



Proposal for a social media-focused emergency communications protocol based on a scoping review and expert validation

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ABSTRACT

Introduction: Social media platforms play a crucial role in crisis and emergency communication by institutions and traditional media. However, evidence suggests that their use for such purposes remains inconsistent and lacks standardization and institutionalization. The aim of this study is to develop a social media protocol for emergency situations that could be useful to emergency teams. **Methodology:** The proposed protocol is based on a decade of research experience by the study team, a scoping review of the existing literature, and interviews with emergency managers and journalists. An initial version of the protocol was then evaluated by a panel of eleven experts. **Results:** The experts provided positive evaluations, considering the protocol a valuable tool for emergency management and highlighting its ability to synthesize processes. Some suggestions for improvement were also offered. Based on this feedback, a final version of the protocol was developed, including an emergency response timeline, clearly defined roles and responsibilities, guidelines for content posting, and ethical considerations. **Conclusions:** The protocol presented in this study has the potential to support and enhance the work of crisis and emergency communication teams. Future research could focus on testing the protocol in real-world scenarios.

Keywords: Emergency communications; crisis communications; social media; scoping review; expert panel; in-depth interviewing; protocol.

1. INTRODUCTION

The social media, and in particular, X (formerly Twitter), are crucial tools to effectively communicate emergencies and crises (Sutton et al., 2019; Brandt et al., 2019; Liu et al., 2019; Renshaw et al., 2021). The fact that experts, institutions, the media, and the general public communicate using social media is relevant, given the technological possibilities offered by these platforms for emergency communications. Some authors even consider social media capable of shaping opinions (Herbst, 2011a; Giansante, 2015). While they may generate disorder and transmit misinformation and fake news (Suau-Gomila et al., 2022), they also help in communicating, managing, and mitigating crises. As noted by Watson et al. (2017), the use of X and Facebook in emergency situations leads to greater interaction and more effective information dissemination.

This research aimed to identify the main challenges faced in emergency communications using social media and to propose a social media protocol aimed at improving communications and management. Most existing proposals identify actors, roles, and emergency characteristics, but do not provide specific guidelines for emergency communications (Torpan et al., 2023; Purohit et al., 2025).

1.1. Emergency communications via social media

The emergence of information technologies and social media has radically transformed how crises and emergencies are managed. While social media have not fully replaced legacy media, they have become an important source of immediate and up-to-date information (Panagiotopoulos et al., 2016; Kurian & John, 2017). Indeed, to some extent, how crisis narratives unfold is through the comments and reactions of social media users (Azer et al., 2021), as it is on these platforms that public debate is generated and climates of opinion are built (Herbst, 2011b).

Social media platforms are key in emergency situations because the interaction with the public is direct; in acting as both repositories and transmitters of information, these platforms perform a task traditionally reserved for the legacy media (Pont-Sorribes & Suau-Gomila, 2019). Public bodies, as ultimately responsible for managing emergencies, have the authority to communicate with the political system and the public without journalistic intermediation, according to Moya-Sánchez and Herrera-Damas (2015), who affirm that much of the big data produced on social media has a positive impact not only on emergency management, but also on crisis prevention. However, Eriksson and Olsson (2016) are critical of the institutional use of X and Facebook,

as, in times of crisis, inconsistent use of social media can hinder the dissemination of vital, and sometimes even lifesaving, information.

Crisis and emergency information circulating on social media includes valuable data on developments in specific places and times, as direct witnesses (Lin et al., 2016) voice opinions and state their concerns and personal needs (Wan & Paris, 2014). Open collaboration allows organizations to collect information useful for coordinating emergency response efforts (Harrison & Johnson, 2019). Appropriate social media communication of emergencies enables positive engagement, achieved when institutions respond quickly to citizens' concerns (Suau-Gomila et al., 2017).

Emergency and crisis communications on social media can exploit a wealth of uploaded shared content; in particular, text combined with images and videos tends to be especially effective (Liu et al., 2016; Stephens et al., 2013). The use of both official and unofficial information sources is crucial to understanding emergency situations. Although the public tends to give greater credibility to government and legacy media sources (Liu et al., 2016; Chew & Eysenbach, 2010), social media users' contextualization of available information can help authorities understand the crisis at the local level.

However, instantaneous communications via social media pose challenges for emergency management, such as the spread of hoaxes, loss of information control, and vulnerability to online criticism (Suau-Gomila et al., 2017). Likewise, since the authorities and the media may have different interests in a crisis scenario (Mayo-Cubero, 2020), such conflicts may increase citizen distrust in official accounts. For this reason, Bruns et al. (2012) underlines the need for coordination between institutions, the media, and the emergency services to ensure that crucial information is disseminated appropriately.

Leveraging information from social media while managing the potential drawbacks is a major challenge in emergency communications. Although institutions and legacy media have been using social media for crisis communication for years, there is room for improvement, as deficiencies continue to exist in social media management (Hughes & Palen, 2009; Kavanaugh et al., 2012; Eriksson & Olsson, 2016; Suau-Gomila et al., 2022), and a somewhat negative perception exists of those management efforts (Piqueiras-Conledo & Perales-García, 2023).

The massification of information technologies has led to digital platforms being incorporated as a rapid means of communicating crises and emergencies with the public. The earliest theories on the subject explored traditional emergency communication models, such as the Situational Crisis Communication Theory by Coombs (2007), the Image Reparation Theory by Benoit (1997), and the Crisis Emergency Risk Communication model by Reynolds and Seeger (2005). However, in recent decades, specific theories and models have been developed regarding social media use for emergency communications. One of the earliest such theories was the Blog-Mediated Crisis Communication Model (BMCM) by Jin and Liu (2010); this inspired Austin and Jin (2016) to develop the Social Mediated Crisis Communication (SMCC) model, which posited that users play roles as influencers, followers, and inactive participants. Other theories further emphasize the role played by the public. The Networked Crisis Communication Model (NCCT) by Utz et al., (2013) focuses on user behaviors during a crisis, beyond considering the type of crisis or organization involved. Since crises are cyclical, the STREMII model by Stewart and Wilson (2016) proposes six social media management phases, largely based on monitoring and seeking interaction with users.

More recent studies focus on user influence and inter-institutional coordination of emergency communication efforts. In the Interactive Crisis Communication (ICC) model, Cheng (2018) proposes response strategies depending on the time and type of public affected by an emergency. The Communication Hub Framework (Mitcham et al., 2021) is designed to improve collaboration between institutions and enhance management effectiveness at the local level. To enhance institutional influence over users during emergencies, Zhao et al. (2019) propose a conceptual framework based on integrating SMCC with other models.

1.2. Social media use for emergency communications: recommendations

The characteristics of social media are such that they enable communications management by both institutions and the legacy media, e.g., the possibility of creating contact networks, their role as information channels and sources, and the possibility for experience exchanges (Brynielsson et al., 2018).

