

Digital Social Networks in Crisis Management: A Case Study of the Tipaza Floods of May 2023

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Abstract:

The purpose of this article is to examine the different communication methods used by a public manager through the use of the digital social network Facebook in the management of the floods that hit the wilaya of Tipaza on May 25, 2023.

This study is part of a methodological approach that is both quantitative and qualitative, in order to explain the ins and outs of communication interactions between different stakeholders, but also to describe the different representations induced by these interactions.

For data collection and discussion, we opted for the technique of content analysis of a corpus consisting of 15 publications posted online by the official Facebook account of the wilaya of Tipaza. Among the results obtained, it was notable that 57% of citizens expressed conflict with the crisis managers and only 5 publications (33%) were marked by warning signals and instructions.

Keywords: Digital Social Networks, Crises, Stakeholders, Conflictuality, Crisis Management.

1. INTRODUCTION

Algeria faces a wide range of disaster risks linked to natural hazards, particularly in urban areas in the north of the country that have seen rapid demographic and economic growth. From the 1950's to the present day floods were most frequently recorded. Today, the national flood risk assessment lists 865 sites considered to be at risk of which almost 10% present a high or very high risk. The main floods are in the north of the country, where a large part of the population and most economic activity is concentrated. (World Bank, 2023)

The floods that hit the communes of Khemisti, Bousmail, and Bouharoun in the wilaya of Tipaza on 25 May 2023 caused extensive damage. In this area, 2 damaged ports, 794 affected and potentially affected structures and 31 sections of road were identified as having suffered damage. According to a recent joint study by the World Bank and the National Delegation of Major Risks (DNRM, 2023) following this disaster, emphasis was placed on sharing information as one of the priority actions to increasing Algeria's resilience to climate and disaster risks.

In this context, the technological innovations of digital social networks have proved to be a major tool for public authorities in crisis management (Panagiotopoulos, P, Barnett, J, ZiaeeBigdeli, A &Sams, S 2016). Particularly as such social media are reshaping the flow of information between the various stakeholders in crisis management, making for a more open and ubiquitous relationship between authorities and the public.

The upsurge in flooding, which is frequently and increasingly affecting regions worldwide (India in 2015, the United States in 2012, France in 2014), has led to a proliferation of scientific studies (Douvinet et al., 2017) confirming that the public services responsible for helping the population have used Digital social networks to provide information about operations in progress and the location of flooded areas; relaying messages about expected behaviour and the nature and seriousness of the event, and to reassure people about the authorities' handling of the emergency.

For their part, citizens in the disaster-stricken regions shared information on Digital Social Networks, producing videos or immediately

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posting images or various comments on their accounts. This information was relayed spontaneously, primarily to inform friends and family, but it was also used by authorities to guide the organisation of the emergency.

This concurs with certain literature reviews (Lorini et al., 2020, Corack et al., 2018, Fernandez et al. 2006), which highlight the growth of digital social networks (DSN), observed more in the 2010's, in its use and integration in crisis communication in the context of natural disasters, thus constituting essential warning tools to seize. Thanks to the large number of messages and the speed of circulation of information shared through digital social networks, authorities can now detect weak signals, retrieve information from areas not covered by the media and/or have a better idea of the damage without being physically present (Douvinet, 2020).

As a result of this widespread use, digital social networks has become an object of study (Boyld, 2008) that involves understanding the practices, implications, culture and meaning of these technological devices, as well as users' engagement with them, by analysing a wide range of social networking sites using a variety of methodological and theoretical approaches.

This new transversal paradigm of the use of the social web not only allows victims of a natural disaster to report information and express needs that can be aggregated and used by rescuers and authorities (Hecker, 2014), but also promotes a flow of information in the opposite direction, by allowing crisis managers to use the social web to transmit information to disaster victims.

Research Question

On the basis of the foregoing, we can already formulate a problem that raises questions about public manager's ability to optimise the use of the Facebook digital social network as the main communication tool in the context of the natural disaster of the floods in Tipaza.

