Natural Hazards Research Australia

Social media analytics to explore community experiences of Tropical Cyclone Alfred

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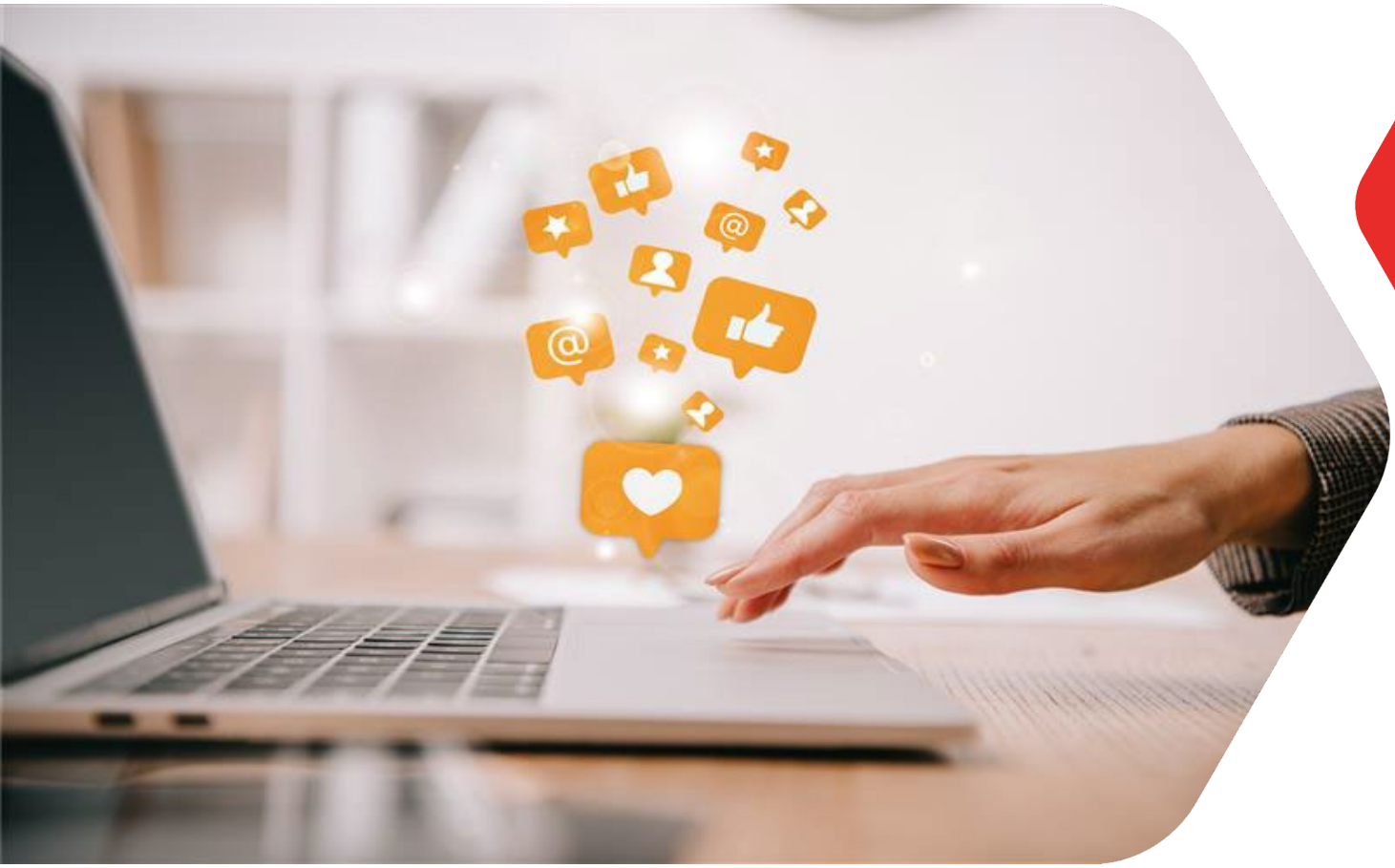

THE UNIVERSITY OF MELBOURNE

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We acknowledge the Traditional Custodians across all the lands on which we live and work, and we pay our respects to Elders both past, present and emerging. We recognise that these lands and waters have always been places of teaching, research and learning.

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Executive summary

This research explores how communities experienced and responded to Tropical Cyclone Alfred by analysing social media activity before, during and after the event. Drawing on publicly available posts from X, Facebook, and Instagram, the study examines how individuals communicated, sought information and coped with the disaster.

The project focuses on several interrelated aspects of community response. It investigates how emergency warnings were received and acted upon, evaluating the effectiveness of official communication channels alongside informal sources such as local knowledge from ad-hoc and pre-existing social media groups. It also examines how households and businesses prepared for the cyclone, exploring the types of protective measures people took and when they acted.

Findings show official one-to-many crisis warnings (e.g., on X) led to less community engagement compared with many-to-many communications in group structures (e.g., in Facebook groups). The study also finds that social media user engagement, including serious discussions about preparedness and recovery, is more pronounced in visual short-form formats (e.g., Instagram reels) compared with textual short-form formats (e.g., X, Facebook posts). Consequently, crisis response agencies can use these findings to adjust their emergency communication strategies to (1) leverage existing many-to-many group structures (e.g., through community ambassadors), (2) prioritise visual short-form media (e.g., TikTok) to benefit from the now dominant practice of “algorithmic audiencing” and (3) use thread-based platforms (e.g., Reddit) to increase control and predictability when engaging with Australian communities on social media.

Introduction

Tropical Cyclone Alfred (TC Alfred) made landfall on 8 March 2025, affecting southeast Queensland and the New South Wales (NSW) North Coast. The cyclone was anticipated as one of the most severe weather events in recent Australian history, prompting increased disaster communication and community coordination via social media. In the past decade, social media platforms have transformed the way individuals receive warnings, share information and mobilise resources during extreme weather events.

While government agencies and emergency services have adopted social media as part of their crisis communication strategies, eliciting engagement among Australian communities remains a challenge. Social media platforms, including their algorithms, features and appeal to users constantly change, creating tensions in the governance and strategy of social media use for disaster communication and community coordination.