It has been suggested that protocols can effectively support social media communications during emergencies (Torpan et al., 2023; Ilbeigi et al., 2021), with authors such as Renshaw et al. (2021) and Gálvez-Rodríguez et al. (2018) highlighting the importance of effective content management. Martínez Solana et al. (2017) point out that pre-established measures in social media communication could help improve trust and sympathy toward authorities. In addition, it is necessary to create communication plans on social media. Purohit et al. (2025) demonstrate that emergency management agencies need to develop a policy to formally incorporate social media platforms into their communication plans to engage with members of their community during all phases of the life cycle of emergency management.

Since social media platforms are a channel for immediately capturing the attention of the public, Bruns (2012) proposes active participation by institutions and the media so that they can exploit information provided by the public. However, key to ensuring successful dialogue requires the particular strengths of each type of platform to first be understood (Bruns, 2012). Maal and Wilson-North (2019) point out that dialogue on social media during a crisis must build trust, and, to achieve that trust, information needs to be immediate, accurate, honest, and transparent, while speculation and subjectivity should be avoided. Graham et al. (2015) underscore the importance of informative immediacy but also point to other key elements for effective dialogue, such as geolocation, language, and the primacy of objective over content, while taking into account the key issue of the impact of a disaster on access to devices.

Other recommendations concern coordination of communication efforts between institutions and between institutions and the legacy media. Calloway et al. (2022) highlight the importance of local-level preparedness, including the establishment of inter-institutional communication relationships and channels. Likewise, coordination with journalists is important to prevent the spread of misinformation, given the legitimacy of the legacy media (Percastre-Mendizabal et al., 2017; Besalú et al., 2021). van Winkle and Corrigan (2022), incorporating changes to the SMCC model, propose considering message amplification through the distinction between message sources and message-amplifying accounts. Finally, the key to increasing message reach is the involvement of influential social media profiles (Suau-Gomila et al., 2022).

2. OBJECTIVES

The main objective was to improve social media communications by emergency teams, based on which we state two specific objectives:

1. To detect weaknesses and strengths in social media use to communicate emergencies and crises.
2. To develop a protocol as a guide to implementing effective social media communications.

Based on previous studies of recent years (Suau-Gomila et al., 2022; Pont-Sorribes et al., 2020; Pont-Sorribes & Suau-Gomila, 2019; Percastre-Mendizábal et al., 2017) and the existing emergency and crisis communications literature (Liu et al., 2016; Brandt et al., 2019; Bruns et al., 2012; Liu et al., 2019; Sutton et al., 2019; Azer et al., 2021), the following three research questions are formulated:

RQ1: Are social media platforms fundamental for emergency communications by public bodies?

RQ2: Is there a lack of specific social media protocols for emergency situations?

RQ3: Why is it important to have a specific emergency communications protocol for social networks?

The research questions were addressed through the development of a social media protocol for emergency

communications, based on research conducted by the authors between 2015 and 2024, a scoping review of the literature, and interviews with emergency managers and journalists. To ensure the study's rigor, the effectiveness of the protocol was validated by a panel of eleven experts, consisting of crisis communication academics, as well as managers and leaders from civil, military, and civil protection systems that use European emergency numbers. By combining scientific knowledge with the practical perspective of public managers and journalists who are routinely involved in emergency situations, the aim was to ensure that the protocol addressed the key needs and priorities of social media teams involved in emergency management. By presenting this action plan, it is intended to assist public bodies in their communication efforts and also help the work of journalists who follow up information during crises.

3. METHODOLOGY

3.1. Scoping review

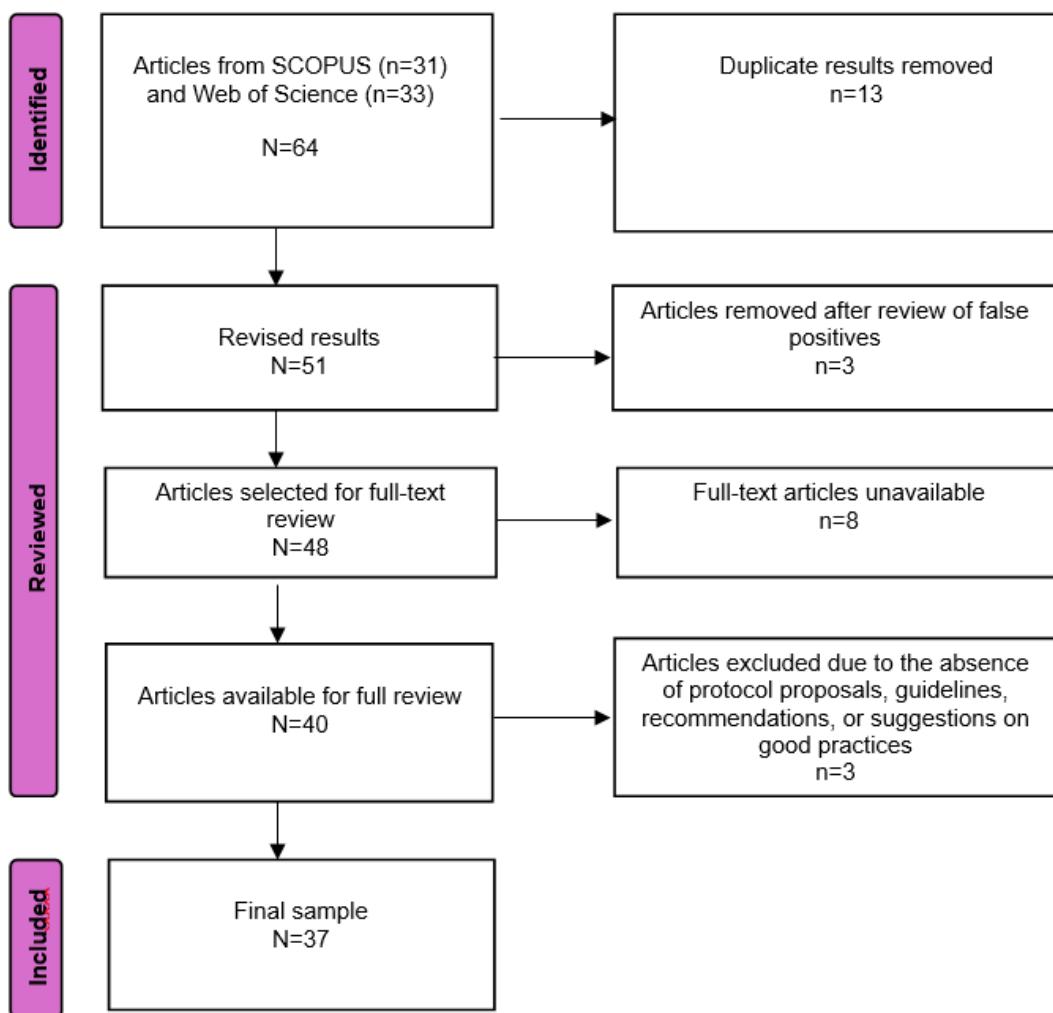
For the first phase of the study, to synthesize the main academic recommendations for social media communications in emergencies, a literature review has been carried out, specifically implementing a scoping review, which enables a synthesis of the evidence on a particular area of knowledge and the identification of gaps for future research (Arksey & O'Malley, 2005; Naidoo & van Wyk, 2019). An especially interesting aspect of scoping reviews is that they focus on depicting the situation regarding a specific knowledge field (Codina, 2021).

