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Twitter as a Tool for Citizen Education and Sustainable Cities after COVID-19

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Abstract: The social confinement resulting from the COVID-19 crisis temporarily reduced greenhouse gas emissions. Although experts contend that the decrease in pollution rates was not drastic, some surveys detect growth in social concern about the climate. In this new climate-conscious environment, municipalities and local governments are promoting a new way of living and caring for cities, even before they can regain national and international freedom of movement. This work analyzes the connections between new climate awareness arising from the COVID-19 crisis, proposals of sustainable citizenship around the world, and its communication on Twitter to educate the new eco-conscious audience. The methodology mixes quantitative and qualitative analysis, using the Twitonomy Premium tool and the Twitter research tool with data extracted at the end of December 2020. Among the top ten most influential and active accounts, the results show educational institutions, local institutions, companies, neighborhoods, associations, and influencers. The impossibility of living in the city has not prevented citizen education and commitment to make real change for when that city and its citizens return to normality. However, this new normality must be different: more ecological, more responsible, more sustainable, and practiced from early childhood.

Keywords: COVID-19; Twitter; sustainable cities; sustainable citizenship; environmental awareness; responsible consumption; sustainable tourism

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1. Introduction

In December 2019, a hitherto unknown type of coronavirus [1], named SARS-CoV-2, caused a severe respiratory illness in mainland China. Virus transmission expanded from a single area to the entire country in 30 days [2–4]. Two months later, after its rapid expansion, the scientific community began calling the disease COVID-19 (an acronym for Coronavirus Disease 19). Throughout 2020, dozens of countries around the world experienced numerous outbreaks, as no effective drugs [5,6] or vaccines were developed. The main factors that contributed to its expansion were the population's high international mobility and the high population density in urban areas [7–10].

Preventive strategies, in addition to hygienic ones, included measures of social distancing, community confinement, reduced mobility, and perimeter closures of hundreds of cities [11–13]. This social confinement temporarily reduced greenhouse gas emissions. In Spain, the Basque Center for Climate Change (BC3) and the Observatory for Energy Transition and Climate Action (OETA) predicted that 2020 would close with a historic decrease in these emissions. They estimated a fall of 15%, the largest decrease since 1990—the year in which these calculations were inaugurated [14]. According to the same study, and according to monthly measurements, in the first months of 2020, the reduction in

emissions was due to the decrease in the activity of coal-fired power plants [14]. This decline steepened in April and May as social distancing and home confinement measures tightened.

The data are reproduced in a similar way when studying the phenomenon at the European level, although experts consider that the decrease in pollution rates was not so drastic. The Global Carbon Project (GCP) of the World Meteorological Organization (WMO), in its November 2020 newsletter, estimated that, in the most intense period of forced confinement, reductions in carbon dioxide (CO_2) could fall as much as 17%, in relation to the 2019 data [15]. However, it predicted that the total annual reduction would only be between 4.2% and 7.5%. The best data for the environment came from the level readings of large cities' centers: Helsinki, Florence, Heraklion, Pesaro, London, Basel, and Berlin [16]. However, the WMO recommends caution and explains that the high natural atmospheric variability of CO_2 requires more measurements over a longer period, since a lower concentration of carbon dioxide is not always linked to a lower presence of fossil fuels.

Until the data are published later, numerous studies and surveys do detect an increase in social concern about the climate as a result of the crisis and confinement. The deadly coronavirus called into question the welfare state and encouraged the world's population to think about climate change more seriously. Keesing et al. [17] already warned of the unbreakable nexus between the climate emergency and the transmission of infectious diseases a decade before the COVID-19 crisis. They noted that the decline in biodiversity reduced the capacity of essential ecosystem services and the defenses of humans, animals, and plants, consequently leading to the increase in infectious diseases [17]. This study called for the need for socio-climatic awareness so that areas of high natural biodiversity serve as a reserve for pathogens that do not have to come into contact, for example, with humans [17]. Currently, this work has accumulated 23,000 downloads on the website of the prestigious journal *Nature*, and more than 854 quotations in publications around the world.

The WMO submitted another report in May 2020, which also openly stated that climate change is deadlier than the coronavirus because it involves ocean warming, record sea levels, melting ice sheets, storms and droughts, and the proliferation of still unknown pathogens [18]. Likewise, the Convention on Biological Diversity (CBD) of the United Nations (UN) underlined in its report Global Biodiversity Outlook (GBO-5), in August 2020, the need to meet the 20 goals of Aichi. According to the text, biodiversity is key to all factors of human life, including health [19].

Numerous international media have shown the results and proposals of these studies. Climate awareness has expanded its visibility and importance in media. Additionally, polls from various organizations include questions on these issues, even focusing on areas that were previously unrelated to climate. The European Investment Bank (EIB), the community financial body of the European Union, published the 2020–2021 EIB Climate Survey in January 2021. The results reveal that COVID-19 has influenced citizen perceptions of the climate emergency and that climate and ecological recovery are high on the EU agenda [20]. Specifically, the survey shows that 57% of European citizens affirm that economic recovery after the global pandemic must consider the climate emergency and that European governments must promote an urgent reduction of CO_2 [20]. According to the same survey, citizens of some European countries, such as Hungary (71%), Malta (67%), Spain (64%), Germany (63%), Luxembourg (63%), and France (61%), think that the fight against climate change should be part of the economic recovery [20].

In this new climate-conscious environment, town halls and local governments promote a new way of living and caring for cities, even before recovering national and international freedom of movement. Although the concept of sustainable citizenship is not new, the current situation has caused its regeneration. Butler [21] explained that the term was born from the *Brundtland Report* of the United Nations, also known as *Our Common Future* [22]. From there, it evolved to combine the care of the human environment and the physical environment [21].

The coronavirus crisis has increased the importance of social responsibility in the ways of living, knowing, and relating to the city [23–28], the promotion of national and international tourism with sustainable perspectives [29–31], and the need to take care of cities, their public spaces, buildings, and monuments [32–35]. The empowerment of the youngest students in schools has been worked on in recent international research to achieve more sustainable cities in conflict areas [36]. Similarly, Lee [33] has worked with young people from Hong Kong to determine their definitions of sustainable consumption and how they take care of their way of consuming and living to end social inequalities. This eco-conscious consumption includes traveling less by plane and using less-polluting public transport, a topic that Cole also investigates [37], relating sustainable citizenship with political voting and Brexit. In his research, tourism appears as a source of income to be exploited after the country leaves the European Union. However, promoting it would contradict the British government's zero-emissions promise [37].

Until people from all over the world can move freely through their cities and can confirm that COVID-19 has made them more responsible and sustainable citizens, city councils and local governments are promoting a new way of living, caring, and relating to cities. Regional institutions promote their cities, streets, gardens, and attractions, dreaming of the day when their own citizens or potential visitors can experience them freely. However, remaining aware of environmental concerns, ecosystem data, and the role of human beings in preventing future pandemics, they propose to return to these cities experiencing them in a different way. The main way to do this is through social networks [38–43], in which the number of users exponentially increased during the mandatory confinement [44]. At the beginning of 2020, more than 4.5 million people used the internet in the world and 3.8 million were social media users. This meant that 60% of the world's population regularly accessed the digital world and 45% of the same population was also on social media [45].

According to other international reports, the digital population spends 6 h and 43 min connected every day [45], and at least half of that time is spent on a mobile phone. Social media users spent an average of 2 h and 24 min a day browsing and interacting with their profiles, which represents more than a third of all the time they dedicate to the digital world [45]. The social networks chosen were, in descending order: Facebook, with more than 2.111 billion users; YouTube, with more than 1.9 billion users; Instagram, with more than 1 billion users; and Twitter, with more than 340 million users [45].