This study investigates the role of social media in shaping community experiences and responses to TC Alfred, drawing on a two-stage analytical approach. Stage one involves a bottom-up analysis combining topic modelling with inductive thematic analysis. This stage captures the dominant themes emerging organically from community-generated content and maps how they evolved over time. Stage two applies a deductive thematic analysis of social media comments using a predefined framework that includes six core response areas: emergency warnings; household and business preparedness; trusted information sources; insurance and financial preparedness; extent of damage; and initial recovery and clean-up. These categories reflect key phases of the disaster timeline and are commonly used in emergency management frameworks to evaluate public response and institutional communication.

Through this dual-layered approach, analysis of public discussions and engagement across the three major platforms was undertaken to understand how communities processed, responded to and coordinated during TC Alfred. Critical questions are addressed, including: how were emergency warnings received? What sources were most trusted? What obstacles did individuals face in accessing support or preparing their households? And how did digital platforms facilitate (or hinder) community resilience in the immediate aftermath? By adopting a social media analytics lens, this report provides a comprehensive account of how information flowed, and communities interacted during the disaster event. The findings inform implications for emergency service agencies and practitioners, emphasising the importance of adapting social media strategies to evolving platform dynamics and community expectations. These insights are critical to the development of more responsive, inclusive and effective disaster communications in Australia.

Background

Social media have become indispensable tools in the management of contemporary crises, including those frequently encountered in Australia such as bushfires, tropical cyclones, and floods (Fischer-Preßler et al., 2024). This is because local communities increasingly use social media to make sense of unfolding events and to navigate the uncertainties of a disaster (Marx et al., 2024). While many users remain passive observers, the affordances of social media also empower citizens to act as active contributors, sharing real-time, crisis-related information with others (Mousavi & Gu, 2024). In Australia, emergency service agencies have adopted social media to access firsthand accounts from affected individuals and to broadcast timely updates, warnings and safety instructions to communities.

Australia is no stranger to extreme weather, with tropical cyclones representing a particularly destructive natural hazards affecting northern parts of the country. While bushfires receive considerable national and international attention—particularly during 2019–20 Black Summer—cyclones continue to pose significant threats to regional and remote communities across northern Queensland, the Northern Territory and Western Australia (Ahmed & Ledger, 2023; Chand et al., 2019). Each cyclone season brings the risk of damaging winds, torrential rainfall, flooding, coastal erosion and infrastructure damage. Yet, despite their regularity, the ways in which communities prepare for, navigate and recover from cyclones remain underexamined in comparison to bushfires.

Cyclones unfold differently from fast-moving fires. While bushfires can erupt with little warning, cyclones are generally tracked days in advance, allowing time for preparation, though this window varies in effectiveness depending on the reliability of forecasts, community awareness and infrastructure resilience. Local knowledge, access to accurate information and communication between emergency service agencies and the communities all play crucial roles in mitigating cyclone risks (Mirbabaie et al., 2020). In regions frequently impacted by cyclones, preparedness often becomes a form of lived knowledge, passed down through generations and reinforced through local networks, including social media (Zander et al., 2022).

The recovery process following a cyclone can be long and uneven. Damage to roads, homes and public infrastructure can isolate communities and complicate access to support services. Similar to bushfires, digital technologies, especially social media, have become central to how communities respond and recover (Abbasi et al., 2024). Platforms such as Facebook and Instagram are increasingly used to disseminate emergency warnings, coordinate aid and share updates about damages or missing persons. Visual content, in particular, plays a powerful role in shaping public perception and prompting external support (Yoo et al., 2024).

Australia's political and media landscape also influences how cyclone-related information is framed and acted on. Public debates around climate change, infrastructure funding and the responsibilities of state versus federal authorities all shape preparedness and recovery efforts. While the media's role during the 2019-202 Black Summer bushfires revealed a polarized environment where narratives around climate responsibility varied widely (Truong-Ngoc et al., 2025), reporting around cyclones tends to receive less sustained national attention unless catastrophic damage is caused. This disparity contributes to a broader challenge: the uneven visibility of disaster-affected communities in public discourse and policymaking.

In light of these dynamics, it becomes increasingly important to understand how Australian communities experience and respond to cyclones, not only through formal emergency channels, but also through grassroots and digital means. Studying social media activity before, during and after cyclone events offers a window into these lived experiences, illuminating patterns of risk communication, trust and collective action. This study aims to contribute to a deeper understanding of community resilience and digital engagement in the face of climate-driven natural disasters in Australia. Specifically, TC Alfred is used to explore how communities prepared for, navigated and recovered from through the use of social media.

Research approach

TC Alfred triggered community-level conversations on major social media platforms, with hashtags such as #CycloneAlfred highlighting its role as a space for real-time public discourse. Users posted updates on local conditions, shared emergency information, expressed concerns and discussed the cyclone's environmental and social impacts. This setting provides a unique opportunity to analyse the sentiment and content of social media postings and user comments, particularly in response to key moments such as weather alerts, flood warnings and infrastructure disruptions.

Data collection

Data from Twitter/X, Facebook and Instagram was collected using a self-developed crawler based on an established Social Media Analytics framework (Stieglitz et al., 2018). The crawler employed a series of keyword and account-based tracking to extract publicly available posts and user comments related to TC Alfred. This automated data collection was supplemented by manual observations of public Facebook groups and Facebook event pages for which an automated data export was not feasible. Data were collected for a time period surrounding the cyclone's development and impact — from 23/02/2025 to 17/03/2025 — using keywords such as *CycloneAlfred*, *cyclone* and *flood*. The dataset includes both hashtagged and non-hashtagged mentions, yielding a total of 5,437 original posts and 11,348 user comments. This dataset covers a representative sample of social media discussions before, during, and after TC Alfred and comprises different content types on all three investigated platforms, including video, image and text-based content.