Applied to the scoping review were the Search-Appraisal-Synthesis-Analysis (SALSA) analytical framework (Grant & Booth, 2009) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) reporting guidelines that document successive sample selection stages (Codina, 2021). All academic articles published on the topic in question in the decade going from 1 November 2013 to 31 October 2023 were included. The articles were sourced from the SCOPUS and Web of Science databases using the following search filters:

`(TITLE-ABS-KEY ("emergency communication" OR "emergency management") AND TITLE-ABS-KEY ("social media" OR "social network") AND TITLE-ABS-KEY ("decalogue" OR "recommendations" OR "guides" OR "protocol")) AND PUBYEAR > 2013`

The retrieved articles were screened by implementing the PRISMA protocol to select the final evidence base (Figure 1), consisting of 37 articles.

Figure 1. PRISMA flowchart.



Source: Own elaboration.

3.2. In-depth interviews

Semi-structured in-depth interviews made it possible to explore the main challenges faced by emergency communicators in leading the conversation and keeping the public accurately informed. This interview methodology is characterized by a certain degree of direction/non-direction, i.e., the interviewer can ask questions fixed in terms of order, content, and formulation, or can use a flexible approach based on a script (Ruiz-Olabuénaga, 2012). Semi-structured in-depth interviews are mainly used in research that seeks to directly approach subjects for specific reasons, e.g., because they hold certain responsibilities. They are especially valuable for obtaining knowledge when the phenomenon studied cannot be observed directly, either because there is no direct and permanent access to the organization or institution or because a past event is being analysed (Callejo, 2002).

In our research, a script was used to guide the interviews in terms of the strengths, weaknesses, opportunities, and challenges posed by social media in relation to emergency communications by public bodies and journalists. The interviews, carried out individually (some in person and others via video call), focused on four thematic areas:

1. Advantages and disadvantages of social media for emergency communications.
2. The most effective social media for emergency communications and the reasons.
3. Coordination of emergency communications between the different responsible institutions and teams.
4. Deontological principles that should be adhered to by emergency managers and journalists in their communications.

Ten interviews in total were conducted. Four interviews were conducted with the corporate communication managers for the emergency services of Andalusia and Catalonia (the most populated autonomous communities in Spain), a private emergency communications consultant, and the manager of communications and protocols for the Official College of Physicians of Malaga. A further six interviews were conducted with journalists specializing in coverage of emergency situations on television (RTVE) and radio (RNE, RAC1) and in the press (*La Vanguardia*, *Diario Sur*, *El País*). The same topics were discussed with both subgroups, except for thematic area #3, which, for the journalists, covered relationships with public press offices, the perceived relevance of press conferences, and the main challenges posed by this type of news coverage.

3.3. Expert panel

Electronic Delphi-style consultation with a panel of eleven experts enabled us to seek their opinions on the use of social media for emergency communications, which they voiced in terms of agreement or disagreement with the social media protocol for emergency communications proposed in this study. Eleven panel consultations took place between February and March 2024. The panel was divided into two subpanels consisting of (a) six public emergency experts, and (b) four academics and one digital communications consultant.

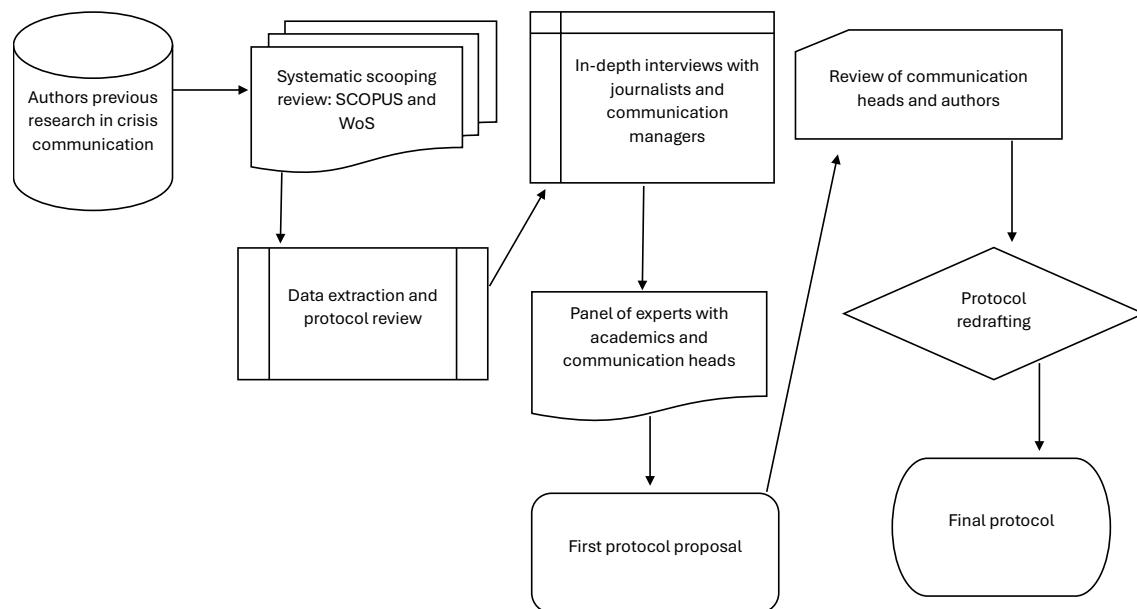
Subpanel (a) was composed as follows: Aurelio Soto, Head of Planning and Institutional Analysis of the Military Emergency Unit of the Spanish Army; Javier Ayuso, Head of Communication of Madrid Security and Emergency Agency; Pilar Limón, Head of Press and Dissemination for the Andalusian Emergency Service; Marc Homedes, Press Officer of the General Directorate for Civil Protection in Catalonia; Laurent Alfonso, European Affairs Advisor at the French Ministry of the Interior; and Núria Iglesias, Director of Firefighter Communications of the Generalitat de Catalonia.

Subpanel (b) was composed as follows: Ferran Lalueza of the Open University of Catalonia; Dr Marcos Mayo-Cubero of the Complutense University of Madrid; Fernando Fernández of the University of Malaga; Eva-Karin Olsson Gardell of the Swedish Defense University; and Silvia Rodríguez, Accounts Director of Estudio de Comunicación SA. Each expert received the proposed protocol, accompanied by an online questionnaire. The questionnaire had six open-ended questions, as follows:

- 1) Do you think a specific social media protocol for emergency communications could be useful?
- 2) Do you consider that our protocol design is effective?
- 3) What protocol items do you consider to be most useful?
- 4) What protocol items do you consider to be least useful?
- 5) What new or innovative aspects does our protocol have?
- 6) What improvements could be made to the protocol?

To visualize the process of developing of the protocol, the authors have designed a flowchart that explains and summarizes the step-by-step procedure used.

Figure 2. Protocol flow diagram.



