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Lesson 1: News Media and Crisis Management

Photo by Jem Stone

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Executive Summary

This lesson is based on the CascEff deliverable "A report on the role of the media in the information flows that emerge during crisis situations" (Reilly and Atanasova 2016[D3.4]). It reorganises the content of that document for individual users, instructors, educators, and educational institutions that wish to engage in a learning session about the news media during crisis situations with cascading effects. It helps learners to consider and understand main areas of change in communication dynamics and information flows during crises, in order to influence the behaviour of disaster-affected populations and improve disaster management in general.

Therefore, the general aim of the first lesson is to help learners to understand the roles and dynamics of mediated communication related to disasters, and to reflect on how institutions and organisations can approach the news media for a successful management of crises. By the end of the course, students should be able to:

1) explain the role of news media in information flows that emerge during stages of cascading disasters, and in particular:
2) describe the positive and negative effects of news media coverage upon the behaviour of citizens and communities that are vulnerable to cascading disasters;
3) explain how social media can supplement pre-existing media strategies deployed during stages of disasters;
4) identify the information flows between key stakeholders (including professional journalists, emergency managers and members of the public), that can inform a collaborative model of decision-making in pre and post disaster stages, and help build situational awareness during crisis situations.

In order to achieve these aims, this lesson explores the role of traditional media in disasters in general, and its changes over time, and it links to issues of citizen engagement and the role of emotions during crises. The lesson also explores the role of traditional media during the different stages of a disaster, and within the wider informative flows that can shape communication at those times. Therefore, this part of the lesson also links to issues related to social media. It then explains the importance of context in evaluating media role, by focusing on three case studies and analysing their information flows and media role (Floods in England, Project X Haren, Pukkelpop). The conclusive part of the lesson brings together the issues considered in the form of a summative discussion of main areas of change in media and emergency management.

1 Introduction

1.1 Introducing the topic and lesson

This lesson focuses on crises, or disasters, and the role of mediated information in these. The Glossary and Definitions of the Casceff project(Lönnermark et al. 2016 [D1.6]) defines disaster as a "**situation where widespread human, material, economic or environmental losses have occurred which exceeded the ability of the affected organization, community or society to respond and recover using its own resources** (ISO 22300:2012)".[1] Both man-made (e.g. explosions, civil unrest) and natural (e.g. earthquakes, tsunamis) disasters have the capacity to **disrupt the social fabric of communities** in these ways (Britton and Centre for Disaster Studies, 1988).

The disruptions caused by disasters can evolve within one system (e.g. a landslide destroying one school), but it is much more likely that disasters affect multiple systems (e.g. a landslide destroying one school and paralysing nearby rail traffic, or disrupting the functionality of one hospital). In these cases, we can speak of cascading effects, and it is on this kind of disaster that this lesson focuses on, even if much of the content presented can apply to disasters and crises in general (both terms are used in the lesson). Disasters "feature cascading effects when a primary incident propagates resulting in overall consequences more severe than those of the primary incident" (Lönnermark et al. 2016 [D1.6]: 7). We can define **cascading effects** as the *impacts* of an initiating event where:

1) system dependencies lead to impacts **propagating to other systems**, and
2) the **combined impacts** of the propagated events are of greater consequences than the root impacts; and
3) **multiple stakeholders** and/or responders are involved(Lönnermark et al. 2016 [D1.6]: 7).
In these situations, information sharing and coordination are critical factors in effective management of such incidents, especially in the case of disasters with cascading effects.

1.2 Importance of topic

Studying the role of the media in information flows during crises is relevant because the **disruption of information relations** has been identified as one of the most frequent **triggers of cascading effects during large-scale emergencies**. This was the case, for example, of crises such as the 2011 Tōhoku earthquake and tsunami in Japan, and the 2005 London bombings (Hagen et al, 2015). As a consequence, a prerequisite for effective emergency management (EM) should be **the cultivation of productive information flows** during crisis situations. Information flows are defined here as "verbal, non-verbal, or written interactions between and among people that serve as precursors to problem-solving and decision-making" (Pipes, 2007: 295). Adequate flows of information not only **provide situational awareness** for EM officials, but **also inform decisions about disaster response and recovery** that have implications for the wellbeing of populations affected by cascading disasters (Pipes, 2007; Potts, 2014). **Information flows** can also **improve the quality of decision-making** during crises (Veil et al., 2008; Veil et al, 2011). Finally, they can reduce the uncertainty amongst disaster-affected populations, and strengthen preparedness of communities for future crises. In these and other ways, adequate flows of information can help in preventing the disruption of other elements of the socio-technical system.

Today **citizens** play a very important role in shaping information flows, and they do so through their collection and sharing of data through social media. The original 'command and control' EM structure, a top-down framework that characterised the public as unreliable conduits of crisis information, has been gradually replaced by a new model of '**shared responsibility**', which views **citizens as 'first informers**' who can provide valuable information for emergency managers (Haddow and Haddow, 2008). In particular, the growth in **social media** usage over the past decade has increased the flow of disaster related information and empowered **citizens to fill the gaps left by EM officials and professional journalists during such incidents** (Meier, 2014; Potts, 2014), and help build situational awareness amongst first responders (Reilly and Atanasova, 2016[D3.3]). Key stakeholders such as **Public Information Officers** (PIOs) have also used these sites to bypass the traditional media and speak directly to vulnerable communities (Hughes and Palen, 2012).Nevertheless, **professional journalists and traditional news media continue to be key agents in the information flows that emerge before, during and after disasters**, as we will see in details later.

Therefore, it is vitally important that EM officials, institutions and organisations are aware of the **contexts** in which the news media operate today, their **new roles** in the digital age, and their **effects** in shaping information flows; this is especially the case if they wish to use the media to influence the citizen behaviour during cascading disasters. Knowledge about **the role of journalists (both citizen and professional) in the information flows** between emergency organisations and the public should improve the quality of emergency decision making, leading in turn to new models of 'sound' emergency management practice (Pipes, 2007).

2 Traditional media and disasters

2.1 Traditional news media and disasters

Traditional media have long played a key role in disaster information flows, generating public recognition and understanding of man-made and natural disasters. For example, already since the 1775 Lisbon earthquake, news organisations were primarily responsible not only for **the public constitution of disasters**, but also for **inviting audiences to respond to these incidents** (Pantti et al., 2012:2). The geographical remoteness of audiences from incidents meant (and still means) that the news media were often their **only source of information** on disasters (Wei et al., 2010; Joye, 2014). With the development of media and news systems, knowledge and response to disasters had been increasingly dependent upon media coverage, and today traditional media allow members of the public living far from the affected areas to experience disasters through their coverage (Lowrey et al., 2007; Wei et al., 2010).

Citizen journalism and social media would appear to have ended this monopoly, providing audiences with unprecedented access to the voices of disaster-affected populations previously marginalised in the news media (Allan et al., 2007; Deuze, 2009). Yet, research continues to show that much of the content circulating on social media during crisis situations is still likely to originate from news media organisations and professional journalists (Lotan et al., 2011). In other words, **traditional media are the most trusted and reliable sources of information about disasters** (Jin et al., 2011; Liu et al., 2011; Ryan, 2013; Stephens et al., 2013). Besides the element of trust in crisis situations, print and broadcast media also continue to be particularly effective tools for crisis and risk communication due to the fact that **such content can still be more easily or quickly shared ingeographically dispersed audiences**, many of whom may lack reliable internet connections (Hannides, 2015). Traditional media help citizens **interpret** the meaning of disasters and provide **practical advice**on how to prepare for and respond to these incidents (Hannides, 2015; Pantti and Wahl-Jorgensen, 2011), Finally, professional journalists typically create news packages infused with emotion in order to encourage audiences to **care** about disasters (Chouliaraki, 2013). For example, the media may invite **distant citizens to respond** to ‘distant suffering’ through charitable donations to disaster relief appeals or **help increase preparedness amongst vulnerable communities** by sharing lessons from previous incidents (Boltanski, 1999; Hannides, 2015).

To examine how the news media contribute to information flows during cascading disasters, one must considerthe historical role of the media in disaster management and their dominant ‘rules’, as well asthe impact of news media coverage of disasters upon the behaviour of citizens.