According to the social context and the theoretical precedents discussed, this work proposes an original, unpublished, and necessary investigation that discovers and analyzes the connection between the new climate awareness arising from the COVID-19 crisis, the proposals of sustainable citizenship around the world, and its communication on Twitter to educate a newly eco-conscious audience. This primary objective includes the following secondary objectives:

- Analyze the state of the matter in academic publications and the most current and prestigious research on social networks for sustainable citizenship education.
- Detect, geolocate, and analyze proposals on Twitter that educate citizens about the care and sustainable development of their cities using the Twitonomy Premium tool, with data extracted at the end of 2020.
- Compute and analyze, based on the accounts detected, those with the most users and the most influence.
- Analyze and comment, in a combined qualitative and quantitative way, on their activity in the social network, from their original tweets with the hashtag #SustainableCity. The quantitative analysis will consider total tweets, tweets per day, retweets, followers, and hashtags. The qualitative analysis will consider the relationship between or reasons for the quantitative data, the most named destinations or tourist attractions in recent weeks, and the most original and eco-conscious proposals for the chosen period: January–December 2020.

To operationalize the general and secondary objective, the following four hypotheses were proposed, which have been drafted on the basis of the international conclusions and reports discussed above:

Hypothesis 1 (H1). *COVID-19 has awakened and increased a virtual civic awareness of citizens who follow accounts that educate and promote sustainable citizenship on social media, months before being able to recover mobility.*

Hypothesis 2 (H2). *This awareness of sustainable citizenship is promoted by official entities, which must fulfill their environmental commitments.*

Hypothesis 3 (H3). *Sustainable citizenship offers a reinvention of the way of living in the city, revising places, public spaces, monuments, and buildings, or proposing destinations with a new awareness.*

Hypothesis 4 (H4). *It is impossible to corroborate whether this sustainable citizenship awareness will actually translate into more sustainable cities when the socio-health crisis is over, although Twitter now offers an eco-conscious education, and a perhaps escapist and cathartic call, showing cities in which we cannot walk freely but that we can care and do dream about.*

2. Materials and Methods

This work analyzes the connection between the new climate awareness arising from the COVID-19 crisis, the proposals of sustainable citizenship around the world, and its communication on Twitter to educate a newly eco-conscious audience, quantitatively and qualitatively, using the Twitonomy Premium tool with data extracted at the end of December 2020. The chosen social media was Twitter because it allows internet users to view tweets without having to be registered as a user. Likewise, Twitter is considered the social network where governments, politicians, and institutions are most present [46–54]. Considering the reports mentioned in the introduction and underlining the fact that ecological commitment and sustainable education must come from governments, institutions, and companies [55–64], the social media for microblogging was chosen as the most adequate to meet the objectives of the study.

Twitonomy is a web application that analyzes the social network Twitter, exclusively. It is used to make publications and to analyze tweets, hashtags, followers, impressions, engagement rate, and top domains. It is owned by Diginomy Pty Ltd., an Australian company headquartered in New South Wales. Its use policies include that its users are over 16 years old, human, and not systems or bots, and, if they opt for the Premium version of payment, that they provide a full name and a valid email address [60]. It is not affiliated with Twitter Inc. or any of its brands, and its features and functionalities are independent of the social network. This point of the tool's independence from the social network is one of the decisive factors in choosing Twitonomy.

The data offered in each search are provided by Twitter's API (Application Programming Interface) and are subject to its limits [64]. Analyzing the general policies and guidelines directly on the Twitter website, the social network explains that its APIs provide companies, developers, and users with programmatic access to their data, with the exception of non-public information or direct messages [65], which implies necessary compliance with the required ethical standards [66–68] and proposes a radical rereading of traditional journalism as a primary source of information [69–72].

The analyzed hashtag in this research is #SustainableCity, which includes all its forms in uppercase and lowercase: #Sustainablecity, #sustainableCity, and #sustainablecity. The Premium version or paid subscription of Twitonomy allows monitoring for up to a full year, and dates were entered for the interval "since: 1 January 2020" and "until: 31 December 2021". Likewise, the last 3000 tweets of the first 9 days of the year 2021 were analyzed in detail, as offered by the tool, to confirm that there were no inconsistencies. Finally, another manual scan was made on Twitter, directly in the search box, for the same dates. The results

were recorded and compared, one by one, with the ones obtained in Twitonomy, and the analysis was articulated from the combination of the two processes. Only the accounts that used the hashtag #SustainableCity, and the rest of the post or description in English, were counted.

The methodology mixes quantitative and qualitative analysis, as allowed by the premium version of Twitonomy and the subsequent analysis of the results by the research team. The quantitative part is based on the data provided by Twitonomy: the flow of tweets per day; most influential users; most engaging users; most active users; top hashtags; top languages and locations on a map; most retweeted tweets; and most favorite tweets, in reverse chronological order, from present to back. The quantitative results can indicate the most influential and most active users, and five proposals to educate in sustainable citizenship.

However, these amounts require a human analysis, which begins with the exploration of each account. The research team analyzed one by one the accounts with the first results, the user or institution that created it, its status, its age, its activity, and any other qualitative element that guarantees that it is a real account and not spam or a fraudulent account. The Twitonomy tool does not offer this qualitative information, but the researchers have carried out this qualitative part to ensure the validity of the comments in the results section. Based on this qualitative analysis, we thought it appropriate to complete the quantitative information on the accounts with a qualitative analysis of the same, focusing on the five proposals to educate in sustainable citizenship. This qualitative analysis includes the reverse chronological reading of all the tweets of the most active accounts, sifting through news, comments, events, sweepstakes, links to news, and retweets to detect original recommendations, formulated in the first person by the author of the account, to make cities more sustainable through small individual and collective actions by citizens.

In order to understand how Twitter APIs work, it is essential to know their privacy conditions. These conditions must be accepted when opening an account on the microblogging network and are set out in detail on the website [73]. They are divided into six points on different topics, and we collected, as follows, all the conditions on user information and user activity, which are important for this research. Regarding the basic account information, Twitter only asks the user for a username, a password, and an email address or a phone number. The account name and username are always public, but Twitter allows the use of a real name or a pseudonym [73]. Profile information, the user's time zone, language, account creation date, tweets, and certain tweet information (date of posting, time of posting, Twitter application, and Twitter version used) are also public [73]. Likewise, lists, accounts followed, followers, tweets marked with a like, and tweets that are retweeted are public. Periscope streams that are created, clicked on, or participated in are also public, as well as information about when these actions took place [73]. You are responsible for your tweets, and the app recommends that you think carefully about what information you make public, especially when it is sensitive information [73].

Twitter explains that when someone tweets, they expressly ask the platform to disclose that information as widely as possible, including through its APIs [73]. This point of privacy is vital for this research and for any other research that addresses work on Twitter, as the user assumes this condition when he/she launches his/her account, and it is his/her responsibility to carefully read the privacy conditions that he/she accepts, and which include this point. Twitter adds that it organizes the information in tweets and accounts so that this information can be used by websites, applications, search engines, and the media [73]. In the privacy terms below, which are interesting for this paper, Twitter recalls that it also shares and discloses non-personal data, such as the number of times someone interacts with a tweet, demographic data, the number of people who clicked on a link, the number of users who voted in a poll with a tweet, the topics users are tweeting about, and their location [73].

To understand this privacy policy and users' awareness, or lack thereof, we have also taken into account several impact studies that have addressed this issue [74–86].