Source: Own elaboration.

4. RESULTS

The social media protocol for emergency communications was based on the authors' experience with four research projects on emergencies and social media, as follows: *Communicating in emergency situations: Tools 2.0 and new protocols in the efficient management of communication* (funded by FBBVA; 2015-2017); *Hate speech on social media* (Ref: 2018RICIP00006; 2019-2020); *Hate in social media: the agora of misogyny. Analysis of anti-feminist discourses and media and institutional coverage of these problems on Twitter, Facebook, and Instagram* (funded by ICIP; Ref: ICI019/22/000015; 2022-2023); and *Crisis and emergency communication in social media. Study of use in Spain and design of information protocols for institutions and media* (Ref: PID2019-109064GB-I00; competitive call of the Spanish Ministry of Science and Innovation 2020-2024). Research team members have also organized three international conferences in Barcelona (2017, 2022, and 2023).

4.1. Scoping review

The scoping review of the literature on social media use for emergency communications identified six major themes in the 37 included articles, as follows: (1) particularities of the population; (2) inter-institutional coordination; (3) information analysis and monitoring; (4) institutionalization of emergency management; (5) leading the conversation; and (6) deployment of resources that improve message reach and comprehension.

As a means of improving social media emergency communications, a main recommendation in several studies is to consider the particularities of the population (Eisenberg et al. 2017; Calloway et al. 2022; Momin et al., 2023), specifically, the geographical, physical, environmental, social, and infrastructure factors associated with the affected population, and also access to the internet and technology in communities with limited resources or where communications may be affected by an emergency.

Several studies underscore the importance of coordinating social media communications between and across institutions and civil society organizations (Simon et al., 2015; Zhang et al., 2016; Ryan, 2017). Involving public bodies at different levels and coordinating informative actions with the legacy media is also crucial, so as to avoid the spread of misinformation and non-contextualized information (Jones & Silver, 2020). Coordination covers not only content dissemination, but also, in order to reduce uncertainty, responses to messages and

comments from the public.

Another recommendation is monitoring and analysis of information circulating on social media during a crisis (Brynielsson et al., 2018; Wang et al., 2022; Sun et al., 2022), as this allows institutions to extract information in real time, immediately identify trends, and plan suitable responses to information needs. Furthermore, evaluating emotions enables the tone of messages to be adapted during a crisis, while monitoring identifies fake news and the associated accounts.

Also highlighted is the need to institutionalize social media use for the purpose of managing emergencies (Knox, 2022; Doyle et al., 2023). This requires investment in all the financial, human, scientific, and technological resources necessary to optimize emergency communications via social media. Likewise recommended is the development of crisis prevention plans that should include training for managers and the organization of drills/simulations with the public.

Leading the conversation on social media is another challenge to be addressed for effective emergency management, taking into account different crisis stages, from pre-crisis to post-crisis (Rusho et al., 2021; Ma et al., 2023). This requires meeting the information demands of the population by clear and accurate reporting throughout the crisis.

Finally, incorporating audiovisual resources can help crisis communication (Pont-Sorribes et al., 2020; Renshaw et al., 2021), as the richness of content that combines various resources can improve message reach and effectiveness. Creativity, in addition, enhances the virality potential of messages and helps avoid information overload.

4.2. Interviews

Journalists

The legacy media interviewees confirmed having no protocol or guidelines of any kind for emergency communications via social media. Consequently, how the corresponding information is published varies according to the medium.

In *El País*, the head of particular sections (international, national, etc) oversees content dissemination on social media. RAC1 operates according to a unified but non-standardized approach based on accumulated experience: "What we have is the outcome of much accumulated experience. In RAC1 we indeed could make a roadmap with our colleagues, but to date we have no written roadmap." *La Vanguardia* provides some instructions, since at least 2017, on how to report in emergency situations, but not a manual: "These instructions focus greatly on the issue of sources and of factchecking before publication." In RNE whether a protocol on communicating emergency situations via social media exists is in doubt: "I do remember that a colleague who had attended a social media training course gave us some guidelines, but no manual was ever mentioned, so if one exists, I don't know of it." At RNE, therefore, guidance depends on the prior training that editorial team members may have received: "The individuals who usually manage social media here have had some kind of training and they pass on guidelines to the rest of us, for instance, on issues to consider when using Twitter/X, say, which is the platform that we use most. A general style manual for the entire corporation, theoretically also applicable to social media, provides guidelines on how to manage certain information and on what should and should not be published and how." *Diario Sur* has a general style guide for social media and even has a crisis office, but has no protocol that sets out specific guidelines for reporting emergencies: "Teams of six or seven people work with the same social media, and, for routine work, there is a style manual for each platform regarding how messages should be communicated. For crisis situations we have a well-defined procedure, and a crisis cabinet is created with three people."

Regarding social media emergency communications training for journalists, only RAC1 and *Diario Sur* provide specific training. Finally, X is the platform most used by the legacy media to report on emergency situations,

and *Diario Sur* uses the greatest variety of platforms: X, Facebook, Instagram, and in addition, LinkedIn, TikTok, Twitch, YouTube, and WhatsApp. Facebook and Instagram are used, in addition to X, by RAC1 and *La Vanguardia*, and to a lesser extent, by *El País* and RTVE.

Emergency managers

A guide, manual, or protocol for communicating emergencies exists in all of the analysed bodies except for the Official College of Physicians of Malaga: “We do not have a specific guide, as we use a guide published by our Spanish federation (Organización Médica Colegial de España) that includes a section on social media.”

The private consulting company (Señor Lobo SL) has a protocol that “in constant evolution and regularly reviewed, as logically, when social media evolve, so too does the world of communication evolve. Nothing is static.” Despite the importance of social media for this company, underscored is the disseminating and legitimizing role of the legacy media. The main platform for managing emergencies is X: “It continues to be the mainstay of crisis communication, as it’s where journalists go to observe risk and communication trends that may end up constituting crises.”

The state emergencies service has had a regularly updated crisis manual since 2008, but not one specific to social media. This crisis manual includes information on the composition of crisis committees, describes situations that are likely to be considered crises, and defines a decision tree for who does what and when.

While the Andalusian emergency service does not have its own specific plan for social media, it does have “an annual communications framework plan with a crisis management section describing protection systems.” Regarding the advantages of communicating emergencies on social media: “The main advantage is the speed with which you can broadcast information, even knowing that the audience of each platform is different.” Key is communicating through all media, while recognizing that communicating with all audiences is not possible.

The Catalan civil protection service has had a crisis communication guide since 2010: “We have defined a basic guideline of communication as soon and as fast as possible, which, of course, does not necessarily mean as accurately as possible.” Priority is therefore given to immediacy, and information is later complemented or expanded on. “Another guideline is service and information continuity – not to keep silent for too long. And also to use different languages: Catalan as the language we commonly use, Spanish, and other languages depending on, for example, whether or not the affected areas is a tourist destination.” Their social media use is generalist, as the main aim is to inform as widely as possible: “Our main emergency communications goal is to provide the public service of informing the masses. Interaction is limited, as we are few in number and so cannot allocate people to specific tasks, and neither can we enter into dialogue. The ultimate aim is to transmit general messages.”