Historical role of the news media

The traditional role of the news media during disasters was **to transmit information obtained from EM officials to members of the public.** These ‘unidirectional’ information flows tended to revolve around press releases and published interviews with representatives of emergency management organisations throughout each stage of the disaster cycle from mitigation to recovery (Keim and Noji, 2011). Organisations such as the US Federal Emergency Management Agency (FEMA) began to use **local media** to increase disaster preparedness through public education broadcasts in the early 1980s (Wenger, 1985). This reflected the orthodoxy of the top-down approach (often referred to as ‘command and control’) towards disaster

management, which **valued expert opinion** much more highly **than that of the general public**. The **centralisation of all information** distributed to the news media was also a **response to the 'media circus'** that surrounded incidents such as the Three Mile Island nuclear accident in the USA in March 1979(Rubin, 1987).

However, such centralised processes of information dissemination did not repair the **intrinsic tendencies of traditional journalism** to incorporate **'disaster myths'**, to rely on **official perspectives**(at the expense of those citizens directly involved in disasters response on the ground), and to focus and emphasise **physical damages and human loss**. One example of **'disaster myth'** is the notion that mass panic and looting are likely to occur in the immediate aftermath of an incident (Quarantelli and Dynes, 1970; Wenger, 1985). Contrary to this disaster myth, much of the research in the field suggests that crime rates are actually likely to fall in the immediate aftermath of a disaster, with such incidents said to enhance community spirit and togetherness (Scanlon, 1992; Tobin, 1999). The problem which must be considered for evaluating the role of news media in crisis management is that disaster myths could stimulate unrealistic demands by members towards EM officials and institutions, adding to their work at crucial times for the management of a crisis.

Questions have also consistently been raised about the representativeness of the media coverage of disasters, considering especially the tendency of the media to rely upon **official sources** (McKinnon et al., 2016). As far back as the early 1970s, researchers such as Quarantelli (1971) argued that this 'command post' view of disasters conveyed by the news media neglected the contribution of citizens to search and rescue efforts and post-disaster damage assessments. In preferring official sources, which is also in line with the model of centralised information, journalists offer a partial view of search and rescue efforts and they restrict the range of perspectives about damage assessments, potentially complicating the work of EM officials and institutions involved.

Professional journalists could also **distort the extent of physical damage to infrastructure and the loss of life** that follows disasters, by using the 'human interest' angle in disaster reporting (e.g. Jiménez-Martínez, 2014). This reflects a **wider tendency of news media**, which has been acknowledged by research about media and disasters. For example, in the mid-80s Wenger suggested that "death, economic loss, human suffering, and social disruption" (1985:13) were standard themes in the media coverage of disasters. In general, while this focus of media coverage could easily attract the attention of the public, facilitating community engagement and response to disasters, it could also trigger more emotive debates and behaviours, which are traditionally less manageable than others and complicate the work of EM officials and institutions during crises.

Other tendencies keep affecting the media coverage of disasters today, and they consist of the 'rules' of the sector, which tend to shape news production in general. Among these, the **agenda-setting** function of news media (McCombs and Shaw, 1972) is a first example to consider in evaluating news media coverage. According to this theory, news media focus on certain events, while other equally relevant events remain hidden and receive no or little coverage. This is also due to the fact that media institutions and journalists have to choose on which story to focus. Nevertheless, this means that the media have the power to determine the agenda of the debate in the community, and the narratives circulating in society, by leading the public debate towards certain topics instead of others, which could be as important for specific purposes such as disaster recovery or prevention. Another example of 'rules' of the sector is the existence of a set of **news values** (Galtung and Ruge, 1965). These

values determine which stories are newsworthy, and therefore more likely to achieve media attention (for example, news about elite nations, or news about people culturally similar and geographically near are likely to receive more coverage than stories about poor nations or distant regions of the world, unless the dead toll is extremely high). A third 'rule' of the sector to consider is **framing**, which is the way in which the media present the news, selecting a certain perspective to tell a meaningful story and defining in this way the way in which it is to be interpreted. For example, a newspaper can present the act of killing someone as a murder, or as an accident, or as retaliation to previous violence or act of defence, or as an act of rage, or as one of the developments in a wider story of a family or neighbourhood, etc. depending on the "frame" chosen for the story. Each of these options reinforces different evaluations about who is responsible, who is to blame, and who should prevent. Each option, in turn, eliminates from the debate other possible frames, which could bring additional meaning or different explanations to make sense of the event (for more see Entman 1993). While these rules remain important for investigating the role of news media in general, it is beyond the scope of this lesson to fully explore the general factors and rules of the media sector that can influence media coverage of disasters.

2.2 Activity 1 - News media and disasters

Think about a disaster you have experienced or know about.

Do you remember how it was represented by news media?

Now go online and retrieve news media articles and video about that disaster, and read or watch them:
1 - can you find examples of **disaster myth?**
2 -can you find **official perspectives** and those of citizen involved in crisis response?
3 - how much is about **physical damages and human loss?**
4 - before you checked this material, what aspects were you remembering about it? What do you think are the reasons?

2.3 Engaging citizens

The **emotional discourses** conveyed in news media coverage of disasters may **facilitate crisis management, or they can disrupt it producing additional damages to the communities experiencing a crisis**. At the same time, much of citizen engagement with social media is often based on a range of emotions, which can be sudden and unexpected, or more predictable, but which can usually have potentially strong effects on information flows. Generally, emotions play a fundamental part in determining understandings and responses to crises by individuals and communities. Therefore, successful citizen engagement in crisis management stems from the evaluation of past examples and research illustrating the role of emotions on information flows during disasters.

Emotion-focused news media coverage of disasters can engage people's ability to care and respond to the plight of the victims (Chouliaraki, 2013). For example, themes of 'distant suffering' in news packages on humanitarian crises have traditionally been constructed by professional journalists in conjunction with representatives from aid agencies (Cooper, 2011; Pantti et al., 2012). This **'invitation to care'** can be viewed as a manifestation of the 'committed witnessing' that has become prevalent in television journalism, where the reporter perceives that they have an ethical duty to judge and evaluate the conditions in which they are working (Pantti et al., 2012), to bear witness for the humanitarian issues affecting the area. Journalists are frequently 'embedded' within aid organisations and have adopted positions on humanitarian disasters that are akin to those of their hosts (Cottle, 2014).Although critics have characterised such coverage as 'disaster porn', there has been some evidence to suggest that it leads to increased aid donations for disaster response (Bennett and Kottasz, 2000; Oosterhof et al., 2009). Most notably, the 2004 Indian tsunami was said to have received over 50 times more aid donations per survivor compared to the worst funded disasters in the same calendar year (Cooper, 2011: 7). Such donations provide vital sustenance to stakeholders attempting to restore vital services to affected populations during the response and recovery stages of the disaster. Humanitarian organisations such as the International Federation of Red Cross and Red Crescent Societies (IFRC) have acknowledged that the media continue to exert strong influence on levels of aid donation. However, the same organisations have expressed concern that humanitarian, emotion-focused media coverage may have **disproportionate influence** upon where such resources are

deployed. The IFRSC were amongst many organisations to voice their concerns about how the extensive media coverage of the 2004 Indian tsunami had diverted the attention of potential donors away from 'hidden disasters' such as the conflict in the Democratic Republic of the Congo.[2] Disaster coverage has the power to **categorise victims** as either '**worthy or unworthy'** recipients of aid donations, in accordance with geopolitical power relations (Pantti et al., 2012: 58).

Another recurring theme in the literature is that citizens are becoming increasingly immune to the emotional invitation to respond to the 'distant suffering' depicted in disaster media coverage. This was first articulated in **the 'compassion fatigue'** thesis proposed by Moeller (1999), which suggested that traditional donors were wary of giving money to what seemed like a never-ending series of disaster appeals in the US print and broadcast media.

Finally, 'human interest' media stories can **provide opportunities for disaster-affected populations to express dissent and their dissatisfaction with how emergency managers have responded to these incidents** (Liebes, 1998). This was evident in the coverage of the Paddington rail disaster in October 1999, which drew on the plight of the victims to illustrate public concerns in relation to safety problems on the UK rail network (Pantti and Wahl-Jorgensen, 2011).

These main trends reveal some of the reasons for which information flows between emergency managers, key stakeholders, and members of the public may not always aid disaster response and wider policies, particularly in relation to incidents that occur overseas.

