Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
Relevance of E-Participation in the state health campaign in Spain: #EstoNoEsUnJuego / #ThisIsNotAGame

Sonia Santoveña-Casal *, Mª Dolores Fernández Pérez

Department of Education, National University of Distance Education, C/ Juan del Rosal, 14, Madrid, 28040, Spain

ARTICLE INFO

Keywords:
E-participation
Digital citizenship
Twitter
COVID-19
Communication
Social interaction

ABSTRACT

Confronting the COVID-19 health emergency has forced public administrations in Spain to work with various networks as a means of promoting their campaigns to citizens. This paper aims to analyse digital citizens’ e-participation by focusing on the state health campaign #EstoNoEsUnJuego - #ThisIsNotAGame. This campaign was launched by the Spanish Ministry of Health in September 2020 via Twitter with the objective of reinforcing protection measures against the virus. A sample consisting of 19,576 tweets, sent from September 2020 to February 2021, was investigated and the results have indicated that, of 9133 users, 64.8% of citizens collaborated in the dissemination of tweets. It was observed that most messages supported the campaign by disseminating information on measures, data and news. Only 0.1% of the messages were aggressive. The conclusion is that, despite not having created a true form of communication between public institutions and citizens, e-participation has generated a functional connection between them. Citizens have acquired a responsible and participatory digital role which, although failing to show personal involvement in their comments, has been the main driving force behind the success of this campaign.

1. Introduction

In a digital society increasingly rife with technology, many researchers are studying the relationship established between citizens and governments through digital media such as social networks [1]. This form of communication is called e-participation or electronic participation and is understood as a process of interaction between government and citizens by means of technology. Its aim is to promote ‘civic participation and open governance’ [2], enabling citizens to become involved in policy formulation [3].

In fact, an increase in the use of various technologies for social interaction is evident among citizens. These technologies are used for social participation, to respond to civic causes through open governance and, also, for the fostering of community actions [4].

Within this framework, the leading role of social networks stands out. Networks expand possibilities for communication and interaction, for exchanging opinions and ideas [5,6] and for building communities with shared interests [7]. What remains unclear, however, is whether networks can really be considered spaces that facilitate the development of what Graham [8] called ‘deliberative democracy’. In deliberative democracy communication is regarded as a means of mutual understanding that implies: reciprocity (listening and responding), reflexivity (citing reasons, reflections) and perspective taking (taking account of others’ opinions). In fact, Twitter has been criticised for being a space for the dissemination of information rather than for debate or interaction [9]. There is also a view that it can impoverish and skew our opinions instead of enriching them [10]. This is because opinions are not debated on Twitter, but developed as monologues rather than dialogues [11].

Networks facilitate discussion of the topics that citizens are concerned about, and, in emergency situations like the COVID-19 pandemic, networks also facilitate the roll-out of government measures [12]. Citizens seem to have their own reasons for using networks [13]. In fact, it has been observed that citizens tend to use networks to satisfy their emotional, socialisation and information needs. Furthermore, while in general citizens use networks to spread and exchange information [14], during crises they engage in heavy network use [12].

Networks are social and cultural spaces which not only allow for the expression of emotions and attitudes [15], but also directly influence their management [16]. This does not happen in traditional media. The interpersonal connections which are generated when we communicate with others are key in terms of the emotional development and personal

* Corresponding author.
E-mail addresses: ssantovena@edu.uned.es (S. Santoveña-Casal), mdfernandez@edu.uned.es (M.D.F. Pérez).

https://doi.org/10.1016/j.techsoc.2022.101877
Received 23 September 2021; Received in revised form 29 December 2021; Accepted 3 January 2022
Available online 11 January 2022
0160-791X/© 2022 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license
involvement in the network. The interaction between networks, and the collaboration and interaction by people who have different profiles and characteristics [26]. Many researchers have focused on Twitter use and the detection of infectious diseases, while others have looked at Twitter users’ perceptions [27–29]. In fact, Twitter has played a leading role in spreading information regarding natural disasters [30]; it has even been observed that the level of communication during the current COVID-19 pandemic [1].

The idea that digitalisation and technological developments facilitate tackling socio-economic and political challenges is accepted [20]. In addition, it can be seen that, in the ‘War on COVID-19’ [21,22], the coordination of efforts between public and private administrations, and with citizens, has been imposed. Furthermore, governments’ use of cyberspace and social networks [23] has led to the creation of new connections, interactive channels and participatory communication between the political agenda and citizens [24]. Thus, new patterns of interaction between government, citizens and technology have emerged [25].

In the realm of public health, networks have furnished a new means of communication among practitioners, institutions and citizens, but also a potential means of improving health, since networks favour collaboration and interaction by people who have different profiles and characteristics [26]. Many researchers have focused on Twitter use and the detection of infectious diseases, while others have looked at Twitter users’ perceptions [27–29]. In fact, Twitter has played a leading role in spreading information regarding natural disasters [30]; it has even been affirmed that Twitter has been the primary means of communication during the current COVID-19 pandemic [1].

In the context of COVID-19, the Spanish Ministry of Health launched four campaigns, exclusively on the Internet, in order to fight the spread of the pandemic. In March 2020, #EsteVirusLoParamamosUnidos (#WeStopThisVirusTogether) sought to unite the country in this fight. In May a message, focused on overcoming the virus, was shared by #SalimosMasFuertes (#WeComeOutStronger). Later, in September, the #EstoNoEsUnJuego (#ThisIsNotAGame) campaign was launched followed, in December, by #ElMejorRegaloEsCuidarnos (#TheBestPresentIsToTakeCareOfOurselves). These last two campaigns were aimed at reinforcing security measures. The great importance given to the security measures for the socio-economic maintenance of the nation, made it necessary to ascertain how citizens were reacting to the messages sent by the state health administration. Measures undertaken to protect public health are known to have had a negative effect on some issues, for example, mental health [13].

This research explores the relevance of citizen e-participation during an emergency situation through the government’s #ThisIsNotAGame social and health campaign on the Twitter social network. It is hoped this research can contribute to and serve as a reference for other e-participation actions and proposals in crisis situations. In doing so, it sheds light on the interactions which emerged between digital citizens and open government and the involvement and role of citizens during the pandemic. This has been done, unlike previous studies, within the specific context of public health, which gives it an element of special interest. In addition, it has allowed us to monitor the evolution of emotions during five key months of the pandemic (from the second wave to the third). It also analyses the topics and concerns of those citizens connected with ‘This is not a game’, as well as the role they played in this context.

The relevance of citizen e-participation is studied via analysis of three fundamental elements of the Twitter communication process: participation and interaction patterns, the topics and emotions expressed and the relationship between these three variables and the evolution of the pandemic (Fig. 1). Thus, we should be able to learn if the Twitter campaign has spurred debate and interaction between governments and citizens and if there is any relationship between the pandemic’s evolution and Twitter participation and between the pandemic’s evolution and the topics and emotions expressed.

Research has been carried out on how Greek immigrants express and share their emotions on Twitter [16] and how interactions on Twitter influence mental health. It found contradictory results. Improvement has been observed [17], due to the role played by informal emotional support networks [18], as well as their influence on suicidal behaviours [18,19].

The idea that digitalisation and technological developments facilitate tackling socio-economic and political challenges is accepted [20]. In addition, it can be seen that, in the ‘War on COVID-19’ [21,22], the coordination of efforts between public and private administrations, and with citizens, has been imposed. Furthermore, governments’ use of cyberspace and social networks [23] has led to the creation of new connections, interactive channels and participatory communication between the political agenda and citizens [24]. Thus, new patterns of interaction between government, citizens and technology have emerged [25].

In the realm of public health, networks have furnished a new means of communication among practitioners, institutions and citizens, but also a potential means of improving health, since networks favour collaboration and interaction by people who have different profiles and characteristics [26]. Many researchers have focused on Twitter use and the detection of infectious diseases, while others have looked at Twitter users’ perceptions [27–29]. In fact, Twitter has played a leading role in spreading information regarding natural disasters [30]; it has even been observed that the level of communication during the current COVID-19 pandemic [1].

In the context of COVID-19, the Spanish Ministry of Health launched four campaigns, exclusively on the Internet, in order to fight the spread of the pandemic. In March 2020, #EsteVirusLoParamamosUnidos (#WeStopThisVirusTogether) sought to unite the country in this fight. In May a message, focused on overcoming the virus, was shared by #SalimosMasFuertes (#WeComeOutStronger). Later, in September, the #EstoNoEsUnJuego (#ThisIsNotAGame) campaign was launched followed, in December, by #ElMejorRegaloEsCuidarnos (#TheBestPresentIsToTakeCareOfOurselves). These last two campaigns were aimed at reinforcing security measures. The great importance given to the security measures for the socio-economic maintenance of the nation, made it necessary to ascertain how citizens were reacting to the messages sent by the state health administration. Measures undertaken to protect public health are known to have had a negative effect on some issues, for example, mental health [13].