Finally, all the interviewees confirmed that, although their teams have received specific training in emergency communications, they do not necessarily have protocols. In emergency communications via social media, stated as the main challenge is loss of control over the message (misinformation, rumours, etc), and, as the main advantages, rapid dissemination, interaction possibilities, reach, and potential virality. X is rated as the most useful platform, although platforms such as Facebook and Instagram are also valued positively.

4.3. Protocol proposal

As mentioned in the methodology section, the preliminary protocol (Table 1) draws on the authors’ previous research, a literature scoping review, and interviews with emergency managers and journalists-.

In the protocol, crisis phases have not been established for two reasons. The first is that the protocol is designed to be implemented once the crisis has already been declared, and therefore, it follows a pre-established crisis plan. Consequently, defining pre-crisis and post-crisis phases would be of little use. The second reason is that the protocol presented here aims to be representative and universally applicable. Making the protocol too specific would excessively limit its usefulness. Hence, the authors understand that this protocol should be

adapted based on the specificities of each institution or administration to which it is applied.

Table 1. *Social media protocol for emergency communications: preliminary version*

Recommendation	
1. Involve the entire administration	Involve the main institutional profiles in social media communications.
	Coordinate social media communications and actions at different administration levels.
	Adapt social media messages to the profile of the institution (scope, territory, activity).
2. Lead the conversation online	Rapidly create social media labels and nodes that ensure cohesive information provision.
	Publish social media content in a systematic and structured way.
	Measure the social media reach and impact of conversations.
3. Participate actively in social media	Monitor crisis-related topics and trends in social media.
	Combat hoaxes and fake news in social media by providing resources and channels to verify information.
	Respond to social media messages and comments from the public.
4. Delimit and monitor crisis phases	<ol style="list-style-type: none"> 1. Declare the emergency. 2. Activate the emergency plan. 3. Manage communications. 4. Deactivate the emergency plan. 5. Declare the end of the emergency.
5. Use text and image effectively	Use simple and clear language.
	Adapt messages to the particularities of each platform.
	Use graphic and multimedia materials to visually reinforce and spread the message.
6. Be socially responsible	Avoid political over-reach (the aim is to provide a service, not capitalize politically).
	Use ethical content and avoid using images and videos that are non-informative or potentially offensive.
	Show respect for victims and protect them from unnecessary exposure.

Source: Own elaboration.

4.4. Expert panel results

The panel of experts in emergency management and communications was consulted for opinions of the preliminary protocol content and for suggestions for changes and improvements (Table 2).

Below we describe the experts' feedback according to three main themes: usefulness and effectiveness; most and least relevant or useful items; and innovativeness and possible improvements.

Usefulness and effectiveness

The experts all agreed with the importance of having a social media protocol for emergency communications. The main advantage was the systematization of communication strategies that reduce the risk of improvisation when time is of the essence. As pointed out: "Having a protocol is vital to be able to act in a planned, safe, and validated way". It was also suggested that it should even be an obligation for institutions to have a social media protocol for emergency situations.

Some of the experts underscored the importance of social media in ensuring up-to-date information provision during crises. A protocol could facilitate this by coordinating the actions of a larger number of institutional actors. As pointed out: “A protocol is key as it ensures that social media managers and institutional actors are clear about lines of action when problems arise.”

Table 2. Expert panel evaluation of the preliminary protocol.

Theme	Expert									
	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10
Useful?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Effective?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Noteworthy points	#2	#1	#2	#6	#1	≥2	≥2	≥2	≥2	#5.2
Expendable points	#4	#3.3	-	-	-	-	-	#4	-	-
Innovative?	Yes	Yes	Yes	No	No	Yes	No	Yes	No	Yes
Improvable?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Own elaboration.

Interviewees also agreed that the protocol was effective in terms of structure, focus, and concision, as it was considered to be clear and consistent in terms of the items and to cover essential aspects of emergency communications via social media. While one expert highlighted that the protocol “maximizes the possibility of goal fulfilment when communicatively managing a crisis or emergency situation,” another expert argued that, given the dynamism and contextuality of crises, effectiveness depended on correct implementation and flexibility: “The core feature of any crisis is that it is a dynamic process that requires adaptation of any designed protocol.”

Most and least useful items

The experts had different opinions regarding the most useful aspects of the protocol. Broadly speaking, they highlighted the effective layout of the protocol, i.e., the topic classification and the detailed recommendations, with one expert commending “the clarity and inclusion of all the necessary elements, its coherence and practicality.” Several experts considered “leading the conversation” in social media to be especially important in proactively tackling crises. Also considered especially useful were the items on social responsibility and coordination between different institutions.

Regarding the least useful protocol items, the experts broadly considered that almost all the items were important or useful: “Considering that a protocol is a minimum plan, all the items seem necessary.” Highlighted as potentially less useful was “delimiting crisis phases” – because it was obvious, lacked development, or not always necessary. The recommendation to respond to messages was considered to require nuance, since this should depend on the situation. Likewise, regarding social responsibility, one expert commented: “Trying to avoid political over-reach is a challenge. Although important, it is complicated and difficult to put into practice.”

Innovativeness and possible improvements

When asked about the innovativeness of the protocol, most experts indicated that, despite its usefulness and effectiveness, it contributed no truly novel aspects. However, some experts found novelty in how the protocol fostered practices already considered effective in the use of social media for emergency communications, and

in the concepts of message adaptation to each platform, misinformation neutralization, and social responsibility. Furthermore, the strategic role of social media use in emergency communications was highlighted, as in their transmission of messages and information, these platforms were afforded “a role beyond the typically sought after presence and the battle for likes.”

The experts contributed several ideas for improving the protocol, mainly the inclusion of more topics in the pre-crisis and post-crisis phases and of examples or graphs to make the protocol more accessible to persons not familiar with crisis management, e.g., institutional middle managers. One expert recommended greater relevance and transversality for the social responsibility concept: “Socially responsible communications and victim protection should be comprehensively present throughout the protocol, and moreover, would significantly add novelty and originality.” Other recommendations were to incorporate artificial intelligence (AI), rethink the role of volunteers and influencers in emergency communications, and consider involving digital platform companies in public emergency management.

5. DEFINITIVE PROTOCOL PROPOSED BY THE AUTHORS

The expert panel confirmed the overall usefulness of the social media protocol for emergency communications, while indicating possible improvements to the preliminary version. Based on their feedback, therefore, the preliminary protocol was revised to incorporate these improvements (Table 3). Due to the numerous comments received, the only changes made (indicated in bold) were those proposed at least twice.