3 Information Flows in Crises

3.1 Media and information flows in crisis management

More directly relevant for crisis management is the **ability of the news media to influence the behaviour of those communities directly affected** by man-made and natural disasters. Media organisations and professional journalists provide information to people "about what has happened, what to do, how to protect themselves during crisis and how to find missing loved ones" (Hannides, 2015: 5). Research continues to suggest that the general public views newspapers, radio and television as the most reliable and trusted sources of information during disasters (Flanagin and Metzger, 2000; Stephens et al., 2013). **Radio in particular is often the most resilient method** for communicating crisis messages to large populations when power supplies are disrupted. For example, during Hurricane Sandy in September 2012, New Jersey residents relied on portable radios to obtain crisis information due to the loss of power and the resultant failure in digital communications networks (Burger et al., 2013). It is also the most effective way of reaching those members of local communities who are unable or unwilling to use online media to search for crisis information. **Only heavy users of social media**, in particular those aged 16-24 years old, **perceive sites such as Facebook and Twitter as more credible during crises**, mainly due to the frequency with which they were able to find updates compared to other media channels (Austin et al., 2012; Sutton et al., 2008).

For these reasons, news media should be **integral components of the 'communication mix'** deployed by emergency managers in order to maximise the reach and impact of risk and crisis communication (Reilly and Atanasova, 2016 [D3.3]). They should be **chosen among those media channels that disaster-affected populations are likely to use** to satisfy their disaster information needs.

An effective 'communication mix' of this kind is based on key stakeholders' awareness of how the news media can better contribute to information flows before, during and after crisis situations. This is a pre-requisite for the **beneficiary communication** that is said to help mitigate the effects of cascading disasters, defined by the IFRC as two-way dialogue between key stakeholders and communities that aims to save and improve lives by providing "timely information through all stages of a disaster."[3]

Hannides (2015:10) suggests that there are two distinctive modes of beneficiary communication, namely **information and communication practices designed to improve aid response** and **those that meet the direct needs of disaster-affected populations**. Examples of different practices will be elaborated in more detail below, where we focus of the role of the news media before, during and after disasters.

3.2 The role of news media before disasters

Desired behavioural changes, such as following the correct evacuation procedures, are more likely to occur during disasters if **preparedness advice** is made readily available to local communities during the pre-incident stage. Print and broadcast media remain the most effective vehicles for the transmission of such disaster-vulnerable communities, especially for those that have limited internet connectivity (Hannides, 2015). As discussed earlier, FEMA

began to use local newspapers, radio and television for public education programmes as far back as the 1980s (Quarantelli, 1996; Wenger, 1985). Japan and the US,which are particularly vulnerable to natural disasters such as earthquakes and tsunamis, have been at the forefront of efforts to use the media to educate the public about disaster risks and to enhance preparedness amongst communities vulnerable to such incidents. In these countries, print media have been viewed by emergency managers as effective tools for educating communities about evacuation procedures.

However, it remains difficult to influence the behaviour of all citizens who live in the vicinity of disaster-vulnerable areas, for **contextual reasons that need to be considered in each specific case**. A great variety of different factors shape the context in which citizens who live in the vicinity of disaster-vulnerable areas operate (e.g. such as level of access to TV or radio, age of the population, or wider social factors such as dominant attitudes and routines in a community), and they can also determine different outcomes with groups of the population affected by the same disaster. For example, studies conducted in the wake of the 2011 Tohoku earthquake and tsunami in Japan found that household preparedness was relatively poor, but also that is was particularly so amongst those who had recently moved to large cities (Tomio et al., 2014). The same 'information gap' was evident in the review of key lessons from the 2007 UK floods, which suggested that local residents in flood-affected areas were still unaware of which organisations they should contact in order to obtain information on the recovery operation (Pitt, 2008).

Nevertheless, **mass-scale broadcasts do appear to have the potential to mitigate the effects** of cascading disasters and large-scale emergencies **by increasing the level of public knowledge about disaster risk**. This was one of the key findings of an evaluation of four projects (the EVD epidemic 2014-15; the 2015 Gaza conflict; the 2015 Nepal earthquake; and the current Syrian refugee crisis) organised by BBC Media Action.[4] The evaluation of these four interventions suggested that massscale broadcasts such as the mini-drama 'Mr Plan Plan' had been successful in encouraging "actions relevant to everyone" such as hand washing that would prevent the spread of EVD (which stands for Ebola Virus Disease) in Sierra Leone and neighbouring countries (Hannides, 2015: 56). Conversely, these broadcasts **did not appear to address more 'local' information needs**. This was congruent with the research into media coverage and risk communication in the Netherlands (Kuttschreuter et al., 2011), as well as the aforementioned research on the effectiveness of public education programmes in Japan and the US. It also explains why the **evaluation** of the way people respond to preparedness information shared via the news media was one of the key recommendations of the Crisis and Emergency Risk Communication (CERC) model (see Reynolds and Seeger, 2005 for an overview).

3.3 The role of the news media during disasters

It is perhaps during the incident that **the news media can facilitate information flows that are most beneficial to both emergency managers and local communities** situated in disaster zones. The traditional media can help **reduce the possibility of disruption** to other elements of the socio-technical system through the **timely verification** of crisis information. Professional journalists typically possess the necessary skills and expertise to verify rumours that have the potential to exacerbate the effects of crisis situations upon critical infrastructures. This has become a central issue in the digital age when, thanks to the rise of social media,

> 'rather than being the first to inform people about an emergency event, newsrooms and other organizations often find themselves acting as a critical second source of verification, a filter that separates signal from noise, and rumour'(Knight 2014).

Therefore it is vital that news media organisations are more prepared than before to verify content circulated online and in particular user-generated content provided by citizens. The Verification Handbookpublished by the European Journalism Centre (Silverman 2014) proposes a cooperative and comprehensive approach to verification, and it provides a list of resources for professional journalists to check the veracity of online content before using it in their work. The Handbook also specifically suggests that news organisations prepare themselves to promote smooth and helpful information circulation during disasters. News organisations can achieve these aims by:

- **deciding which specific role they will play during an emergency,**
- **preparing and training their staff to respond quickly and using smooth internal communication channels, roles, and approaches,**
- **building trustful relationships and strengthening dialogue with emergency organisations, institutions, and their audience (Knight 2014).**

The importance of a media sector able to quickly verify content and to **guarantee steady flows of information** during a crisis can be illustrated by the case of the explosion at the Dutch Chemie-Pack plant in Moerdijk, the Netherlands in January 2011. On the day of the explosion(5th January), the Dutch press agency *Algemeen Nederlands Persbureau* (ANP) announced that it would lead to road closures but provided no further information on what had caused the incident in its coverage over the next two days. Twitter users filled this vacuum by suggesting that the explosion had been caused by a terrorist attack, causing much alarm and panic amongst local residents and further afield (van der Meer and Verhoeven, 2013). However, such speculation was quickly quelled in the following days when the Dutch news media provided more specific information on what had caused the explosion at the plant. Therefore this crisis also demonstrates the power of traditional news media in comparison to other media, stemming from the **perceived credibility of information about crises that they actively circulate.** This credibility factor can be considered as a third fundamental element (after verification and steady flow of news) that can help restore information relations during large-scale emergencies and cascading disasters.

Finally, information shared via the news media during disasters does appear to raise awareness of initiatives to foster disaster resilience amongst affected communities. Hannides (2015) suggests that mass-scale broadcasts via radio and television are particularly effective in terms of achieving psychosocial impacts, such as making people feel connected with each other and helping them cope with the loss and trauma associated with the crisis situation. During the English riots in August 2011, for example, coverage of the 'clean-up' operations in newspapers such as the Guardian was said to have helped build community spirit, and articulated the collective voice of local residents who opposed the rioters (de Castella, 2011). A similar observation was made in relation to the media coverage of the 2011 Brisbane floods. The framing of the disaster as one in which community spirit and cohesion came to the fore was said to have reinforced the perception of local residents that they were capable of self-organising and enduring the flood event (Bohensky et al., 2014). Both incidents demonstrate a fourth fundamental factor of news media during disasters, which is **the power of the traditional media in creating stronger bonds between individuals and groups affected by man-made and natural disasters, in turn providing the foundation for resilience against future incidents.** All together, these four factors contribute to shaping and sustaining forms of

'two-way communication' between citizens and emergency managers, which can be particularly important in crises that last for a longer time.