Data analysis

In this research project, social media responses to TC Alfred were investigated in two analytical stages. Stage 1 adopts a bottom-up approach to uncover emergent topics on Twitter/X, Facebook, and Instagram, identifying how public discourse evolved over the course of the event. Stage 2 builds on this by applying a deductive analysis of postings and user comments related to official social media profiles of relevant emergency service agencies. This analysis is guided by six predefined themes that reflect critical phases of community crisis response: (1) emergency warnings, (2) household and business preparedness, (3) trusted information sources, (4) insurance and financial preparedness, (5) extent of damage, and (6) initial recovery and clean-up.

Stage 1 - Exploratory analysis

A manual, bottom-up thematic analysis with a focus on semantic (rather than latent) themes was employed (Braun & Clarke, 2006, 2019). The analysis included posts from X, Facebook and Instagram, allowing a multi-platform perspective of public discourse during TC Alfred. Specific activity peaks across the platforms were identified, periods where the volume of cyclone-related posts spiked. These peaks were determined based on platform-specific engagement metrics (e.g., tweet frequency, post volume and comment activity). Posts that did not directly address the cyclone or its impacts were removed to maintain clear analytical focus. In the initial coding phase, descriptive labels were assigned to each post or comment based on its primary focus and tone. These included expressions of concern, requests for information or help, documentation of damage, reflections on preparedness and responses to official communications. The use of imagery (e.g., photos or videos of floodwaters) and platform-specific features (e.g., hashtags, reels, group tags) were also noted. Subsequently, initial codes were grouped the into themes capturing the underlying narratives and emotional tones within the posts. This allowed the identification of patterns of collective action, trust and distrust in authorities, shared coping strategies and the evolving emotional responses of affected communities.

Combining this manual analysis with an automated analysis allowed a larger sample and contrast our manual thematic analysis to be processed with results of a state-of-the-art topic modelling algorithm. The BERTopic library in Python, which leverages state-of-the-art transformer-based natural language processing (NLP) capabilities. BERTopic converts social media posts into numerical representations using word embeddings, which capture the contextual meaning of words within a given text. These embeddings allow for the computation of similarity metrics, such as cosine distance, to determine semantic relationships between posts.

For this research, BERTopic models were instantiated using pre-defined hyperparameters and the algorithm applied separately to the data derived from Instagram (n=2,309). After initial topic modelling, manual refinement was conducted to merge overlapping topics and improve interpretability. Each post in the final dataset was then labelled with a topic based on the model's output.

Additionally, exploratory quantitative analyses were performed involving descriptive statistics of social media engagement metrics. For example, analysis includes posting and commenting frequencies, Facebook group membership dynamics and lists of the most popular postings based on views, likes, shares and comments. The purpose of this analysis was to better understand the volume and impact of certain themes in the overall communication around TC Alfred.

Stage 2 - Explanatory analysis

In stage 2, a deductive thematic analysis was performed to complement Stage 1's explorative, bottom-up approach. The was undertaken as particular topics of interest to emergency service agencies, including responses to official warnings and the discussion of insurance claims, did not emerge organically from the bottom-up analysis. These topics where either (1) not high in volume and frequency, that is, they were discussed very little compared to other topics, or (2) did not end up in keyword-based tracking as related postings did not make use of the cyclone-related keywords and hashtags used in the data collection approach.

Consequently, in Stage 2, account-based approach was used to analyse posts and comments across all three platforms on official profiles of the following organisations and agencies (if applicable): Australian Red Cross; Energy Networks Australia; Green Cross Australia; National Emergency Management Agency (NEMA); Queensland Fire Department; Queensland State Emergency Service; NSW Reconstruction Authority; Healthy Land and Water; Bureau of Meteorology; NSW Reconstruction Authority; Fire and Rescue NSW; NSW Rural Fire Service; NSW State Emergency Service; Department of Planning and Environment; Department of Customer Service; and NSW National Parks and Wildlife Service.

In this analysis, community responses to official communications by these accounts were of most interest. A deductive thematic analysis of the six predefined themes was applied to user comments relating to official communications on platforms. This allowed all themes of interest to emergency service agencies to be covered, as well as benchmark the clout, nature and tone of community responses to official communications (one-to-many) against self-organising community responses (many-to-many).

Research findings

Stage 1: Exploratory analysis

This section presents findings of the multi-platform social media analysis of community responses to TC Alfred. The examination of user-generated content on X (formerly Twitter), Facebook and Instagram facilitated understanding of how communities navigated the event—how they sought information, communicated risk, coordinated support and coped with the crisis. This analysis combines computational topic modelling and thematic qualitative analysis, offering a layered picture of digital engagement during the cyclone.

Scale and nature of community engagement on social media

Across platforms public engagement with TC Alfred was high, indicating the central role of social media in crisis communication and response. More than 36,000 TC Alfred-related posts were identified on X and recorded more than 31,000 interactions. Instagram featured approximately 34,600 TC Alfred-related posts of which 2,309 were sampled for detailed analysis. Figure 1 displays the sample's posting activity over time and by content type.

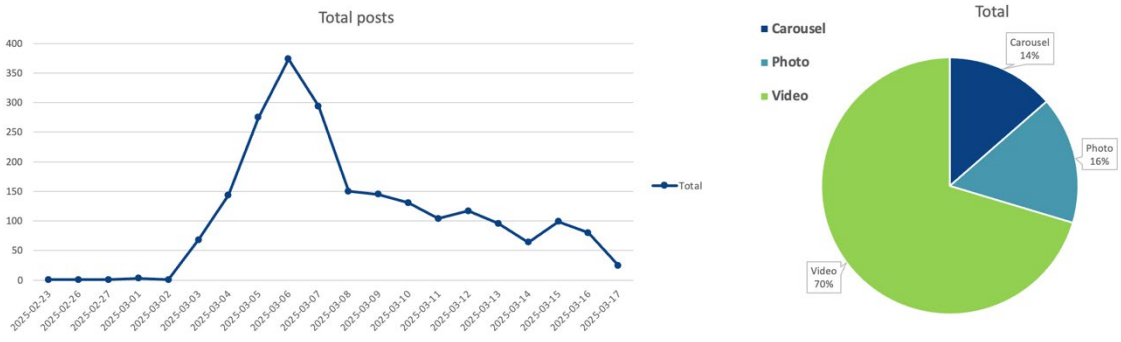


FIGURE 1. POSTING ACTIVITY OVER TIME (LEFT) AND CONTENT TYPES (RIGHT) IN THE INSTAGRAM SAMPLE

Facebook activity comprised both public discussion as well as semi-public group activities and public event pages. Approximately 2,100 posts and comments were retrieved for analysis. Additionally, the Facebook crisis tab became a hub for real-time updates, peer support and localised information sharing, however, it also became a temporary issue as Facebook's search yielded no results about TC Alfred for multiple hours in the early stages of the event. Figure 2 shows the share and comment activity in one of the most active pages.

