madrid)	@BibliotecaUEM
Universidad Autónoma de Madrid (Autonomous University of Madrid)	@uam_biblioteca
Universidad Cardenal Herrera CEU (CEU Cardenal Herrera University)	@BibliotecaUCH
Universidad Carlos III de Madrid (University Carlos III of Madrid)	@biblioteca_uc3m
Universidad Católica San Antonio de Murcia (San Antonio Catholic University of Murcia)	@UCAM_Biblioteca
Universidad CEU San Pablo (CEU San Pablo University)	@bibliotecaceu
Universidad Complutense de Madrid (Complutense University of Madrid)	@Bcomplutense
Universidad de Alcalá (University of Alcalá)	@bibliounialcala
Universidad de Almería (University of Almería)	@bibliotecaUAL
Universidad de Burgos (University of Burgos)	@bibliotecaubu
Universidad de Cádiz (University of Cádiz)	@BiblioUCA
Universidad de Cantabria (University of Cantabria)	@BUCantabria
Universidad de Castilla-La Mancha (University of Castilla-La Mancha)	@BibliotecaUCLM
Universidad de Córdoba (University of Córdoba)	@Buco_es
Universidad de Extremadura (University of Extremadura)	@UexBiblioteca
Universidad de Granada (University of Granada)	@bibliotecaUGR
Universidad de Huelva (University of Huelva)	@bibliotecaUHU
Universidad de Jaén (University of Jaén)	@bujatuit
Universidad de La Laguna (University of La Laguna)	@bibliotecaull
Universidad de La Rioja (University of La Rioja)	@bibur
Universidad de Las Palmas de Gran Canaria (University of Las Palmas de Gran Canaria)	@bulpgc
Universidad de León (University of León)	@bibliotecaule
Universidad de Málaga (University of Málaga)	@Biblioteca_UMA
Universidad de Murcia (University of Murcia)	@UmBiblioteca
Universidad de Navarra (University of Navarra)	@unavbiblioteca
Universidad de Salamanca (University of Salamanca)	@bibliotecasusal
Universidad de Sevilla (University of Seville)	@Biblioteca_US
Universidad de Valladolid (University of Valladolid)	@BURSofia
Universidad de Zaragoza (University of Zaragoza)	@bibliounizar
Universidad del País Vasco (University of the Basque Country)	@upvehuBiblio

University	Twitter username
Universidad Loyola Andalucía (Loyola University of Andalusia)	@BiblioLoyolaAnd
Universidad Miguel Hernández de Elche (Miguel Hernández University of Elche)	@bibliotecasUMH
Universidad Nacional de Educación a Distancia (UNED) (National University of Distance Learning)	@Biblioteca_UNED
Universidad Oberta de Catalunya (Open University of Catalonia)	@UOCbiblioteca
Universidad Pablo de Olavide (Pablo de Olavide University)	@bibupo
Universidad Politécnica de Cartagena (Polytechnic University of Cartagena)	@BibliotecaUPCT
Universidad Politécnica de Madrid (Polytechnic University of Madrid)	@biblioupm
Universidad Politécnica de Valencia (Polytechnic University of Valencia)	@BiblioUPV
Universidad Pontificia de Comillas (Pontificia de Comillas University)	@Comillas_biblio
Universidad Pontificia de Salamanca (Pontifical University of Salamanca)	@BibliotecaUPSA
Universidad Rey Juan Carlos (King Juan Carlos University)	@BURJC
Universidade de Santiago de Compostela (University of Santiago de Compostela)	@BUSCUSC
Universidade de Vigo (University of Vigo)	@saibuvigo
Universitat Autònoma de Barcelona (Autonomous University of Barcelona)	@bibliotequesUAB
Universitat d'Alacant (University of Alicante)	@BibliotecaUA
Universitat de Barcelona (University of Barcelona)	@crai_ub
Universitat de Girona (University of Girona)	@UdGBiblioteca
Universitat de les Illes Balears (University of the Balearic Islands)	@BibliotecaUIB
Universitat de Lleida (University of Lleida)	@bibliotequesudl
Universitat de València (University of Valencia)	@bibliotequesuv
Universitat de Vic (University of Vic)	@uvic_biblioteca
Universitat Internacional de Catalunya (International University of Catalonia)	@BibliotecaUIC
Universitat Jaume I (Jaume I University)	@BibliotecaUJI
Universitat Politècnica de Catalunya (Polytechnic University of Catalonia)	@bibliotecnica
Universitat Pompeu Fabra (Pompeu Fabra University)	@bibliocraipf
Universitat Rovira i Virgili (Rovira i Virgili University)	@craiURV

The library of the *University of Oviedo* and that of the *International University of La Rioja* were not included as they were not up to date when the study began (15 March 2020).