This research explores the relevance of citizen e-participation during an emergency situation through the government’s #ThisIsNotAGame social and health campaign on the Twitter social network. It is hoped this research can contribute to and serve as a reference for other e-participation actions and proposals in crisis situations. In doing so, it sheds light on the interactions which emerged between digital citizens and open government and the involvement and role of citizens during the pandemic. This has been done, unlike previous studies, within the specific context of public health, which gives it an element of special interest. In addition, it has allowed us to monitor the evolution of emotions during five key months of the pandemic (from the second wave to the third). It also analyses the topics and concerns of those citizens connected with ‘This is not a game’, as well as the role they played in this context.

The relevance of citizen e-participation is studied via analysis of three fundamental elements of the Twitter communication process: participation and interaction patterns, the topics and emotions expressed and the relationship between these three variables and the evolution of the pandemic (Fig. 1). Thus, we should be able to learn if the Twitter campaign has spurred debate and interaction between governments and citizens and if there is any relationship between the pandemic’s evolution and Twitter participation and between the pandemic’s evolution and the topics and emotions expressed.

Research has been carried out on how Greek immigrants express and share their emotions on Twitter [16] and how interactions on Twitter influence mental health. It found contradictory results. Improvement has been observed [17], due to the role played by informal emotional support networks [18], as well as their influence on suicidal behaviours [18,19].

In short, this study seeks to learn the relevance of digital citizens’ e-participation in emergency situations within the particular context of the #EstoNoEsUnJuego social and health campaign, and it explores the following research questions:

Q1. Does the Twitter health campaign spur debate and interaction between government authorities/public institutions and digital citizens, or is it primarily intended as a means of disseminating health safety measures?

Q2. Is there any connection between participation in the campaign and the evolution of the pandemic?

Q3. Is there any connection between the emotions expressed/topics discussed and the evolution of the pandemic?

Fig. 1 shows the research task performed for each question.

2. Literature review

2.1. Digital participation by citizens and governments

E-participation is one of the processes which is recommended in order to enable citizens to influence government services [31]. It concerns citizens assuming rights, as well as obligations and responsibilities, in the digital sphere [32]. It has been observed that digital participation in politics is low on a global level and that, above all, the most privileged individuals engage in it to the greatest extent [33]. However, citizens want to actively participate and be heard when it comes to politics [24]. Furthermore, it has been found that this kind of citizen participation can positively influence an increase in trust in governments [34], reinforcing, in turn, a better response from public institutions [35]. In addition, there has been an increase in the value of citizen participation as a potential to support official policies [36].

Some of the variables which influence the development of e-participation by citizens include the existence of a good reason to engage in it, the belief that the political system is democratic and that the government has a plan to develop its policies based on technology [20]. Other variables include perception of the advantages of e-participation and perception of an open government [37,38]. In addition, it has been observed that ‘the awareness of government policies was indirectly associated with more positive attitudes to social media (…)’ [39]. On the other hand, the main barriers found in respect of the development of e-participation are the lack of digital training and/or technological resources and infrastructure, mistrust in governments and a lack of socio-political awareness or initiative [37,38]. It has been observed that the more citizens trust their government the more they use the digital services provided by it [40].

The COVID-19 pandemic is a good reason to start an e-participation process, because it is a situation that affects everyone and everything, one that can be dealt with only through cooperation between government authorities and citizens.

Network participation by government and health authorities has intensified exponentially during the COVID-19 pandemic. The majority
of the institutions that craft health policy have been found to have Twitter accounts, which they have used to release information about risks and protective measures [41] and to share current news about the crisis almost immediately [42]. As Garcia and Berton [43] say, networks are a great source of health-related information.

Despite the fact that, in the analysis of 28.5 million tweets, only ten tweets a day were sent by health organisations [41], during the pandemic, the Twitter accounts of public health organisations in Spain were a great source of health-related information.

Social networks have proved to be especially important in emergency situations, since information is very scarce at such times, and networks facilitate the collaborative distribution of any information available [49,50]. Social networks are regarded as playing a leading role in emergency situation management [51], and it has been asserted that Twitter has more potential than other networks and media to spread information in emergency situations, because it is capable of sending messages instantaneously and is simple to operate [52]. As Han et al. [13] affirm, Twitter contains huge amounts of citizen data and conversations. Twitter is regarded as a tool that facilitates debate [53], a chat centre [54,55] that can get information out immediately in disaster situations [56]. It has been proved not only that Twitter is highly useful for spreading information about catastrophes and critical situations, but that analysis of such information can help improve how working teams respond, identify citizens’ needs [57,58] and increase public awareness of future dangers [59].

As the pandemic advances, social network information about COVID-19 has increased exponentially [60], showing itself to be an effective means of tracking the disease and preventing outbreaks [59]. At the start of the pandemic, Twitter became the primary source of news [61]; it is a channel that reveals not only citizens’ concerns during COVID-19, but also their awareness [62]. The network can be used to create calm and increase awareness and thus reduce the risk of COVID-19 contagion [63], and it can be used to research citizens’ emotional responses to the pandemic [64,65]. Social networks have acted as a clearing house for information in the fight against COVID-19, and Twitter has stood out as a fundamental tool during this period [66].

2.2. Social network use in crisis situations

It has been observed that networks can be used to strengthen the commitment between citizens and government [46]. Moreover, there is a gradually increasing consensus that social networks are a powerful source of information in emergency situations [inter alia, 47, 48].

Social networks have proved to be especially important in emergency situations, since information is very scarce at such times, and networks facilitate the collaborative distribution of any information available [49,50]. Social networks are regarded as playing a leading role in emergency situation management [51], and it has been asserted that Twitter has more potential than other networks and media to spread information in emergency situations, because it is capable of sending messages instantaneously and is simple to operate [52]. As Han et al. [13] affirm, Twitter contains huge amounts of citizen data and conversations. Twitter is regarded as a tool that facilitates debate [53], a chat centre [54,55] that can get information out immediately in disaster situations [56]. It has been proved not only that Twitter is highly useful for spreading information about catastrophes and critical situations, but that analysis of such information can help improve how working teams respond, identify citizens’ needs [57,58] and increase public awareness of future dangers [59].

As the pandemic advances, social network information about COVID-19 has increased exponentially [60], showing itself to be an effective means of tracking the disease and preventing outbreaks [59]. At the start of the pandemic, Twitter became the primary source of news [61]; it is a channel that reveals not only citizens’ concerns during COVID-19, but also their awareness [62]. The network can be used to create calm and increase awareness and thus reduce the risk of COVID-19 contagion [63], and it can be used to research citizens’ emotional responses to the pandemic [64,65]. Social networks have acted as a clearing house for information in the fight against COVID-19, and Twitter has stood out as a fundamental tool during this period [66].

2.3. Twitter and emotion expression in crisis situations

It is generally held that one of the main problems with the Twitter network is a lack of civility on the part of citizens. This has been demonstrated by tracking tweets containing words like ‘whore’ and «slut » over a three-week period. Over 200,000 tweets were found to be aggressive and included these [67]. However, different studies on the sentiments reflected in tweets show a tendency to develop positive conversations, and find a low frequency of hostile messages, little confrontation and registering few conversations [11]. Even when it comes to conversations regarding collective action, there is no confrontation or criticism in the tweets. These issues are simply debated and centred on general questions regarding the protest [68]. Those studies focused on the analysis of emotions on Twitter, particularly regarding citizen mobilisations, highlight indignation and empowerment as the predominant feelings [69].

A great many studies have focused on Twitter as a platform for learning about the evolution of emotions in crisis situations. The study run during the 2016 Louisiana flood showed that only a third of Facebook users made negative posts and two thirds of users posted positive message of reinforcement [47]. Furthermore, the study conducted during and after the Tianjin explosion and Typhoon Nepartak showed that both positive and negative feelings increased among Weibo users when disaster struck, returning afterward to normal stable levels [47]. Both cases trace out a cyclical evolution of emotions, where positive feeling (expressions of encouragement, support for first responders or religious support) outweighs negative feeling (pain, sadness, indignation, panic) during the disaster [47]. In the Tianjin explosion, the highest emotional peak was registered at the start of the disaster, and emotions gradually subsided from there. Avvenuti [70] monitored Twitter activity in earthquakes, concluding that the text contained predominantly offensive words and slang, because the reporting users were generally frightened by the situation.

The literature review shows the importance of strengthening social network communication processes between citizens and government and networks’ potential as a means of learning what feelings citizens express in crisis situations.

The research presented in this article is based on the idea that, while the COVID health emergency situation lasts, the government authorities and institutions responsible for managing the crisis need to have a fast, efficient way to communicate with citizens [71] and to learn how in this context Twitter users can spread information and facilitate citizen awareness [70]. It is therefore extremely important to learn about Twitter’s potential as a means of communication and to focus research on digital citizenship to disseminate information and facilitate citizen awareness. It is also very important to learn what emotion lies behind each message and thus facilitate emergency management and decision making for crisis administrators [71].

The timeliness of this article resides in the fact that it studies e-participation at a time of world crisis, analysing the kind of interaction that is generated, the kinds of topics that are discussed and the kinds of emotions that are conveyed during a health emergency.

3. Development of research hypotheses

3.1. Participation and interaction patterns

This research looks into the interaction patterns generated over the Twitter social network between citizens and government and the amount of participation by these two collectives. The study of the role citizens play is based on the classification by Kahn and Kellner [71] and Reuter et al. [12]. The research into the different systems of communication in Twitter is based on the proposal by Veltri [11].