To conclude, it is important to stress again that **not all traditional media interventions can be characterised as a form of beneficiary communication.** As discussed earlier, coverage focusing on the 'death and destruction' caused by disasters may disempower disaster-affected communities by reinforcing global divides and strengthening elite narratives on the causes and solutions to such incidents. Media framing of crisis situations can also have a negative influence upon the behaviour of these citizens as the incident unfolds (Norris et al., 2007). This was evident in the way that some citizens responded to media framing of Hurricane Katrina, which left approximately 80 percent of New Orleans flooded when it made landfall in August 2005. Members of the public began to barricade themselves in their homes and take up arms following media reports quoting mayor Ray Nagin's assessment of the situation as "living hell" (Boin and McConnell, 2007). Media speculation about the likelihood of looting also led to some citizens disobeying evacuation orders and remaining in their homes in order to protect their property (Tierney et al., 2006). Such media speculation about the impact of the disaster also had implications in terms of the allocation of resources towards disaster response. Katrina news stories that focused predominantly on looting (e.g. a looting frame) and lawlessness (e.g. a civil unrest frame) are believed to have contributed to decisions to redirect police officers from attending to life-saving activities to monitoring for law-breaking activities (Tierney et al, 2006). Clearly, 'disaster myths' perpetuated by the news media have the potential to hinder response and recovery initiatives as misinformation circulating online can potentially do, and even more than that, depending on the crisis, its context and circumstances.

3.4 Role of traditional news media after disasters

Many of the same journalistic practices set out above can also be applied during the post-disaster phase. Professional journalists can positively **influence the behaviour of citizens** through the debunking of rumours and disinformation that have the potential to undermine disaster response initiatives. They also play a key role in **'disastercommunication'**, the term used by Coombs (2010) to refer to the post-event coordination of key stakeholders engaged in 'relief and restoration' initiatives. In this phase, the news media can also enable a form of **'two-way communication' between citizens and emergency managers**. On the one hand, human interest stories that **articulate the grievances of disaster-affected populations** can theoretically help emergency managers allocate resources to those areas that are most in need. On the other hand, the media provide an outlet for emergency managers to **reassure these communities that assistance will be provided,** as well as highlighting **the progress made on the restoration of critical infrastructure and other key services** (Haddow and Haddow, 2008). Media reports can also provide useful **recovery information** to members of the public, detailing which organisations they should approach for help and how they can apply for disaster relief. The mass-scale broadcasts of media organisations can prove particularly helpful to emergency managers in this regard.

The news media can also share information that helps build community resilience towards **future disaster events**. This can include not only coverage of the aforementioned 'clean up' operations that were seen in London and Brisbane, but also content that warns and educates citizens about disaster risk. For example, the media have long played an influential role in raising public awareness about preventative measures that citizens should take to mitigate the risk of bushfires in Australia (Cohen et al 2006). Media reports also contribute to 'post-disaster

learning' about the causes of such incidents and how to build preparedness against future events (Landau and Saul, 2004). The media framing of disasters **attributes responsibility** for these incidents and proposes how key stakeholders should respond to them (Entman, 1993; Goffman, 1974).

3.5 Social media and information flows

With the rise of social media networks, crises information management and the role of the news media in these have changed, and new approaches, actors, and channels, are now part of the context shaping information flows during crises.

Social media could repair to a series of weaknesses of traditional media in crisis management. This is because, despite the central role of news media during the different stages of a crisis, their **gatekeeping function** may limit the representativeness of their coverage, for example leaving out the voices of many disaster victims. Their need, or choice, to focus on specific aspects and omit others in news reports (i.e. agenda setting), may shape **information which does not meet the needs** of different members of the audience. Finally, citizens may **lack access to the news media, or they may lack access those news specifically, or they may lack an ability or willingness to use the information** provided by the traditional media in the first instance.

However, **the emergence of 'first informers'**, eyewitnesses that share first-hand testimonies on crisis situations, has been the biggest challenge for news media coverage of disasters over the past two decades (Haddow and Haddow, 2008:145). The **2004 Indian tsunami** marked a watershed in disaster media coverage due to it being the first time that the dominant images came from citizens rather than professional journalists (Allan et al., 2007; Cooper, 2007). The agenda-setting function of the news media has also been eroded through the rise in citizen journalists (Bowman and Willis, 2003:9). In other words, the explosion of user-generated content (UGC) online has made it virtually impossible for emergency managers and professional journalists to control disaster information flows (Cottle, 2014).

In this context, the classic Euro-US model of top-down disaster management has gradually been replaced by one of **'shared responsibility'**, in which citizens are encouraged to play an active role in the production and sharing of crisis information via social media. The gatekeeping function of the news media has given way to **'gatewatching,'** the process whereby the news media evaluate and share newsworthy content rather than solely focus on its production (Bruns, 2008:2). The role of PIOs, for instance, has transformed from gatekeeper to translator in light of their ability to use social media to both push and pull crisis information from citizens (Hughes and Palen, 2012).

Today **UGC is viewed as a cost-effective way for news media organisations to report on overseas disasters**. Mainstream media organisations such as the British Broadcasting Corporation (BBC) in the UK and Cable News Network (CNN) in the US have created hubs dedicated to the capture and verification of UGC prior to its use in news packages (Popoola et al., 2013).It is probably this expansion of the role of the news media as guarantor of quality, but at the same time as a sector connected to official and public sources and institutions, which explains why print and broadcast media continue to be seen as the most authoritative sources of information during crisis situations in the era of user-generated content. This also applies to content distributed via their social media accounts, which tends to be the most

shared during disasters, as seen during incidents such as the Oklahoma grassfires in April 2009 (Starbird and Palen, 2010).

At the same time, emergency managers now use social media to crowdsource crisis information that helps build situational awareness during disasters (Latonero and Shvlovski, 2010; Zook et al., 2010). Similarly to what has happened to the news media in relation to their audience, this marks a shift from a monodirectional top-down approach to **a two-way communication between emergency services organisations and affected populations**. The multi-directional information flows facilitated by sites such as Twitter enable key stakeholders to gather information from multiple sources at each stage of the disaster cycle. Tools such as Coosto and Twitcident can be deployed in order to help them process and obtain insight from the typically large volume of UGC created during a crisis situation (Reilly and Atanasova, 2016 [D3.3]).

Citizens' autonomous use of social media also plays a variety of important roles in shaping information flows, outside channels of communication pre-established by news media or emergency organisations and institutions. The terrorist attacks in Mumbai in November 2008 arguably represented a 'tipping point' for online participation in disaster information flows. Here citizens used Google documents to share information about the identity of the victims, and also Twitter to share images before news organisations had been mobilized in India's largest city (Potts, 2014). Further evidence of the benefits of using social media to crowdsource information from citizens was found during the 2011 Haiti earthquake, which saw an unprecedented level of 'digital volunteerism'. These volunteers helped pull information from a variety of online sources including Facebook, Twitter and blogging platforms in order to create a digital crisis map using the open source tool Ushahidi (Dufty, 2011; Purohit et al., 2014). This map showed the full scale of the damage caused by the earthquake and the material needs of specific disaster-affected areas (Meier, 2014). Digital volunteer organisations such as the Standby Volunteer Task Force (www.standbytaskforce.org) and the Virtual Online Support Group (http://vosg.us) have been mobilised during subsequent natural disasters to help make sense of the large quantities of UGC produced during such incidents and to help build situational awareness that aids disaster response (Goolsby, 2010; Hughes and Palen, 2012; Ingram, 2014; Meier, 2014).

This harnessing of collective intelligence via social media has the **potential to create new information flows during the response and recovery stages that could prevent disruption spreading to other elements of the socio-technical system**. In particular, **social media appear to empower citizens, in particular those aged 16-24 years old, to address their own information needs during large-scale emergencies and cascading disasters** (Sutton et al., 2008). Hashtags can function as 'fire spaces' in which local residents can ask questions (e.g. when will the power supply be restored?) that can be quickly answered by other users and representatives of key agencies (Cheng et al, 2015; Potts, 2014). The real-time, context-specific information provided on sites such as Facebook and Twitter may **often fill the 'gaps' left by asynchronous media channels during disasters** (Westerman and Spence, 2013). For example, citizens used a combination of Twitter, online forums and community websites to obtain information during the 2007 Californian wildfires in the absence of regular updates from the traditional media (Shklovski et al., 2008). Finally, **social media appear to play a particularly important role in the information flows that occur at the response and recovery stages of the disaster** (Miles and Morse, 2007). Studies have also suggested that sites such as Facebook and Twitter provide outlets for citizens to express support and solidarity with disaster-affected populations (Schultz et al., 2011; Spence et al., 2015). Such psychosocial impacts related to

social media use can bring disaster-affected communities together and help them cope with the trauma associated with these incidents (Murthy, 2012). This was illustrated during the 2010 Love Parade disaster in Duisburg, Germany. Survivors of the disaster, which saw 21 people killed during a stampede at the electronic dance music festival, turned to social media to offer emotional support to one another and to deal with the negative emotions caused by the incident (Neubaum et al., 2014). Like the Californian wildfires, this was an example of how social media helped cultivate a sense of community spirit and resilience amongst those citizens directly affected by the disaster.