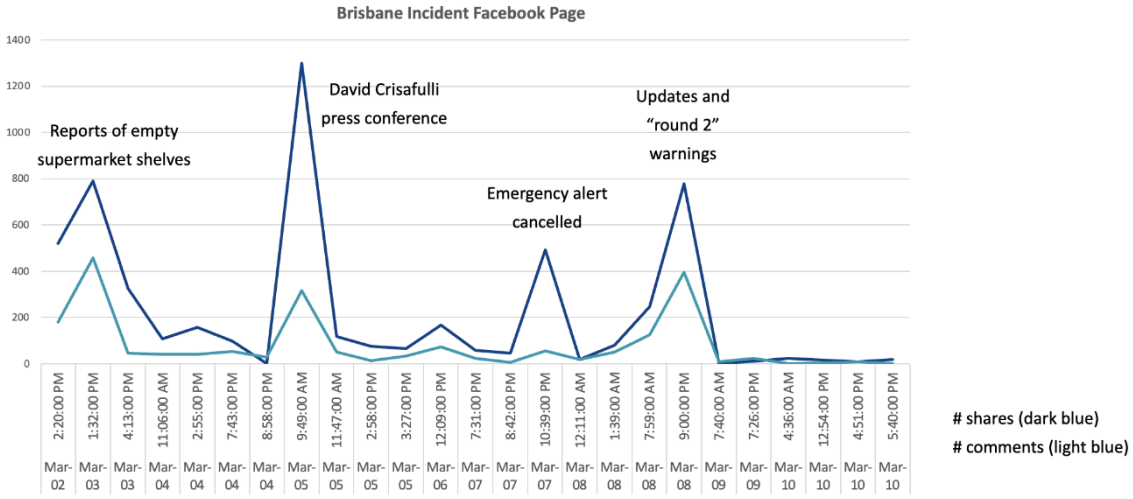


FIGURE 2. SHARE AND COMMENT ACTIVITY OVER TIME IN THE BRISBANE INCIDENT FACEBOOK PAGE

Topic modelling and visual narratives

Using the BERTopic algorithm, 32 distinct topics were extracted from the Instagram dataset. These were categories into eight overarching clusters, capturing recurring themes such as emergency warnings, local damage reports, recovery efforts and expressions of solidarity. The high prevalence of visual content, particularly Instagram Reels and photos of damage or local conditions, underscores the importance of imagery in disaster communication. The most viral content tended to be short-form videos that did not highlight the dramatic weather footage or community efforts. Two out of the four most viral reels contained humorous content of community members 'having fun' with the weather (e.g., strong winds, waves, etc.). Several reels gained thousands of likes and comments, serving as informal yet impactful records of how local communities felt about their TC Alfred experience. These posts often blended informational and emotional content, conveying both urgency and collective resilience. Instagram findings suggest visual short-form media play a disproportionately large role in engagement and reach. For emergency service agencies, this highlights a need to expand communication strategies to include platforms and formats that prioritise visual storytelling, especially when targeting younger demographics or broad public audiences. Figure 3 provides an overview of all 32 topics and their frequency.

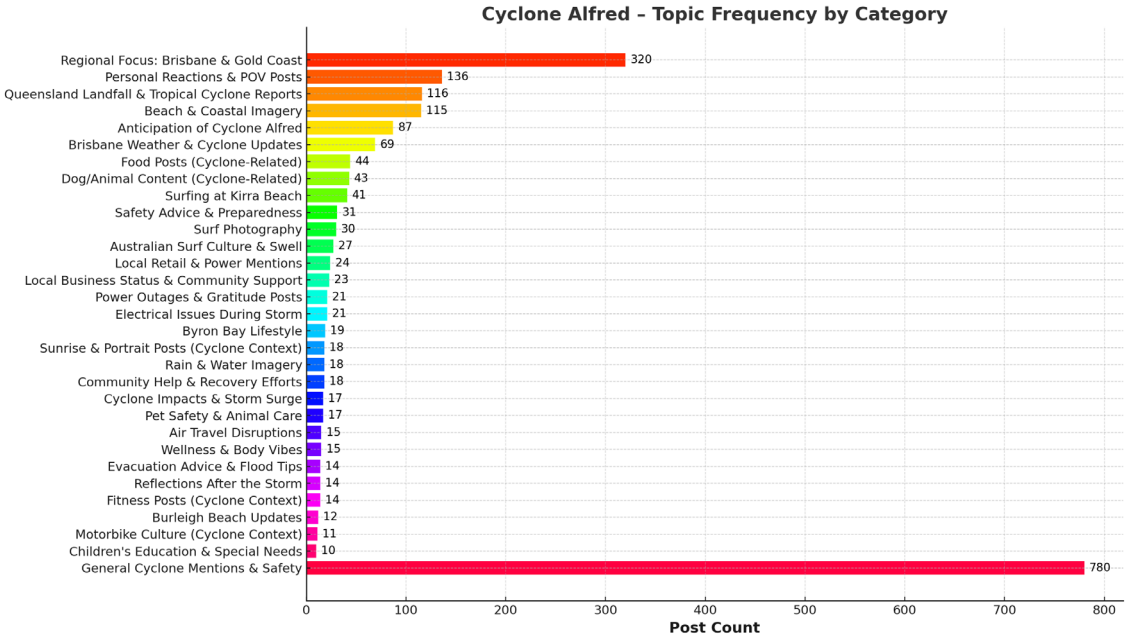


FIGURE 3. OVERVIEW OF 32 TOPIC CATEGORIES AND THEIR FREQUENCY

Community-led crisis communication

Analysis of Facebook groups and event pages highlighted a highly participatory environment characterised by strong peer-to-peer interactions. A qualitative thematic analysis of posts and comments identified six themes:

- Theme 1: Requesting crisis-related information – users frequently asked for help navigating evacuation routes, payment services, travel disruptions and donation procedures.
- Theme 2: Sharing crisis-related information – posts included real-time weather alerts, personal evacuation experiences, warnings about dangerous areas and offers of aid.
- Theme 3: Support and wellbeing – users offered encouragement, shared mental health concerns, posted photos of pets and family and thanked group moderators.
- Theme 4: Humour as a coping strategy – memes and sarcastic commentary were used to express frustration, reduce anxiety and maintain social bonds.
- Theme 5: Turning to unofficial information sources – many posts included screenshots from other platforms (e.g., ChatGPT) or unverifiable but trusted social sources, indicating both reliance on and risk from informal information networks.
- Theme 6: Exploiting the crisis – minority of content included conspiracy theories, misinformation, and opportunistic content reposting.

These themes highlight the broad spectrum of digital behaviour, from coordination and empathy to misinformation and emotional regulation. Notably, the use of humour and community-driven moderation appeared to strengthen group cohesion and engagement. Emergency service agencies may benefit from recognising and engaging with these organically developed online communities, which often have a local focus, particularly during the initial and recovery phases of disaster response. Figure 4 shows three examples for themes 1, 4, and 5.

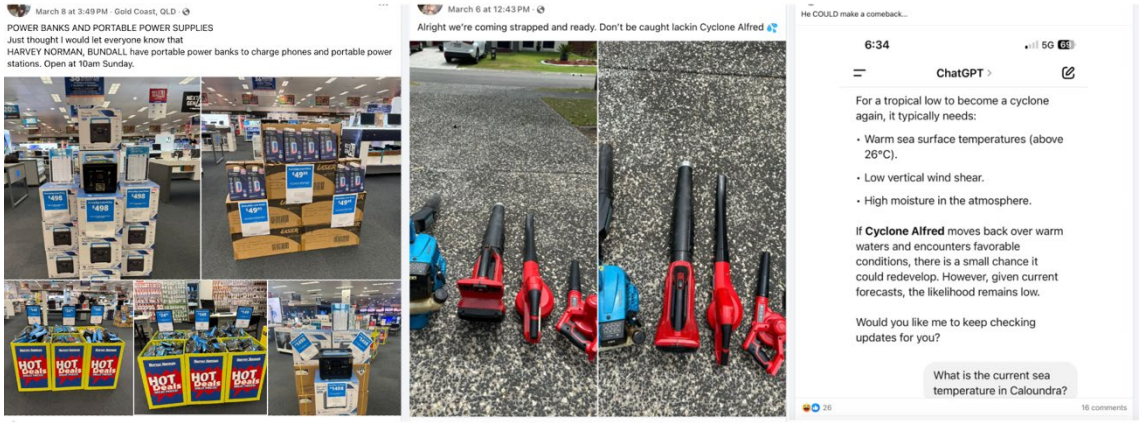


FIGURE 4. EXAMPLES FOR THEMES 1, 4, AND 5.

Stage 2: Explanatory analysis

Building on the multi-platform social media analysis, these findings relate to six core thematic areas reflecting a key component of public response and experience during TC Alfred. These themes: emergency warnings; preparedness; trust in information sources; insurance and financial concerns; perceived damage; and recovery efforts, offer insight into how communities across Queensland and Northern NSW experienced, understood and navigated the cyclone.

Emergency warnings

A wide range of accounts—government agencies such as the Bureau of Meteorology, national and local news channels, as well as community groups and individuals—actively participated in posting and amplifying emergency warnings. These warnings were shared across Facebook, X and Instagram. While issuing bodies maintained a steady presence, user response varied. Many expressed gratitude and felt reassured by timely updates, particularly when these posts included location-specific details and visual cues (e.g., weather maps, video forecasts). Others however voiced frustration, citing a lack of clarity or delays in updates and a portion of users responded with humour or sarcasm, common coping mechanisms during disasters.

Crucially, accounts that combined accuracy with active audience engagement (e.g., responding to comments, posting real-time follow-ups) generated the highest levels of trust and reach. Within Facebook groups, moderators and highly active users created safe spaces for information exchange, emotional support and problem-solving. These peer-led interactions often complemented official communication and provided a sense of community resilience in times of uncertainty.

Yet, it was striking that most emergency warning posts from issuing bodies and official institutions—some of which count over 100,000 followers—received very low community engagement and reach on Facebook and X/Twitter, compared to community-led exchanges in Facebook groups and on Instagram. Most posts were text-based, few were visual and low in emotionality. This hints at a mismatch between current social media strategies by emergency service agencies and 'algorithmic audiencing' (Riemer & Peter, 2021), which is prevalent today on all major platforms. The implications of this observation are discussed later in this report.

Household and business preparedness

Across platforms, particularly on Facebook, extensive discussion around household preparedness was observed, though comparatively little evidence was found of business-oriented planning. Individuals shared practical advice and resources related to storm preparation, including how to access sandbags, store food and water, secure furniture, protect sentimental items and locate temporary shelters. Posts from emergency service agencies frequently prompted community engagement in this regard. One commenter in response to a post by an emergency service agencies stated:

> What's the location for sandbags in ORMEAU area please?

This simple question generated not only direct answers but also extended threads of discussion offering alternatives, sharing local depot hours, or commenting on road accessibility.

Despite these peer-led efforts, challenges were evident. Inequities in access, especially for elderly, disabled, or lower-income individuals surfaced in the comment sections. One user described being unable to leave their home for sandbags due to flooding and mobility issues, expressing frustration at the lack of accommodation for vulnerable populations.