To further elucidate this pivotal question, we propose to develop two sub-questions to :

-Identify the factors likely to influence the effectiveness of local authorities in better informing and interacting with the audiences affected by the floods and interact with the audiences affected by the disaster.

-To explore the different issues for the stakeholders involved in crisis management, to determine their characteristics in terms of solidarity and conflict in relation to the crisis manager.

Objectives

The aim of this study is to explore the existing practices of digital social networking employed by the public manager in the social media landscape during a natural disaster.

This will enable us to identify the challenges associated with the use of this new medium. This study also allows us to highlight the limits and dysfunctions that prevent the public crisis manager from making the best possible use of digital social networks in crisis management.

2. Crisis Management: A Literature Review

2.1 conceptual Framework

A crisis/emergency or conflict state refers to a threat of disruption to the ordinary and regular functioning of an organization (country/part of a society) that announces the emergence of an unhealthy situation. The organizational structure that takes charge of an action responding to this situation is designated by the crisis manager (Steven Fink, 1986).

A crisis is a perception of an unpredictable event that threatens the expectations of different stakeholders in terms of health, safety, environment or economy and which can have a negative impact on the short/medium or long term (Coombs, 2015, p. 3).

A distinction can be made between two types of crises: solidarity crises that threaten victims and conflictual crises that oppose antagonists to the crisis manager (Rosenthal and Kouzmin, 1997). These two forms of crises mobilize different crisis management and communication methods. In fact, major crises managed in public bring several challenges to managers, starting with an image challenge, consisting of maintaining the manager's reputation as effectively as possible. From this point of view, a solidarity crisis identified by the public (natural disaster) is a potential societal responsibility challenge, in which the organization must aim to be perceived as responsible and effective (Laverdet, 2021, p. 35).

2.2 Crisis Management

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Crisis management involves identifying the causes and consequences of a crisis - including stakeholder reactions - and the appropriate management mechanisms, in order to limit the damage of the crisis or transform it into an opportunity (Coombs and Holladay, 2010).

Crisis situations are dynamic and fluid events, which require organizations to move from one management phase to another, sometimes in a disorderly manner (Fink, 1986).

To properly manage crises, managers must anticipate or identify, in a transdisciplinary manner, the causes and consequences of the crisis, measure the emergency management, reactions, and communication of the stakeholders (BJORCK, 2016). However, it is important to note that certain endogenous or exogenous factors can intervene in the emergence, aggravation or management of a crisis.

To this end, the manager must maintain an information network that allows him or her to be permanently informed of all the other actors in the system. By following this reasoning, it appears that stakeholders could constitute resources for crisis management, or threats or sources of aggravating reactions, or even potential opportunities to improve the reputation of the crisis manager, especially when it comes to a public actor (a minister, the president, a wali, or a mayor for example).

2.3 Identification of Stakeholder

In a crisis situation, a crisis manager must first identify the potential stakeholders. The latter are defined by their objectives, expectations, the size and composition of the group to which they belong, as well as the connections of the group members, their degree of credibility, power, etc., the capacity to threaten the manager and/or other actors (Laverdet, 2021, p. 44).

During the crisis, the manager must determine the actors who make up the operational dimension of the crisis (victims and future victims of a natural disaster, the antagonists and future antagonists of a conflictual crisis and their supporters, but also those who are involved or impacted by the crisis response mechanisms (partners, journalists, etc.)

Therefore, a systemic and cross-functional analysis of the different

stakeholders is essential from the outset for better performance in crisis management (Crozier et al, 1975).

2.4 How to Alert in a Crisis ?

An alert message is the first communication brought to the attention of the public about a potential or real risk (Lavredet, 2021, p. 56).

Informing by alerting about crises and risks is a principle and a deontological objective in order to preserve the physical and mental integrity of populations and victims. This type of communication accompanies all stages of the crisis response (from crisis detection, precaution, and prevention, to the post-crisis phase).