Specifically, Jeong and Coyle (2014) concluded that young users are more concerned about the information they provide to Facebook than Twitter [85]. However, they are more concerned that people close to them in positions of authority (parents, teachers) see the information on their profiles, while they are unconcerned about the information that reaches advertisers and companies, which they see as people who are distant from their account and their lives [85]. Nardis and Panek (2018) also studied user privacy control on Twitter and Instagram. According to their findings, the narcissistic user is an exhibitionist who uses fewer privacy controls, and their profile is often publicly accessible [86]. When the user's self-esteem increases, the likelihood of having a public setting on the Instagram account decreases, but the same is not true for the Twitter account [86].

3. Results

When searching for the hashtag #SustainableCity, the Twitonomy Premium app offers numerous results. In the left column of results, it provides the flow of tweets per day, the most influential users, the most engaging users, the most active users, top hashtags, top languages, and locations on a map. In the right column of results, it provides the most retweeted tweets and most favorite tweets, in reverse chronological order, from present to back. Taking into account the main objective of the study, the results that allow a solid, realistic, and deductive portrait have been chosen.

3.1. Most Influential Users and Most Active Users

According to Twitonomy, the most influential users are the users or accounts with the most followers, the most engaging users are the users or accounts that gained the most favorites using the selected hashtag and the most active users are the users or accounts that most mentioned the selected tweet in original tweets since they do not count retweets, as they are not original content. To meet the proposed objectives, the five Twitter accounts that used the hashtag #SustainableCity and that have the most influence (more users), and the five Twitter accounts that used the hashtag #SustainableCity and that were most active (used the hashtag more times), were compared, as shown in Table 1.

Table 1. Users and Twitter accounts that stood out the most with the hashtag #SustainableCity.

Most Influential Users and Most Active Users	Tweets	Following	Followers	Listed
@dirkjanjanssen	17,324	986	113,559	376
@weincludedorg	34,273	3	2025	30
@Sustain_City	2008	408	1438	51
@aberdeenCF	676	73	632	24
@labiks_lab	167	286	244	0
@imagine_garden	218,903	931	4532	41
@imaginecities	3716	220	519	96
@DaanV72	1990	331	170	0
@MissNRush	1353	793	496	8
@les_kidz	225	321	142	0

Source: Self-made from the data obtained in Twitonomy and Twitter.

Among the 10 accounts with the most influence and activity, we find educational institutions (@Sustain_City, @les_kidz), local organizations, companies (@labiks_lab, @imaginecities), neighborhood associations (@aberdeenCF), non-governmental organizations (@weincludedorg, @imagine_garden), and influencers (@dirkjanjanssen, @ DaanV72, @MissNRush). Their activity, in the number of tweets, is very inconsistent, between 167 and 218,903. Likewise, the range of followers is very wide, between only 142 and 113,559. Another interesting, representative point is Twitter lists. This tool allows a user to create a list of accounts that interest him so that only the tweets of the accounts that he has decided to include in that list appear in it. It is another way to measure engagement, and it is

interesting to see that @dirkjanjanssen (an influencer) would be the most included in lists. On the contrary, @labiks_lab, @DaanV72, and @les_kidz are not on any list.

3.2. Tweets, Retweets, Hashtags, and Retweeted Tweets Activity

Table 1 provides some very interesting quantitative data for the intended objective; however, in taking advantage of the features of Twitonomy, the data related to the specific activity of each account were also recorded. It is very interesting to relate the visibility of the account with the work that is carried out by the user or owner of that account, or the effort that is dedicated by each account to achieve their visibility and engagement. These results are shown in Table 2.

Table 2. Users and accounts with their activity in tweets and hashtags.

Most Influential Users and Most Active Users	Tweets Per Day	Retweets	Hashtags	Tweets Retweeted
@dirkjanjanssen	8.13	2%	9	28.91%
@weincludedorg	132.79	97%	0	100%
@Sustain_City	0.43	46%	1.04	32.69%
@aberdeenCF	0.16	43%	0.08	33.9%
@labiks_lab	0.16	32%	1.16	28.14%
@imagine_garden	0.17	98%	3.14	22.30%
@imaginecities	0.67	17%	2.12	20.24%
@DaanV72	4.92	15%	0.44	6.50%
@MissNRush	1.48	34%	0.54	10.15%
@les_kidz	0.31	22%	0.67	16.1%

Source: Self-made from the data obtained in Twitonomy and Twitter.

After selecting the 10 accounts with the most influence and activity, this study analyzed, one by one, the activity of each of those accounts. The Twitonomy tool offers a very complete set of profile analytics: tweet analytics, tweet history, users most retweeted, users most replied to, users most mentioned, hashtags most used, tweets most retweeted, tweets most favorited, days of the week, hours of the day (UTC), platforms most tweeted from, tweets, followers, following, favorites, and lists following. To meet the objectives of this research, it was determined that the most representative data are those that appear in Table 2:

- Tweets-per-day: Average number of tweets posted every day.
- Retweets: Percentage of retweets in the total of analyzed tweets.
- Hashtags: Average number of hashtags per tweet.
- Tweets retweeted: Proportion of the user's tweets retweeted by others.

The tweets-per-day section shows a wide range of 0.16 to 132.79 tweets per day. This datum is remarkably interesting, as it shows profuse activity, especially from non-governmental organizations (@weincludedorg) and influencers (@dirkjanjanssen, @DaanV72, @MissNRush). It must be noted that the validity of this data is based on the fact that the number of tweets per day arises from the selected period and not from the overall age of the account, since, in the second case, the data would not be comparable between accounts that can have very different life spans.

Retweets are another interesting point, in this research and any other work on Twitter. Notably, the Twitonomy screening excludes posts where the hashtag has been retweeted, that is, it stores and analyzes the original tweets in which the chosen hashtag has been used. However, it does allow you to determine how many times that original tweet was retweeted by other accounts, as will be seen later. In this case, the data refer to the non-original publications that each account made, which were retweets, but from their entire activity log, not only referring to the hashtag #SustainableCity. These data illustrate the interaction of the accounts with other users of the social network and is the part of the investigation where the results are more even, as profuse activity in retweets is observed. This includes @imagine_garden, with 98% of its publications involving retweets coming

from original tweets of other users; @weincludedorg, with 97% of activity involving retweets; @Sustain_City, with 46% involving retweets; and @aberdeenCF, with 43% of its activity involving retweets. This activity, in sustainable citizenship education, is quite common because accounts can retweet publications of citizens who are visiting or have visited them.

The hashtags section provides the number of tweets used by each of the accounts in their publications. The average number of hashtags is very similar in all cases, and almost all accounts use only one hashtag or less, thus giving the hashtag(s) all the prominence. Some accounts have an average hashtag per tweet below zero, and this is an interesting circumstance since the absence of hashtags can worsen the visibility of the tweet and the account, but this would not have happened in all these cases.

3.3. Five Proposals to Educate in Sustainable Citizenship

After the quantitative analysis of the two previous subsections, a mixed analysis of the content of the accounts was necessary. The accounts' variety, age, and origin are quite different, as already mentioned, and that makes it necessary to know the specific educational proposals of each account to make cities more sustainable, as shown in Table 3.