According to Kahn and Kellner [72] three types of citizens can be differentiated: 1) responsible citizens (those who are responsible and respect laws); 2) participatory citizens (those who understand the government and organise themselves and participate actively) and 3) citizens oriented towards justice (those who seek changes, are critical of social, political social and economic issues, and defend justice). Krutka and Carpenter [73] explain, and give an example of, the difference between these types of citizens: a responsible citizen contributes by collaborating with a food campaign, the participative citizen organises the campaign, and the justice-oriented citizen analyses where the problem lies so there are no people who go hungry.

If we take into account the medium in which citizen participation is analysed, the categorisation of Twitter users in crisis situations created by Reuter et al. [12] can be a good reference. They have established the following roles:

1. Helper: Characterised by the content of their posts, which are focused on the dissemination of useful information and emotional support such as: emergency notices, information on donating clothes or concrete actions for rescue, advice and emotional support.
2. **Reporter:** The individual who generates synthetic and innovative information, mainly news, and can function as an organised (non-emerging) news channel between those affected and the official crisis management.

3. **Retweeter:** The individual who focuses on retweeting information tweeted by other users. This user disseminates important information (emergency notices, news, videos). They have lots of tweets and retweets from others, but do not tweet themselves. The retweeter shares existing information and is characterised by a large number of retweets.

4. **Repeater:** The person whose objective is to convey specific information to many users. They only have one or very few specific messages, which they repeat continuously (requests for help, opinions, specific information) in order to spread the message to as many Twitter users as possible.

5. **Readers:** Data on these individuals are not computed. The readers are those who visit the platform to find information without being registered on Twitter. They consume information passively.

On the other hand, Veltri [11] classifies the different communication systems on Twitter as ‘singleton’, ‘retweet’ and ‘messages with @’. In its relationship with the world of politics, the following user profiles are found on Twitter: 1) messages using @: Senders, Receivers and Sender-receivers; and, 2) for retweeting: Retweeters, Elites and Networkers. Retweets are considered fundamental in the type of conversations generated on Twitter. This is because it is a system which enables recommendations of an original post or information [12].

On the basis of these interaction patterns, this research seeks to ascertain if the Twitter health campaign encourages debate and interaction between governments or public institutions and digital citizens or whether, on the contrary, the campaign is aimed at simply disseminating basic information about health safety measures without exploiting the full potential of the Twitter network.

Previous studies have demonstrated that Twitter users usually respond to messages in disaster situations with retweets and favourites, and it has been observed that these two types of responses can improve the process of interaction between organisations and the public in general [36,72]. However, it has also been observed that, while governments and organisations use Twitter as a way to release information in emergency situations, they fail to take advantage of all the platform’s possibilities for fostering immediate, interactive communication, like retweets and interaction through the use of ‘likes’ [30,72]. In fact, the study on Twitter participation during the 2019 Ridgecrest earthquake in southern California [30] shows that government authorities did not involve their audience in their messages; they used messages containing basic information (earthquake location and magnitude), in contrast with media that used news of current events and videos and had a greater impact on the social network in terms of retweets and favourites.

Within this framework, it is necessary to analyse how citizens and governments have responded via networks. It is interesting to do so in specific contexts and related to concrete actions, for example through the public health campaigns initiated by governments. Based on the aforementioned points, and taking into account three interacting elements (government, public health and networks), we propose to test the hypothesis and answer the following research question:

**H1.** The Twitter health campaign promotes the dissemination of health safety measures but not debate or interaction between governments/public institutions and digital citizens.

### 3.2. Evolution of Twitter participation and the pandemic

According to the National Epidemiological Surveillance Network (RENAVE is its acronym in Spanish) [73] there were several notable peaks in the number of daily cases, which indicate the maximum level reached in each wave. On 20th March 2020, it was 10,659 daily cases; on 18th September 2020, it was 14,220 cases; on 27th October 2020, it was 23,130 daily cases and on 15th January 2021, it was 39,251 cases. Taking into account these data, the chronological spread of the pandemic can be structured, so far, in three waves: the first was from March 2020 to June 2020, the second from June to December 2020 and the third from January 2021 to the present.

A variety of studies have analysed Twitter participation in emergency situations in terms of when the Twitter participation takes place, i.e., before, during or after the disaster [71,74,75]. Zheng et al. [76] and Wu et al. [77] studied disaster location through Twitter participation during and in the aftermath of the emergency situation; Hasan et al. [78], focused on after the disaster; and Laylavi et al. [79] looked into real-time disaster detection.

The study conducted during the 2016 Louisiana flood showed that Facebook user interactions increased exponentially during the first two weeks (the time frame when 47% of the interactions were registered), and later declined over time [47]. A strong relationship between the proximity and severity of Hurricane Sandy and social network activity was found; it was observed that perceived or real imminence of disaster and the effect of the hurricane were reflected in the evolution of messages and the intensity of discourse [80].

In connection with the pandemic, Pirnau [59] asserts that few online posts with the word ‘COVID-19’ were registered in December 2019 and that starting on March 1, 2020 the number of studies based on the flow of network messages increased; these were contrasted with the evolutionary tendencies of the pandemic for a real-time analysis. An analysis of 153,303 Weibo messages during the pandemic found a significant positive correlation between participation and the number of cases related with COVID-19 [64].

This article analyses whether the pandemic’s evolution influenced citizen participation in the campaign during the period of study. It was expected that, due to the importance of the topics the campaign addressed, as the cases of infection rose, Twitter participation in connection with the campaign would rise also. Therefore, the following hypothesis was put to the test:

**H2.** There is a connection between the evolution of campaign participation and the evolution of the pandemic

#### 3.3. Emotions, topics of debate and evolution of the pandemic

Semantic analysis of Twitter data reveals what information needs arise during disasters and threats, be they potential or real, and the physical effects that ensue [51]. During the pandemic, the public agenda on Twitter has dealt with a diversity of topics which show little similarity. This highlights the fact that citizens tend to share personal experiences and emotions [13]. Throughout the pandemic Twitter users have tended to share information having to do with health, which has enabled citizens to satisfy a cognitive need (search for and exchange of information) and social needs through discussion of topics having to do with community engagement and social interaction [51]. Other studies indicate that the topics featured on Twitter this year have been related to issues like flight availability, financial problems, data on deaths, the spread of COVID-19 and contagion, in addition to the medical aspects of the disease [12]. This contrasts with topics discussed in English and Portuguese during COVID-19 where topics related to strictly health issues (treatments, case reports, monitoring of the pandemic) were discussed, as well as economic, political, educational and sport-related matters and those associated with charity or social events online [43].

Twitter offers valuable information about peoples’ emotional responses to COVID-19 (inter alia, [51-54]). From January to April 2020, four basic emotions were detected in the conversations on Twitter: fear, anger, sadness and joy [83]. From January to July 2020, the predominant emotion was anger [85], and Garcia y Berton [43] found that, from April to August 2020, most of the messages expressed a negative emotion related to topics regarding the spread of the pandemic in terms
of statistics. The analysis of the tweets sent, in Europe (Madrid Time Zone) from May to December 2020, shows that the dominant emotion is joy (52.34%) followed by sadness (15.73%) [86].

Analysis of over 20 million tweets worldwide at the start of the pandemic showed a very fast emotional evolution, where the population’s emotional state varied from fear (lack of diagnostic tests and medical supplies) to anger (lockdown), and where the emotions of sadness (losses of friends and relatives) and happiness (thankfulness and good health) appeared [83]. Another study focusing on India showed that the steady rise in COVID-19 cases was related with a negative emotion [84].

In Spain it has been observed that the general feelings towards the situation during the second wave of the pandemic were ‘tiredness, anger and apathy’. This turned into a feeling of ‘pandemic fatigue’ followed by indifference during the third wave [87]. WHO highlights this when it states that, after making a great effort to contain COVID-19, it is normal to feel apathetic and demotivated. This directly influences how we deal with the outbreak that follows. Analysis of three million tweets posted in the Spanish language (from Chile, Mexico, Peru and Spain) between March 2020 and March 2021 showed that the pandemic outbreak had affected the emotions expressed on Twitter and that in Spain that emotion had evolved towards a highly negative feeling [81].

According to data from COSMO-SPAIN [87], shown in Fig. 2, the trends in the emotional and perceptual evolution of COVID-19 in Spain (percentages) indicate that, in the months from September to November, mistrust in institutions and in decisions made in Spain increased, as well as depressive feelings. From September 2020 to January 2021, there were negative feelings related to concern about the virus, feelings of depression and perceptions relating to the risk of further contagion. There was also an increase in confidence in institutions and in the adequacy of decisions taken in Spain. All negative feelings decreased from January 2021 to March 2021:

An analysis of pandemic fatigue is shown in Fig. 3. This has been defined by the National Health System as the ‘reaction of exhaustion in the face of a sustained and unresolved adversity’ [89]. It can be seen that, from November 2020 to January 2021, there was an increase in all negative feelings (‘Tired of the debates about COVID-19’; ‘Tired of hearing about COVID-19’; ‘Feelings of tension about the idea of having to follow all the recommendations’ and, ‘I am losing the desire to fight against COVID-19’).

