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

Sara Martínez-Cardama; Ana R. Pacios

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 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).

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

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 infomediation 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 (Cañada-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.

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; Martin-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).

Table 1. Selection of Twitter accounts of Spanish university libraries

<table>
<thead>
<tr>
<th>University</th>
<th>Twitter username</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universidad Europea de Madrid (European University of Madrid)</td>
<td>@BibliotecaUEM</td>
</tr>
<tr>
<td>Universidad Autónoma de Madrid (Autonomous University of Madrid)</td>
<td>@uam_biblioteca</td>
</tr>
<tr>
<td>Universidad Cardenal Herrera CEU (CEU Cardenal Herrera University)</td>
<td>@BibliotecaUCH</td>
</tr>
<tr>
<td>Universidad Carlos III de Madrid (University Carlos III of Madrid)</td>
<td>@biblioteca_uch3m</td>
</tr>
<tr>
<td>Universidad Católica San Antonio de Murcia (San Antonio Catholic University of Murcia)</td>
<td>@UCAM_Biblioteca</td>
</tr>
<tr>
<td>Universidad CEU San Pablo (CEU San Pablo University)</td>
<td>@bibliotecaceu</td>
</tr>
<tr>
<td>Universidad Complutense de Madrid (Complutense University of Madrid)</td>
<td>@Bcomplutense</td>
</tr>
<tr>
<td>Universidad de Alcalá (University of Alcalá)</td>
<td>@bibliounialcala</td>
</tr>
<tr>
<td>Universidad de Almería (University of Almería)</td>
<td>@bibliotecaUAL</td>
</tr>
<tr>
<td>Universidad de Burgos (University of Burgos)</td>
<td>@bibliotecaabula</td>
</tr>
<tr>
<td>Universidad de Cádiz (University of Cádiz)</td>
<td>@BiblioUCA</td>
</tr>
<tr>
<td>Universidad de Cantabria (University of Cantabria)</td>
<td>@BUcantabria</td>
</tr>
<tr>
<td>Universidad de Castilla-La Mancha (University of Castilla-La Mancha)</td>
<td>@BibliotecaUCLM</td>
</tr>
<tr>
<td>Universidad de Córdoba (University of Córdoba)</td>
<td>@Busco_es</td>
</tr>
<tr>
<td>Universidad de Extremadura (University of Extremadura)</td>
<td>@UexBiblioteca</td>
</tr>
<tr>
<td>Universidad de Granada (University of Granada)</td>
<td>@bibliotecaUGR</td>
</tr>
<tr>
<td>Universidad de Huelva (University of Huelva)</td>
<td>@bibliotecaUHU</td>
</tr>
<tr>
<td>Universidad de Jaén (University of Jaén)</td>
<td>@bujatuit</td>
</tr>
<tr>
<td>Universidad de La Laguna (University of La Laguna)</td>
<td>@bibliotecaaul</td>
</tr>
<tr>
<td>Universidad de La Rioja (University of La Rioja)</td>
<td>@bibir</td>
</tr>
<tr>
<td>Universidad de Las Palmas de Gran Canaria (University of Las Palmas de Gran Canaria)</td>
<td>@bulpgc</td>
</tr>
<tr>
<td>Universidad de León (University of León)</td>
<td>@bibliotecaule</td>
</tr>
<tr>
<td>Universidad de Málaga (University of Málaga)</td>
<td>@Biblioteca_UMA</td>
</tr>
<tr>
<td>Universidad de Murcia (University of Murcia)</td>
<td>@UmBiblioteca</td>
</tr>
<tr>
<td>Universidad de Navarra (University of Navarra)</td>
<td>@unavbiblioteca</td>
</tr>
<tr>
<td>Universidad de Salamanca (University of Salamanca)</td>
<td>@bibliotecasusal</td>
</tr>
<tr>
<td>Universidad de Sevilla (University of Seville)</td>
<td>@Biblioteca_US</td>
</tr>
<tr>
<td>Universidad de Valladolid (University of Valladolid)</td>
<td>@BURSoñan</td>
</tr>
<tr>
<td>Universidad de Zaragoza (University of Zaragoza)</td>
<td>@bibliounizar</td>
</tr>
<tr>
<td>Universidad del País Vasco (University of the Basque Country)</td>
<td>@upvehuBiblio</td>
</tr>
</tbody>
</table>
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; McAllister, 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. 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.