Table 3. Five proposals to educate in sustainable citizenship

Most Influential Users and Most Active Users	Five Proposals to Educate in Sustainable Citizenship
@dirkjanjanssen	Ride a bicycle, wear a helmet when riding a bicycle, promote walking, encourage the use of the train instead of the car, and pedestrianize the downtowns of cities.
@weincludedorg	Use electricity from solar panels, reduce water waste, use eco-friendly printers, wear recycled polyester clothing, and use bamboo toothbrushes.
@Sustain_City	Eat sustainably, do not flush wipes, do not use plastic swabs, travel by bicycle, and encourage girls to study for science careers.
@aberdeenCF	Promote more lanes for cyclists, increase the distances between bicycles and cars, do not use the car on short trips, promote more paths for walking and running, and do not litter the road.
@labiks_lab	Promote the use of shared bicycles, promote more lanes for cyclists, ride bicycles with adequate equipment, ride a bicycle using a mask and hydroalcoholic gel, and promote sports to reduce obesity, diabetes, and hypertension.
@imagine_garden	Reduce the use of pesticides, take care of endangered species, promote tree planting, promote plants in homes, and promote gray water recycling.
@imaginecities	Promote neighborhood associations, build greenhouses, use clean energy, promote fair wages, and reduce construction on the waterfront.
@DaanV72	Promote bike lanes, reduce car use for individual commutes, promote affordable public transportation, promote short journeys by foot, and increase the width of sidewalks for pedestrians.
@MissNRush	Promote teleworking, promote quality online teaching, raise awareness about water consumption, fight for quality education worldwide, and empower students to reduce inequalities.
@les_kidz	Reduce the use of plastics, promote urban gardens, educate on sustainability from early childhood, make children aware of endangered species, reduce water waste, and consume non-packaged fruits and vegetables.

Source: Self-made from the data obtained in Twitonomy and Twitter.

The education proposals for sustainable citizenship are numerous and varied. The common link is clear and blunt: climate change is possible from small individual changes, in each home and from each citizen (Figure 1).

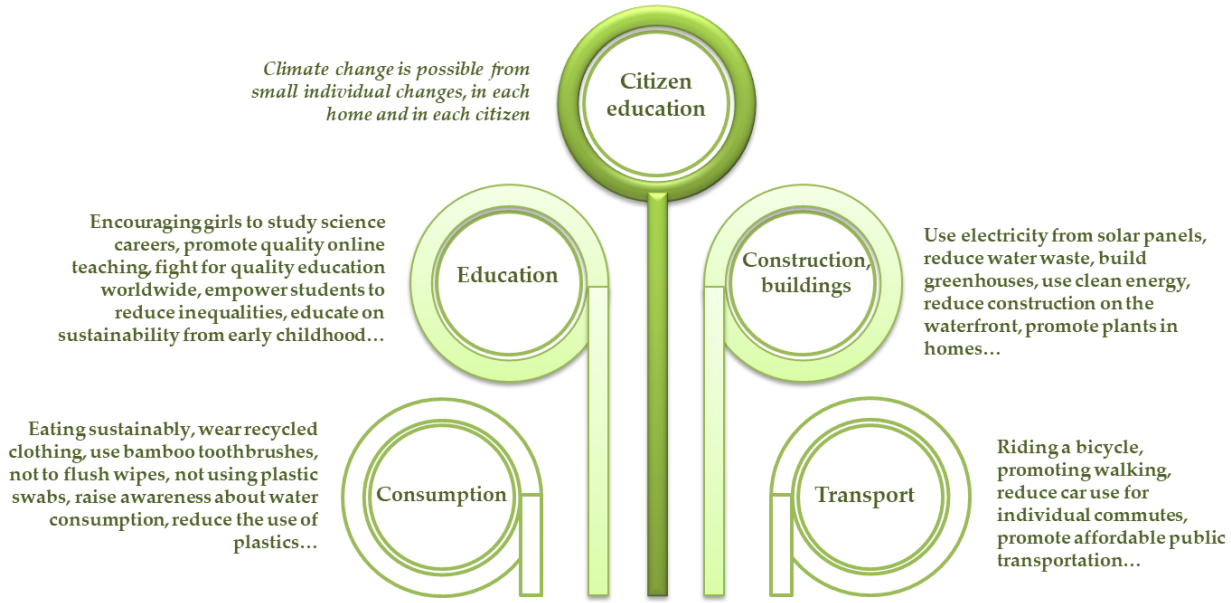

Figure 1. Basics of citizen education for sustainable cities. Source: Self-made from the data obtained in Twitonomy and Twitter.

These changes must be implemented, shared, and promoted, along with public and community proposals. Reading in depth each one of the tweets, this message is repeated almost every time, and sustainable education contains small and simple gestures: reducing water waste, using public transport or walking short routes, using shared transport, reducing the use of plastic products, or educating on sustainability from early childhood. This last point constitutes one of the key findings of this research and shows Twitter as a useful and diverse space for citizens to train in sustainable citizenship, at all levels, and for all actions.

4. Discussion of Results

The previous results, according to the objectives of this research, must be commented on and discussed in depth, from the perspective of the authors to the state of the art and the previously exposed working hypotheses.

Hypothesis 1 (H1). *COVID-19 has awakened and increased a virtual civic awareness of citizens who follow accounts that educate and promote sustainable citizenship on social media, months before being able to recover mobility.*

Climate awareness is one of the concerns that has grown the most after the SARS-CoV-2 social and health crisis [14–18]. Although it was already on the political agenda of governments and parties, it is now also on the social and citizen agenda, as revealed by the aforementioned international polls [19,20]. It is confirmed that sustainable citizenship awareness is a top concern and as the media share the results of reports and surveys, they get the audience interested and expand their data and knowledge on the matter in social networks [22–24]. The decision to search for this information on social media corresponds to the exponential growth of these discourses during confinement. Although they were already an important part of our lives, the prohibition of physical socialization promoted the increase of virtual communication through social networks.

Hypothesis 2 (H2). *This awareness of sustainable citizenship is promoted by official entities, which must fulfill their environmental commitments.*

The analysis of the hashtag #SustainableCity has corroborated this hypothesis, although it has shown that the accounts with the most influence and activity are also individual and personal. According to the aforementioned research, Twitter is the social network most chosen by official entities, local governments, political parties, or politicians in office [46–52]. The research data confirm that the most active accounts in sustainable citizenship are of this nature and maintain the validity and timeliness of these previous research [23–25].

Specifically, @Sustain_City highlighted the sustainable initiative of the City University of London, which according to its description, is located in the heart of London and committed to academic excellence. In addition to this commitment, it indicates another great commitment to making London a sustainable city with the help of its students. It is one of the most successful accounts, with more than 31,100 followers, and its account is more than a decade old since it joined Twitter in June 2009. Further research could focus on comparing this initiative with others from other universities, the country, or other continents. Its activity is very profuse, with more than 10,100 tweets at the end of this investigation, and its proposals for the education of its students in environmental commitment are numerous and laudable.

Hypothesis 3 (H3). *Sustainable citizenship offers a reinvention of the way of living in the city, revising places, public spaces, monuments, and buildings, or proposing destinations with a new awareness.*

The state of the matter outlined high-impact academic works, including experiences across the five continents and the proposal of many ways to educate citizens in making cities more sustainable [28–36]. In the same way, it showed responsible sustainable education campaigns, on social networks and outside of them [23,30,36,38]. These investigations were considered to elaborate this hypothesis, which stood as one of the fundamental preconceptions for developing a mixed analysis that included the qualitative. This hypothesis has been corroborated with the five proposals to educate in sustainable citizenship, listed in Table 3.

