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ANALYSIS OF TWITTER SOCIAL MEDIA FUNCTIONS IN RESPONDING TO THE CIANJUR EARTHQUAKE IN INDONESIA

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Abstract

Social media Twitter as a place to respond disaster events that build an effective place to disseminate the latest information and communication users to discuss the current disaster. This research focuses on exploring the intensity of tweets related to analyzing the disaster content of tweets in discussions of the Cianjur earthquake on Twitter social media. This research uses a Qualitative Data Analysis (QDA) approach, which helps to know the network, content, and cloud using the Nvivo 12 Plus software. The study results stated that the intensity of the conversation on Twitter social media related to the Cianjur earthquake received a relatively high response from various groups, especially public officials and government agency accounts. Twitter social media is also a place to think about grief and prayer, increase solidarity to assist, and become a media that reports condition quickly gives limited greetings online, and assist directly victims through donations.

Keywords: Public Response; Social media; Twitter; Earthquake Disaster.

Introduction

Indonesia is located on three main earth plates: the Eurasian, Indo-Australian, and Pacific, Indonesia's location is known as the Ring of Fire area, which often raises the possibility of earthquakes in Indonesia and volcanic eruptions in the Pacific Basin region (Utomo & Purba, 2019). This can cause many natural disasters, not only caused by active volcanoes but can also be caused by the movement of tectonic plates that occur naturally (Kirana et al., 2019). This condition causes high activity and the potential for earthquake disasters in Indonesia.

The most recent event, an earthquake, hit the Cianjur and surrounding areas on Monday, 21 November 2022 (CNN Indonesia, 2022). As a result of this disaster, 268 people died, and 151 people are still missing (BNPB, 2022). An earthquake with a magnitude of 5.6 that occurred in Cianjur and its surroundings also disrupted several regional telecommunications infrastructures (Kompas, 2022). The earthquake that occurred in the Cianjur Regency area was a warning to Indonesia that a disaster could occur at any time. This shows the importance of other media being a solution during a disaster. Post-disaster information dissemination should be the main focus. This situation leads to complex scenarios of increased communication and information that are difficult to handle (Laylavi et al., 2017).

Considering Indonesia's problems that can experience disasters unexpectedly, especially the recent Cianjur earthquake, knowing about the conditions after the disaster is significant to reduce the impact of disasters on humans and the economy. The development of technology and information contributes to social and economic improvements (Juditha, 2021). Therefore, the availability of timely and accurate information is essential for the implementation of responsive decisions and actions. Social media has been used in natural disaster management to increase situational awareness and enhance emergency response (Z. Wang & Ye, 2018). The use of social media is seen as an important trend to get fast, accurate, and easy response information for the public to find out about the critical situation.

In recent years, social media has been used as an emergency communication tool as it can help distribute aid and coordinate recipients of information (Vera-Burgos & Griffin Padgett, 2020). Social media has become

an integral part of disaster communication which has various functions. These functions consist of preparing and receiving information and warnings on preparedness, giving signals before a disaster occurs, and connecting community members after a disaster (Houston et al., 2015). As an emerging source of big data, social media data is gaining increasing attention in disaster emergency management (Wu et al., 2021). This is due to the easy dissemination of information through social media, which the whole community can access.

Along with the development of the times, disseminating information with the help of technology has become easier and faster. Twitter is social media with many users, especially in Indonesia (Kirana et al., 2019). Twitter is quite popular in Indonesia recently because using Twitter is relatively easy to access some information. One of the information that can be found is related to natural disaster reports (Prihantoro et al., 2021). Among various social media platforms, Twitter is among the most popular for collecting, analyzing, and summarizing emergency-related information to support emergency response and decision-making (Karimiziarani et al., 2022). Twitter is the most important social media platform that is not only used in emergencies but has also changed the way people create, disseminate and share emergency information (Pourebrahim et al., 2019). Research using Twitter in disaster situations has focused on the information content conveyed, identifying prominent users, and using Twitter features (Son et al., 2019).