The first communications on the occurrence of a risk are essential, in particular the alert and the first instructions concerning the immediate risk (Palttala and Vos, 2012).

In a crisis, clear and effective communication is essential. The manager must communicate in such a way that the issues are easily understandable by everyone, and it is important to repeat important information regularly (alerts about risks, road closures due to snowfall or flooding). Alerts are essential for crisis management because they can significantly limit and mitigate the damage caused to populations (Sellnow and Seeger, 2013, p. 73).

These alert messages are characterized by:

- Their instantaneous distribution following the triggering of the incident;
- They are easily identifiable and noticeable by introducing them with an icon (e.g. a triangle colored red or yellow to attract attention);
- They give clear instructions or directions on the measures to be taken;
- They provide advice on how to find more information.

3. Social Media and Crisis Management

In the scientific literature, the term "social media" refers to a wide range of Internet tools and uses (Wybo et al, 2015, p 38), which allow a large number of users and communities to share information, ideas and opinions in an interactive way: blogs, microblogs (twitter), networking sites

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(facebook), wiki (wikipedia), and videos (Youtube). The main characteristic of social media is that they are managed in a very decentralized way by the general public.

3.1 Uses of Social Media and Their characteristics

The advent of social media has led to a real reconfiguration of the traditional media landscape, particularly after their progressive integration into both the production and dissemination of different forms of content in risk (cybercrime and terrorist acts) and crisis situations (natural disasters such as the Haiti earthquake in 2010). Some authors have considered that the end of the monopoly of traditional media in the dissemination of information in times of crisis has been accelerated following the spread of massive use of social media in crisis situations (Ramonet, 2011, p.15).

Social media such as Facebook or Twitter disseminate communications from managers, their partners and their relays, before, during and after a crisis (Schwartz et al, 2016).

Social media makes it possible to involve users in risks and management systems, to alert them to imminent threats and risks;

The social network Facebook is able to reach very large audiences because it disseminates information between and within groups of users. Indeed, since 2014, some Western governments have recommended that local institutions be imperatively present on Facebook to communicate and to constantly monitor public discourse, due to the large number of users registered on Facebook (Lavredet, 2021, p.78).

Two main modes of use of social media in crisis situations are identified, a “passive” use for the dissemination and reception of messages from users; a “systematic” use to manage emergency communication, alerts and requests from victims, to monitor the progress of activities and to assess damage (Lindsay, 2011).

It is important to note that the first category of use mentioned above is not as passive, as social media allows populations to report and identify the existence of disasters, sometimes even ahead of managers (Houston et al, 2014), as well as the testimonies in images or videos by users on social networks facilitate the risk assessment by managers.

Overall, social networks allow populations and certain stakeholders to:

- Learn what is happening to others;
- Receive and disseminate media coverage of the disaster, or crisis communications from managers and their partners;
- Identify and list means of aid, raising citizen awareness, giving and receiving donations.
- Social networks allow users to express emotions, concerns, wishes, commemorate victims, tell stories about the crisis, discuss and disseminate explanations of socio-political, technical or scientific causes, implications or to identify responsibilities (Houston et al, 2014, p. 8).

3.2 The impact of user reactions on the manager's reputation

Reputation is an accumulation of individual beliefs and impressions towards the manager among heterogeneous audiences. It is a form of capital that the manager does not hold, it is an exogenous factor to his resources.

The manager's reputation influences the credibility and effectiveness of his communications which respond to the risks and needs of the victims (Lavredet, 2021, p.91).

Once the messages around the crisis are disseminated and consulted, the public's emotional reactions will serve as a barometer of the consequences of the crisis for the manager's activity and reputation (Coombs, 2016). In this sense, particular attention must be paid to the anger expressed by the populations towards the manager, as it triggers reactions that are harmful to his activity and reputation; starting with a modification of his image, such as social sharing conveying a negative image of the manager (Lavredet, 2021, p. 99).

Several studies agree on the reasons for this anger towards the manager, which essentially results from a responsibility attributed to the manager in the emergence or aggravation of a crisis (Coombs, 2007).