This research seeks to discover whether there is a connection among emotions, topics discussed and pandemic evolution and to ascertain if throughout the pandemic citizens on Twitter have tended to share personal topics or mostly topics related with the COVID-19 campaign, whether they have tended to express positive, negative or neutral emotions and whether these emotions are related with the topics discussed and the evolution of infections.

Based on the aforementioned arguments, and taking into account the three interacting elements (emotions, topics and pandemic), it is proposed to test the following hypothesis:

H3. There is a connection between emotions, the topics discussed and the pandemic’s evolution.

4. Research methodology

4.1. Sampling method

The #ThisIsNotAGame campaign disseminated, from 8th to 29th September 2020, the ‘3 M’s rule: ‘always wear a mascarilla (face mask)’, ‘wash your manos (hands) frequently’ and ‘mantener (keep) a safe distance with other people’. Its goal was to make society, especially young people, aware of the importance of these measures [80]. On the other hand, in the #TheBestPresentIsToTakeCareOfOurselves campaign the focus was on air circulation (outdoor activities and open windows) and ‘staying home if you have symptoms’; that is, ‘if I have been diagnosed with COVID-19; I am waiting for diagnostic results’ or ‘I have been in contact with a case’.

This research is focused on an analysis of the #ThisIsNotAGame campaign because, on the one hand, it emphasizes the reinforcement of safety measures related to COVID-19 and social life, particularly with regard to young people. Through the period of our research, government measures were focused on raising awareness of citizen responsibility regarding the spread of the pandemic. In this respect, it has been of interest to understand how citizens experienced this approach through the selected campaign. On the other hand, our research has embraced a specific period of time which was of special interest at the time of the investigation. This period ran from September 2020 to February 2021 when the second and third waves of COVID-19 occurred. It is interesting to note the discourse and emotions expressed by citizens relating to the spread of COVID-19 at such a significant time in Spain, and through an official campaign, which has allowed us to obtain a wider image of this situation by connecting Government and digital citizenship.

In short, the research population relates to the four campaigns previously cited and a total of 68,631 tweets sent. In our first selection we extracted 21,200 tweets which included the campaign hashtag #EstoNoEsUnJuego (#ThisIsNotAGame). They were posted from 15th September 2020 to 4th February 2021. Of these tweets, 1,624 were unrelated to the campaign, so a sample of 19,576 tweets remained. Finally, 9133 users participated in the sending and dissemination of these
tweets.

From our original sample, duplicate messages were grouped together in order to facilitate discourse analysis. In this way, 2081 non-duplicate messages were obtained, sent by 952 tweeters. In addition, the profile of these tweeters was analysed.

In relation to the analysed tweets, a sampling error of 1% was found, based on a simple random sampling in the most disadvantaged case of the sample (p = q = 0.5) and at a confidence level of 99%. Regarding the non-probabilistic accidental selection of tweeters, a sampling error of 3% (p = q = 0.5) was obtained at a confidence level of 95%.

4.2. Design

This research is based on a mixed triangulation design, a theoretical model, a quantitative part (descriptive analysis) and a qualitative part (discourse analysis, following the principles of grounded theory).

The quantitative study was developed in line with a descriptive analysis which allowed us to extract the frequencies (and percentages) and basic data of participation in the campaign, as well as to contrast the behaviours of different groups in the debate.

The qualitative analysis is based on a discourse analysis which allows for an in-depth understanding of the subject matter, in addition to the emotions expressed and the involvement of the participants in the debate.

4.3. Data collection

Following the outline used by other researchers (inter alia, 89, 90), the procedure was as follows: 1) selection of tweets and related data bearing the #EstoNoEsUnJuego hashtag, 2) initial analysis of the initial topics discussed, 3) data preparation and 4) in-depth data analysis.

The Google TAGS spreadsheet v. 6.1.7 application was used to extract the tweets [92]. The Excel TAG sheet was downloaded containing all the data, i.e.: download start date, download end date, top tweeters, number of tweets sent by top tweeters, number of links, number of retweets, number of singletons sent and number of responses with @.

The preprocessing stage provided the definitive sample, the user information (number of retweets, messages using '@user', number of messages with links). A base of potential topics was also obtained through keywords. A first group of 21,200 tweets was selected carrying the campaign hashtag #EstoNoEsUnJuego, ranging from September 15, 2020 to February 4, 2021. This included 1624 messages unrelated with the campaign, leaving a sample of 19,576 tweets. The duplicated messages from the original sample were grouped together.

For the topic and sentiment analysis, the data were processed by hand. No automatic data procedures were used.

Text coding was done according to Gibbs [93] and Flick [94], based on the qualitative text analysis that considers that to code is ‘to index or categorise the text to establish a framework of thematic ideas concerning it’ [93]. Data processing through coding involves identifying and recording one or more phrases from the text that describe the same idea and, after having identified these phrases or ideas, linking them together with a code (name) [93]. In all the tweets, tweets that exemplify the same contents are identified under the same name.

The categorisation and coding procedure was done with the support of Excel spreadsheets. Each tweet was read and coded on the Excel spreadsheet according to its topic and the emotion it expressed. In tweets accompanied by a URL, the tweet was accessed to ascertain the nature of the supplementary content, generally a video or a news item.

At this point the tweets were reread. Following the indications given by Gibbs [93], the initial template of topic categories drawn from the supplementary content is a ‘code’ of one or more phrases from the text that describe the same idea and, after having identified these phrases or ideas, linking them together with a code (name) [93]. In all the tweets, tweets that exemplify the same contents are identified under the same name.

The summary of the data is given in Table 1.

| Word                        | Count | Percent |
|-----------------------------|-------|---------|
| thisisnotagame              | 20,867| 2.93%   |
| ✔                           | 10,974| 1.54%   |
| covid19                     | 9311  | 1.31%   |
| mask                        | 9058  | 1.27%   |
| don’tthrowitallaway         | 7772  | 1.09%   |
| hand                        | 6910  | 0.97%   |
| person                      | 4753  | 0.67%   |
| 🍼                         | 3845  | 0.54%   |
| distancing                  | 3648  | 0.51%   |
| leave alone                 | 3315  | 0.47%   |
| precaution                  | 3293  | 0.46%   |
| hygiene                     | 3110  | 0.44%   |
| distance                    | 3039  | 0.43%   |
| get-together                 | 3030  | 0.43%   |
| span                        | 2942  | 0.41%   |
| extra-careful               | 2721  | 0.38%   |
| regular                     | 2640  | 0.37%   |
| health worker               | 2508  | 0.35%   |
| number                      | 2370  | 0.33%   |
| today                       | 2300  | 0.32%   |
| information                 | 2155  | 0.30%   |
| data                        | 2114  | 0.30%   |
| update                      | 1828  | 0.26%   |
| initial                     | 1828  | 0.26%   |
| well                        | 1812  | 0.25%   |
| recommendation              | 1791  | 0.25%   |
| can                         | 1764  | 0.25%   |
| deceased                    | 1714  | 0.24%   |
| confirmed                   | 1681  | 0.24%   |
| measured                    | 1655  | 0.23%   |
| takingcareofyourselftakingcareofus | 1627 | 0.23%   |
| reduce                      | 1618  | 0.23%   |
| space                       | 1609  | 0.23%   |
| our                         | 1497  | 0.21%   |
| protect                     | 1448  | 0.20%   |
| have                        | 1407  | 0.20%   |
| guard                       | 1404  | 0.20%   |
| lower                       | 1403  | 0.20%   |
| frequency                   | 1383  | 0.19%   |
| avoid                       | 1334  | 0.19%   |
| week                        | 1310  | 0.18%   |
| symptom                     | 1259  | 0.18%   |
| virus                       | 1246  | 0.18%   |

4.4. Data analysis methodology

Data analysis employed the SPSS Statistics version 24 package (for statistical analysis) and the Atlas TI HM software (for discourse analysis).

For the quantitative analysis, first the TAGS application’s main data on the number of retweets, messages using ‘@user’ and number of messages with links were extracted, and the percentages were found. Next, the Spanish National Health System’s general population data from November 2020 to January 2021 were consulted for the correlation analysis comparing pandemic evolution (contagion numbers) and campaign participation (number of tweets and retweets).

The reference for content analysis was the perspective of Chae [90], where tweet content analysis focuses on three variables: word frequency, hashtag importance and sentiment analysis. The hashtag and word frequency analyses are the foundation that helps identify and classify topics. The sentiment analysis provides subjective information.

Content analysis began with a study of keywords, after which general and specific categories were identified. The emotions expressed were analysed as well.

Therefore, first an automatic analysis of the main words used in tweets was conducted with the support of Atlas TI (32480). This first dip into analysis furnished a general reference framework of the topics discussed. Table 1 contains the keywords with a frequency of over 1240 (a total of 32,480).

For the topic and sentiment analysis, the data were processed by hand. No automatic data procedures were used.

The topics were grouped into three categories: word frequency, hashtag importance and sentiment analysis.
keyword list was modified to reflect the new content detected. Therefore, new codes were generated, following an analytical axial coding procedure that, as Schettini and Cortazzo [94] affirm, enables the data to be organised into categories and subcategories that afford a better understanding of the data.