Social media should be incorporated into the emergency management communication mix in order to ensure that crisis messages reach as many people as possible during the aftermath of disasters (Reilly and Atanasova, 2016 [D3.3]). The **importance of using both asynchronous and synchronous media channels** for crisis communication during disasters is also highlighted by research indicating that **citizens are likely to use whatever communication channel is available to them**during terrorist attacks, wildfires, and earthquakes (Boyle et al., 2004; Hughes et al., 2008; Mileti, 2000). At the same time, it should be noted that the use of social media for these purposes, as well as for two-way communication between emergency services organisations (or news media) and affected populations, is likely to **privilege the voices of** those **residents** that possess skills and expertise to make themselves heard online (Madianou, 2015). Social media should also be incorporated into the emergency management communication mix to counter rumours and misinformation online, which are today among the most important issues preventing the diffusion of accurate information to the public. Rumours and misinformation develop more easily due to lack of representativeness, within those 'gaps' left by asynchronous media channels during disasters,(Westerman and Spence, 2013). Knight called these **gaps** a **'vacuum'** (2014), alerting the news media of the importance of providing a steady, consistent flow of information in order to avoid creating voids of information that could be filled by bad information. In the digital context of multidirectional communication, multiple channels, and lack of control, these **rumours and misinformation can be prevented by the work of the news media, and if they are not successfully prevented, then they must be quickly corrected on social media by news media, emergency organisations, and public institutions.** Social media can be successfully used for this purpose, as it was seen during the civil disturbances in several English cities in August 2011 and the 2013 Boston Bombing (Gupta et al., 2013; Procter et al., 2013). This calls for **a comprehensive approach to verification techniques and preparedness for disasters in all its stages by news media organisations, and a comprehensive communication mix strategy within emergency organisations.**

3.6 Activity 2: Social media and disasters

1) Think about a disaster, or a local crisis, you have experienced or know about. Do you remember how it was represented by social media?

2) Go online and use Twitter to look at tweets about disasters. You can do this by searching by specific hashtags, like for example #ChannelTunnelFire. Spend some time looking at the tweets, then answer to these questions:

- who is writing these tweets?
- how many tweets can you see from citizens, news media, and organisations respectively, at a first glance?
- what kind of information and material do they share?
- how do they share information? can you see more examples of two-way communication between emergency services organisations or institutions and affected populations, or do you mostly see autonomous tweets of citizens sharing information among themselves?

Focus on two-way communication tweets between emergency services organisations (or institutions, companies involved, etc.) and affected populations:

- what is the role of those tweets?
- what information is being shared, and what is the role of organisations and the role of citizens in this exchange?

Focus on autonomous tweets:

- what is the role of those tweets?
- are citizens sharing information and for what purpose, or are they spreading rumours, or what?

Looking at hashtags:

- from your example, do you think they have been used effectively to support crisis management?
- how do you think emergency organisations and institutions should approach and manage hashtags of disasters and why?

Support your answer by reading *Hashtags Standards for Emergencies* by OCHA, the UN Office for the Coordination of Humanitarian Affairs, available at https://app.box.com/s/yvobt4n9wptqa8sd0887 [accessed 01 March 2017].

3) Finally, compare your analysis for this activity with that of another learner who has been examining a different disaster on Twitter, then answer to this question:
what differences do you see between tweets about the two disasters? Discuss the potential reasons for these differences.

4 Examples and Contextualisation

4.1 Activity 3: Examples & the importance of context

Cascading disasters occur when disruption in one system impacts upon others in the socio-technical system (Lönnermark et al. 2016 [D1.6]: 7). Large-scale emergencies share many similar characteristics to those with cascading effects, such as uncertainty and a time pressure for emergency organisations to respond quickly (Bram et al., 2016 [D3.2]). Therefore, lessons can be learnt from the information flows evident during large-scale emergencies and applied to cascading disasters.

At the same time, it is crucial to remember that communication dynamics during crises can be different from one disaster to another, and from one time to another, because social interactions and discursive forms of participation are based on socio-cognitive and historical, contextual factors, which **cannot be predicted**. Therefore, strategies of communication management during crises must continuously rely on previous cases to understand the range and characteristics of new dynamics that disasters can trigger today, and how these can be responded to, and to quickly adjust to contextual and changing circumstances that could affect dynamics of communication during disasters.

In this section, you are invited to work on the information flows surrounding three large-scale European emergencies:

- the floods in South-West England (December 2013-February 2014);
- the thunderstorm that hit the Pukkelpop music festival in Belgium (18 August 2011);
- the 'Project X' riots in Haren, the Netherlands (21 September 2012).

Read about these disasters in "A report on the role of the media in the information flows that emerge during crisis situations" pp. 23-30(Reilly and Atanasova (2016) [D3.4]), available athttp://casceff.eu/publications/).Inthatdocument, background on each incident is provided, with a specific focus on how citizen and professional journalists contributed to disaster information flows.

4.2 Successes and failures of the three case studies

The content of sessions 4.2.1, 4.2.2, and 4.2.3below, and correspondent slides, is intended to facilitate one or more reflexive sessions on the three case studies. Following activity 3 above, learners can read more widely about the cause studies directly from the CascEff Deliverable D3.4 (Reilly and Atanasova (2016) [D3.4]). However relevant parts of the CascEff deliverable D3.4 for this lesson about these cases are also available below. They can be used by the instructor to lead the session and highlight key elements of the discussion, or they can be used by learners to revise key elements of the case studies treated more widely in D3.4.

*Therefore, this part lends itself well to a **class discussion (workshop)**or reflective session (for self-learners) about the failures and successes of each case, to have learners-participants identify the key elements, develop additional considerations about these successes and failures, find new links between the elements that triggered these crises, and to compare with other*

experiences or knowledge of the learners-participants. In this way, this final part of the lesson will help strengthening an understanding of main areas of change in relation to media and communication management during disasters, which are summarised in the Conclusions.

4.2.1 The importance of traditional media for disaster management (Floods in England)

Record rainfall throughout December 2013 and January 2014 coupled with tidal surges saw floods batter many coastal areas in the UK. South-West England in particular bore the brunt of these storms, with large sections of the Somerset Levels left under water by 11 January. The train line at Dawlish would collapse on 5 February (see Figure 1, slide 27), effectively cutting off Devon and Cornwall from the rest of the UK rail network. The full scale of the economic impact of the floods would be revealed months later. The UK Environment Agency estimated that £135 million worth of damage had been caused to flood defences, with the Association of British Insurers stating that there were 17,500 flood-related claims (worth an estimated £1.1 billion) between 23 December 2013 and 28 February 2014.

Once the floods had subsided, Cornwall Council launched a campaign via various media outlets to communicate that the area was open for business and in this way aimed to help mitigate the economic impact of the floods on the local tourism industry (Andrew, 2014).

The UK Environment Agency (EA) used a communication mix, which included print, broadcast and social media, in order to issue emergency notifications, weather forecasts and flood warnings to local communities affected by the floods during this period. As confirmed by a representative from the EA, this was part of the agency strategy to ensure that information pertaining to the floods could reach as many people as possible. As it had happened in previous disasters (Hurricane Sandy and the 2004 Indian tsunami), flood-affected communities used any communication channel and device available to them in order to search for information on the response and recovery operations. At the same time, **print and broadcast media** had been the most effective communication channels during the floods. **Local news media** played a key role in providing information to residents about where they could obtain sandbags, as well as providing travel updates. Congruent with the traditional role of the media in disaster management, **local BBC radio and television stations** also issued crisis information on behalf of the key stakeholders responsible for coordinating the response to the floods. **Traditional media provided reassurance and trusted information for those affected by the floods**. For example, BBC **Radio** Gloucestershire had invited personnel from the local County Council to base themselves in the newsroom, thus enabling them to speak directly to members of the public who were contacting the radio station with requests for help. **The size of the radio audience** was typically cited as the reason why it had proven particularly effective as a communication channel during crisis situations such as the 2013-14 floods. A BBC Radio Cornwall spokesperson suggested that as many as a third of the adult population in the county listened to the station at least once a week. This was in sharp contrast to the lack of 3G, 4G and broadband connectivity in many remote areas that militated against the use of social media to disseminate crisis information in those areas. In this way, **this case study appears to provide further evidence of how citizens** perceive traditional media as a reliable and trusted information source during crisis situations.