Table 3. Social media protocol for emergency communications: suggested changes and final recommendations

	Suggested changes	Revised recommendations
1. Involve the entire administration	–	Involve the main institutional profiles in social media communications.
	<i>To include personnel from areas other than communications and provide them with the necessary training.</i>	Coordinate social media communications and actions at different levels and in different areas.
	–	Adapt social media messages according to the profile of the institution (scope, territory, activity).
2. Lead the conversation online	<i>To incorporate AI tools and analytics to ensure greater responsiveness.</i>	Rapidly create social media labels and nodes that ensure cohesive information provision.
	–	Publish social media content in a systematic and structured way.
	<i>To consider influential social media users.</i>	Lean on volunteers, opinion leaders, and influencers to amplify message reach.
3. Participate actively in social media	<i>To combine two initial recommendations on measurement and monitoring.</i>	Monitor crisis-related topics and trends on social media and measure the reach and impact of the resulting conversations.
	<i>To include the threat of disinformation by AI.</i>	Combat human- and AI-generated hoaxes, misinformation, and fake news in social media by providing resources and channels to verify information.
	<i>To address some messages privately, depending on the situation.</i>	Respond to social media messages and comments from the public, doing so privately or publicly according to the situation.

4. Delimit and monitor crisis phases	<i>To include a post-crisis review phase focused on lessons to be learned from the crisis.</i>	1. Declare the emergency. 2. Activate the emergency plan. 3. Manage communications. 4. Deactivate the emergency plan. 5. Declare the end of the emergency. 6. Post-crisis: evaluate communications management and identify lessons for the future.
5. Use text and image effectively	<i>To also consider the sensitivity of the message.</i>	Use simple and clear language that is appropriate to the communication context.
	–	Adapt messages to the particularities of each platform.
	<i>To use AI for content generation, applying appropriate criteria.</i>	Use graphics and multimedia materials and AI tools to visually reinforce and spread the message.
6. Be socially responsible	<i>To institutionalize social media as a communications mode.</i>	Avoid political over-reach (the aim is to provide a service, not capitalize politically).
	–	Use ethical content and avoid using images and videos that are non-informative or potentially offensive.
	–	Show respect for victims and protect them from unnecessary exposure.

Source: Own elaboration.

Based on these recommendations, a new round of revisions was carried out to incorporate possible improvements to the protocol. As a result, the authors present a definitive protocol (Table 4) as the final outcome of this study. The result includes the design of the emergency timeline with three emergency momentums, eight fundamental principles within these three emergency moments, a section detailing the tasks to be carried out by emergency managers, a description of each task, a breakdown of roles and responsibilities, and finally, case studies in which the described tasks have been successfully performed. These cases have been defined based on our previous analysis and review with the expert panel. In this way, the protocol aims to be useful without losing its generality, as it is intended to serve as a reference document for any type of institution.

It should be clarified that this protocol does not contemplate the classic phases of emergency communication (pre-crisis, crisis and post-crisis). Instead, to organize and structure its proposals, mainly focused on the crisis and post-crisis phases, an emergency timeline has been designed to provide structure and order to the protocol. This timeline gives the protocol a sequential structure, making it more practical and easier to follow for crisis management teams.

Table 4. Definitive protocol for the use of Social media protocol in emergency communications