The recurrence of crises (humanitarian, natural, security...) has led public actors and researchers to develop techniques that allow them to process messages and analyze the functioning of social media in sudden, dynamic and evolving crisis situations.

3.4 Processing of Information Circulating in Social Media

The analysis of information flows that are conveyed through social media is very important to identify certain information. This need has led to the development of social media analysis techniques, which exploit data collected in real time to provide different types of results during the three phases of the crisis:

A) Before the crisis:

- Capture weak signals or precursors and anticipate changes or events.

B) During the crisis:

- Visualize the development of the situation, identify important events and influential individuals, identify groups and/or pages that are forming.

C) After the crisis:

- Understand what happened and identify key moments and people, in order to evaluate the organization and promote good practices.

From this perspective, a social network is defined as a set of nodes and a set of links connecting these nodes together. Nodes can be customers, URLs, products, individuals... (Wybo et al, 2015, p. 40). Since the September 11, 2001 attacks, these techniques have been used in crisis management, counterterrorism, and fraud detection.

The analysis of a social network can be broken down into four steps:

1. Describe the entities and connections and define the interactions.
2. Explore and visualize the social network.
3. Calculate social variables.
4. Use these variables to identify influential nodes and build predictive models.

This textual analysis of the content will make it possible to identify stakeholder conversations based on the thematic dimension of the texts (what are they talking about?) but also based on the evaluative dimension (what feelings, opinions, tones do they express?) (Wybo, 2015, p.42).

4. Methods and Materials

This research is part of a mixed (qualitative-quantitative) approach, through which we will use the Content Analysis technique in its two aspects:

A) Quantitative analysis to elucidate and explain the causal relationships of the interconnections between the various stakeholders involved in the

crisis through the use of the Facebook social network. This will enable us to answer the following two questions:

- 1) Which stakeholders are protagonists and endogenous to the crisis manager identified on the Facebook page?
- 2) Did the content produced on the Facebook page capture people's attention?

Categories: quantitative approach

C1) Stakeholders: the Wali, wilaya directorates (energy, public works, education, water resources, civil protection)

C2) Content modes: to identify the style that best captures the attention of the public during the crisis.

Textual/ image/ audiovisual mixed text + image

C3) The integration of warning signals as indicators of capture on RSNs

The number of occurrences of these signals reflects the public manager's commitment to warning and raise awareness among the population affected by the disaster.

B) The qualitative analysis will help us to answer the following question: How can we describe people's reactions? Solidarity with the manager or conflict?

Categories of the qualitative approach

This analysis consists of implementing a categorisation based on the reactions expressed by social network users on the day of the floods.

According to the literature about this question (Hargie & Irving, 2016, Parmer et al., 2016; Seeger, 2006) we can distinguish between 04 types of reaction to users' comments, which may express :

- solidarity between users
- solidarity with the manager
- conflict between users
- Conflict with the manager

Sampling

The phase studied in this article was limited to the day of 25 May 2023, when the official Facebook site of the wilaya of Tipaza published a total of 15 posts entirely dedicated to the floods that hit the towns of Bouharoune,

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Bouismail, Douaouda, Kolea and Khemisseti. Given the relatively small number of publications, we opted for a targeted (purposive) sampling.

5. Results and Discussion

Table n° 1 research corpus

Désignation of the page	Number of Subscribers	Structure in charge	Total publications
Facebook account of the Wilaya of Tipasa	105 k	communication Unit (w. Tipasa)	15 publications

1) The Protagonist and Endogenous Stakeholders of the Crisis Manager Identified on the Tipasa Wilaya Facebook Pages

It is noteworthy that the main endogenous actors and resources for crisis management are, in order of occurrence: the Directorate of Public Works, the Directorate of Sonelgaz, the Directorate of Civil Protection and that of SEAAL.