There was some anecdotal evidence to suggest that **social media had helped fill the gaps in information flow left by traditional media, in particular those more strictly related to emergency communication**. For example, a representative of Gloucestershire Fire and Rescue

Service, who had been directly involved in the emergency management operation response, confirmed that the authorities had received numerous requests for assistance via Twitter. An official EM account on the microblogging site had received a tweet from a member of the public who needed help moving medical gas, but had been unable to reach the authorities via other channels. While acknowledging the problem of verifying UGC produced during this period, the consensus amongst interviewees for the CascEff deliverable D3.4 was that **social media had helped build situational awareness and awareness of citizens' needs in flood--affected areas more specifically**. Fire and rescue services personnel were also said to be using Twitter to direct the attention of the news media towards the measures they were taking to protect residents in flood-affected areas. This demonstrated how **social media might create new information flows between key agencies and the news media during crisis situations** (Reilly and Atanasova, 2016 [D3.3]). However, none of the interviewees believed that social media would overtake traditional media as the preferred channel for crisis and risk communication in the region. A representative of Cornwall Council argued that it would be preferable to "run the two together" in order to maximise the reach of crisis messages.

There was also some evidence suggesting that there had been **a breakdown in information relations between key agencies and members of the public during the floods. The news media** did not appear to have satisfactorily articulated the frustration of local communities at what they saw as the lack of preventative measures taken by the authorities to mitigate flood risk in the region. Conversely, **social media would play an important role in the mobilisation of citizen-led campaigns** such as #forageaid and the Flooding on the Levels Action Group (FLAG), who criticised the UK government and the EA for failing to dredge rivers in the region, a measure that they claimed would have reduced the risk of flooding during extreme weather events such as those seen during this period. One of the interviewees from the EA confirmed that they had subsequently piloted a hyperlocal Facebook site due to their inability to directly participate in this citizen-led 'online dialogue' about the floods. This was seen as a way to provide context-specific information to members of the public, as well as explaining what preventative measures were being taken by the authorities to minimise the impact of future flood events. This approach was also informed by their own market research, which suggested that 16-24 year olds were more likely to use smart phones to search for information than access traditional media sources such as newspapers and television news.

4.2.2 Beware of the digital factor! (Project X Haren)

Project X refers to the sequence of events in the small Dutch town of Haren on 21 September 2012, during which a Facebook invitation to a Sweet Sixteen birthday celebration that went 'viral' online led to riots involving thousands of young people who had gathered for the party. On 6th September Merthe -a girl from Haren - had sent her friends a public birthday invitation via Facebook. A friend of one of those who received the invitation promptly shared it with500 other people on the site, who then did the same with their online social networks. Within two days, 16,000 people had been invited, at which point Merthe deleted the event from Facebook. Jesse Hobson from Christchurch, New Zealand and 'Ibe der Fuhrer' from Berlin, Germany responded to this by using Facebook to organise a birthday party for the same date and time as proposed by Merthe on the original invitation. The Twitter hashtag #ProjectXHaren began to circulate online around 16th September, referencing the Project X movie in which young people organise a party that spirals out of control. On 19th September a teaser trailer for the party was uploaded to YouTube and an invitation-only Facebook group created for the event. This group was heavily moderated with posts like 'we should not do this' deleted. A flyer for the event was also shared on lifestyle blog Melf. Some popular

television talk shows and entertainment radio programmes were also covering the event and encouraging young people to go.

Concerned about the level of media interest in the event, the municipality of Haren in conjunction with the local police discussed the option of organising an alternative party on the 22nd September in order to manage the large crowd of teenagers that were expected to travel to the town. However, these plans were quickly shelved due to fears that this might encourage further Project X events in other cities across the Netherlands. While the official line was that there would in fact be no party on the 22nd, a communication officer for the municipal authorities would create further **confusion** by mentioning the alternative party in a press interview just two days before the event. Buoyed by the warm weather, an estimated 4,000 young people (the majority of whom were said to be students) ignored the advice of the Haren authorities and travelled to Haren on the 21st September as planned. They began to gather in the streets once it became apparent that Merthe's family home was surrounded by local police and that there was no alternative party for them to attend. The insufficient police numbers in the town meant that many of the young people were able to break the law by consuming alcohol in the streets from early in the afternoon. At around 8.30pm, rioting broke out with cars and properties vandalised and a series of rumours began to circulate online about a teenage girl who had been killed during the violence. The violence lasted for several hours and resulted in several young people being injured. Footage of the rioting would also circulate on social media sites such as YouTube, which would later be incorporated into news media coverage of the incident.

In contrast to the 2013-2014 floods in South-West England, there appeared to be **a lack of centralised control over information flows in the run up** to the Project X Haren riot. The official Project X Haren Research Committee, set up to identify key lessons from the incident, criticised the Haren authorities for providing inconsistent messages about the aborted 'alternative party' (Reilly and Atanasova, 2016 [D3.3]). A representative from the Committee interviewed for this project argued that the **sharing of information via the news media** meant that large numbers of **young people** travelled to the town with 'wrong expectations' and were disappointed when they found out there would be no such party. A recurring theme in interviews with local and national Dutch journalists in the CascEff deliverable D3.4 (Reilly and Atanasova, 2016 [D3.4]) was that the **news media coverage** showing how Merthe's Facebook invitation went **viral** online had contributed to the scale of the party that would culminate in rioting. A national journalist claimed that **the presence of broadcast media in the town the day before** had probably convinced many young people that it was a real event that was worth attending. **Media frames** characterised this event as an exciting, unmissable event for young people and rendered efforts by the authorities to downplay its significance ineffective.

The Research Committee also criticised the authorities for their **failure to convert social media data into information that could build situational awareness during the incident**. While YouTube footage was eventually used to help identify some of the rioters, there were clear information failures that contributed to the unrest seen on the 21 September. For example, interviewees criticised **the police** for their **slow response to the rumour** that a19-year-old girl had been killed during the riots. A local journalist claimed that the police took as long as 20 minutes to confirm that they didn't have any information to corroborate these claims. The **circulation of these erroneous reports on social media** had probably contributed to the violence directed at the police and local properties later that evening. A national journalist also pointed out that such was the level of social media activity in the days preceding the event, "you couldn't deny that something big was going to happen". They expressed surprise at the **failure of the police and the Mayor to prepare for the influx** of thousands of young people in

light of what was being posted on Facebook and Twitter. However, like the 2013-14 floods, **citizens appeared to be empowered through social media to help with the response and recovery phases** of this large-scale emergency. On the following day, members of the public created a public Facebook page to organise a clean-up of Haren. A member of the public, who had collected about 500,000 tweets and scraped messages from the Facebook group, later initiated a hackathon to try and make sense of what had happened (Schäfer, 2012).