Recent research supports the claim that social media Twitter facilitates collective behavior in disaster situations (Mukkamala & Beck, 2018). The study by Son et al., (2019) concluded that during the 2011 Tohoku earthquake in Japan, Twitter was the only communication channel available to help citizens understand their surroundings when a magnitude 9.0 earthquake disrupted critical communications infrastructure such as telephone networks and power lines. Twitter is frequently used to communicate relief efforts. For example, Twitter users in the Philippines are more likely to use social media to coordinate relief efforts than abroad (Takahashi et al., 2015). In the context of earthquake disasters, Twitter users also often mention affected victims, prayers, and social support after the crisis, showing solidarity that is common in various types of disasters (Buntain & Lim, 2018). In addition, research by

Amiresmaili et al., (2021) stated that in the context of an earthquake disaster, social media can act as a bridge to receive and disseminate information between victims or as a tool in earthquake response because of the various possibilities of social media, such as the ability to receive information, produce new content and influence the existing content.

Several studies related to Twitter social media in disaster conditions have many uses. So in this research, we will explore more about the Twitter function that users use when a disaster occurs in Indonesia. The case taken in this research is the Cianjur earthquake. The earliest research on social media and disasters is described as "new media" and assesses the potential of new mass communications to report primary data (Hasfi et al., 2021). Apart from social research, research was also conducted using Twitter data in disaster areas, especially in Indonesia (Santoso, 2020;Ridho Fariz et al., 2021). This research is considered to be rarely done even though it would be beneficial because Indonesia has a high enough potential for various natural disasters. In addition, Indonesia has rapid socio-cultural development in social media and disaster management, so it becomes a qualified research focus to study the use of Twitter data in the disaster field (Carley et al., 2016). Another critical matter related to the dynamics of disaster communication in various places and institutions needs to be published to increase the capacity of communities in other areas (Wardyaningrum & Hutomo, 2022). Based on this statement, this study aims to examine the Twitter community's response to the Cianjur earthquake. Focusing on the intensity of tweets related to the Cianjur earthquake on social media Twitter and analyzing the function of Twitter in responding to the Cianjur earthquake disaster.

Research Method

This study uses a qualitative method to examine in depth how Twitter aggregates events related to the Cinajur earthquake in Indonesia. A qualitative approach involves analyzing Twitter social media data using a structured method (Silver & Lewins, 2007). This structured method is a Qualitative Data Analysis (QDA) mining method that focuses on content, network, and cloud.

The author uses Nvivo 12 Plus as the author's analysis tool in this study. Nvivo 12 Plus is one of the software choices for computer-assisted qualitative data analysis (CAQDA) (Sotiriadou et al., 2014). Nvivo 12 Plus generates word frequency, cluster analysis, and text analysis functions from research data to perform data analysis (Brandão, 2015;Woolf & Silver, 2017).

Data collection was performed using NCapture, a Google Chrome toolbar add-on developed by Nvivo 12 Plus that facilitates the collection of publicly available social media data (Bogen et al., 2022). The data collection was carried out on 24 November 2022. The initial determination of data collection was three days after the Cianjur earthquake occurred in Indonesia. The following table informs the intended data source.

Table 1. Research data sources

Data source	Tool	Pickup Time	Keyword	Total Tweet
Twitter	NCapture	24 November 2022	“Earthquake” and “Cianjur”	17.865

The analysis is carried out in stages. In the first analysis, the words “Earthquake” and “Cianjur” are the keywords used as benchmarks for analyzing online discussion cycles. Remembering the words that are trending topics can be used as keywords during the data collection process (Lestari & Mahdiana, 2021). Then data processing is carried out using the Nvivo 12 Plus application to determine the intensity of the conversation based on the data obtained.

The second analysis stage was carried out qualitatively using thematic analysis techniques. Thematic analysis is a method for identifying, analyzing, and reporting patterns (themes) in data (Castleberry & Nolen, 2018). This allows for a better picture of the public's reaction to the Cianjur earthquake in Indonesia. Furthermore, researchers used the NVivo 12 Plus application to process data.