The analysis considered two dimensions: published tweets and retweets. It sought to determine not only how libraries disseminated their activities, but also their position or interest in disseminating content particularly related to the coronavirus crisis. Retweets are therefore an essential part of communication via *Twitter* and are considered part of the informational behavior of its users. They allow us to analyze, among other features, the degree of agreement with the information shared, whether that content is useful, recognition of its authorship, and how it is a visible part of a conversation (Boyd; Golder; Lotan, 2010). Moreover, they allow an evaluation of the virality of the content in question (Alhabash; McAlister, 2015). Retweets have already been studied as an indicative degree of engagement with public health and health promotion campaigns (Neiger *et al.*, 2013), and in specific studies on the use of *Twitter* during Covid-19 (Thelwall; Thelwall, 2020).

The data were obtained daily from the listed *Twitter* profiles during the study period. A database was then constructed in Excel for their analysis. The quantitative analysis determined the dynamics of publications by university libraries during this period as well as the average number of publications.¹ Once collected in the database, qualitative analysis was carried out. In this process, a selection was made from a corpus of 10,694 tweets after the elimination of excessive repetitions of content or as a result of retweeting or duplicate publications by each of the accounts.

Content analysis techniques, a methodology applied in Communication and Media Studies for the treatment of information, were applied once this corpus was defined. Each of the items was coded by assigning it to a category based on a manual ad hoc categorization of the most frequent tweet typologies (Titscher *et al.*, 2002). This type of analysis is very frequently used for the treatment of tweets (Chew; Eysenbach, 2010; Wang; Zhuang, 2017), and for their analysis during Covid-19 (Brennen *et al.*, 2020; López-García, 2020).

Seven categories were created to synthesize the publications and activities of the university libraries:

- Dissemination of collections and online resources. All the tweets aimed at promoting the resources subscribed to by the library, the new conditions to access the databases, as well as other resources provided by the library: topic guides, blogs, tutorials, etc.

- Maintenance of university activity. This item includes the tweets and retweets aimed at transmitting the maintenance of the activity not only of the library but also of the university in general. This includes content associated with issues such as the maintenance of the loan service and its current conditions, new information and reference channels, messages related to the work of the library in online teaching, the dissemination of training courses and webinars, and other activities, many of which had to eliminate face-to-face interactions and adapt to an online format.
- Contextual information. This broad category comprises all the messages that include the library within the conversational framework generated by the coronavirus. The set of tweets and retweets in this category includes information that allows monitoring of the pandemic (official messages, news related to the evolution of the virus, etc.), as well as those messages that favor community building (encouragement, support for health workers, recommendations for issues such as teleworking or isolation, etc.). As part of this section, it was considered relevant to evaluate the extent to which university libraries included in their own tweets motivational hashtags created by the community to support society in these difficult times [#yomequedoencasa (#stayhome), #estevirusloparamosunidos (#Wewillstopthisvirustogether), etc.]. Analyzing whether university libraries use these labels to tag their content reveals the extent to which they are part of this online movement.
- Dissemination of cultural and educational activities (external to the university environment). The messages concerning questions related to the dissemination of leisure and culture from home and online are grouped here (especially retweets).
- Reliable scientific information on the coronavirus. This only includes information related to the coronavirus from a scientific perspective (scientific articles, reports, etc.), while news items with content referring to the monitoring of the pandemic (questions on prevention measures, official reports presenting monitoring data related to the pandemic, etc.) were excluded.
- Misinformation. This category includes tweets and retweets related to the dissemination of fake news and hoaxes, as well as mechanisms for their prevention and which contest false information that has been published or widely disseminated.
- Miscellaneous.