4.2.3 Open channels make a difference (Pukkelpop 3)

On August 18th, 2011 at 6:15 pm a thunderstorm hit the Pukkelpop festival area in Kiewit, Belgium. The thunderstorm was later classified as a supercell - characterised by a sudden onset and capability to produce a combination of severe weather conditions including high winds, large hailstones and strong tornadoes. Within a few minutes the festival area began to flood and the ferocity of the winds would cause the Chateau tent to collapse, causing many casualties and leading to five fatalities.
Video footage recorded by festival goers on their mobile phones would quickly begin to circulate online showing the full extent of the devastation caused by the thunderstorm. In contrast to Project X and the 2013-14 floods, however, **the authorities chose to keep communication to a minimum in order to avoid causing further panic as the Pukkelpop disaster unfolded**. They would face criticism for this approach in a subsequent report, as well as for their **failure to provide real-time crisis information via social media**. **Restriction on top-down information flow was arguably reflected in the media coverage of the disaster.** The coverage in three Flemish daily **newspapers would perpetuate a number of myths** about the disaster, particularly in relation to the scale of the flooding that occurred on the festival site (Temmerman and Mast, 2014). The **news media would also publish erroneous information obtained from Twitter** about the number of fatalities caused by the collapse of the Chateau tent. Several news outlets, including the national news agency Belga, would publish this **unverified information** on their websites. The central role of the news media in **amplifying UGC** during the incident was demonstrated by the fact that the number of tweets about the rumoured death toll peaked after it had been reported in mainstream media outlets (Terpstra et al., 2012). Nevertheless, two newspapers would later be forced to retract this information and publish a letter of apology to their readers and the victims (Joye, 2013)**.**

Information flows during the Pukkelpop disaster were disrupted due to the lack of mobile cellular towers on the festival site, which meant that there was no mobile phone coverage in the aftermath of the thunderstorm (Botelho-Nevers and Gautret, 2013). The consensus amongst Belgian interviewees (Reilly and Atanasova, 2016 [D3.4])was that **social media** had helped fill this information gap, albeit its potential use to enhance situational awareness had not been fully exploited by emergency managers. Festival goers used Twitter to describe how trees and scaffolding had fallen over due to the high winds, as well as the flooding of the festival grounds caused by the heavy rainfall. Citizens also appeared wary of spreading rumours and misinformation relating to the disaster. At 6:52 pm the first rumours about the number of fatalities began to emerge on the micro-blogging site, however these tweets were not widely shared and many tweeters expressed doubts about their veracity (Schafer, 2012). A police officer from a neighbouring jurisdiction confirmed that lessons had been learnt from the Pukkelpop disaster and that the police in northern Belgium now had a dedicated social media monitoring team to evaluate UGC during festivals and large public demonstrations.

Social media also played a key role in the information flows that emerged during the response and recovery stages of the disaster. Facebook and Twitter functioned as spaces in

which citizens could provide and seek information about the safety of their families and loved ones. With mobile phone networks unavailable, social media emerged as a reliable way to say ‘I am OK’. On Facebook, users created the public ‘Pukkelpop Safehouse’ page where festival goers, friends and families were able to check in and find each other. However, Twitter appeared to be the social media site most frequently used by those affected by the disaster. Hashtags such as #ppok were used by festival goers to reassure family members that they were safe (Terpstra et al., 2012). One tweeter connected festival goers with residents of a nearby town called Hasselt via the #hasselthelpt hashtag. This hashtag mobilised Hasselt residents to offer festival goers food and shelter, transport, and internet connection. Some of the Hasselt residents who offered help via #hasselthelpt were had no history of use of Twitter prior to the events. The #hasselthelpt initiative stimulated other nearby towns to follow with offers for help resulting in additional hashtags such as #antwerpenhelpt, #brusselhelpt and #genthelpt (van Peteghem and Caudron, 2011). The following year, the ‘I’m Fine’ App would be created bya Pukkelpop festival goer who had been affected by the disaster. The idea was that people could use the App to inform their families and loved ones about their wellbeing and whereabouts through email or Facebook.

5 Conclusions

5.1 Areas of change for communication management during emergency

This lesson has focused on the role of the news media in the information flows that emerge during large-scale emergencies and cascading disasters. Literature on citizen and professional journalism practices during such disasters was examined, as well as the key information about successes and failures during three large-scale European emergencies. The impact of media coverage of crises upon the behaviour of members of the public was also explored in order to identify key lessons for emergency managers who wish to use these channels to communicate with populations affected by cascading disasters.

The lesson has discussed four main **areas of change** related to the role of the news media in the information flows of disasters. These are: models of crisis management, traditional and news media, social media, and the role of the citizens. The discussion of each of these areas of change as developed in this lesson is summarised below.

5.2 The model

The classic Euro-US model of top-down disaster management has gradually been replaced by one of **'shared responsibility,'** in which citizens are encouraged to play an active role in the production and sharing of crisis information via social media. This reflects the explosion of UGC online and the inability of emergency managers and professional journalists to control information flows during cascading disasters.

5.3 Traditional and news media

The role of the news media has shifted **from gatekeeping to gatewatching**, whereby they publicise and share relevant news content rather than focus solely on its production.

However, the most shared content during cascading disasters is still likely to originate from the social media accounts of news **media organisations and professional journalists. Print and broadcast media remain the most trusted and authoritative source** of information during crisis situations such as cascading disasters. The persistence of digital divides militates against the use of social media for risk and crisis communication in many geographically isolated areas.

Traditional media have long played an important role in **educating** the public on disaster risk. However, **media interventions appear to have a greater influence upon general behaviours** e.g. handwashing to prevent the spread of EVD, **and are not as suitable for the provision of real-time, context-specific information**.

The news media can make significant contributions to information flows during and after cascading disasters. The **verification of UGC and the quelling of rumours and misinformation** can help prevent further disruption to other elements of the socio-technical system.

At the same time, **'disaster myths'** perpetuated by professional journalists and traditional media may also hinder response and recovery initiatives through their distortion of the behaviour and needs of affected populations.

5.4 Social media

Social media provide practical support for crisis management. 'First informers' and citizen journalists provide **eyewitness perspectives on disasters that help emergency managers build situational awareness**. Digital volunteers can also help **identifying those areas that are most in need of disaster relief**. Finally, **citizens can get organised and share information**, especially when institutions and media are still absent or silent. This flexibility of social media, and characteristics of the news media also suggest that the multi-directional information flows facilitated by social media may be more effective in addressing the immediate needs of communities affected by disasters. As a consequence, social media offer strong potential to sustain information flows during the response and recovery stages of disasters that could limit damage and prevent disruption spreading to other elements of the socio-technical system. At the same time, if let alone social media can give life to autonomous flows of information that **can practically disrupt social life or prevent effective crisis management**.

Social media can also facilitate **multi-directional information flows** that have **psychosocial impacts** for disaster-affected populations that build resilience against future incidents. Facebook and Twitter in particular bring disaster-affected communities together and help them cope with the trauma associated with these incidents. They also help **citizens to take greater responsibility for disaster management**, and **provide emotional support for victims**. However, it should be noted that this often privileges the voices of better off residents at the expense of poorer ones, who typical lack the skills and expertise to make themselves heard online. In general, however, **unmanaged flows of information on social media can also weaken the sense of security and enhance a feeling of vulnerability in citizens**, triggering emotive flows that can be difficult to manage.

5.5 Citizens

Emotional discourses circulating in communities are both empowering and weakening crisis management. In disaster media coverage, emotional discourses can have positive impact on crisis management, for example by helping raise aid donations and invite members of the public to care. However, this focus on danger, 'death and destruction' has disproportionate influence upon the allocation of resources, and is often appropriated by political elites to serve their respective agendas. At the same time, a consistent part of social media discourse about disasters by citizens is also emotional discourse. This is because disasters trigger fear and a sense of vulnerability, and as a consequence debates about these crises are unavoidably marked by emotions. It is also because disasters represent an opportunity for citizens to express their feelings about organisations and institutions, politicians and businesses for their management of the crisis. Emergency managers, public institutions, traditional and news media, may need to attend to not only the factual elements of circulating information, making sure that what it is timely, consistent, coherent, factual, and accurate, but also to emotions in information flows, which are today very present and exploited in public debates.

For an effective crisis management, emergency managers, public institutions, and news agents would need to manage both facts and emotions by taking into account the fact that

disaster-affected populations are still likely to use whatever **communication channels** are at their disposal to search for information on disaster response and recovery.

5.6 Final remarks

All these dynamics inform decisions about disaster response and recovery, and so have implications for the wellbeing of populations affected by disasters. They can help emergency managers build situational awareness and identify those areas and communities that are most in need of assistance, or disrupt their work at crucial times. Therefore, it is vitally important that all these dynamics are carefully considered, and that emergency managers develop a **communication mix of both digital and traditional media, in order to engage all the actors that concur in shaping information during disasters.** Given that citizens, journalists, emergency organisations, and institutions use and circulate information in different ways, at different times, and according to a range of purposes and complex dynamics, a variety of fully working and flexible channels of communication is indispensable to engage all stakeholders, in order to prevent further disruption to other elements of the socio-technical system during disasters.

6 Notes

1 The United Nations Office for Disaster Risk Reduction (UNISDR) defines a disaster as "a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources" (UNISDR 2009).

2 The IFRC issues an annual World Disaster Report in which such issues are discussed. For more, see: http://www.ifrc.org/en/publications-and-reports/world-disasters-report/(accessed18 May 2017).