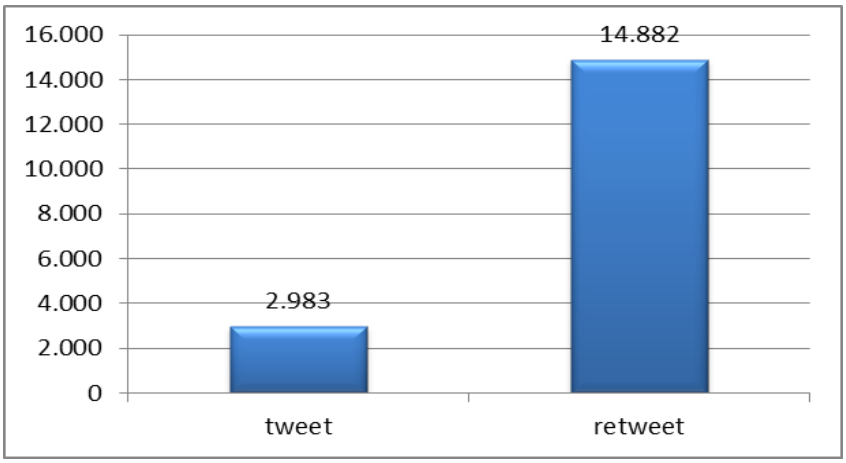
Results and Discussion

In this discussion section, we present the findings that have been analyzed. By focusing on two discussions. In the first part, we analyze the intensity of the Cianjur earthquake conversation on social media Twitter. Furthermore, in the second part, we analyze the theme of the Cianjur earthquake conversation on social media Twitter to find out the function of Twitter for the public in responding to disasters.

Cianjur Earthquake Conversation Intensity on Twitter Social Media

After the Cianjur earthquake, the conversation on social media Twitter was inseparable from the response to the Cianjur earthquake. This is because big data from Twitter user conversations tend to provide information that answers questions in new ways or from new perspectives (Scarborough, 2018). Twitter is essential during a disaster (Muralidharan et al., 2011). Because Twitter social media is a platform for real-time conversations between users (Amen et al., 2022).

Our findings on Cianjur earthquake conversations on Twitter social media, from around 17,865 tweets obtained after being processed using Nvivo 12 Plus, showed that retweets dominated the spread of conversations. More details can be seen in the following image.

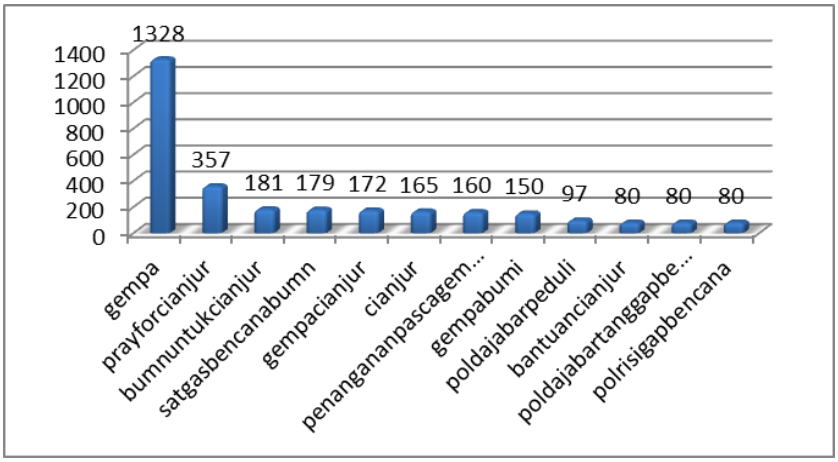


Picture 1. Number of Tweets and Retweets

The image above shows that retweeting is essential for disseminating information in discussions about the Cianjur earthquake. Of the tweets

collected, 14,882 were retweets, and only 2,983 were tweets. This finding confirms that retweeting is a rapid transmission of information from users to their followers (Chen et al., 2020). Twitter became an effective tool for spreading information during the Cianjur earthquake, especially for users interested in spreading relevant information through the retweet function (Kim, 2014).

Furthermore, our findings state that several different issues are placed based on the presence of several hashtags in one tweet. The topic of the Cianjur earthquake does not stand alone but is followed by other issues that Twitter users want to convey. Below are some of the top hashtags most frequently shared by Twitter users.