> Easy to say when you have the means to get out, I don't if the creek behind me floods, I can't even get to a depot to get sandbags, it's ok I'm just a poor disabled pensioner with a dog who's breed gets a bad rep so wouldn't be allowed in a lot of shelters.

As in this comment, pet-related concerns during evacuations emerged as a common theme, with users sharing which shelters allowed animals and expressing distress at the limitations. Panic buying and empty supermarket shelves were also frequently mentioned, highlighting supply chain anxiety influenced household-level decisions.

Trusted information sources

To assess trust in information sources, patterns of engagement across X, Facebook and Instagram were analysed, focusing on accounts a high number of likes, shares and positive comments. Trust did not solely correlate with the source (e.g., government vs. individual) but with tone, responsiveness and perceived helpfulness. Official accounts such as the Bureau of Meteorology, Australian Red Cross and Fire and Rescue NSW ranked highly in terms of reach and re-sharing activity. News outlets like 9 News, ABC News and news.com.au also performed strongly, particularly when providing visual or breaking coverage.

Meanwhile, local Facebook groups such as Brisbane Incident Alerts and Cyclone Alfred Updates proved grassroots influence with users tagging friends, posting updates from local observations and correcting misinformation in real time. The study found users are more likely to amplify content when they trust its relevance. High-performing posts tended to answer anticipated questions, use plain language and include localised or visual information. In contrast, generic warnings with no location tags or late updates attracted criticism or were ignored altogether.

Insurance and financial preparedness

The study data contained limited discussion about insurance and financial preparedness associated with TC Alfred. The discussions observed largely concerned the disaster payments and how to access them were across both official and community-based platforms.

On a Facebook event page related to the cyclone, one individual asked:

> Yo, I'm curious- has anyone been approved and paid their disaster claims yet? Of any kind?

People struggled to determine their eligibility and to fill in the required information. There was also general concern around how long it took to receive assistance and the high number of rejections.

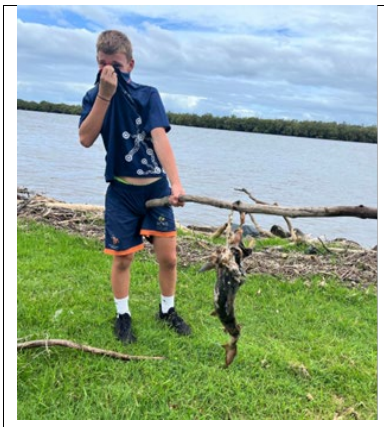
One respondent to an emergency response organisation reported:

> What a nightmare it's confusing and trying to upload relivent documents really it's that hard to understand it's really just not worth even attempting the government has made it that hard unless U basically attended a evacuation centre forget it waste of time and energy

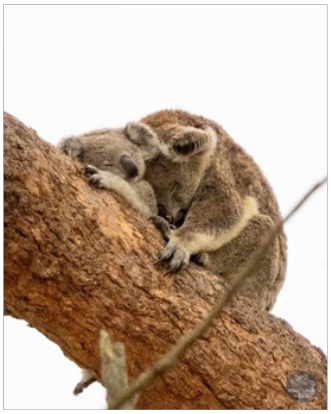
These sentiments suggest that financial aid mechanisms need to be better communicated and simplified during future disasters. The absence of pre-disaster insurance discussions also points to an area of future preparedness education.

Extent of damage

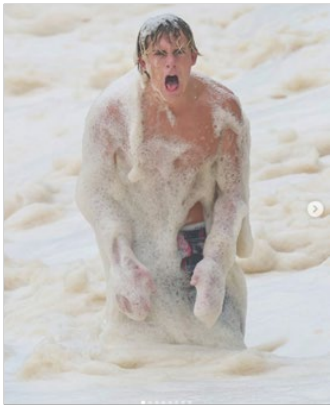
Social media served as a vital archive of cyclone damage documentation, with users posting about the physical, infrastructural, and economic impact of TC Alfred. The posts ranged from immediate reports of fallen trees and flooded streets to more emotional reflections on the loss of property or disrupted livelihoods. Users shared before and after images of beaches, stormwater damage to homes and power outages affecting entire neighbourhoods. This citizen-generated content often filled gaps in official updates and gave voice to lesser-covered regions. Figure 5 displays examples of physical damage imagery.



A highschool student presenting a dead fish (link to Facebook)



A Koala protecting its offspring from heavy winds (link to X)



A swimmer in the foaming Southeast Queensland ocean (link to Instagram)

FIGURE 1. EXAMPLES OF PHYSICAL DAMAGE

On the economic front, small and local businesses reported closure, loss of stock, and uncertainty about reopening due to damage and logistical interruptions. Notably, several online business owners described how power cuts and internet outages prevented order processing, compounding financial losses. Figure 6 displays examples of economic damage.

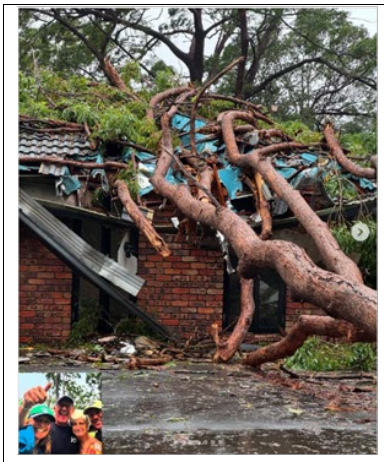
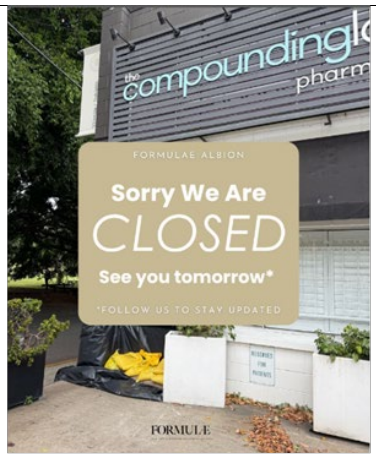
		
A tree crashed into a family home in Gold Coast, Queensland (link to Instagram)	Closed local business in Albion, Queensland (link to Instagram)	Heavy winds damaging roofs and power lines (location unknown) (link to X)

FIGURE 6. EXAMPLES OF ECONOMIC DAMAGE

The infrastructure damage, especially to roads and bridges, was a key concern for both residents and emergency responders. Social media updates about impassable routes were rapidly shared, often outpacing official channels in both speed and specificity. Figure 7 displays examples of infrastructure damage.