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>Universidad Loyola Andalucia (Loyola University of Andalusia)</td>
<td>@BiblioloayolaAnd</td>
</tr>
<tr>
<td>Universidad Miguel Hernández de Elche (Miguel Hernández University of Elche)</td>
<td>@bibliotecasUMH</td>
</tr>
<tr>
<td>Universidad Nacional de Educación a Distancia (UNED) (National University of Distance Learning)</td>
<td>@Biblioteca_UNED</td>
</tr>
<tr>
<td>Universidad Oberta de Catalunya (Open University of Catalonia)</td>
<td>@UOCbiblioteca</td>
</tr>
<tr>
<td>Universidad Pablo de Olavide (Pablo de Olavide University)</td>
<td>@bibupo</td>
</tr>
<tr>
<td>Universidad Politécnica de Cartagena (Polytechnic University of Cartagena)</td>
<td>@BibliotecaUPCT</td>
</tr>
<tr>
<td>Universidad Politécnica de Madrid (Polytechnic University of Madrid)</td>
<td>@biblioupn</td>
</tr>
<tr>
<td>Universidad Politécnica de Valencia (Polytechnic University of Valencia)</td>
<td>@BibliolipvV</td>
</tr>
<tr>
<td>Universidad Pontificia de Comillas (Pontificia de Comillas University)</td>
<td>@Comillas_biblio</td>
</tr>
<tr>
<td>Universidad Pontificia de Salamanca (Pontifical University of Salamanca)</td>
<td>@BibliotecasUPSA</td>
</tr>
<tr>
<td>Universidad Rey Juan Carlos (King Juan Carlos University)</td>
<td>@BURJC</td>
</tr>
<tr>
<td>Universidade de Santiago de Compostela (University of Santiago de Compostela)</td>
<td>@BUSCUSC</td>
</tr>
<tr>
<td>Universidade de Vigo (University of Vigo)</td>
<td>@sailbuugo</td>
</tr>
<tr>
<td>Universitat Autònoma de Barcelona (Autonomous University of Barcelona)</td>
<td>@bibliotequesUAB</td>
</tr>
<tr>
<td>Universitat d’Alacant (University of Alicante)</td>
<td>@BibliotecaUA</td>
</tr>
<tr>
<td>Universitat de Barcelona (University of Barcelona)</td>
<td>@crai_ub</td>
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<tr>
<td>Universitat de Girona (University of Girona)</td>
<td>@UdGBiblioteca</td>
</tr>
<tr>
<td>Universitat de les Illes Balears (University of the Balearic Islands)</td>
<td>@BibliotecaUIB</td>
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<tr>
<td>Universitat de Lleida (University of Lleida)</td>
<td>@bibliotequesudl</td>
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<tr>
<td>Universitat de València (University of Valencia)</td>
<td>@bibliotequesuv</td>
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<td>Universitat de Vic (University of Vic)</td>
<td>@uvic_biblioteca</td>
</tr>
<tr>
<td>Universitat Internacional de Catalunya (International University of Catalonia)</td>
<td>@BibliotecaUIC</td>
</tr>
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<td>Universitat Jaume I (Jaume I University)</td>
<td>@BibliotecaUII</td>
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<tr>
<td>Universitat Politècnica de Catalunya (Polytechnic University of Catalonia)</td>
<td>@bibliotecnica</td>
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<td>Universitat Pompeu Fabra (Pompeu Fabra University)</td>
<td>@bibliocraupF</td>
</tr>
<tr>
<td>Universitat Rovira i Virgili (Rovira i Virgili University)</td>
<td>@craiURV</td>
</tr>
</tbody>
</table>

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- 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 (#Istayhome), #estevirusloparamosunidos (#Wewillstopthisvirus-together), 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).
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.

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.
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 (#readingduringthecrisisLibraryUBU) or #fotosencuarentenaBiblioUBU (#photosduringthecrisisLibraryUBU) 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 (#WiththeLUintheCorner), 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 #BUGDiadelibro2020 (#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 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 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 (Iocol), which request the opening of collections and datasets related to Covid.

- 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 #musicaconfinada (#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-
Twitter communication of university libraries in the face of Covid-19

El análisis de las actividades de las bibliotecas universitarias durante la pandemia de COVID-19 en España se ha centrado en el uso de Twitter como plataforma de comunicación. La crisis sanitaria ha requerido una adaptación rápida de los servicios bibliotecarios, pasando de un modelo centrado en la presencia física a uno más digital.

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

El contenido de Twitter relacionado con la difusión de actividades culturales o educativas externas es el tercero más amplio. La mayoría de las publicaciones corresponden a la comunicación de eventos y actividades de otras instituciones, como conferencias, seminarios y cursos en línea. Los hashtags más utilizados en esta categoría son #laU, #UAM-elsiglo, #ibelicos, #biblioteconomia, entre otros. La publicación de eventos y actividades en Twitter permite la difusión rápida y amplia de dichas actividades, facilitando su participación por parte de la comunidad universitaria y general.

4.2.5. Transmission of reliable information

Las bibliotecas universitarias han utilizado Twitter como plataforma para la difusión de información confiable en relación con el COVID-19. Se han utilizado hashtags como #uauditucoruna, #bibliotecaUALcontigo, #bibliotecaUPMSeQuedaContigo, entre otros, para comunicar información de confianza sobre el coronavirus. Esta categoría es la cuarta más utilizada en Twitter, con una variedad de publicaciones que incluyen alertas de nuevos casos, consejos de salud y recomendaciones de uso de mascarillas, técnicas de desinfección y protocolos de aislamiento.

4.2.6. Combating misinformation

El contenido relacionado con la combate de la desinformación es la categoría más pequeña en cuanto a la cantidad de publicaciones, pero de gran relevancia en términos de su impacto. Los hashtags utilizados en esta categoría son #ayudabiblioteca, #helplibraries, #bibliotecasalud, entre otros. La difusión de información confiable y facturada en Twitter es una estrategia eficaz para combatir la desinformación, especialmente en un contexto en el que la velocidad y la difusión de la información puede ser desmesurada.

5. Conclusions

La crisis sanitaria y el confinamiento han obligado a las bibliotecas universitarias a adaptarse rápidamente a un nuevo modelo de funcionamiento. A pesar de la urgencia y el desafío, se ha observado unido y colaboración entre las diferentes bibliotecas universitarias españolas, convirtiendo a Twitter en un ideal campo de estudio debido a su bidireccionalidad y capacidad para generar interacción con la comunidad. Las bibliotecas han utilizado Twitter no solo para ofrecer servicios en línea, sino también para difundir información confiable, combatir las desinformaciones y crear un ambiente de diálogo y participación activa.

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 to participate actively in the search for reliable information.
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.
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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