Six general categories were extracted from the discussion topics (Measures, Information, Comment, Campaign, Criticism and Rest of Categories), as were several specific categories within the general categories (Table 2). The results of the categorisation of the subject are illustrated in a concept map.

The sentiment analysis was run at two levels. Each tweet was analysed fully and classified as positive, negative or neutral [90, 91]. Next, each tweet was subjected to in-depth sub-categorisation indicating the emotion it expresses (Aggression, Support, Criticism, Criticism and Anger, Anger, Irony, Objectivity, Optimism/Positivity and Worry and Sadness) (Table 3); this classification is based on Venigalla et al. [84] (anger, disgust, happiness, surprise, fear, sadness and neutral emotion).

As Chae [90] suggests, these emotions were associated with the topic discussed, so as to identify different groups of tweets by the topic they address and the emotion they express. The association process was conducted through descriptive analysis based on a cross table (emotions and topics).

In addition, an analysis was carried out on the responses given to the messages sent during the five peaks of activity which correspond to the original messages of the campaign. These conversational threads were not automatically downloaded because they did not contain #EstaNoEsUnJuego. However, they were manually downloaded. They were messages shared in the moments of greatest activity.

In the debate relating to the #ThisIsNotAGame campaign, an analysis of each tweet was carried out, taking into account participation and interaction patterns, topics and discourse developed on Twitter, in addition to the relationship between the evolution of emotions, topics and the pandemic. These three themes constitute the units of analysis from which the categories and subcategories are inferred.

The operation to check the validity and accuracy of the research from the standpoint of error elimination and data set richness was based on Gibbs [93]. A compound design was used, combining triangulation, a theoretical model, a quantitative component (descriptive analysis) and a qualitative component (content analysis); this furnishes an accurate, valid view of reality. In addition, a constant comparison process was used to avoid errors in content interpretation and coding. This iterative circular process, as outlined by Gibbs [93], was based on comparisons to check the uniformity and accuracy of coding, primarily at the start of the process. Both researchers performed the process, which meant codes were corrected and new codes were generated during the process.

5. Results
5.1. Participation and interaction patterns

The campaign began on 8th September 2020. Its main message was shared in a video which featured young people in the street, meeting, drinking, talking without face masks and not respecting a safe distance (Fig. 4). These images are interspersed with footage of hospitalisations, police officers and coffins, along with the audio, or written, message: ‘Bada bing, bada boom … Out. #ThisIsNotAGame. If we do not follow the health recommendations, we put our lives, and the lives of others, at risk. Help us to keep them’. This message attracted more than 7907 likes, was cited 728 times and prompted 4525 retweets.

From the participation process over the five months analysed, 21,200 tweets were extracted, in which 20,253 links and 18,116 retweets (RT) were shared, and 220 responses to the messages were found. Once the messages not directly related to the campaign were eliminated, it was found that, of the 19,576 tweets, 76.69% were retweets (14,964 RT). In addition, 22,582 @user were found. This implies that, in the majority of the messages (whether original or retweeted), specific users were quoted.

The official campaign account, SaludPublicEs, sent 189 messages, all related with this campaign and the three basic safety measures. This was 8.8% of all messages sent and placed the official account in fourth place in terms of participation. The three Twitter profiles registering the highest participation belonged to citizens. The official accounts of the central government and the governments of the various Spanish regions together accounted for 13.6% of the messages sent.

Citizens were responsible for sending 64.8% of the messages. In second place were institutions like companies, museums, youth associations, athletic associations and religious associations, with 14.6%. Last in line with 7% were other institutions: educational institutions (e.g., universities, schools, parents’ associations) (4.3%), health institutions

| Table 2 | General and specific categories yielded by discourse analysis in terms of the topics discussed. |
|----------------|---------------------------------------------------------------------------------------------------------------------------------|
| **Measures (M):** Dissemination of security measures and/or instructions on COVID-19 |
| Prevention (PM): Basic measures, and others, such as lockdown and perimeter closure. |
| Coercive (CM): Sanctions, controls … sent by the security forces. |
| From Case Management (MM): What to do if you have had contact with a person who is positive or if you have symptoms. |
| Information (I): Dissemination of objective information |
| Data (DI): Deaths, infections and pandemic evolution. |
| News (NI). |
| Education (EI): Information on education and COVID-19. |
| General Information (GI): Where to find advice, websites with COVID-19 measures, etc. |
| Comment or personal reflection (CM) related to the topic |
| Thoughtful comment (TCM). |
| General comment (CM). |
| Comments from other users (OCM). |
| Reflective comment of a political nature (PCM). |
| Campaign (CA): Explicitly referring to the campaign |
| Support for or dissemination of the campaign (SCA). |
| Criticism of the campaign (CCA). |
| Criticism (C): Critical messages to: |
| Governments (local or national) (GVC). |
| Citizens (in general or young people) (CIC). |
| Rest of categories |
| Awareness (AWM): Messages focused on raising awareness of the situation, without spreading the campaign. |
| Advertising (Ad) from the field of educational (AE) related to COVID-19 (offer of places in centres adapted to COVID-19 measures). |
| Complaints (C) from the educational field (CE) related to the topic. |

| Table 3 | Descriptive analysis of the general and specific categories of topics discussed on Twitter. |
|----------------|---------------------------------------------------------------------------------------------------------------------------------|
| **Measures** | **Information** | **Personal comment** | **Campaign** | **Awareness** | **Criticism** | **Advertising** | **Complaints** |
| Measures | PM | 9444 | 48.2 |
| MM | 265 | 1.4 |
| CM | 70 | 0.4 |
| DI | 3085 | 15.7 |
| NI | 656 | 3.3 |
| GI | 611 | 3.1 |
| EI | 471 | 2.4 |
| SCA | 1762 | 9 |
| CCA | 44 | 0.2 |
| AWM | 645 | 3.3 |
| GVC | 442 | 2.3 |
| CIC | 109 | 0.6 |
| AE | 74 | 0.4 |
| RE | 63 | 0.3 |
| **Total** | 19,609 | 100 |
5.2. Evolution of participation and the pandemic

The participation evolution process throughout the five-month period analysed indicates that the month of October was when there was the most participation (35.6%), followed by September (27.2%). Subsequently, participation decreased as follows: 23% in November, 5.6% in December, 8.5% in January and 0.1% in February (only the first days were recorded).

The analysis of participation by days shows five main peaks, where 20% of participation accumulated: 6% of the messages were sent on October 13, 2020; 2.9% on 15th September; 2.8% on 9th October; 2.8% on 16th September; 2.5% on 19th September; 2.5% on 20th September; and 2.3% on 6th October.

The 13th October 2020, peak was due to the intervention of the Minister of Health at a press conference and via an important radio station, Cadena Ser. The minister also sent a message from his personal Twitter account: ‘Difficult weeks are ahead. In Europe the cases continue to increase and in Spain the situation is unstable and fragile. We cannot let our guard down. We have to be alert as we are living with a very dangerous virus with a high level of contagion’. This message was retweeted 412 times, and received 973 likes. In addition, data on newly diagnosed patients, ICU admissions and deaths, as well as information on health safety measures, were retweeted.

The second peak occurred on 15th September 2020. This was the first day of downloading the tweets. Most of the dissemination of the campaign and the security measures took place then, as well as messages related to information on incidence: 603,167 cases confirmed by PCR and 30,004 deaths.

The peaks observed on 16th, 19th and 20th September were due to the dissemination of the campaign and the video which included the campaign’s main message (described above). The same occurred with the increase in participation on 9th October, which was due to the relaunch of the #ThisIsNotAGame campaign with complementary messages. Spanish Public Health resent the message with a warning video, along with a message aimed at increasing awareness of the need to respect the measures. In addition, the message issued by the Ministry of Health was retweeted with the dissemination of advice on how individuals could protect themselves. It highlighted ten specific measures (cleaning regularly, air circulation, measures to be taken when coughing or if we have COVID-19 symptoms, etc.).

These tweets were related to the two different socio-sanitary periods, corresponding to the second wave of COVID-19 in September, and the beginning of the third wave in December. The campaign was launched in September, and the Spanish government, emphasised the three basic measures (3 M) with press releases and conferences. Later, in December with the start of the Christmas period, the Ministry of Health added three more measures (6 M).

Lastly, the comparison of the pattern of evolution between the pandemic and campaign participation demonstrates no relationship between the two variables. In fact, inverse response trends are observed (Fig. 5). The months of September and October were when the highest level of participation in the campaign was seen to take place, while the lowest level of participation was in December and January. In contrast, the data on spread of the pandemic (number of infections) in Spain goes from lower levels in September and October to higher levels in December and January. Both trends can be seen to intersect at the end of November, where low data on infections and participation were obtained. Both trends remained low from the end of November to the beginning of December, but, as of 8th December, infections increased progressively and the participation also decreased. In addition, analysis by Spearman’s correlation proves that there is no correlation between the two variables (0.016).
5.3. Relationship between topics, emotions and pandemic

5.3.1. Topics

Six topics were classified, and the content discussed in each tweet over a five-month period was analysed, providing an assessment of the evolution of topics from September to February.

Table 2 contains the general and specific categories yielded by discourse analysis in terms of the topics discussed.