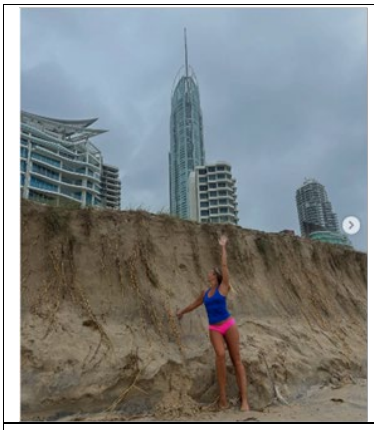
		
Beach erosion in Gold Coast, Queensland (link to Instagram)	Beach cleanup in Gold Coast, Queensland (link to Facebook)	Road Closure on the way to the M1 in Gold Coast, Queensland (link to X)

FIGURE 7. EXAMPLES OF INFRASTRUCTURE DAMAGE

Initial recovery and clean up

While there was no consistent evidence of coordinated community-level recovery efforts in the early aftermath of TC Alfred, individual posts began to reflect a gradual return to normalcy and civic re-engagement. Users expressed gratitude toward emergency services, shared volunteering intentions and documented efforts to support neighbours.

In response to a post by the Australian Red Cross, one person replied:

> Great to post in regional community groups!

Most comments on official postings from emergency service agencies are filled characterised by gratitude from the general public. However, there is also several users questioning where donations go, indicating some sort of donation-fatigue. One individual stated in response to a call out by the Australian Red Cross:

> Booked plasma in for next Thursday will be my 144th donation

Posts from fire and rescue emergency service agencies addressing reckless behaviour in floodwaters also generated strong reactions. One post received over 1,000 comments, with users condemning risky behaviour and reinforcing community norms around safety. The same post on Instagram received the following comment:

> Absolute noodles! Stop making stupid choices when it comes to flood water!

Within the public community groups, we also observed a sense of relief and joy following the downgrading of ex-TC Alfred to a tropical low. As recovery efforts are still ongoing, especially in the aftermath of the flooding, this topical area is still emerging at the time of writing.

Discussion

The findings from this research highlight both the strengths and the limitations of social media as a tool for disaster communication during TC Alfred. While platforms like X, Facebook and Instagram remain central to how individuals experience, document, and respond to crises, our analysis reveals a widening gap between how emergency service agencies use these platforms and how communities actually engage with them.

Legacy strategies in a transformed social media landscape

A consistent pattern emerging across all platforms is that many emergency service agencies continue to approach social media using strategies that reflect an earlier era of platform design and user behaviour—relying heavily on one-to-many broadcasting strategies through official pages and assuming that large follower counts translate to reach. However, this assumption no longer holds true. Social media ecosystems have undergone substantial structural shifts. Where once followers reliably received updates from accounts they followed, today's platforms operate largely through what can be referred to as 'algorithmic audiencing'. This mechanism favours short-form, highly visual, emotionally resonant and often polarising content.

Traditional crisis messaging—text-heavy, formal, and informational—rarely meets the criteria to be algorithmically prioritised, resulting in low visibility and limited engagement, even from large accounts. For example, although government agencies posted regularly during TC Alfred, their messages were often buried beneath more engaging content. Posts from news media outlets, which adapted more quickly to the changing platform dynamics (e.g., use of compelling visuals, real-time updates, and platform-specific storytelling formats), saw substantially better traction. Yet, the most viral and widely shared content did not come from institutions—it came from community members using short-form videos, personal narratives, and emotionally rich visual content, especially on platforms like Instagram (sometime repurposed from TikTok).

Community-driven communication and the rise of dark social

In parallel, we observed a strong migration of meaningful crisis-related discourse into "dark social" spaces (Madrigal, 2012; Marx et al., 2024), such as private or semi-public Facebook groups. This also includes spaces that were not part of our research, such as Messenger chats and threat-based social media such as Reddit. These environments are not governed by platform algorithms in the same way public feeds are (because they are often not monetised through advertising revenue by social media platforms). Instead, distribution relies on user-driven sharing within trusted, often hyperlocal networks. Here, content reach is not randomised by algorithms but determined by social relationships and mutual interests.

Ironically, this gives users greater control over visibility than they would have via public-facing posts. However, emergency service agencies are largely absent from these dark social environments. Without an institutional presence in these spaces, the responsibility for translating and disseminating official information often falls to community members themselves. This creates a dependency on organic forwarding of key messages, transforming crisis communication from a top-down flow into a networked patchwork of redistributed alerts. While this structure enhances resilience in well-moderated communities, it introduces risk when groups are fragmented, inactive or susceptible to misinformation.

Implications

The findings from this research point to a fundamental shift in how Australian communities engage with crisis communication on social media. As platforms evolve and user behaviours change, the traditional one-way, top-down communication strategies used by emergency service agencies are becoming increasingly ineffective. To remain visible, trusted and responsive, emergency service agencies must adapt to the realities of today's algorithmically driven, community-shaped digital landscape. The following implications outline strategic pivots that emergency service agencies should consider to meet the demands of contemporary and future social media crisis communication.

Strategic priorities for social media crisis communications

The implications of these findings are profound. It is no longer sufficient for emergency service agencies to focus on follower numbers, post frequency or simply being present on major platforms. The visibility and impact of their messaging now depend on their ability to adapt to platform-specific logics. To improve their crisis communication strategies on social media, emergency service agencies can:

1. Engage with visual and short-form content formats

   To increase reach on algorithm-driven platforms, emergency service agencies can adopt short-form, visual formats like reels, stories and TikToks (if this platform is accessible). These are favoured by contemporary distribution algorithms and resonate with social media users, enhancing visibility during crises. However, there's a risk of oversimplifying critical information or losing nuance, so content must be carefully designed to remain clear, accessible and trustworthy.