Emergency Timeline	1. Declaration and activation			2. Action and resolution			3. Deactivation and evaluation			
	Task	Roles	Cases	Tasks	Roles	Cases	Tasks	Roles	Cases	
	Declare the emergency	Head of Institution	Of the cases analyzed, only in the case of the attacks in Barcelona and Cambrils in 2017 was the activation of the emergency plan published by Civil Protection.	Monitor crisis-related topics and trends on social media, and measure the reach and impact of the resulting conversations. Use specialized software such as NodeXL Pro, Twittonomy, Twitter API, Facebook API, Social Blade, Hootsuite, or TweetDeck.	Head of Digital Communications Head of Social Media Unit	During the Riomena storm in 2021, Madrid's Civil Protection used messages and posts from users on X to detect victims and reach out to them directly in an effort to maintain calm, informing them that authorities were working to deliver aid.	Report the deactivation of the emergency plan.	Head of Communication Head of Digital Communications	Once all the victims of the 2017 Barcelona and Cambrils attacks were identified, Civil Protection of Catalonia announced the deactivation of the state of alert. https://x.com/emergenciescat/status/890682788189896704	
	Coordinate most essential tasks with the main institution's communications officers for a plan of periodical content sharing.	Head of Institution Head of Communications Head of Digital Communications	During Covid-19 pandemic in Spain, at the beginning there were six spokespersons from different institutions: Civil Guard, National Police, Army, Ministry of Health and Ministry of the Interior, which caused a feeling of chaos and lack of coordination.	Through this active listening, detect human- and AI-generated hoaxes, misinformation, and fake news in social media.	Head of Digital Communications Head of Social Media Unit	When the first lockdown of the COVID pandemic was declared, a rumor spread on social media claiming there would be a shortage of food and essential products. Upon detecting this trend, Catalonia's Civil Protection made a post clarifying that no such shortage existed and that the availability of these products was guaranteed.	To thank the volunteer teams, the media and the public for having been informed through official sources and for having avoided the dissemination of fake news.	The President of the Community of Madrid organized a gratitude event with the staff and volunteers who had helped during the DANA emergency in 2023. This event was private and not open to the media. However, it was later used to be shared on social media.		
	Set messages for different main institutions and managers, so that they can amplify these messages.	Head of Institution Head of Digital Communications Head of Content Production Unit Head of Social Media Unit	In the case of the Ebola health crisis in Spain, a Special Committee was created for its management and although this committee published messages and infographics with relevant information, these messages did not reach the public as they were not disseminated by the Ministry of Health or the Regional Ministry of Madrid, the institutions that had the most followers and impact on social networks.	Use simple and clear language that is appropriate to the communication context. Additionally, when sharing certain types of information, factors such as the sensitivity of the population at a certain moment should be considered.	Head of Communication Head of Digital Communications Head of Social Media Unit	Message from the Guardia Civil in the Germanwings accident: Information for family members of flight 4U9525 In Catalonia: 012 Outside Catalonia: 9024000012	Report the restoration of normality (end of the emergency).	Head of Communication Head of Digital Communications Head of Social Media Unit	During Covid-19 emergency, Civil Protection of Catalonia published clear information regarding the ending of the pre-alert phase of the crisis. https://x.com/emergenciescat/status/1636707416044650499	
	Depending on the type of crisis (health, disaster, technological accident, etc.) select the different institutions that are going to lead the crisis communication efforts.	Head of Institution Head of Digital Communications Head of Content Production Unit Head of Social Media Unit	In Catalonia the communication department of the Firefighters is the one who leads communication in the event of forest fires, not the Government. For example, during the forest fire in the Ribera de Ebre, the profile that leads the conversation in X is that of the Firefighters.	Use graphic and multimedia materials and AI tools to visually reinforce and spread the message. This will increase the likelihood of the content being shared by users. More engaging and clear content is more likely to be shared.	Head of Communication Head of Digital Communications Head of Social Media Unit	It is important to prepare these materials before the crisis. Also, the use simple and neutral emojis that could reinforce communication without trivializing the situation is suggested. For example, FEMA (www.fema.gov) explains earthquake risk communication very well with images and animated graphics.	After managing the emergency, issue a message of support, mourning or condolences to the victims of the emergency.	Head of Communication Head of Digital Communications Head of Social Media Unit	A good example is what the mayor of Madrid Manuela Carmena did during the collapse of a house in 2015. On that occasion, although the emergency had ended, information continued on the care of the victims, who would be temporarily housed in hotels and other homes.	
	Coordinate the main messages issued by the rest of the administration, so that they reach the public clearly and unequivocally.	Head of Institution Head of Communications	A good example of this can be found in the case of the 2017 Barcelona and Cambrils attacks, because while Civil Protection published operational messages, the police forces issued messages asking not to spread rumors or false information and the Barcelona City Council asked to avoid and combat the hate speeches that arose after the attack.	Adapt messages to the particularities of each platform, considering the specificities regarding the use of video, image and text.	Head of Digital Communications Head of Social Media Unit	Ex X is useful for providing rapid crisis updates, while Instagram may be more effective for showing support and expressing empathy toward the victims.	3.2 Declare the end of the emergency			
	Adapt social media messages for the rest of institutions considering their specific characteristics: their scope, reach, and activities.	Head of Communications Head of Digital Communications	Creating a stockpile of statements and graphics could be useful for institutions to adapt the message and content to their needs.	2.2 Fight against disinformation and rumors	Tasks			3.3 Evaluate crisis outcomes		
	1.2 Unify and lead the conversation online			Tasks	Roles	Cases	Tasks	Role	Cases	
	Task	Roles	Cases	Respond to social media messages of users. As much as possible, legitimate queries and concerns from the public should be addressed, as well as debunking falsehoods that go viral and attract public attention.	Head of Digital Communications Head of Social Media Unit	During Covid-19 pandemic, Catalonia's Civil Protection fought against a rumor about a person lying on the street in Igualada. It turned out to be someone who had abused alcohol, but people mistakenly believed it was a COVID-related death. The administration posted a tweet to clarify the situation. https://x.com/emergenciescat/status/124280037511274499	Evaluate how communication and coordination with other institutions has worked in the different phases of the emergency and examine whether or not the spread of misinformation has been avoided.	Head of Digital Communications Head of Social Media Unit	During the Barcelona attacks of 2017, the case of a deceased minor became known. His mother was in a coma and the father was on a plane. To avoid distressing the family, authorities chose not to confirm the child's death until they were able to contact the relatives first.	
	Activate the communications plan on social media	Head of Institution Head of Communications Head of Digital Communications	Set the first publication and the social media platform on which it is published. For instance, many administrations in Spain have a policy of starting crisis communication on social media on X.	Combat these hoaxes and misinformation by reporting and debunking falsehoods and by sending reminders messages to the public about encouraging them to get information through the official profiles of the emergency managers, as well as offering complementary resources such as websites or apps where people could access to more information.	Head of Digital Communications Head of Social Media Unit	After the Germanwings accident, the profile of the Spanish police explains that what is important is only official sources of information. There are many examples of this fight against misinformation.	If necessary, modify or adapt the social media crisis communication plan, incorporating the aspects to be improved detected in the previous phase.	Head of Digital Communications Head of Social Media Unit	For instance, different Spanish administrations, after coordinating certain emergencies, have created WhatsApp groups to improve coordination between communication departments and operational areas such as firefighters and police.	
	Rapidly create social media labels and nodes that ensure cohesive information provision. Analytical and AI tools can be incorporated to facilitate this task.	Head of Digital Communications Head of Content Production Unit Head of Social Media Unit	In the case of Ebola in Spain, all the information was unified through the hashtag #EbolaEnEspaña.	Do not allow ambiguity. Facilitate the interpretation of data, areas and technical terms.	Head of Communication Head of Digital Communications Head of Social Media Unit	On this point, authorities may follow GCS Behavioural Science Team or the UK Cabinet Office guidelines for crisis communication. On improving communication understanding, it is recommended to not just describe evidence, but to promote the right protective behaviour. https://shorturl.at/sViQ	Examine the impact of emergency communication and how it has been received by the public.	Head of Communication Head of Digital Communications Head of Social Media Unit	Impact metrics, sentiment analysis, press clipping, and surveys to measure citizen satisfaction with the institution's management.	
	Public content in a systematic way: communicate what is known while avoiding speculation. Periodically update the status of information with summaries that provide a better overall understanding of the situation. Additionally, a pre-established publication schedule should be maintained to prevent "information gaps".	Head of Digital Communications Head of Content Production Unit Head of Social Media Unit	As mentioned above, the case of the attacks in Barcelona and Cambrils were an example of this, in addition, it should be noted that most of the information was published, at least, in Catalan, Spanish, English and French as it was an emergency with international scope.	2.3. Be socially responsible	Tasks			3.3 Evaluate crisis outcomes		
	Seek the support of digital opinion leaders and content creators who have reach and credibility among large digital audiences. Having an online network of volunteers (e.g. VOSTERope; Red Cross,) can also help improve the dissemination of messages to users who are less engaged with news content.	Head of Digital Communications Head of Social Media Unit	In the cases of the natural emergencies analyzed, the Tarragona fire in 2019 and the ANA 2020, the teams of digital volunteers (VOSTERope; VOSTERope) were important not only to amplify the information coming from the Fire Department or Civil Protection, but also to offer service information, such as the lifting of confinement or the opening of metro services, for example.	Provide a citizen service that addresses the emergency's needs and avoid political overreaction. The focus should be on the causes and consequences of the emergency, those affected (injured, deceased, displaced, etc.), material damage, and preventive, containment, or other measures.	Head of Communication Head of Digital Communications Head of Social Media Unit	In the case of the Ebola crisis, political meetings were broadcast that only served to promote the minister, but not to provide useful information to citizens.	Tasks	Role	Cases	
				Use ethical content and avoid using images and videos that are non-informative or potentially offensive. Avoid sensationalism, value judgments, and offensive language.	Head of Communication Head of Digital Communications Head of Social Media Unit	On this point, authorities may follow CEN-CENELEC Guidelines for effective social media messages in crisis and disaster management regarding the use of Graphics (4.2.4). https://shorturl.at/q80X2				
				Be careful with the content posted. Show respect for victims and protect them from unnecessary exposure. Do not provide data on victims (injured or deceased) until they are confirmed. Track and combat, with particular emphasis, rumors, speculations, or falsehoods that affect the victims.	Head of Communication Head of Digital Communications Head of Social Media Unit	On this point, authorities may follow CEN-CENELEC Guidelines for effective social media messages in crisis and disaster management regarding the use of Graphics (4.2.4). https://shorturl.at/q80X2				

Source: Own elaboration.