From a quantitative point of view, 49.9% of the messages were aimed at disseminating information on health and security measures, 24.6% shared information (news related to data, education, hoaxes and general information), 9.5% of the posts were comments (personal, reflective, political or from third parties), and the remaining messages were intended to raise awareness, make criticisms or advertising (Fig. 6).

In Table 3, the distribution of general and specific categories (in percentages):

The analysis of the specific categories shows that the most widespread measures were preventive measures (48.2%), more than coercive and/or case management measures in the case of infections. This shows that 15.7% refers to the dissemination of data, and the rest includes data on education and general information. Most of the tweets were exclusively comments, 6.5 were thoughtful comments and the rest (3%) were general in nature, comments from other users and reflective comments of a political nature. Messages of support and dissemination of the campaign constitute 9%, and comments critical of the campaign, 0.2%.

Finally, the topics covered to a lesser extent were Awareness, that is messages focused on raising awareness of the situation. Critical messages, which were directed mainly at the government and, to a lesser extent, at citizens. The category ‘Advertising’ was related mainly to the field of Education, and Claims were also focused on the same field.

From a qualitative point of view, the main thematic nodes and the generated structures or topical relationships are shown in the conceptual map (Fig. 7), which coincides with the data shown in Table 3. From a global analysis of the concept map, and taking into account the space occupied by each of the thematic nodes and the generated structures, we see that the thematic node ‘Campaign’, together with ‘Measures’, occupies a central position in the map. In addition, there is a direct relationship between ‘Awareness’ and ‘Measures’. At the extreme end, it is associated with ‘Criticism’ and ‘Commentary’. ‘Information’ is directly related to ‘Measures’ and ‘Campaign’. Finally, ‘Advertising’ has lesser weight.

Fig. 6. General categories of the tweets yielded by Twitter discourse analysis in terms of the topics discussed.
However, there were also criticisms targeted at the campaign itself. Criticism was directed mainly at governments (central or the autonomous communities) in various subject areas (social affairs, political affairs, economics) and at citizens, focusing on risky behaviour and bad citizenship on the part of some young people, who were the campaign’s main target.

The category ‘Awareness’ is linked to the topics of life, health, danger and responsibility. Awareness messages were connected with the measures, since they focused on, for example, taking care of oneself, protecting oneself, not putting the weakest at risk and on civic responsibility.

Those tweets based exclusively on personal comments (reflective, political or from third parties) were associated with criticism, the campaign, measures and awareness.

Finally, the ‘Advertising’ category is a marginal thematic node. It does not occupy the centre of the conceptual map and is mainly associated with information issued by companies or educational associations.

5.3.2. Emotions and topics

Sentiment analysis showed that citizens expressed these emotions: Aggression (AG); Support (S); Criticism (C); Criticism and anger (CA); Anger (A); Irony (I); Objectivity (OB); Optimism/Positivity (O) and Worry and sadness (W).

The main emotion expressed was neutral (90.2%); 9.3% expressed negative emotion, and 0.4%, positive emotion. The relationship of emotion with topics can be observed in Fig. 8.

The contrast between topics and emotions shows that messages tended to be expressed in a neutral way, especially when social health safety measures were disseminated (48%) and, secondly, in relation to the dissemination of information (21%). When acceptance was expressed it was done by disseminating the campaign’s message and sending awareness messages. Aggression was found mainly in critical messages (0.13%). Critical emotion was related to ‘Comment’ and ‘Criticism’ tweets. Those messages where anger and/or criticism, or both, were expressed simultaneously were found in 4.45% and, above all, expressed in critical messages (1.82%) and in those with comments (1.67%). Sadness and/or worry was expressed in messages which shared information (1.59%) and also when a comment was added (1.26%) (Table 4).

5.3.3. Topics, emotions and pandemic

Fig. 9 illustrates the analysis of the distribution of emotions throughout the months of our research compared with the ‘waves’ of the pandemic. Three coincident peaks can be observed. The expression of neutral emotions increased in October, registering 32.93% of cases, the month in which 20.87% of all COVID-19 cases were registered in Spain. Subsequently, a rise in infection was observed in January, with 39.77%. This coincides with a peak in the expression of neutral emotions (Fig. 9).

At the two peaks of contagion we can see that there was an increase in messages that spread information on preventive measures relating to social health safety, the campaign and objective information (news, data, education, etc.). In October, of the total number of messages sent, 32.59% shared information on the campaign, provided objective information (news and data) and disseminated facts about the measures. Subsequently, there was a progressive decrease towards the month of January. Then there was a small increase when 6.83% of the messages about the campaign, information and measures were disseminated. The third peak was registered at this time, and the expression of neutral emotion rose.

Finally, it was found that 77.6% of tweeters did not comment on the message sent or retweeted, while 22.4% made a comment.
22.4% added additional comments to their tweets. This limits the possibility to highlight a process of e-participation, carried out by ‘digital citizens’ [72] categorisation of citizens, we hold that the citizens who participated in the dissemination of information about the campaign were responsible and participatory. However, we cannot conclude that they were oriented towards justice, since only 22.4% added additional comments to their tweets. This limits the possibilities of analysing whether they really seek change, whether they are critical of the social, political and economic fields, and whether they defend justice. Following the classification of Reuter et al. [12], it can be seen that the main role played by some individuals has been that of re-tweeter. These individuals tend to spread important information that the citizens who participated in the dissemination of information than as a space for encouraging debate. In addition, it can be seen that some individuals made 50 comments to the most frequent tweets. However, neither the central government, nor the governments of the autonomous communities, intervened or interacted with these citizens at any time. Furthermore, the low percentage of additional comments can be interpreted as low personal involvement (only 22.4% make any additional comment to tweets).

On the other hand, it has been found that the state administration is responsible for the dissemination of the ‘SaludPublicaEs’ (PublicHealthEs) campaign attracted a high level of participation, being the fourth Twitter account in terms of the frequency of tweets sent. And, the participation of private institutions (companies, museums, youth associations, sports, the Church, etc.) amounted to 14.6%.

Together (citizens, governments and private institutions), they represent 93% of the messages sent. This shows that governments, private institutions and, above all, citizens constitute the three pillars which enable the implementation of measures for the success, and overcoming, of health emergency situations. This is done with the support of social networks.

This analysis of the communication process between citizenship and the Spanish government was carried out by taking into account general participation, as well as citizens’ responses to those tweets with the highest frequency of dissemination. It can be seen that some individuals made 50 comments to the most frequent tweets. However, neither the central government, nor the governments of the autonomous communities, intervened or interacted with these citizens at any time. In addition, the face of aggressive and insulting responses posted by citizens the government never, at any time, responded with counter-arguments nor did it offer criticism or comments. The tone that has been identified in the citizens’ responses to these tweets was not representative of the general behaviour of digital citizens. Indeed, digital citizens have, during the five months, maintained a collaborative and polite style in their communications.

The reflective and reciprocal interaction has a secondary place in this campaign, since there was no true communication between government and citizens. A high number of @users were registered, but they were the result of retweeted messages. In fact, 76.69% of the messages were RTs. Furthermore, the low percentage of additional comments can be interpreted as low personal involvement (only 22.4% make any additional comment to tweets).

Although Spanish governments use Twitter as a means of spreading information in emergency situations, they fail to take advantage of all Twitter’s possibilities to foster communication, such as retweeting and/or interaction through ‘likes’. These results support those found by Ahn et al. [30] and Gurman and Ellenberger [72]. In addition, as was found to have happened in Twitter participation during the 2019 Ridgecrest earthquake [30], government authorities have failed to engage their audience, because their communication has been based on sending out basic information. To sum up, as in previous research [9,41,42], e-participation on Twitter has been based on the exchange and dissemination of information and news on preventive measures, on the spread of the pandemic, and for the dissemination of information about the campaign. The campaign’s main focus was on the sharing of information through links, either by featuring the campaign video or posting complementary links. The high number of URLs (20,253) shared support the concept of the Twitter platform more as a space for sharing information than as a space for encouraging debate. In addition, it can be observed that participation was based mainly on the retweeting of messages (76.69% are RT). This implies that the dissemination, and forwarding, of previously published information formed the basis of the campaign.

As found by previous studies based on analysis of Twitter participation in natural disaster situations [30,72], the communication process was based primarily on retweets.

It has been found that 64.8% of the messages were sent by citizens. This participation was widely distributed, since 71.5% of people participated on Twitter just once.

Based on Kahn and Kellner’s [72] categorisation of citizens, we hold that the citizens who participated in the dissemination of information about the campaign were responsible and participatory. However, we cannot conclude that they were oriented towards justice, since only 22.4% added additional comments to their tweets. This limits the possibilities of analysing whether they really seek change, whether they are critical of the social, political and economic fields, and whether they defend justice. Following the classification of Reuter et al. [12], it can be seen that the main role played by some individuals has been that of re-tweeter. These individuals tend to spread important information (news, data, videos) as they retweet messages received from others. But they do not generate messages themselves. In other words, they tend to share second-hand information and are characterised by the large number of tweets they forward.

It was found that two of the most active profiles during the campaign belonged to citizens. In fact, of the 19,576 tweets, citizens sent 12,696 or 65.1% of the total tweets. The campaign #EstoNoEsUnJuego attracted a high level of participation, being the fourth Twitter account in terms of the frequency of tweets sent. And, the participation of private institutions (companies, museums, youth associations, sports, the Church, etc.) amounted to 14.6%.