4. Results and discussion

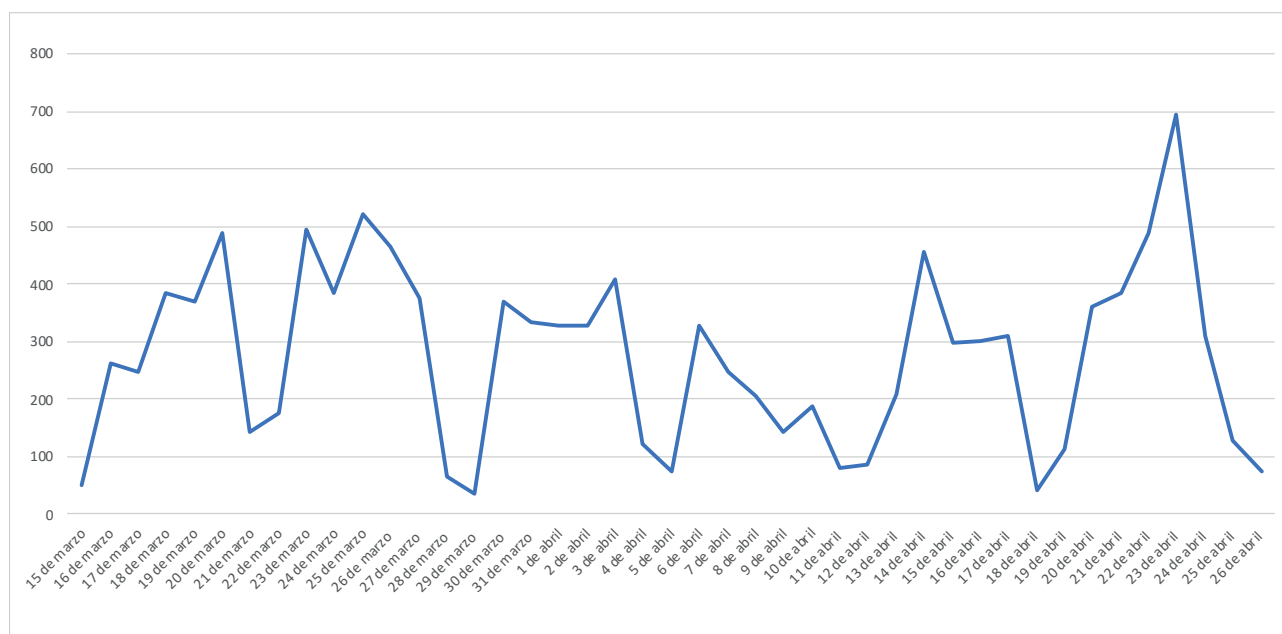
The main results are presented according to the two stages of the present study.

4.1. Number of publications

A total of 11,867 publications were collected prior to the content analysis. The publication trend by the 56 university libraries was constant, with descending peaks coinciding with weekends or the Easter holiday. The maximum number of publications per day reached 695 (on 23 April, World book day) (Graph 1).

The five most productive libraries were:

- *Polytechnic University of Madrid* (1,930);
- *University of Castilla-La Mancha* (567),
- *University of Barcelona* (495),
- *Miguel Hernández University of Elche* (476), and
- *CEU San Pablo University* (469).



Graph 1. Evolution of university library publications on *Twitter* (15 March to 26 April, 2020)

And those with the fewest number of tweets were

- Loyola University of Andalusia (63),
- CEU Cardenal Herrera University (61),
- University Carlos III of Madrid (59),
- King Juan Carlos University (44), and
- San Antonio Catholic University of Murcia (13) published the fewest tweets.

The average number of posts per day was 211 tweets.

In general, this quantification is useful to provide a general overview of the activity of the university libraries in these weeks, but in no way to determine the quality of their social media policy. A sample of 10,994 tweets previously chosen after eliminating duplicate content and excessive retweets was used for the content analysis.

4.2. Content analysis

Based on the corpus of tweets obtained for content analysis, the results for the number of tweets per subject category are shown in Graph 2.