2. Partner with trusted community influencers and local groups

   Collaborating with 'community influencers' with strong existing engagement allows emergency service agencies to tap into existing trust networks and extend their reach organically. While this strategy can enhance relevance and impact, it introduces risks around message consistency and potential bias, requiring careful coordination and the provision of clear, pre-approved messaging guidelines.

3. Venture into in 'dark social' ecosystems

   Closed groups and messaging platforms are where real-time coordination often happens without algorithmic filtering. Emergency service agencies can improve trust and access by embedding themselves in these spaces through collaboration with group admins. However, entering these environments must be done transparently to avoid perceptions of surveillance, and agencies must allocate resources to meaningfully engage without overwhelming these networks.

4. Experiment with two-way communication models

   Moving beyond one-way broadcasting to include Q&As, comment responses, and feedback mechanisms builds trust and allows agencies to address misinformation and surface local needs. The challenge lies in managing the volume of input and maintaining timely, respectful responses—requiring well-prepared teams and communication protocols to avoid reputational risk and ensure productive engagement.

The shift toward user-led, emotional, and visually driven content does not necessarily mean that emergency service agencies must compromise accuracy or credibility. Rather, it calls for new ways of packaging accurate information in formats that are platform-relevant and community-centric. For example, transforming static

warning posts into brief, visually engaging videos with voiceovers, captions, and emotive cues can increase reach without sacrificing reliability.

There is a need to rethink the division of labour in crisis communication. As observed in TC Alfred, community members are already playing a central role in bridging the gap between official messages and localised needs. Recognising, legitimising and supporting these informal actors—whether through access to templates, early alerts, or co-branded messages—can enhance the networked resilience of communication during disasters.

The changing landscape of social media crisis communication

While this research focused on Facebook, Instagram and X, it is important to acknowledge that a significant portion of crisis-related activity occurs on platforms where emergency service agencies currently have little to no presence, particularly TikTok and Reddit. TikTok represents an extreme version of the algorithmically driven, short-form visual content environment, where emotionally charged videos can go viral within minutes, shaping public perception and behaviour well beyond the reach of official messaging. Reddit, by contrast, fosters long-form, thread-based discussions within hyperlocal subreddits that function as many-to-many networks for community coordination, resource sharing and storytelling. Both platforms offer valuable windows into public discourse, yet remain underexplored in crisis communication research. Future studies must examine how these environments shape community response and meaning making, and how emergency service agencies might strategically engage with or monitor them to better understand and serve affected populations.

The findings from this research project on TC Alfred underscore that the future of crisis communication is not only digital—but algorithmically structured and socially embedded. As such, emergency service agencies must move from legacy thinking toward a community-integrated, platform-savvy, and format-adaptive approach. Failing to do so risks invisibility in the very moments when institutional voices are most needed. By understanding and responding to the changing dynamics of visibility, trust, and interaction online, emergency service agencies can better align their communication strategies with how communities actually engage with social media during crises. This will be essential to ensuring that future emergency responses are not only well-coordinated, but also truly seen, shared and acted upon.

Future research needs

The findings from this project highlight several knowledge gaps. First, there is limited research on how emergency messaging can be optimised for visibility within algorithm-driven platforms, particularly in terms of format, tone and emotional engagement, without compromising accuracy. Emergency service agencies currently still rely on a traditional broadcasting model, assuming a linear relationship between audience size and message reach. However, platforms like Instagram, Facebook and X now use algorithms that prioritise emotionally engaging, short-form, and visually rich content. This algorithmic 'gatekeeping' means even well-crafted warnings can remain unseen if they do not fit the platform's preferred format. There is limited research on how algorithmic visibility thresholds work for critical content during disasters and how emergency service agencies can effectively adapt message design without compromising clarity or credibility. What remains underexplored is the trade-off between emotional appeal and informational integrity and how emergency service agencies can balance both in high-stakes contexts.

Second, future research is needed that explores how emergency service agencies can navigate the strategic uncertainty posed by algorithm-controlled platforms—especially when organisational models depend on predictability, traceability and accountability in messaging. Emergency service agencies and other government bodies operate under institutional imperatives that demand consistency, traceability and control over message dissemination. Yet, the social media platforms that are frequently used by Australian communities are governed by dynamic algorithms designed for entertainment and advertising, resulting in a mismatch between communication logic and organisational goals. This tension presents a dilemma: how can emergency service agencies design communication strategies that maintain control and reliability when distribution is shaped by non-transparent and constantly evolving algorithms? Current literature does not adequately address strategies for managing this contradiction, nor does it offer models for how institutions can navigate or partially reclaim influence over their message delivery pathways.

Third, insufficient understanding of how "dark social" spaces, such as private Facebook groups, Messenger threads and platforms like WeChat or private comment sections on TikTok, simultaneously foster resilience and risk within communities during crises. These semi-private networks and social media features operate outside the reach of algorithmic feeds, enabling more intentional and trusted information sharing. On one hand, they support community resilience by facilitating mutual aid, hyperlocal coordination and emotional support. On the other hand, they can become echo chambers for misinformation, especially in the absence of official presence or moderation. Emergency service agencies are often absent from these spaces due to ethical, logistical or resourcing concerns, but this absence leaves a vacuum filled by informal actors of varying credibility. What remains unclear is how best to balance emergency service agencies presence in these spaces, ensuring accuracy without compromising trust or being perceived as intrusive. There's a need for more research on the mechanisms of information flow, trust dynamics, and moderation within dark social space and how emergency service agencies might engage constructively.

Further reading

A growing body of academic research has begun to examine how new algorithmic logics on social media platforms shape crisis communication, community engagement, and institutional response during disasters. These studies explore topics such as the affordances and limitations of platform algorithms, the emergence of bottom-up communication networks ('dark social'), and how misinformation can be combatted in theses contexts. Together, these literature recommendations provide valuable insights into the challenges and opportunities of social media crisis communication outlined in this report.

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