Together (citizens, governments and private institutions), they represent 93% of the messages sent. This shows that governments, private institutions and, above all, citizens constitute the three pillars which enable the implementation of measures for the success, and overcoming, of health emergency situations. This is done with the support of social networks.

This analysis of the communication process between citizenship and the Spanish government was carried out by taking into account general participation, as well as citizens’ responses to those tweets with the highest frequency of dissemination. It can be seen that some individuals made 50 comments to the most frequent tweets. However, neither the central government, nor the governments of the autonomous communities, intervened or interacted with these citizens at any time. Furthermore, the low percentage of additional comments can be interpreted as low personal involvement (only 22.4% make any additional comment to tweets).

Although Spanish governments use Twitter as a means of spreading information in emergency situations, they fail to take advantage of all Twitter’s possibilities to foster communication, such as retweeting and/or interaction through ‘likes’. These results support those found by Ahn et al. [30] and Gurman and Ellenberger [72]. In addition, as was found to have happened in Twitter participation during the 2019 Ridgecrest earthquake [30], government authorities have failed to engage their audience, because their communication has been based on sending out basic information. To sum up, as in previous research [9,41,42], e-participation on Twitter has been based on the exchange and dissemination of information and news on preventive measures, on the spread of the pandemic, and for the dissemination of information about the campaign. The campaign’s main focus was on the sharing of information through links, either by featuring the campaign video or posting complementary links. The high number of URLs (20,253) shared support the concept of the Twitter platform more as a space for sharing information than as a space for encouraging debate. In addition, it can be observed that participation was based mainly on the retweeting of messages (76.69% are RT). This implies that the dissemination, and forwarding, of previously published information formed the basis of the campaign.

### Table 4

Cross table: Topics of the debate and expressed emotions (descriptive analysis).

|            | S   | AG  | C   | CA  | A   | I   | O   | OB  | W   |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Campaign   | 6.36| 0.00| 0.31| 0.00| 0.01| 0.87| 0.00| 6.23| 0.20|
| Comment    | 0.91| 0.01| 1.64| 0.01| 0.03| 0.05| 0.16| 0.69| 1.26|
| Awareness  | 2.54| 0.00| 0.02| 0.01| 0.00| 0.00| 0.01| 0.52| 0.19|
| Criticism  | 0.47| 0.13| 1.17| 0.45| 0.20| 0.30| 0.00| 0.01| 0.08|
| Information| 1.43| 0.00| 0.25| 0.00| 0.05| 0.02| 0.21| 21.04| 1.59|
| Measures   | 1.49| 0.00| 0.02| 0.01| 0.00| 0.00| 0.03| 48.16| 0.17|
| Advertisement| 0  | 0.00| 0.29| 0.00| 0.00| 0.00| 0.00| 0.39| 0.02|
| Total      | 13.20| 0.14| 3.69| 0.48| 0.28| 1.23| 0.41| 77.04| 3.52|

Fig. 9. Distribution of COVID-19 contagion cases, emotions and topics from September 2020 to February 2021 (descriptive analysis).

### 6. Discussion

#### 6.1. Participation and interaction patterns

A high degree of campaign participation was observed; 19,576 tweets related with #EstoNoEsUnJuego were sent, out of a total population of 68,631 tweets sent during the government’s four campaigns.

As A high degree of campaign participation was observed; 19,576 tweets related with #EstoNoEsUnJuego were sent, out of a total population of 68,631 tweets sent during the government’s four campaigns.

As found by previous studies based on analysis of Twitter participation in natural disaster situations [30,72], the communication process was based primarily on retweets.

It has been found that 64.8% of the messages were sent by citizens. This participation was widely distributed, since 71.5% of people participated on Twitter just once.

Based on Kahn and Kellner’s [72] categorisation of citizens, we hold that the citizens who participated in the dissemination of information about the campaign were responsible and participatory. However, we cannot conclude that they were oriented towards justice, since only 22.4% added additional comments to their tweets. This limits the possibilities of analysing whether they really seek change, whether they are critical of the social, political and economic fields, and whether they defend justice. Following the classification of Reuter et al. [12], it can be seen that the main role played by some individuals has been that of re-tweeter. These individuals tend to spread important information (news, data, videos) as they retweet messages received from others. But they do not generate messages themselves. In other words, they tend to share second-hand information and are characterised by the large number of tweets they forward.

It was found that two of the most active profiles during the campaign belonged to citizens. In fact, of the 19,576 tweets, citizens sent 12,696 or 65.1% of the total tweets.
Therefore, hypothesis 1 is confirmed: the health campaign encourages the dissemination of health safety measures, but it does not encourage debate and interaction between governments/public institutions and digital citizens.

6.2. Evolution of twitter participation and the pandemic

The evolution of campaign participation shows that campaign impact hit its height at the campaign’s debut and followed a significant gradual decline over the following months; by February the campaign’s participation index was extremely low, 0.1%. These data agree with research done in natural disaster situations [47,80], where network participation has been observed to have its exponential maximum at the start of the emergency.

It seems participation increases when there is an important reason [20], such as the dissemination of information about health safety measures in the case at hand. Other variables may come into play as well, such as trust in government [40], resource availability and the ability to use resources [37,38]. A subsequent study based on targeted interviews of citizens who participated in this campaign may throw light on the reasons why they helped spread it.

The data do not support those of Hou et al. [64], who found a significant positive correlation between participation and the number of cases related with COVID-19, because in this study campaign participation bore no direct relationship with the evolution of the pandemic, inasmuch as campaign participation rose in September and October and fell in December and January, which is when the number of infections began to rise.

The high level of citizen e-participation over a three-month period shows how this kind of Twitter campaign has the potential to enable citizens to satisfy a cognitive and social need, as Tayuan and Ramos [81] conclude in their studies. The cognitive need focuses on the search for and exchange of information, and the social need is the need to share with other citizens something so important as health safety measures. Both kinds of behaviour are reflected in the participation analysis.

To sum up, hypothesis 2 is not confirmed. There is no clear connection between the evolution of campaign participation and the evolution of the pandemic.

6.3. Emotions, topics discussed and pandemic evolution

As expected, in the analysis of the message topics, we see that the most frequent messages were those related to the dissemination of preventive measures. This would explain the lack of personal comments in the tweets, since the objective of participating in the campaign was to spread the word and make the security measures known to the Spanish population.

The analysis of the topics shows that participation focused on disseminating the campaign’s message on socio health safety measures and related information (data, news and general information) (74.5%). In addition, there was a small percentage of critical messages. The information was associated with disseminating data on levels of infection, number of deaths and, in recent weeks, on vaccination campaigns. The disclosed measures connect with two distinct periods: the second wave of COVID-19 (September) and the start of the third wave (December). The criticisms were mainly aimed at governments (the central government and those of the autonomous communities) and at different areas (social, political, economic). They also addressed the population, highlighting risky behaviours and the lack of civility shown by some young people, which was the main objective of the campaign. Criticism was aimed primarily at governments (central and regional alike) and spread to socio-political and economic issues. There was also criticism of citizens for risky behaviour and the poor citizenship displayed by the young people who are the target of the campaign.

When citizens shared links in their messages, they had a direct connection with social reality. During the period analysed (from September 2020 to February 2021), several significant events related to COVID-19 took place in Spain which were covered by the main media. On the one hand, the messages reflected the spread of COVID-19 during the two main waves, which took place between September and January. On the other hand, many of the criticisms aimed at governments were reflected in the news linked to the tweet, such as those relating to the building of hospitals and the mismanagement of the measures adopted [96]. Finally, the criticisms directed at society and young people corresponded to the social reality experienced in Spain with the agglomerations of January 2021 or overcrowding on public transport [97], as well as with young people’s parties.

In addition, we see that the participants showed a polite and collaborative attitude when disseminating the campaign. Citizens conducted the debate, and spread the campaign’s message, in a civilised and objective way, as the emotions expressed are neutral (90.2%) (acceptance and objectivity), with only 9.3% being negative (aggressiveness, criticism, anger, irony, worry and sadness). They issued information on safety measures, data and news objectively, and in those cases in which critical comments are produced. Only 0.1% of aggressive messages were found, 3.66% were critical and 1.9% showed anger and/or were ironical. These results do not support other investigations which found that verbal insults and aggressive comments on Twitter are very common [67]. On the other hand, there were also a number of positive or optimistic messages (0.41%). In addition, analysis of the comments shows limited personal involvement in the debate.

The rise in cases of COVID infection is not reflected in negative emotions (agression, sadness or worry, irony or anger). In fact, National Health System data from November 2020 to January 2021 registered an increase in all negative feelings in the general population, but these data were not observed in the analysis of the campaign messages, where priority was given to the expression of neutral emotions. In fact, it was observed that the three points of maximum infection numbers (October, November and January) were precisely when there was an increase in neutral emotion; this agrees with researchers who indicate that neutral emotion is predominant in conversations about natural disasters [47]. The increase in the expression of neutral emotion can be said to have coincided with the three peaks of contagion, despite the decline in campaign participation.