Hypothesis 4 (H4). *It is impossible to corroborate whether this sustainable citizenship awareness will actually translate into more sustainable cities when the socio-health crisis is over, although Twitter now offers an eco-conscious education, and a perhaps escapist and cathartic call, showing cities in which we cannot walk freely but that we can care and do dream about.*

As mentioned, surveys on problems that concern European and international society, of course, contemplate climate awareness and education in climate awareness [20,22]. This includes, in some studies, a promise or the anticipation of being more aware and sustainable citizens when it is possible to live in the city again. When the desired group immunity has been achieved, the virus is overcome, and freedom of movement regained, studies will have to assess whether that awareness has been translated into reality or was only a promise, and how long that awareness lasts, whether it is temporary or long-lasting.

Unfortunately, there are still many months to go before these studies can be done. Meanwhile, this research has corroborated this hypothesis, showing Twitter as a citizen education tool for sustainable cities after COVID-19. Additionally, this result is due to the number of accounts, the number of users, their activity, the engagement they achieve, and the internationalization of the proposals. The impossibility of living in the city has not stopped citizenship education and the commitment to real changes when the city and its citizens return to normal. Although this new normality must be different: greener, more responsible, more sustainable, and learned from early childhood.

Figure 2 visually summarizes how these four hypotheses are related and follow one another, becoming theories when validated:

Figure 2. The interdependent operation of hypotheses validated as original theories. Source: Self-made.

5. Conclusions, Contributions, Limitations, and Future Avenues

The best way to transmit this new eco-awareness cannot be through mass media, because they do not reach the entire population, they do not reach all ages, and they have concentrated on providing information about the virus, the deaths it has caused, and the ways to combat it. However, social networks have expanded the information that did not fit or did not interest mass media and have p an important space to this new sustainable awareness. They have taken advantage of the virality of Twitter, reaching the whole world and offering solutions that can work for any citizen in any region. And most importantly, they have done so by speaking the same language as their citizens. It is the language of social networks: short but profound, close but professional, horizontal and peer-to-peer, and never paternalistic (Figure 3).

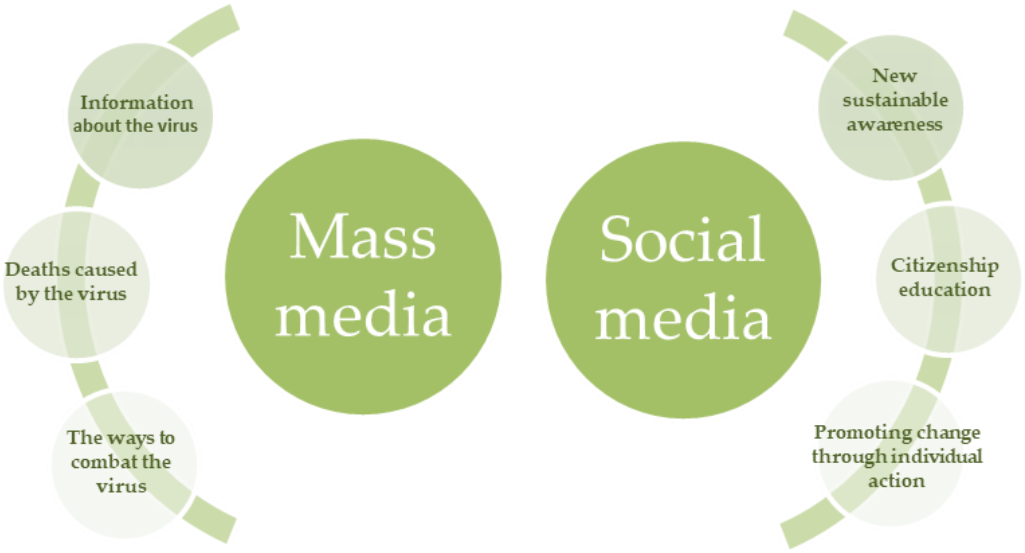

Figure 3. Virus issues in mass media and social networks. Source: Self-made.

Theoretically, this work provides several important insights: the COVID-19 crisis has created a new sustainable conscience through an understanding that the infection of the virus in humans may have been due to humans entering the animal environment that they should respect and leave aseptic; citizens, with this new civic and sustainable conscience, seek information on sustainability in the media and social networks; this individual and proactive search activity, especially on social networks, was benefited by the social and sanitary confinement, where citizens found more time for these activities; official entities, recognizing this new citizen interest, have increased their eco-sustainable discourse and have resorted to Twitter to publish it and encourage virality; this new eco-awareness does not only refer to official and public commitments of governments, administrations, or city councils, but individual actions are also proposed, accessible to any citizen, which have to do directly with their way of life in their own city.

In terms of practical contributions to academia, this research has used a Twitter analysis tool, although its use in academic research is not original. However, this research is original in its thematic and qualitative approach. As has been shown, so far, there are no studies on climate eco-awareness on Twitter (or on social networks) after COVID-19. Nor are there any scientific studies on the concrete proposals included in these posts/tweets on social networks to encourage citizens to take care of their planet through small, individual, and accessible actions. These proposals can be summarized in the following basic idea: the biggest change for the planet can be made through easy, small, and individual changes.

After identifying and evaluating the contributions as an essential part of the soundness of this research, we must comment on its limitations. The first refers to the privacy of Twitter in two aspects: the virality of content and the deletion of tweets. Regarding the virality of content, we have commented extensively on the privacy conditions of the microblogging social network [73–79]. According to these conditions, the user who launches an account understands or knows that Twitter has their implicit permission to distribute tweets and their activity in general, in the most viral way possible [73]. Likewise, according to the privacy terms, the user allows their activity to be contained and tracked by Twitter's APIs and to be shared by third-party companies [73]. Twitter's privacy is clear and detailed, but a possible limitation would have to do with users' knowledge and lack of knowledge about these privacy conditions [84–86]. Indeed, we understand that official and institutional accounts seek this free virality that Twitter offers. However, as a limitation and an idea for future work, we consider contacting the most active users and interviewing them to find out if they are aware of Twitter's privacy conditions and if so, to find out their opinion on these conditions.

The second limitation we have found that concerns the privacy of Twitter is the deletion of tweets and even the deletion of accounts [73]. When a user deletes a tweet, this tweet also disappears from the APIs. The limitation would then be that the search does not pick up tweets that were viral at the time but now no longer exist. Likewise, if an account is deleted, its tweets can be deleted and are no longer collected in the APIs. They cease to be trackable for Twitonomy and any other tool, and cannot be part of any study, even if they were viral at certain points in their existence. It is an impossible limitation to overcome, according to current conditions, but we also wanted to point it out.

In line with these limitations, we have detected another interesting pitfall worthy of comment. To complete this research results, it would have been interesting to compare 2020 with previous years: 2019, 2018, or 2017. However, studying those earlier years can lead to unreliable results, precisely because of the elimination of tweets and accounts. This limitation is an external problem to any research team and for any tool they decide to use. At present, it is an insurmountable limitation, if the study is conducted from the present backward. The limitation can only be overcome if the emptying and screening of tweets are done on a daily or weekly basis. Unfortunately, it is difficult to detect long-term trends with such detailed work in such a large and close time span. Indeed, it is possible to monitor an account, hashtag, and topic; always with the risk that its relevance and interest will decline sooner or later. For this reason, we are committed to a retroactive analysis, taking into account its limitations. The monitoring of a complete year was done after the end of that year, but with the certainty that the hashtag to be studied was sufficiently relevant, due to the eco-awareness mentioned in all the international reports referred to above.