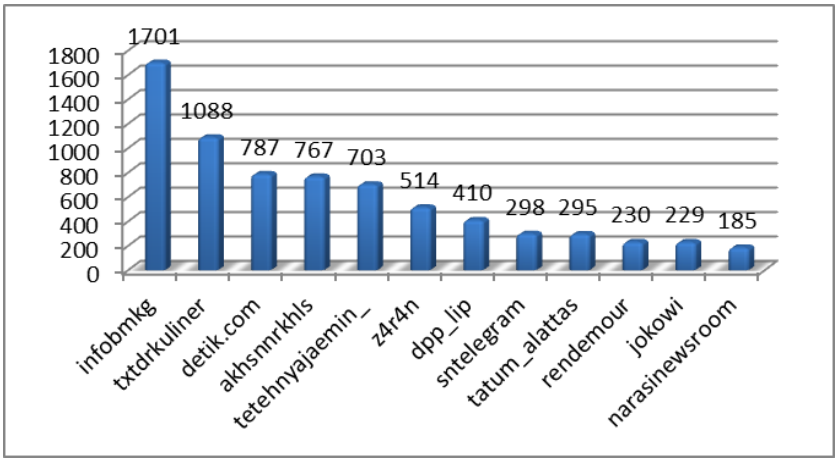


Picture 2. Hashtag intensity

The picture shows many hashtags in the discussion of the Cianjur earthquake. The emergence of several hashtags in the same tweet or "co-occurrence" (R. Wang et al., 2016). There is a spread of hashtags to show solidarity in conveying grief and collecting scattered aid, such as “It is interesting to note that the spread of hashtags focuses on "actors" who express their concern, such as “bumnuntukcianjur”, “satgasbencanabumn”,“poldajabarpeduli”, “poldajabartanggapbencana”, and “polrisigapbencanaalam”. This confirms that Twitter is a public platform, information spreads quickly and allows users to act quickly, leading to rapid mobilization (Hermida et al., 2014). One of the essential communication

techniques is the use of hashtags, which make discussion content searchable and more accessible for others to see (Isa & Himelboim, 2018).

The Cianjur Earthquake conversation network on Twitter social media shows that some of the top accounts are involved in conversations related to the earthquake in Cianjur. The following image shows the ranking of accounts processed using Nvivo 12 Plus.



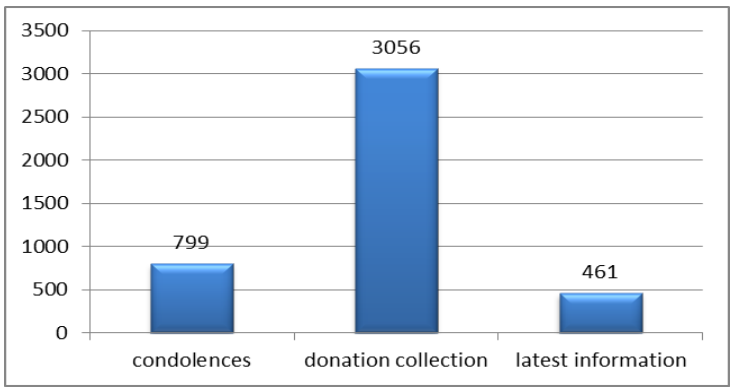
Picture 3. User Account Intensity

This visualization shows that conversations about the Cianjur earthquake on social media and Twitter received responses from various groups. The official Twitter account for the Meteorology, Climatology, and Geophysics Agency, namely "@infobmkg" which is a government agency, is the top account for spreading tweets related to the Cianjur earthquake. There is also the official account of a public official, one of the top accounts in the Cianjur earthquake conversation on Twitter, such as the president of the Republic of Indonesia, namely "@jokowi". This makes social media a forum for direct interaction between government and citizens, such as gathering public feedback and opportunities for joint policy-making (Stone et al., 2022). Official media accounts were also found, which assisted in disseminating the latest information regarding the Cianjur earthquake, namely "@detikcom" and "@narasinewsroom". With technological advances, social media can be

used to share, send and receive information during a disaster (Shan et al., 2019).