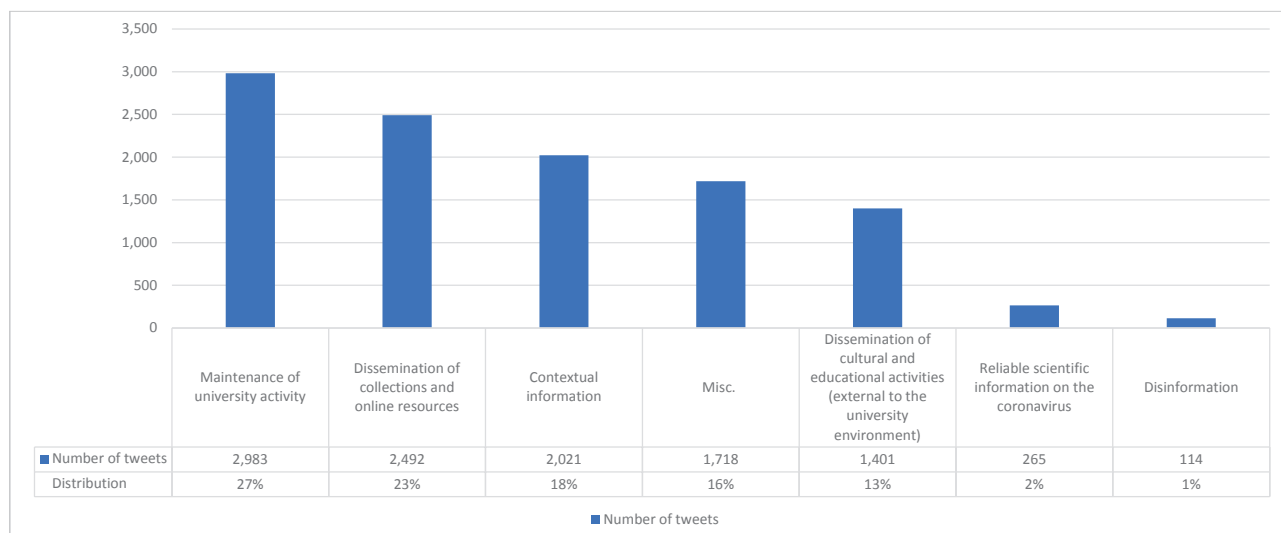
4.2.1. Maintenance of university activity

This analysis revealed that the most common category of tweets and retweets (2,983) was those dedicated to transmitting how the services and activities of the library or how the university reacted during the early weeks of the pandemic. The general perception obtained when analyzing this set of tweets is the desire of the libraries to transmit the normal operation of the services. Analysis of this set allows a glimpse at various types of content. The first type aimed to communicate changes in activities or services and how they have adapted. This is the case with practically all essential library activities, such as borrowing and timely reminders to extend return dates as the alarm status progresses, practical information such as VPN installation and database access, maintenance of interlibrary loans exclusively for digital works, or the migration of activities such as training courses or reading clubs to the digital world. It also includes various initiatives to publicize this new way of providing services, such as explanatory videos, infographics, or even more innovative options such as direct sharing from their *Instagram* channel, as is the case of the library of the *University of Cantabria*, or stimulating a conversation on *WhatsApp*, like the library of *Pablo de Olavide University*. Likewise, some libraries, such as those of the *Autonomous University of Barcelona* and the *University of Cantabria*, asked their users whether they lacked any services and how to improve them through a survey.

“ The general perception obtained when analyzing this set of tweets is the desire of the libraries to transmit the normal operation of the services ”

Another line of tweets identified in the analysis of this thematic block was libraries acting as disseminators of university decisions regarding the continuation of the academic year, and the various instructions, resolutions, and plans issued by different bodies with updated information of interest to the academic community.

However, the trend that attracted the most interest without a doubt is the choice of the digital space as a framework for programming activities during the quarantine. On the one hand, this includes those that had to change venue, such as exhibitions or contests originally planned with a face-to-face format, for example, the *XIV Haiku Contest* of the *General University Library of Albacete*, which had to be held via *Skype*.



Graph 2. Number of tweets by subject category

The quarantine led to the development of campaigns to promote engagement with users, despite the requirement for physical separation. This includes frequent campaigns and competitions in which users are asked to share photos and videos about their readings where they play with location. For example, the *Polytechnic University of Valencia* promoted the idea of sending readings from balconies, or photographs or micro-story competitions like those of the library of the *University of Burgos* under the hashtags #lecturasencuarentenaBiblioUBU (#readingduringthequarantineLibraryUBU) or #fotosencuarentenaBiblioUBU (#photosduringthequarantineLibraryUBU) about changes in daily life or the experience of reading in quarantine. Similar experiences can be found in the libraries of the *University of Córdoba*, the *University of Alicante* with their #ConlaBUAenMiRincón tag (#WiththeLUAINtheCorner), or the *UNED* through their #booktuber competition. Significant dates such as World Book Day continued to be celebrated online and constituted an opportunity to launch campaigns that enhanced engagement and interaction with users. For example,

- the library of the *University of Burgos* paid homage to Miguel Delibes in commemoration of the centenary of his birth. With #DelibesencasaBiblioubu (#DelibesathomeLibraryUBU), they urged users to share photos of their books from home;
- the *University of Granada* carried out a raffle under the hashtags #BUGDiadellibro2020 (#BUGBookDay2020) and #Confinadosperoniaisladosniamargados (#Confinedbutneitherisolatednorbitter), inviting users to share their readings, or the #BookfaceBUCLM challenge of the library of the *University of Castilla-la Mancha*.