The limitations have also been very valuable because they inspire us to think about future research. In future research, it would be interesting to see if there are more reasons to choose social media as a source of information on sustainable citizenship, for example: the training of municipalities and local organizations to educate citizens on sustainable citizenship; the promotion of recycling in neighborhoods and cities; itineraries of bicycle routes; car-sharing initiatives; urban gardens in buildings, schools, and gardens; the sale of second-hand products; the promotion of a circular economy; tricks of products and services in neighborhoods; proposals to sell perishable products at low prices to avoid waste; etc. Likewise, it would be very suggestive to interrelate the presence of a hashtag on social networks with searches for the same term in search engines, as allowed by the Google Trends tool.

It is true, as has been raised in this research, that it is necessary to distinguish between more influential accounts and more active accounts. Influence is usually measured by the number of followers, and official entities have an easier time scoring points in this regard, while an influencer or individual person must win each follower, one by one, for the content they offer. It would be productive, in subsequent research, to filter the search for activity on Twitter only to include European countries, to analyze and compare which country would be the most active and responsible on social media, and to compare their proposals with those of countries that stand out in each of the other continents.

Based on the results, future research also could focus exclusively on analyzing the Twitter accounts of a city by searching and analyzing neighborhood accounts and proposals, comparing them according to their nature: public, community, or private initiative. It would be important to detect whether these cities are more influenced by official entities (governments, parties, municipalities), by companies, by influencers, by education institutions [60–62], or by citizens who live in these cities and want to share their sustainable proposals with the rest of the world [34–36,51]. Other investigations could focus on studying in depth the proposals that have been promoted by the citizens and that, after reaching visibility on social networks, have gone on to become a public or official action. Activism promotes, in part, these initiatives, as has been commented in the theoretical framework [47–51,59], and it would be interesting to focus a study on art education, intervening in the city in a sustainable way.

Additionally, thinking about the world after COVID-19, when the crisis, confinement, and distancing and movement measures have returned to normal, it is proposed that future research compares the activity of the most influential accounts, contrasting their activity on Twitter, YouTube, Facebook, Instagram, and TikTok, to detect successes and errors, similarities and differences, or the best exploited and most chosen networks by the audience. Likewise, it would be interesting to conduct surveys or focus groups with students, who are followers of these accounts, to find out which groups choose one social network over another and why when raising awareness about sustainable citizenship.

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References

1. Ram, S. Coronavirus Research Trends: A 50-Year Bibliometric Assessment. *Sci. Technol. Libr.* **2020**, *39*, 210–226. [CrossRef]
2. Byass, P. Eco-epidemiological assessment of the COVID-19 epidemic in China, January–February 2020. *Glob. Health Action* **2020**, *13*. [CrossRef]
3. Wu, Z.; McGoogan, J.M. Characteristics of and important lessons from the coronavirus disease 2019 (Covid-19) outbreak in China: Summary of a report of 72 314 cases from the Chinese center for disease control and prevention. *JAMA* **2020**, *323*, 1239–1242. [CrossRef]
4. Zhao, Z.; Lu, K.; Mao, B.; Liu, S.; Trilling, M.; Huang, A.; Lu, M.; Lin, Y. The interplay between emerging human coronavirus infections and autophagy. *Emerg. Microbes Infect.* **2021**, 1–28. [CrossRef]
5. Totura, A.L.; Bavari, S. Broad-spectrum coronavirus antiviral drug discovery. *Expert Opin. Drug Discov.* **2019**, *14*, 397–412. [CrossRef] [PubMed]
6. Li, Q.; Guan, X.; Wu, P.; Qun, L.; Xuhua, G.; Peng, W.; Xiaoye, W.; Lei, Z.; Yeqing, T.; Ruiqi, R.; et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N. Engl. J. Med.* **2020**, *382*. [CrossRef]
7. Chan, J.F.-W.; Kok, K.-H.; Zhu, Z.; Chu, H.; Kelvin, K.-W.; Yuan, S.; Yuen, K.-Y. Genomic characterization of the 2019 novel human-pathogenic coronavirus isolated from a patient with atypical pneumonia after visiting Wuhan. *Emerg. Microbes Infect.* **2020**, *9*, 221–236. [CrossRef] [PubMed]
8. Freedman, L. Strategy for a Pandemic: The UK and COVID-19. *Survival* **2020**, *62*, 25–76. [CrossRef]
9. Gronvall, G.K. The Scientific Response to COVID-19 and Lessons for Security. *Survival* **2020**, *62*, 77–92. [CrossRef]
10. Marín-Casanova, J.A. Consequences of a Health Crisis. Ideas Kit for the Understanding of the Coronavirus and its Informational Techno-Pandemich. *Revista Comunicación Salud* **2020**, *10*, 63–80. [CrossRef]
11. Wilder-Smith, A.; Freedman, D.O. Isolation, quarantine, social distancing and community containment: Pivotal role for old-style public health measures in the novel coronavirus (2019-nCoV) outbreak. *J. Travel Med.* **2020**, *27*, 1–4. [CrossRef] [PubMed]
12. Wright, C. Local government fighting Covid-19. *Round Table* **2020**, *109*, 1–2. [CrossRef]
13. Bateman, L.B.; Schoenberger, Y.M.M.; Hansen, B.; Osborne, T.N.; Okoro, G.C.; Speights, K.M.; Fouad, M.N. Confronting COVID-19 in under-resourced, African American neighborhoods: A qualitative study examining community member and stakeholders' perceptions. *Ethn. Health* **2021**, 49–67. [CrossRef] [PubMed]
14. González-Eguino, M. Emisiones Adelantadas de Gases de Efecto Invernadero en España 2019; Observatorio de la Transición Energética y la Acción Climática: Leioa. 2020. Available online: https://otea.info/OTEAInformeEmisionesGEIAdelantadas2020.pdf (accessed on 20 January 2021).
15. World Meteorological Organization (WMO). Can we see the impact of COVID-19 confinement measures on CO_2 levels in the atmosphere? *WMB Greenh. Gas Bull.* **2020**, *16*, 1–3. Available online: https://mcusercontent.com/daf3c1527c528609c379f3c08/files/279cb390-e91d-4506-9c23-bc538d68fa35/GHG_Bulletin_16_print_en.01.pdf (accessed on 22 January 2021).
16. Integrated Carbon Observation System (ICOS). Media Release: ICOS Study Shows Clear Reduction in Urban CO2 Emissions as a Result of Covid-19 Lockdown. 2020. Available online: https://www.icos-cp.eu/event/933 (accessed on 20 January 2021).