Analysis of the Function of Twitter as a Public Media Responding to the Cianjur Earthquake

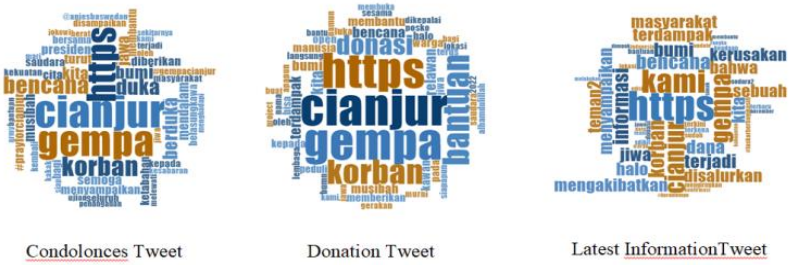
Information about the earthquake in Indonesia received attention from Twitter content. As an essential platform for discovering trending news, Twitter delivers the latest news instantly. More specifically, the contents of these tweets are analyzed using thematic analysis, which is used to interpret coding patterns or themes from the data that has been retrieved (Karlsen & Scott, 2019). Our focus is that the public's response on social media Twitter is directed at the theme of condolences, solidarity in collecting donations and being the latest information media related to the Cianjur earthquake. This focus is taken from several studies that have been conducted, namely, Twitter can be a place for users to express grief in disaster situations (Vera-Burgos & Griffin Padgett, 2020). In addition, Twitter and Social Media in a disaster can be a medium for conveying topics of help and donations (Karimiziarani et al., 2022). As well as Twitter social media can also be an effective tool for spreading information and can prevent the situation from worsening (Derani & Naidu, 2016). This analysis also identifies the implications of the Cianjur earthquake disaster in more detail. The thematic analysis according to predetermined themes produces the following picture.



Picture 4. The intensity of the theme of the cianjur earthquake response tweet

The results of a thematic exploration of the contents of the tweets show that many Twitter users responded to the Cianjur earthquake disaster. With tweets collecting donations being the highest compared to condolences and the latest information. There were 3,056 tweets for collecting donations, 799 for condolences, and 561 for the latest information. This finding states that Twitter social media can be used as a real action to help each other by collecting aid to be distributed to disaster victims.

Furthermore, we also filtered social media content in the Cianjur earthquake conversation using the word cloud. Word cloud is a content mining strategy that allows researchers to display the most frequently used keywords in content paragraphs (Saini et al., 2019). The following is a word cloud from the Cianjur earthquake conversation network.



Picture 5. Word could of tweet theme

The picture shows that most of each tweet focuses on affected victims who are ultimately oriented toward condolences, collecting donations, and up-to-date information. Through these various categories, we can see how Twitter conversations become forums for user interaction. Social media Twitter creates online interaction that promotes better public attitudes towards information disseminated on the network, enabling individuals to navigate dynamic terrain, communicate and engage with others in real-time (Alexandre Huang & Wang, 2019).

Analysis of the contents of the tweet above shows that social media Twitter can be used in various ways in a disaster situation. We are starting by expressing condolences, collecting donations, and becoming the latest media about the Cianjur earthquake disaster. Next, we will present examples of tweets from each function of Twitter in response to the Cianjur earthquake.

Table 2. An example of a Twitter function tweet in response to an earthquake disaster

Condolences Tweets	Donation Tweets	Latest Information Tweets
Bencana gempa di Cianjur adalah duka bagi kita semua. Polri akan terus hadir dilapangan untuk memberikan bantuan dan semangat kepada saudara kita yg menjadi korban agar senantiasa diberikan kesabaran dan bangkit bersama dalam menghadapi musibah ini. #prayforcianjur #polripresisi https://t.co/U3m683WuFq	@convomf Halo semuanya, aku izin drop ini ya. Besar/kecil nominal yg diberikan sangat berarti utk saudara2 kita yg menjadi korban bencana gempa di Cianjur. Utk warga KRW-CKP klo mau donasi barang bisa langsung ke posko pengumpulan donasi kami ya. Terima kasih banyak, have a nice day! https://t.co/s3fXA3aJh1	Situasi kondisi jalanan dari Cipanas-Cianjur sudah membaik dan sudah bisa dilewati. Hanya saja jalanan masih licin dan penuh tanah. Untuk yang mau lewat, harap berhati-hati. Karna gempa susulan masih terus berangsur datang. https://t.co/ydr12rpsul
Presiden Joko Widodo menyampaikan ucapan duka cita atas musibah gempa bumi yang melanda Kabupaten Cianjur, Provinsi Jawa Barat, Senin (21/11). https://t.co/OdAte3OLVH	Hallo temen temen. Mohon bantuannya untuk retweet tweet ini ya Teman teman, warga Cianjur korban gempa 5,6 SR senin kemarin masih sangat membutuhkan bantuan kalian. Kami butuh tenda, kebutuhan bayi dan lansia, juga obat obatan. Kiranya bisa membantu, tolong hubungi saya	Data Terbaru dari BNPB Terkait Korban Gempa Cianjur Sebanyak 271 Jiwa https://t.co/CxrIlRvsKJ