Within this new service provision framework, the configuration of new workspaces at home and teleworking has changed the library's communication with users. Within this category, it is very common for university libraries to show their employees' workstations inside their homes or share images from videoconferences. It is common for libraries to view and present those in charge of the services working from home, or to portray the various meetings that are held. Paradoxically, in times of physical distancing, the proximity to library staff seems greater than ever through the presentation to their social media community of daily work scenes that were not previously visible. In this sense, among the most original initiatives we find the production of videos such as those by the libraries of the *University of Huelva*, the *University of Cantabria*, the *Pablo de Olavide University*, or the *University of Castilla-La Mancha*. The latter is especially noteworthy because of its great virality and diffusion, launching a message of encouragement to the beat of a song while emphasizing the presence of the library.

This type of proximity initiative has served to further reinforce the digital facet of the university library. The health crisis and confinement have provided an opportunity not only to expand collections and services, but to strengthen their visibility. This is shown by the coverage of these initiatives in the media (local press and radio) and by the recognition by universities of their work during these weeks.

4.2.2. Dissemination of collections and online resources

The second most represented thematic category is that devoted to the dissemination of digital collections and online resources subscribed to by the libraries (2,492 tweets). This category mainly includes tweets with two perspectives: First, the dissemination of the digital resources and collections subscribed to by the library. In this sense, special emphasis is placed on the dissemination of thematic resource guides for the preparation of university dissertations [*trabajo fin de grado* (TFG) or *trabajo fin de master* (TFM) in Spanish] and as support for online teaching. *Twitter* has been used as a platform to discover and raise awareness of the use of these resources among the university community, especially focusing on the needs of students and to support teaching. The suspension of face-to-face teaching has led to greater use of these collections. For example, data from the *University of Cantabria* indicate that the confinement has changed the use made of the university's institutional website. Concerning the library, although visits to the home page have decreased, those to the remote services and collections page have increased by 130%.

The other trend detected is related to tweets dedicated to the dissemination of resources that are made available openly or under special conditions by publishers and providers. The communication strategies in this sense are diverse, from publicizing each open resource one by one, indicating their advantages or special conditions of use, to the dissemination of these resources in new thematic guides generally created through the *LibGuides* platform (*Springshare*). Generally, these guides collect all the information required to access the library's services remotely and include special sections for specific open collections on Covid-19 or others that have been expanded due to the pandemic. Some examples of these guides are:

- "The Library/CRAI (learning resource centre) during Covid-19" from the *Pablo de Olavide University* library;
- "The Library with you at home" from the *University of Extremadura*, and
- "Coronavirus: a guide to resources available in times of pandemic" of the *University of Málaga*.

“ The trend that attracted the most interest is the choice of the digital space as a framework for programming activities during the quarantine ”

“ In times of physical distancing, the proximity with the library staff seems greater than ever when presenting scenes of daily work that were not previously visible on social networks ”

The latter two also incorporate cultural and online leisure offerings.