17. Keesing, F.; Belden, L.; Daszak, P.; Dobson, A.; Harvell, C.D.; Holt, R.D.; Hudson, R.; Jolles, A.; Jones, K.E.; Mitchell, C.E.; et al. Impacts of biodiversity on the emergence and transmission of infectious diseases. *Nature* **2010**, *468*, 647–652. [CrossRef]
18. World Metereological Organization (WMO). WMO Statement on the State of the Global Climate in 2019. *WMO Ser.* **2020**, 1248. Available online: https://library.wmo.int/index.php?lvl=notice_display&id=21700#.YAluNhZ7mUm (accessed on 22 January 2021).
19. Convention on Biological Diversity (CBD). Global Biodiversity Outlook (GBO-5). 2020. Available online: https://www.cbd.int/gbo5 (accessed on 20 January 2021).
20. European Investment Bank (EIB). 2020–2021 EIB Climate Survey. 2021. Available online: https://www.eib.org/en/surveys/climate-survey/3rd-climate-survey/climate-change-and-covid-recovery.htm (accessed on 20 January 2021).
21. Butler, R.W. Sustainable tourism: A state-of-the-art review. *Tour. Geogr.* **1999**, *1*, 7–25. [CrossRef]
22. United Nations (UN). Report of the World Commission on Environment and Development: Our Common Future. 1987. Available online: https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf (accessed on 22 January 2021).
23. Barrientos-Báez, A.; Caldevilla-Domínguez, D.; Cáceres-Vizcaíno, A.; Sueia-Val, E.G. Tourism sector: Communication and sustainable innovation. *Revista Comunicación SEECI* **2020**, *53*, 153–173. [CrossRef]
24. Kurian, P.A.; Munshi, D.; Bartlett, R.V. Sustainable citizenship for a technological world: Negotiating deliberative dialectics. *Citizsh. Stud.* **2014**, *18*, 435–451. [CrossRef]
25. Mason, K. Becoming Citizen Green: Prefigurative politics, autonomous geographies, and hoping against hope. *Environ. Politics* **2014**, *23*, 140–158. [CrossRef]
26. Huckle, J.; Wals, A.E.J. The UN Decade of Education for Sustainable Development: Business as usual in the end. *Environ. Educ. Res.* **2015**, *21*, 491–505. [CrossRef]
27. Mondal, S.; Samaddar, K. Responsible tourism towards sustainable development: Literature review and research agenda. *Asia Pac. Bus. Rev.* **2021**, 1–38. [CrossRef]
28. Walker, T.B.; Lee, T.J.; Li, X. Sustainable development for small island tourism: Developing slow tourism in the Caribbean. *J. Travel Tour. Mark.* **2021**, *38*. [CrossRef]
29. Chi, X.; Han, H. Emerging rural tourism in China's current tourism industry and tourist behaviors: The case of Anji County. *J. Travel Tour. Mark.* **2021**, *38*, 58–74. [CrossRef]
30. Jeon, C.-Y.; Yang, H.-W. The structural changes of a local tourism network: Comparison of before and after COVID-19. *Curr. Issues Tour.* **2021**, 1–15. [CrossRef]
31. Wilson, J.; Garay-Tamajon, L.; Morales-Perez, S. Politicising platform-mediated tourism rentals in the digital sphere: Airbnb in Madrid and Barcelona. *J. Sustain. Tour.* **2021**, 1–22. [CrossRef]
32. Greeley, R.W.B. Conservation Territorialization and Sport Hunting in Lebanon's Shouf Biosphere Reserve. *J. Int. Wildl. Law Policy* **2021**, 1–11. [CrossRef]
33. Nuzzo, M.; Faella, G. The Carmine Maggiore Bell Tower: An Inclusive and Sustainable Restoration Experience. *Sustainability* **2021**, *13*, 1445. [CrossRef]
34. Souiher, K.; Abdessamed Rezzaz, M. Rehabilitation of infrastructure in urban tourist areas (province of Algiers, Algeria). *Loisir Société Soc. Leis.* **2020**, 1–14. [CrossRef]
35. Vukmirović, M.; Nikolić, M. Industrial heritage preservation and the urban revitalisation process in Belgrade. *J. Urban Aff.* **2021**, 1–26. [CrossRef]
36. Akar, B. Citizenship education in conflict-affected areas and nation-states: Empowering teachers for sustainable reform. *Intercult. Educ.* **2020**, *31*, 519–532. [CrossRef]
37. Coles, T. Tourism, Brexit and the climate crisis: On intersecting crises and their effects. *J. Sustain. Tour.* **2021**, 1–18. [CrossRef]
38. Gössling, S. Technology, ICT and tourism: From big data to the big picture. *J. Sustain. Tour.* **2020**, 1–10. [CrossRef]
39. López-Villafranca, P.; Smolak-Lozano, E. The digital cultural consumption of radio programs on YouTube in Spain and Poland. *Hist. Comun. Soc.* **2020**, *25*, 123–138. [CrossRef]
40. Halim, T.M.; Kiatkawsin, K. Beauty and Celebrity: Korean Entertainment and Its Impacts on Female Indonesian Viewers' Consumption Intentions. *Sustainability* **2021**, *13*, 1405. [CrossRef]
41. Subawa, N.S.; Widhiasthini, N.W.; Astawa, I.P.; Dwiatmadja, C.; Permatasari, N.P.I. The practices of virtual reality marketing in the tourism sector, a case study of Bali, Indonesia. *Curr. Issues Tour.* **2021**, 1–12. [CrossRef]
42. Trunfio, M.; Lucia, M.D.; Campana, S.; Magnelli, A. Innovating the cultural heritage museum service model through virtual reality and augmented reality: The effects on the overall visitor experience and satisfaction. *J. Herit. Tour.* **2021**, 1–19. [CrossRef]
43. Wang, Y.; Feng, D. History, modernity, and city branding in China: A multimodal critical discourse analysis of Xi'an's promotional videos on social media. *Soc. Semiot.* **2021**, 1–24. [CrossRef]
44. Arana, E.; Mimenza, L.; Narbaiza, B. Pandemic, audiovisual consumption and future trends in communication. *Revista de Comunicación y Salud* **2020**, *10*, 149–183. [CrossRef]
45. We Are Social & Hootsuite. Digital in 2020. Available online: https://wearesocial.com/digital-2020 (accessed on 22 January 2021).
46. Jivkova-Semova, D.; Requeijo-Rey, P.; Padilla-Castillo, G. Uses and tendencies of Twitter in the campaign to the Spanish general elections of 2015 20D: Hashtags that were trending topic. *Prof. Inf.* **2017**, *26*, 824–837. [CrossRef]