Unlike the protocols, guidelines, and recommendations reviewed from other authors (Brynielsson et al., 2018; Calloway et al., 2023; Renshaw et al., 2023; Suau-Gomila et al., 2022; van Winkle & Corrigan, 2022; and Torpan et al., 2023), the proposed protocol offers a clear definition of roles and responsibilities within the institutions managing emergencies, with a detailed allocation of tasks encompassing institutional leaders, communication units, digital teams, and social media units. Additionally, it constitutes a comprehensive crisis communication timeline that covers the phases of declaration, active management, and deactivation, guiding coordinated messaging among institutions. The protocol incorporates the use of artificial intelligence and digital volunteer networks (e.g., VOSTEurope, VOSTSpain) for the detection of misinformation and message amplification, integrating cutting-edge resources beyond traditional protocols. Attention is given to ethical communication, including respect for victims, prudent dissemination of data, and combating rumors through official sources and complementary resources. Finally, this proposal has undergone a rigorous validation process involving a panel of eleven experts, ensuring both the scientific validity and practical applicability of the protocol.

In summary, the protocol proposed builds extensively on best practices from the current literature, innovating by explicitly integrating multilevel coordination, technological aids, ethical content guidelines, and rigorous expert validation into a unified and detailed framework. It addresses key gaps identified by Torpan et al. (2023), especially the need for actionable and institutionally coordinated social media protocols in emergency situations, making it a significant contribution to crisis communication research and practice.

To analyse the different contributions of the referenced protocols, guidelines and recommendations on crisis communication, the following comparison is presented in Table 5.

Table 5. Comparative Table of Crisis Communication Elements and Innovation

Elements / Features	Brynielsson et al. (2018)	Calloway et al. (2023)	Renshaw et al. (2021)	Suau-Gomila et al. (2022)	Torpan et al. (2023)	Protocol proposed by the authors (2025)
Use of social media for real-time alerts and monitoring	Emphasized real-time filtering and accuracy in alert generation using automated tools	Multi-channel communication with emphasis on community feedback	Importance of timely and clear messaging for retransmission	Coordination of multiple institutional Twitter accounts	Call for standardized social media emergency protocols	Integration of real-time monitoring with clear roles for social media units and digital communications
Coordination among institutions	Cooperation between technical experts and responders	Strong focus on cross-sector collaboration	Importance of leveraging trusted influencers	Explicit coordination among institutional social media profiles	Identified lack of unified protocol; recommends multi-agency coordination	Detailed roles for heads of communications, digital units, and institutions to ensure cohesive messaging
Misinformation management / Combat rumors	Highlighted credibility and transparency	Recognized the need for feedback loops to counter rumors	Recommends clear, empathic messaging to debunk misinformation	Proactive misinformation combat and rumor control	Emphasize reporting and debunking falsehoods	Specific tasks for rumor detection and combating misinformation, including AI-based tools and volunteer networks
Language and cultural	Not a primary focus	Emphasizes community	Messages tailored to	Recommends multilingual	Mentioned in training and	Adapted for international and

considerations		engagement and vulnerable groups	resonate with audiences	communication and cultural sensitivity	guidance	diverse audiences, including use multilingual communication, empathetic language and sensitivity approach
Use of multimedia and AI tools	Proposed automated data analysis tools	Not specifically highlighted	Suggested use of credible and engaging content	Suggested use of images and graphics	Calls for technological integration	Pre-crisis preparation of multimedia resources, AI tools for content adaptation, and graphical messaging to increase impact
Post-crisis actions and evaluation	Not explicitly covered	Strong emphasis on ongoing support, including food security	Focus on continued communication and community participation	Emphasizes issuing messages of support and condolences	Suggests training for preparedness but less on evaluation	Includes formal phases: declaration, action, deactivation, and evaluation, with expert panel validation and iterative improvement
Practical integration of academic and field expertise	Academic-driven proof of concept	Focus on practical lessons from a real event	Research-based messaging tailored for public health emergencies	Case-study-based practical improvements	Calls for integrating scientific criteria and practical experience	Explicitly combines scientific research with expert practitioner input, validated through expert panels for both academic rigour and operational relevance

Source: Own elaboration.

6. DISCUSSION, CONCLUSIONS AND LIMITATIONS

This article presents a protocol for more efficient institutional management of disasters, crises, and emergencies via social media, based on own experience, a scoping review of the relevant literature of the last decade, and consultations with communication managers and journalists. The protocol was further refined and improved with contributions from an expert panel composed of specialists in crisis communications.

In response to RQ 1, (*Are social media platforms fundamental for emergency communications by public bodies?*) It has been found that these platforms are indeed fundamental, thus corroborating the literature (Sutton et al., 2019; Brandt et al., 2019; Liu et al., 2019; Renshaw et al., 2021). X, in particular, was considered especially useful in emergency scenarios. The authors consider X to be an effective platform in these situations for three reasons: rapid response, virality, and participation. This finding is considered essential for contributing to efficient civil protection management and coordinating communication between citizens and emergency officials. Furthermore, by allowing immediacy in the transmission of important crisis information (Eriksson, 2018), X helps traditional media monitor the events through government emergency accounts.

In relation to RQ2 (*Is there a lack of specific social media protocols for emergency situations?*), most entities do have emergency communication protocols, although they are not always specific to social media. The evidence from the scoping review and the interviews with journalists is that the legacy media tend not to have specific guidelines or specific training on social media use for emergency communications. It seems clear that a protocol to communicate emergency situations on social media is necessary, although highlighted as drawbacks were the loss of control and the proliferation of misinformation, rumours, and fake news on social media.

Finally, regarding the RQ3 (*Why is it important to have a specific emergency communications protocol for social networks?*), the expert panel concluded that specific social media protocols for emergency communications would systematize communication strategies and avoid improvisation. Allowing to act more quickly, to inform, alert and prevent the population, which can contribute to reduce the number of damages, injuries and victims, consequently, the non-improvisation in emergencies is crucial to favor the resolution of the crisis and to avoid disinformation and alarmism typical of digital social networks (Eriksson & Olsson, 2016).

The experts commended the described protocol for its synthesis capacity. They especially valued institutional involvement that improves reach and communication effectiveness, institutional leadership of the social media conversation throughout a crisis, active monitoring of trends and countering of misinformation, delimitation of crisis phases and communication of the start and end phases, exploitation of the wealth of content on social media, and the planning and implementation of social responsibility principles.

Crisis situations, as Mayo-Cubero (2020) points out, can lead to a lack of information control and generate distrust. For this reason, the authors believe that the protocol developed in this article can support essential coordination between institutions, media, and emergency services, a need that Bruns et al. (2012) also highlighted. Moreover, this protocol could help reduce undesirable emergency outcomes resulting from communication errors, which, as Martínez-Solana et al. (2017) note, can be mitigated through pre-established measures.

6.1. Limitations and future research

A limitation of the work is the lack of internationalization of the sample. Although some of the interviewees and experts represented different European countries, most were based in Spain. Future research could therefore consider other countries and world regions. Given the diversity of political cultures and legal frameworks worldwide, there is a clear need for further research to study the diversity of regions and countries. The findings of this study could be tested and refined in contexts where emergencies are managed differently. Another future research line would be to analyse the usefulness and effectiveness of new social media platforms in communicating emergencies and crises. Furthermore, future studies could implement a pilot test for the proposed protocol. This would help evaluate its functionality and relevance in real-world scenarios and enhance its usefulness.

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