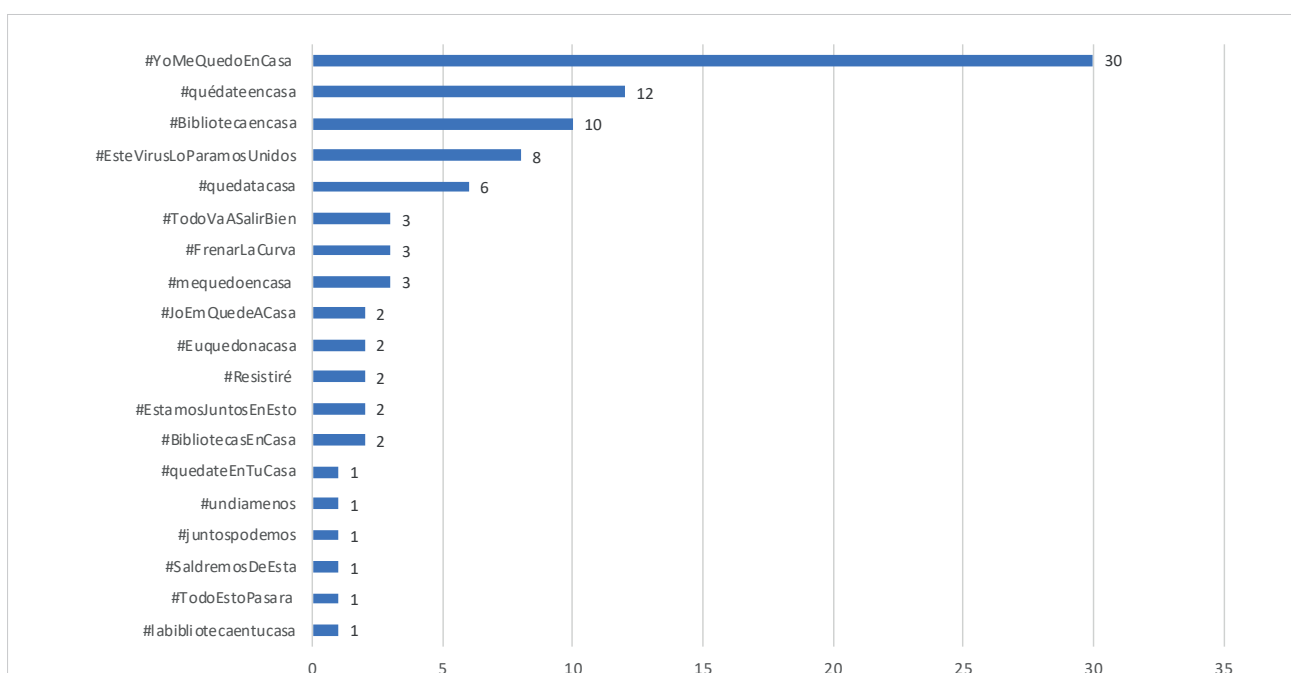
4.2.3. Contextual information about the pandemic

The third most frequent category of tweets is that on contextual information about the pandemic (2,021 tweets). This evaluation item reveals the level of involvement of university libraries in disseminating such information, which enables the health crisis to be monitored from a more social perspective. Within this category, retweets are more frequent than original messages. The types of messages found can be summarized as follows:

- Collaboration messages. University libraries tweeted or retweeted regarding the difficulty in obtaining personal health protection equipment during the early days of the pandemic. We often see messages echoing the solidarity initiatives of universities, not only in the delivery of material but also in its manufacture by mobilizing 3D printers available in their facilities. As an example, the makerspace of the library of the *University of Las Palmas* collaborated with the manufacture of protective visors approved by the *Canary Islands Health System*. Nor can we ignore the collaboration of the *Polytechnic University of Madrid* and the *Ifema* library, also known as the “*Resistiré*” (“I will survive”) library.
- Tips for confinement. Libraries frequently broadcast recommendations for day-to-day issues relating to the new life brought on by confinement. In this sense, it is common to find, among others, recommendations for teleworking, on physical and mental health during quarantine, prevention of cybercrime, etc.
- Activism in open science. Libraries frequently share reflections and news on the need to promote the opening of science and scientific communication channels in times of health crisis. This is a way of echoing the declarations in favor of open and sustainable knowledge from the *Rebiun* (university libraries network) and the *Declaration of the International Coalition of Library Consortia (Icolc)*, which request the opening of collections and datasets related to Covid. In addition, the libraries used different initiatives for such opening and echo reflections on the scientific publication model based on the publication of preprints to share results related to the coronavirus more quickly.
- Encouragement messages. Undoubtedly, a good part of the content generated by libraries consisted of messages in which they tried not only to provide information related to the health situation, but above all to encourage their community. Posts with motivational phrases and images are frequent. For example, the library of the *University of Castilla-La Mancha* ended the day with this type of message for many weeks. Humorous content including memes or gifs trying to lighten the severity of health information were also common. Another resource used by libraries was to present challenges and nominations, through which they aimed not only to encourage their community but also to interact with other libraries, as was the case of the challenge and nominations for musical recommendations #musicacofinada (#confinedmusic).

One feature to consider when considering the degree of involvement with the informational dynamics generated by Covid-19 is to evaluate the follow-up of the main hashtags generated by the *Twitter* community to create bonds of unity and encouragement. Hence, the frequency of these hashtags in the libraries’ own tweets was quantified (Graph 3).