The total number of publications produced by the communication unit of the public institution of the Wilaya of Tipasa for the day of May 25, 2023 is 15 publications. This information flow was shared on the official Facebook account of the Wilaya with 105 thousand subscribers.

The number of occurrences of the main endogenous stakeholders in crisis management is distributed as follows:

The Wali (05 times) / Directorate of Public Works DTP (05 times)

Directorate of Sonelgaz 04 times / SEAAL Company 03 times

Civil Protection 01 time.

It is important to underline the strong presence of the Ministry of the Interior and territorial Communities through the press releases published on the Facebook page.

For a disaster of this magnitude, and according to the scientific literature previously cited, it is clear that the manager has not optimized or at least given visibility to the involvement of all the resource actors in order to respond effectively to the needs expressed by the users, such as the health services, the directorate of social services and solidarity, the

directorate of education, the environment, not to mention the actions of citizen solidarity that are mobilized in a context of crisis.

2) Did the Content Mode Produced on the Facebook Page Capture the Attention of the Population?

Table N°2. The relationship between the mode of content and capturing the attention of populations

Content mode	Number of generated comments	Number of generated share
Informative text 06	24	35
Texte + image 05	145	78
Image 02	23	14
Vidéo 02	356	170
	Total comments 548	Total share : 297

Quantitative analysis of the data relating to the attraction of users (citizens-victims-witnesses) of the floods to the messages conveyed by the public crisis managers, shows that out of the 548 comments generated following the 15 publications put online, 65% refer to two audiovisual interventions (video) by the top manager, namely the wali of Tipasa, the main crisis manager. However, six text-based publications generated only 4.5% (24) comments, or 4.5% of the total number of comments, a capture rate considered very low given the context marked by a feeling of uncertainty among the populations of the localities of Bou Ismail, Douaouda, Khemisseti and Koléa, in the wilaya of Tipasa.

In this sense, we can highlight the number of shares of publications as an indicator of capture and citizen mobilization. We note that the origin of nearly 60% of the shares comes from video publications, despite the fact that it was only used twice during the whole day of the crisis. In second position, the publications that combined text and image collected 78 shares, or 27% of the total number of shares (297). However, the manager's use of text-based publications six times does not seem to achieve its objectives in

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terms of managerial information efficiency, as the number of shares generated from this format did not exceed 11 shares (12%) of the total number of shares. We can deduce that the use of the video format in the mode of produced content optimizes the capture of interest, indicated by the significant number of comments generated by users.

**Table n°3 :Alert Signals as Indicators of audience capturing on
Social Media**

The Publication of posts in chronological order	Clarity of alert messages and instructions	
P1	Placed in conclusion, not visible	
P2	Clearly visible	
P3	No Alert	
P4	“Alert” title well highlighted	
P5	Users report the death of a child	
P6	Users report damage and aggregation in their localities	
P7	Users: Road aggregation, destroyed house, ports, ...	
P8	No Alert	
P9	Clearly visible	
P10	No Alert	
P11	No Alert	
P12	Clearly visible	
P13	No Alert	
P14	No Alert	
P15	Clearly visible	
Total des publications 15	Publication with a clear alert signal 05	Publications without an alert signal 10

Table n°03 indicates that certain endogenous crisis managers, such as those from SEAAL, Sonelgaz, and the Directorate of Public Works, were positioned on the front line to alert populations in the localities affected by the floods, the repeated interruptions of electricity and gas supply, and the damage to drinking water pipes. This situation

therefore required the mass production of clear and comprehensible alert messages for different audiences (public transport users, schoolchildren, drivers, households, etc.). However, Table 3 shows that only 5 publications, or 33%, were marked with alert and instruction signals (Important! Alert!). However, 67% of the publications did not mention any iconographic sign or headline indicating that it was important information, following which the different endogenous and exogenous stakeholders in crisis management would know what decision should be taken with regard to the priorities for action (sanitary, rescuing victims, road sanitation, etc.) at what time? And in coordination with which party? It is important to note that in the absence of these alerts in the publications of the public manager, 3 alert messages were found in the comments of Internet users, in which they reported the death of a child in the city of Khemisseti.