In connection with the correspondence between the evolution of expressed emotions and discussed topics, citizens displayed primarily neutral emotions when the topic was related with health safety measures (48%) and related information (21%) and when the messages disseminated the campaign (12.6%). When a personal comment was made (3%), however, or when criticism was offered (0.13%), the emotion was aggressive. Only when information was shared was a positive emotion expressed (0.21%).

So, hypothesis 3 is confirmed, because there is a connection between emotions and the topics discussed, and an increase in neutral emotions is observed depending on how the pandemic evolves.

6.4. Limitations and future research

Although focusing on a single campaign has allowed us to carry out a detailed study, we are aware that this research has important limitations. One of the limitations is that of losing the wider perspective of the debate in relation to the measures adopted in Spain and the different aspects which were dealt with by each campaign. A broader study, which takes into account the other health campaigns launched by the Spanish government, would give us a more complete picture of this relationship.

Another flaw that is evident to us is that the time period which we chose (despite being relevant as explained above) omits an analysis of citizens’ emotions in the subsequent period when the crisis continued its progression during the first semester of 2021. Given these deficiencies, we believe that future research will focus on comparing the data from all campaigns as well as on an analysis of the debate based on a longer time
period. Thus, we hope to achieve a more complete mapping of the emotions of the Spanish population.

In addition, it would be advisable to enlarge the sample to include international social health campaigns, with a view to arriving at higher-impact generalisations. However, we feel we are off to a good start taking national cases as our reference.

Lastly, a broader study based on interviews would enable us, first, to learn the reasons why citizens helped spread the campaign and, second, to study in detail what the government’s main objective for this campaign was. These data would provide the foundation for fresh research to contrast the campaign’s objective with e-participation.

7. Conclusions

Firstly, true deliberative communication, according to the terminology in Graham (2010) [38], based on a reciprocal process of listening and responding, a process of reflection and integration of participants’ perspectives cannot be concluded to have occurred among the parties involved. In fact, even when faced with aggressive comments, government accounts did not interact with citizens. However, the importance of e-participation in the campaign to get preventive safety measures to disseminate and share information about health safety measures. In this way, support for the dissemination of the campaign was reinforced and information on COVID-19 was shared, having a good reason, and the existence of a democratic political system, favours the development of e-participation. The research shows the importance of fostering e-participation as an effective response in the context of a health emergency, and it describes the communication process, interaction patterns, topics and discourse on Twitter and the relationship between the evolution of emotions, topics and the pandemic in the health campaign.

Author contribution

Sonia Santoveña-Casal: Conceptualization, Data curation, Methodology, Software, Investigation. Ma Dolores Fernández Pérez: Investigation, Visualization, Supervision, Validation; Writing – original draft; Roles/Writing - original draft; Writing – review & editing.

Funding

This work was supported by the UNED (National University of Distance Education).

Acknowledgments

This article is based on the work carried out by the project Truth and ethics in social-networking websites. Youngsters’ perceptions and educational influence of Twitter, Instagram and YouTube (Grant number, PID2019-104689RB-100) (FECYT, from its Spanish initials), Ministry of Science and Innovation, Spain) and the work carried out by the consolidated Innovation Group “Communication, Social Networks and New Narratives” (GID2017-4) of the UNED (National University of Distance Education).

References

[1] T. Kaya, The changes in the effects of social media use of Cypriots due to COVID-19 pandemic, Technol. Soc. 63 (2020) 101380, https://doi.org/10.1016/j.technosoc.2020.101380.
[2] United Nations (Ed.) (s/f), Citizen involvement, Retrieved on June 25th 2021 from, https://bit.ly/3yhiT84.
[3] O. Saha, J. Rose, L. Flak, The shape of eParticipation: characterizing an emerging research area, Govern. Inf. Q. 25 (3) (2008) 400–442, https://doi.org/10.1016/j.git.2007.04.007.
[4] V. Palacin, M.A. Ferrario, G. Hsieh, A. Knutas, A. Wolff, J. Porras, Human values and digital citizen science interactions, Int. J. Hum. Comput. Stud. 149 (2021) 102605, https://doi.org/10.1016/j.ijhcs.2021.102605.
[5] C. Astarhet, E. Bouton, Teenage peer-to-peer knowledge sharing through social network sites in secondary schools, Comput. Educ. 110 (2017) 16–34, https://doi.org/10.1016/j.compedu.2017.03.007.
[6] S. Santoveña-Casal, C. Bernal-Bravo, Exploring the influence of the teacher: social participation on Twitter and academic perception, Comunicar 58 (2019) 75–84, https://doi.org/10.3916/C58-2019-07.
[7] M.G. Bligh, E.K. Ruppel, K.V. Schoenborn, Cyberpsychol., Behav. Soc. Netw. 20 (5) (2017) 314–319, https://doi.org/10.1089/cyber.2016.0505.
[8] T. Graham, The use of expressions in online political talk: impeding or facilitating the normative goals of deliberation?, in: E. Tumoubis, A. Macintosh, O. Glaney (Eds.), Electronic Participation, vol. 6229 Springer, Berlin, Germany, 2010, pp. 26–41.
[9] S. Faktor, The 10 Types of Twitterers and How To Tame Their Tweets. Idea Faktory, 2013. Retrieved on July 25th 2021 from, https://goo.gl/okmGt.
[10] P.A. Kirschner, Facebook as learning platform: argumentation superhighway or dead-end street? Comput. Hum. Behav. 53 (2015) 621–625.
S. Santove

X. Wu, Y. Cao, Y. Xiao, J. Guo, Finding of urban rainstorm and waterlogging disasters based on microblogging data and the location-routing problem model of the location-routing problem model, Knowl. Data Eng. (2018), https://doi.org/10.1109/TKDE.2018.2807840.

R. Halliwell, J.A. McElderry, Social media and disasters: a functional framework. The 15M network system, a new paradigm of distributed connected crowds. The 15M network system, a new paradigm of distributed connected crowds, Int. Arch. Photogram. Rem. Sens. Spatial Inf. Sci., Volume XLI-3/W4, 2018 Geoinformation For Disaster Management (GI4DM), 18–21 March 2018, Istanbul, Turkey. Retrieved on December 18th, 2021.

B.K. Chae, Insights from hashtag #supplychain and Twitter Analytics: considering Twitter and Twitter data for supply chain practice and research, Int. J. Prod. Econ. 210 (2020) 107417, https://doi.org/10.1016/j.ijpe.2021.107417.

A.W.Z. Chew, Y. Pan, Y. Wang, L. Zhang, Hybrid deep learning of social media big data for predicting the evolution of COVID-19 transmission, Knowl. Base Syst. 233 (2021) 107417, https://doi.org/10.1016/j.knosys.2021.107417.

M.-O. Lwin, J. Lu, A. Sheldenkar, W. Shin, R. Gupta, Y. Yang, Global sentiments surrounding the COVID-19 pandemic on twitter: analysis of twitter trends, JMIR, Public Health Surveill 6 (2) (2020), e14447, https://doi.org/10.2196/14447.

A.S.M. Venigalla, S. Chimalakonda, D. Vagavolu, Mood of India during Covid-19 - an interactive web portal based on emotion analysis of Twitter data, in: Onference Companion Publication of the 2020 on Computer Supported Cooperative Work and Social Computing, C, 2020, pp. 65–68, https://doi.org/10.1145/3406865.3418567.

R.K. Gupta, A. Vishwanath, Y. Yang, COVID-19 Twitter Dataset with Latent Topics, Sentiments and Emotions Attributes, Affective and Social Intelligence, 2020.

A/We Feel, Página web, Retrieved on July 25th 2021 from, https://wefeel.cioso.au/main/.

H.G. Barnes, La tercera ola es la de la indiferencia: por que el covid preocupa menos aunque vaya a peor [The third wave is that of indifference: why the covid worries less even if it gets worse], Públicos. 2021. Retrieved on July 25th 2021 from, https://bit.ly/3FQDsbq.

Consejo Interterritorial, Sistema nacional de Salud [Inter-territorial council, national health system] (2020, 2021), Recomendaciones sobre estrategias comunicativas frente a la fatala pandemia [Recommendations on communication strategies for pandemc fatigue]. Retrieved on July 25th 2021 from, https://bit.ly/3yB50K.

B.K. Chae, Insights from hashtag #supplychain and Twitter Analytics: considering Twitter and Twitter data for supply chain practice and research, Int. J. Prod. Econ. 165 (2021) 247–259, https://doi.org/10.1016/j.ijpe.2014.12.037.

A.K. Kushwaha, P. Kumar, A.K. Kar, What impacts customer experience for B2B enterprises on using AI-enabled chatbots? Insights from Big data analytics, Ind. Market. Manag. 98 (2021) 207–221, https://doi.org/10.1016/j.indmarman.2021.08.011.

M. Hawksey, Twitter Archiving Google Spreadsheet (TAGS), 2013. https://bit.ly/1GoxMxV.

G. Gibbs, El análisis de datos cualitativo en investigación cualitativa, Morata, España, 2012.

P. Schettini, I. Cortazzo, Análisis de datos cualitativos en la investigación social: Procedimientos y herramientas para la interpretación de información cualitativa, Editorial de la Universidad de la Plata, 2015.