Kami turut berduka atas terjadinya musibah gempa di Cianjur dan sekitarnya. Mari bersama kita doakan saudara kita semua yang berada di Cianjur dan sekitarnya, Semoga para korban dan keluarga diberikan kekuatan dan ketabahan. #BPJSKesehatanRI #JKNKIS https://t.co/s929jJaR9C	Dari semalam saya koordinasi dgn Tim @KitaBisaCom terkait kondisi pasca-gempa Cianjur. Kondisinya sangat memprihatinkan & butuh bantuan besar kita. Krnnya saya memutuskan utk ikut buka link donasi utk korban gempa Cianjur >> https://t.co/psltxk6dQB. Bismillah! https://t.co/nZeMTfX76e	Gempa bumi M 5,6 mengguncang Cianjur dan sekitarnya pada Senin (21/11). Pantau situasi terkini pascagempa Cianjur di sini: https://t.co/qNbkZM4qhv https://t.co/I4K1jQEh5t

Social media can provide various information from the government or the public as social media users (Anson et al., 2017). As shown in the table above, the Cianjur earthquake received mixed reactions from the public. Loilatu et al., (2021) see social media as an excellent property for information transmission. The response of the Twitter user community to the Cianjur earthquake helped determine what the community expected, especially the adoption of government policies to deal with this disaster. This follows the opinion of Fang et al., (2019) that social media can be a way for the government to immediately respond to information and provide up-to-date information about disasters if a disaster occurs. Interestingly, Twitter can also be used as a decision-making tool because it is considered an elite media platform during a crisis (Azmi et al., 2021).

After the thematic categorization, Twitter's role in responding to the Cianjur earthquake disaster was dominated by fundraising or victim-aid tweets. Social media has been essential in raising funds and donations during natural disasters (Möller et al., 2018). This states that Twitter's social media in responding to disasters is not only a medium for receiving and sending information but can be a medium for channeling real aid to victims of natural disasters, with the high intensity of tweets related to collecting donations compared to other tweet themes.

Conclusion

Twitter social media can be a place to respond quickly to disasters. The Cianjur earthquake disaster received a high-intensity response from Twitter users from various circles, especially public officials and official accounts of government agencies who also contributed to disseminating information related to the Cianjur earthquake disaster. In addition, social media Twitter is also intended as a medium for expressing sorrow and prayer, increasing solidarity to provide assistance and donations, and a media for updating in real-time on the latest conditions related to the Cianjur earthquake disaster. The highest intensity of tweets is on the theme of collecting donations, which means that social media Twitter can have a function to provide real assistance. Public response on Twitter social media can be essential data for the community to find out the latest information and as a consideration for making decisions related to the Cianjur earthquake that the government can use.

This research can provide an overview of how the community uses the Twitter function when responding to natural disasters through the classification of tweet themes that we have determined. We realize that this research needs to be improved, which is where we only analyze how Twitter social media functions for users to respond to natural disasters. We do not delve deeper into the relations between actors and only analyze Twitter social media conversations in responding to disasters in general. Therefore, we suggest future research to explore the relations between actors in Twitter social media conversations in responding to disasters. In addition, it can analyze the use of social media Twitter in responding to natural disasters by specific accounts such as government agencies, public officials, news media, and non-governmental organizations concerned about natural disasters.

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