Of the 56 libraries analyzed, 30 (53.5%) shared content under the hashtag #yomequedoencasa (#Istayathome), perhaps the most popular during the crisis, which tried to make people aware of the importance of compliance with confinement. This number increases further if its variants are included (#quédateencasa, #mequedoencasa, etc.). Likewise, has-



Graph 3. Frequency of motivational hashtags

htags describing home library activity such as #bibliotecaencasa (#Homelibrary) and its variants were found for 13 libraries (23.2%). More personal hashtags have also been frequently created by libraries to indicate not only remote services but also their commitment to users, including #ConlaBUAenMiRincón (#BUAinmycorner), #bibliotecaUALcontigo (#UALlibrarybyyourside), #laUCOdesdeCasa (#UCOathome), #BibliotecaUPMSeQuedaContigo (#UPMLibraryStaysWithYou), #SomosUNEDdesdeCasa (#WearetheUNEDathome), among others.

“ A good part of the content generated by libraries consisted of messages in which they tried not only to provide information related to the health situation, but above all to encourage their community ”

4.2.4. Dissemination of cultural or educational activities from outside the university

The dissemination of cultural or educational activities from outside the university itself encompassed a total of 1,401 tweets and retweets. To a greater or lesser extent, libraries have overseen providing their community of users with resources and cultural initiatives during the quarantine. This category generally includes many retweets of external initiatives, although there are also messages generated by the libraries' own blogs, or based on interactions such as collective initiatives, e.g., requests for reading recommendations, which may sometimes take the form of a raffle, like in the *European University of Madrid*, or the use of gifs or memes as a follow-up to the #tupelifavoritaenungif (#yourfavouritefilmnonegif) tag, a challenge by the library of the *University of Castilla-La Mancha*.

4.2.5. Transmission of reliable information

The last two content categories identified are dedicated to the transmission of reliable information and the fight against misinformation. Regarding the former, 257 tweets containing scientific information about the coronavirus were found. For this purpose, some libraries created specific thematic guides on Covid-19, in which they include not only the open resources discussed above, but also specific lists of reliable official sources such as the “*Biblioguía*” (*LibGuides*) of the *University of Málaga* that lists official bodies for the consultation of reliable information under the heading “What we should know.”

Along these lines, the *University of Alcalá* also wrote a specific guide on information about Covid-19, including organizations, databases, and the most up-to-date recent publications and advanced search strategies to find information in *PubMed* or similar databases. An important feature of the guide provided by the library of the *University of Alcalá* is its difference from the more informative one, where it shares more general information and recommendations. In this sense, this category includes abundant informative content compared with primary scientific sources. Retweets of news published by media such as “The conversation” or the *Servicio de Información y Noticias Científicas (SINC)* agency (Scientific news and information service) were very frequent. In this regard, the *UNED* library retweeted a list of reliable sources from the *Asociación Española Contra el Cáncer (AECC)*, the official Spanish association against cancer) to facilitate access to reliable information.

The university libraries also echoed the collaborative initiative of #ayudabiblioteca (#helplibraries) of the libraries specialized in health sciences in Spain, sharing not only the introduction of this idea but also their resource page <https://sites.google.com/view/covid19-por-especialidades>

Another type of content is based on sharing individualized research or scientific issues related, for example, to *Aenor's* technical specifications for the manufacturing of personal protective equipment.

4.2.6. Combating misinformation

The content category referring to misinformation is the smallest (114). External content is generally shared in this category, also characterized by an informative nature. Libraries usually share general news about misinformation and official recommendations to avoid falling for hoaxes about the coronavirus, but they do not usually generate their own content on these topics. As an exception to a more active participation, the *UNED* library highlights the organization of a workshop with *Google* entitled “Online verification: tools and techniques against misinformation.”

“ The requirement to migrate activities to the digital space has generated a climate of greater closeness with the community ”

5. Conclusions

The health crisis caused by Covid-19 and the subsequent confinement have halted the activity of many institutions whose services relied on a substantial face-to-face component. Libraries had to quickly modify their activities to cope with this reality. Although university libraries have a more developed digital facet than other types of information unit, they were also forced to make far-reaching changes that affected their conception of service. The current analysis of their presence and communication through social media, in this case *Twitter*, is of interest to determine how they transmitted these changes and the extent to which they have been visible and present during the pandemic. Social media are the ideal platforms for this type of study due to their bidirectional component and ability to generate engagement with the community. Likewise, certain types of communications that are more oriented towards information on the social health context can be evaluated, as well as those that are more informal in nature (challenges, competitions, etc.), which also help to improve the visibility of the library within the digital ecosystem.