47. Aladro-Vico, E.; Jivkova-Semova, D.; Bailey, O. Artivism: A new educative language for transformative social action. *Comunicar* **2018**, *57*, 9–18. [CrossRef]
48. Bernárdez-Rodal, A.; Padilla-Castillo, G.; Sosa-Sánchez, R.P. From Action Art to Artivism on Instagram. Relocation and instantaneity for a new geography of protest. *Catalan J. Commun. Cult. Stud.* **2019**, *11*, 23–37. [CrossRef]
49. Bernardez-Rodal, A.; Requeijo-Rey, P.; Franco, Y.G. Radical right parties and anti-feminist speech on Instagram: Vox and the 2019 Spanish general election. *Party Politics* **2020**. [CrossRef]
50. Castillo-Esparcia, A.; Castillero-Ostio, E.; Castillo-Díaz, A. The think tanks in Spain. Analysis of their digital communication strategies. *Revista Latina de Comunicación Social* **2020**, *77*, 253–273. [CrossRef]
51. Fernández-Fernández, Á.; Revilla-Guijarro, A.; Andaluz-Antón, L. Analysis of the discursive characterization of migratory stories on Twitter: The Aquarius case. *Revista Latina Comunicación Social* **2020**, *77*, 1–18. [CrossRef]
52. Gutiérrez-Almazor, M.; Pando-Canteli, M.J.; Congosto, M. New approaches to the propagation of the antifeminist backlash on Twitter. *Investig. Fem.* **2020**, *11*, 221–237. [CrossRef]
53. Losada -Díaz, J.C.; Rodríguez-Fernández, L.; Paniagua-Rojano, F.J. Government communication and emotions in the Covid-19 crisis in Spain. *Revista Latina Comunicación Social* **2020**, *78*, 23–40. [CrossRef]
54. Ortega Fernández, E.A.; Padilla Castillo, G. Transmedia dialogue of TV series. Overcoming the Fifth Wall in House of Cards. *Estudios Sobre El Mensaje Periodístico* **2020**, *26*, 1101–1120. [CrossRef]
55. Feijoo Fernández, B.; Guerrero, J.J. Market research in social networks: Know your consumer so publish on Facebook and Twitter. Case analysis of ADT Security Services in Chile. *Vivat Academia. Revista de Comunicación* **2018**, *144*, 19–35. [CrossRef]
56. Castillo-Esparcia, A.; Fernández-Souto, A.-B.; Puentes-Rivera, I. Comunicación política y Covid-19. Estrategias del Gobierno de España. *Prof. Inf.* **2020**, *29*, 1–22. [CrossRef]
57. Justel-Vázquez, S.; Fernández-Planells, A.; Victoria-Mas, M.; Lacasa-Mas, I. Twitter e información política en la prensa digital: La red social como fuente de declaraciones en la era Trump. *Prof. Inf.* **2018**, *27*, 984–992. [CrossRef]
58. Pano, A. Hashtags politic in Twitter. *Vivat Academia. Revista de Comunicación* **2020**, *152*, 49–68. [CrossRef]
59. Aladro-Vico, E. Sustainable communication and 2.0 society: Oddities derived from a three decade relationship. *Revista Comunicación SEECI* **2020**, *53*, 37–51. [CrossRef]
60. Vázquez-Cano, E.; León Urrutia, M.; Parra-González, M.E.; López Meneses, E. Analysis of Interpersonal Competences in the Use of ICT in the Spanish University Context. *Sustainability* **2020**, *12*, 476. [CrossRef]
61. Sánchez-Carracedo, F.; Moreno-Pino, F.M.; Romero-Portillo, D.; Sureda, B. Education for Sustainable Development in Spanish University Education Degrees. *Sustainability* **2021**, *13*, 1467. [CrossRef]
62. Antón-Peset, A.; Fernandez-Zamudio, M.-A.; Pina, T. Promoting Food Waste Reduction at Primary Schools. A Case Study. *Sustainability* **2021**, *13*, 600. [CrossRef]
63. Roig-Vila, R.; Prendes-Espinosa, P.; Urrea-Solano, M. Problematic Smartphone Use in Spanish and Italian University Students. *Sustainability* **2020**, *12*, 10255. [CrossRef]
64. Twitonomy. Terms of Service. 2021. Available online: https://www.twitonomy.com/content/terms.php (accessed on 22 January 2021).
65. Twitter. Información Sobre las API de Twitter. 2021. Available online: https://help.twitter.com/es/rules-and-policies/twitter-api (accessed on 22 January 2021).
66. Martín-Antoranz, P.; Cabezuelo-Lorenzo, F.; Bartolomé-Muñoz-de-Luna, Á. Competencias y formación ética de los profesionales de la comunicación corporativa en contextos interculturales. *Revista Ciencias Comunicación Información* **2019**, *24*, 59–72. [CrossRef]
67. Adamik, A.; Nowicki, M. Pathologies and Paradoxes of Co-Creation: A Contribution to the Discussion about Corporate Social Responsibility in Building a Competitive Advantage in the Age of Industry 4.0. *Sustainability* **2019**, *11*, 4954. [CrossRef]
68. Khan, A.A.; Wang, M.Z.; Ehsan, S.; Nurunnabi, M.; Hashmi, M.H. Linking Sustainability-Oriented Marketing to Social Media and Web Atmospheric Cues. *Sustainability* **2019**, *11*, 2663. [CrossRef]
69. Ruiz-Rico, M. El periodismo reconstructivo como género periodístico en la era de la posmodernidad digital. *Revista Ciencias Comunicación Información* **2020**, *25*, 39–48. [CrossRef]
70. Kenterelidou, C.; Galatsopoulou, F. Sustainable Biocultural Heritage Management and Communication: The Case of Digital Narrative for UNESCO Marine World Heritage of Outstanding Universal Value. *Sustainability* **2021**, *13*, 1449. [CrossRef]
71. Zakharchenko, A.; Peráček, T.; Fedushko, S.; Syerov, Y.; Trach, O. When Fact-Checking and 'BBC Standards' Are Helpless: 'Fake Newsworthy Event' Manipulation and the Reaction of the 'High-Quality Media' on It. *Sustainability* **2021**, *13*, 573. [CrossRef]
72. Maniou, T.A. Semantic Analysis of Cultural Heritage News Propagation in Social Media: Assessing the Role of Media and Journalists in the Era of Big Data. *Sustainability* **2021**, *13*, 341. [CrossRef]
73. Twitter. Privacy. 2021. Available online: https://twitter.com/es/privacy (accessed on 10 March 2021).
74. Cabezuelo-Lorenzo, F.; Martínez-Gutiérrez, F. Interactividad. Revisión conceptual y contextual. *Revista ICONO14 Revista Científica Comunicación Tecnologías Emergentes* **2012**, *8*, 9–21. [CrossRef]
75. Novak, A.N.; Vilcenau, M.O. "The internet is not pleased": Twitter and the 2017 Equifax data breach. *Commun. Rev.* **2019**, *22*, 196–221. [CrossRef]
76. Vargo, C.; Gangadharbatla, H.; Hopp, T. eWOM across channels: Comparing the impact of self-enhancement, positivity bias and vengeance on Facebook and Twitter. *Int. J. Advert.* **2019**, *38*, 1153–1172. [CrossRef]

77. Baik, J. Data privacy and political distrust: Corporate 'pro liars,' 'gridlocked Congress,' and the Twitter issue public around the US privacy legislation. *Inf. Commun. Soc.* **2020**, 1–18. [CrossRef]
78. Gil-Torres, A.; Martín-Quevedo, J.; Gómez-García, S.; San José-De la Rosa, C. The Coronavirus in the mobile device ecosystem: Developers, discourses and reception. *Revista Latina Comunicación Social* **2020**, *78*, 329–358. [CrossRef]
79. Arnold, K.D.; Casellas Connors, I. The 'anti-Instagram': Using visual methods to study the college experiences of underrepresented students. *Vis. Stud.* **2021**, 1–19. [CrossRef]
80. D'Avanzato, C.; Bogen, K.W.; Kuo, C.; Orchowski, L.M. Online dialogue surrounding violence against women in South Africa: A qualitative analysis of #MenAreTrash. *J. Sex. Aggress.* **2021**, 1–17. [CrossRef]
81. Li, Y. Identity construction in social media: A study on blogging continuance. *Behav. Inf. Technol.* **2021**, 1–18. [CrossRef]
82. Li, B.; Scott, O.K.M.; Naraine, M.L.; Ruihley, B.J. Tell Me a Story: Exploring Elite Female Athletes' Self-Presentation via an Analysis of Instagram Stories. *J. Interact. Advert.* **2020**, 1–19. [CrossRef]
83. Mosca, L.; Quaranta, M. Are digital platforms potential drivers of the populist vote? A comparative analysis of France, Germany and Italy. *Inf. Commun. Soc.* **2021**, 1–19. [CrossRef]
84. Williams, M.L.; Saunderson, I.P.; Dhoest, A. Students' Perceptions of the Adoption and Use of Social Media in Academic Libraries: A UTAUT Study. *Communicatio* **2021**, 1–19. [CrossRef]
85. Jeong, Y.; Coyle, E. What Are You Worrying About on Facebook and Twitter? An Empirical Investigation of Young Social Network Site Users' Privacy Perceptions and Behaviors. *J. Interact. Advert.* **2014**, *14*, 51–59. [CrossRef]
86. Nardis, Y.; Panek, E. Explaining Privacy Control on Instagram and Twitter: The Roles of Narcissism and Self-Esteem. *Commun. Res. Rep.* **2018**, *36*, 24–34. [CrossRef]