3) Qualitative Analysis: How to Qualify the Reactions of the Population? Solidarity with the Manager or Conflictual?

Table n° 4 : Population Reactions to Crisis Managers

Conflict between users	Solidarity between users	Solidarity with the manager	Conflict with the manager
58	101	74	315
Total of comments 548			

Out of the 15 publications analyzed, we identified 548 comments, distributed as follows: 315 comments (57%) expressed conflict with the crisis managers. The delay or lack of response was the main source of this conflict, followed by the lack of competence of local officials, who are responsible for the consequences of the flooding. In no case did we record any reactions or interaction from the manager's endogenous resources to these comments, particularly when it came to clarifying certain false information that was circulating that day, or to

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responding to certain urgent concerns. In this case, (Scarwell and Lagarnier, 2004) explain that rumors are also amplified by the gaps between the emotional impact (experienced by those affected by the disaster) and the media coverage. In the absence of an official press release, individuals often act on the information received before it is even verified. According to (Douvinier, 2020) the exchanges between individuals and discussions move quickly, which can generate rumours, confusion, but also a lack of responsiveness to less flexible and less dynamic means such as institutional warning tools.

This dysfunction in terms of the tone and opinions expressed by some and ignored by others created a divide and a sense of angry disenchantment among the population. This explains the 18% of comments that expressed solidarity between citizens in this context of crisis, with messages of support and courage to overcome this ordeal, particularly those addressed to the family that had lost a 9-year-old child, reported by users early in the morning, but which was ignored by the disaster manager until the Ministry of the Interior mentioned it in its second press release hours later. This feeling of anger expressed means according to (Berger, 2011) that the public tends to socially share information that arouses significant physiological arousal, such as intense emotion. This applies primarily to disasters and other situations whose emergence into public discourse is associated with collective emotions.

On another note, we found that 13.5% of citizens expressed solidarity with the managers, who had been mobilized from the early hours of that day in the localities affected by this natural disaster.

For 10.5% of Internet users, the primary responsibility lies with the citizens who, according to their comments, "lack civic-mindedness and build houses anarchically without taking into account urban sanitation plans."

6. CONCLUSION

Crisis management in a digital context requires a cross-functional management system in the choice of editorial line which frames all the communication actions undertaken in the resolution of the crisis.

The results of the study demonstrated a timid activity in terms of use of the social network Facebook by the public manager and its endogenous stakeholders to reassure and effectively inform the inhabitants of the localities affected by the floods. The total number of fifteen publications published in such circumstances has led to critical reactions marked by the conflicting nature of the comments

The low optimization of the use of the social network, where only two publications in video mode were broadcast out of a total of 15 publications, resulted in the low impact of the content of the official communication which did not succeed in producing a viral effect of the shares.

To conclude, the use of digital social networks in crisis management takes into account several parameters, characterized by variable flexibility depending on the specificity of the digital social network mobilized, the socio-digital practices of the populations (users) impacted by the crisis, the intensification of interactions with all stakeholders involved in the management or worsening of the crisis. The effectiveness of crisis management will now depend on the need to reinvent new digital communication professions with public institutions in order to maintain their image and reputation in the perceptions of citizens.

7. Recommendations:

The literature review and the results obtained from this study enable us to propose some reflexions for future researchers or practitioners.

- 1) It is true that the Facebook social network is widely used in Algeria (more than 24 million Facebook users), but using it as main tool in natural disaster for information and exchange, has shown its limitations because useful information is drowned in a stream of disparate data.

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2) Research should be carried out into the vulnerability created by social networks, which is linked to their open nature. Anyone can log on and publish all kinds of information.

The mechanisms for countering rumours and attempts at disinformation must therefore be strengthened.

3) the national and local authorities responsible for risk and natural disaster management in Algeria should draw up a guide to good practice in using social media in emergency management to improve responsiveness and efficiency in times of crisis.

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