The content analysis carried out through the systematization of a corpus of 10,994 tweets and retweets makes it possible to answer the research questions proposed herein. In relation to the first research question, the thematic classification allowed the visualization of the priorities when communicating. In this sense, the two

thematic categories with the greatest amount of content are those dedicated to the maintenance of university activities and the dissemination of its digital collection. These two aspects are closely linked, as the latter has been the cornerstone of their support for activities such as teaching and online learning during these months.

One of the detected characteristics is that the requirement to migrate activities to the digital space has generated a climate of greater closeness with the community. Spaces at home and on balconies have been made public, fostering ideas that allowed libraries to maintain contact with their users and enabling one to speak of the creation of a third digital space. This is the case of the reading challenges and competitions, which although being common elements in social media strategies on a regular basis, in this exceptional context represent an extra mechanism to increase the collective spirit and maintain the feeling of the university community. This climate of closeness is shown by the scenes of librarians portrayed working from home. It is paradoxical that, in these times of distanced social life, library professionals have become more visible than ever. Libraries have widely broadcasted meetings, video calls, videos, and presentations of the librarians responsible for the services from their workstations, to show that they were still present and available to users despite the lockdown conditions. This continuous activity earned them recognition not only from their institutions and community but also in news published in the media. In this sense, university libraries have made the best out of the situation and have made the digital collections and services that they usually provide available to a greater number of people.

The present study makes it possible to verify that university libraries have constituted important points to supply up-to-date information to monitor the evolution of the pandemic, providing an answer to research question 2. The so-called contextual information holds third place among the categories, with 2021 tweets. There have been many messages from libraries that reflect the situation experienced by the country. Daily retweets on health data and the evolution of the crisis have been mixed with important calls for collaboration from the population to follow official recommendations. From a communication study perspective, this type of message helps to create relevance within a crisis. This fact is shown by examining the extent of follow-up of motivational hashtags created as a result of the health crisis (Graph 3).

Regarding the third research question, less content related to the communication of reliable scientific information or against misinformation and fake news has been disseminated. Albeit represented in the thematic categories, the corpus of such tweets differs in number from the others. Most such content is public and disseminated via retweets, having an informative nature. However, it is worth highlighting initiatives such as the creation of specific thematic guides providing scientific information on Covid-19.

Despite the fantastic campaigns carried out on *Twitter* to address digital resources and collections, the fight against fake news has not been approached in a more personal way, perhaps taking advantage of those resources and the opening of diverse collections to debunk hoaxes based on primary information, which could be accessed through the collection itself. Likewise, this situation could also have been used to create specific thematic guides on either general or specific fake news about the coronavirus, like the example of the *LibGuide* entitled "Fake news: Coronavirus - Covid-19" from *London South Bank University*.

This study provides a global approach to communication by university libraries during the early weeks of the state of alarm decreed in Spain due to the coronavirus. This communication has been intense in terms of its proximity, trying to achieve the maximum maintenance of their services and activities. Libraries have also used their platforms to fuel the feeling of a university community that may have weakened after the closure. The transmission of messages of encouragement and monitoring of the health crisis implies that the profiles of university libraries on *Twitter* have been part of a community marked by the exceptional nature of the moment and may have turned them into an agent of useful and up-to-date information during this crisis.

The limitations of this study include the limited period of time analyzed and the type of methodology applied based on the categorization of the content of the messages and not on other types of quantitative studies using social media key performance indicators (KPIs), such as the number of followers or the reach of the posts. These questions could be addressed in future comparative studies to determine the real scope of the publications retrospectively. Likewise, it would be interesting to carry out studies on the increased use of digital services by the university community.

6. Note

1. Two issues associated with the collation of tweets from two universities should be noted.

- Firstly, regarding the data for *UPM* library, the number of retweets could not be established for 15-17 March or 28 March 2-April, when only original tweets are counted.

University libraries have constituted important points to supply up-to-date information to monitor the evolution of the pandemic

The content on reliable scientific information or against misinformation and fake news has been lower

- Secondly, regarding the tweets by the library of the *Miguel Hernández University*, the account @bibliotecasUMH appears to suffer from a problem of duplicated content, significantly reducing the number of tweets.

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