3 See the IFRC evaluation of the response to the Haiti earthquake of 2010 as an example of how private sector, communities, and humanitarian NGOs contribute to beneficiary communication, available at http://www.ifrc.org/PageFiles/121469/1253602-Beneficiary-Communications-Evaluation-Report-A4-EN-03.pdf (accessed 18 May 2017).

4. BBC Media Action is the international development charity set up by the UK public service broadcaster to "help reduce poverty and support people in understanding their rights". See: http://www.bbc.co.uk/mediaaction (accessed 18 May 2017).

7 References

Allan S, Sonwalkar P and Carter C (2007) Bearing witness: citizen journalism and human rights issues,*Globalisation, Societies and Education* 5(3) 373–389.

Andrew, R (2014) *Cumulative impact of severe weather in Cornwall*: Winter 2013/2014,Cornwall Council.

Austin, L., Fisher, B. & Yan J. (2012) How audiences seek out crisis information: Exploring the social-mediated crisis communication model, *Journal of Applied Communication Research* 40(2) 188-207.

Bennett, R., and Kottasz, R. (2000) Emergency fund-raising for disaster relief, *Disaster Prevention and Management: An International Journal* 9(5)352 - 360.

Bohensky, E. L. & Leitch, A. M. (2014) Framing the flood: A media analysis of themes of resilience in the 2011 Brisbane flood,*Regional Environmental Change* 14(2) 475-488.

Boin, A. & McConnell, A. (2007) Preparing for critical infrastructure breakdowns: The limits of crisis management and the need for resilience,*Journal of Contingencies and Crisis Management*15(1) 50-59.

Boltanski, L. (1999) *Distant suffering: morality, media and politics*, Cambridge: Cambridge University Press.

Bowman, S. & Willis, C. (2003). We media: How audience are shaping the future of news and informationhttp://www.hypergene.net/wemedia/download/we_media.pdf (accessed 24 May 2017)

Boyle, M. P., Schmierbach, M., Armstrong, C. L., McLeod, D. M., Shah, D. V. & Pan, Z. (2004) Information seeking and emotional reactions to the September 11 terrorist attacks,*Journalism & Mass Communication Quarterly*, 155-167.

Bram, S., Degerman, H., Eriksson, K., Vylund, L., Amon, F., Ronchi, E., Uriz, F.N., Criel, X., Reilly, P., Van Heuverswyn, K., and Brugghemans, B. (2016) [D3.2] Decision-making and human behaviour in

emergencies with cascading effects, CascEff Deliverable 3.2http://casceff.eu/publications/ (accessed 24 May 2017).

Britton, N. R.and Centre for Disaster Studies (1988) Organized behavior in disaster: A review essay,*International Journal of Mass Emergencies and Disasters,* 363–395.

Burger, J., Gochfeld, M., Jeitner, C., Pittfield, T. & Donio, M. (2013) Trusted information sources used during and after Superstorm Sandy: TV and radio were used more often than social media,*Journal of Toxicology and Environmental Health, Part A: Current Issues* 76(20) 1138-1150.

Bruns, A. (2008) *Blogs, Wikipedia, Second Life and beyond: From production to produsage*. New York: Peter Lang.

Cheng, J. W., Mitomo, H., Otsuka, T., & Jeon, S. Y. (2015). The effects of ICT and mass media in post-disaster recovery - A two model case study of the Great East Japan Earthquake,*Telecommunications Policy* 39(6) 515–532.

Chouliaraki, L. (2013) *The Ironic Spectator: Solidarity in the age of post-humanitarianism*, Cambridge: Polity.

Cohen, E., Hughes, P., White, P.B., (2006) *The Media and Fire Services: Public relations and community information: A Victorian view (Bushfires and the Media: Report N. 2*,Bundoora: La Trobe University http://www.latrobe.edu.au/bushfires (accessed 17 May 2017).

Coombs, W. T. (2010) Crisis Communication and Its Allied Fields, in *The Handbook of Crisis Communication* (eds W. T. Coombs and S. J. Holladay), Wiley-Blackwell, Oxford, UK, 54-64.

Cooper, G. (2011). From their own correspondent? New media and the changes in disaster coverage: lessons to be learnt. Reuters Report Series: Reuters Institute for the Study of Journalism, University of Oxford), (May) 1–48.

Cottle, S. (2014). Rethinking media and disasters in a global age: What's changed and why it matters,*Media, War & Conflict*, 7(1) 3–22

De Castella, T. (2011) 'England riots: Are brooms the symbol of the resistance?' BBC News Magazine (10 August) [Online] http://www.bbc.co.uk/news/magazine- 14475741 (accessed 21 June 2013).

Deuze M (2009) The future of citizen journalism. In: Allan S and Thorsen E (eds) Citizen Journalism: Global Perspectives. New York: Peter Lang, pp. 255–264

Dufty, N. (2011) Using social media for natural disaster resilience. http://works.bepress.com/neil_dufty/22 (accessed 17 May 2017).

Entman, R.M. (1993). "Framing: Toward clarification of a fractured paradigm". *Journal of Communication* 43 (4): 51–5

Flanagin, A.J., and Metzger, M.J. (2000) Perceptions of Internet information credibility, *Journalism & Mass Communication Quarterly*, 77:515-540.

Galtung, J. and Ruge. M. (1965) The structure of foreign news, *Journal of Peace Research*, 2 (1): 64-91.

Goffman, E. (1974), *Frame analysis: An essay on the organization of experience*. New York: Harper and Row.

Goolsby, R. (2010) Social media as crisis platform: the future of community maps/crisis maps, *ACM Transactions on Intelligent Systems and Technology* 1(1) 7-11.

Gupta, A., H. Lamba, H., and Kumaraguru, P. (2013) $1.00 per rt #bostonmarathon #prayforboston: Analyzing fake content on twitter, *in Eighth IEEE APWG eCrime Research Summit (eCRS).*

Haddow, G. and Haddow, H (2008) *Disaster Communications in a Changing Media World. Butterworth Heinemann*. Burlington, MA.

Hagen, K., Tzanetakis, M., and Watson, H. (2015) Cascading effects in crises: categorisation and analysis of triggers, ISCRAM, Short Paper - Planning, Foresight and Risk Analysis, in*Proceedings of the 2015 ISCRAM Conference*.

Hannides, T. (2015) Humanitarian broadcasting in emergencies - A synthesis of evaluation findings, Research Report Issue 7, BBC Media Action, London.

Hughes, A. L. & Palen, L. (2012) The evolving role of the Public Information Officer: An examination of social media in emergency management,*Journal of Homeland Security and Emergency Management* 9(1) DOI: 10.1515/1547-7355.1976.

Hughes, A. L., Palen, L., Sutton, J., Liu, S.B., &Vieweg, S. (2008). "Site-Seeing" in Disaster: An Examination of On-Line Social Convergence, in *Proceedings of the 2008 ISCRAM Conference*.

Ingram, M. (2014) Putting the crowd to work, in Silverman, C. (ed) *Verification Handbook: a definitive guide to verifying digital content for emergency coverage*, European Journalism Centre70-75.

ISO 22300 (2012) Societal security: Terminology, https://www.iso.org/obp/ui/#iso:std:iso:22300:ed-1:v1:en (accessed 19 May 2017).

Jin, Y., Liu, B.F. & Austin, L.L. (2011) Examining the role of social media in effective crisis management: The effects of crisis origin, information form, and source on publics' crisis responses,*Communication Research* 41(1) 74-94.

Jiménez-Martínez, C. (2014) Disasters as media events: The rescue of the Chilean miners in national and global television. International Journal of Communication, 8: 1807–1830.

Joye, S. (2014) Media and disasters: Demarcating an emerging and interdisciplinary area of research. Sociology Compass, 8(8): 993–1003

Keim, M. E. and E. Noji (2011) 'Emergent use of social media: a new age of opportunity for disaster resilience'. *American Journal of Disaster Medicine*. 6(1): 47–54.

Knight, S. (2014) Preparing for disaster coverage, in Silverman, C., and Tsubaki, R. Creating a verification process and checklist(s), in Silverman, C. (ed) *Verification Handbook: a definitive guide to verifying digital content for emergency coverag*e, European Journalism Centre 86-96.

Kuttschreuter, M., Gutteling, J. M., & de Hond, M. (2011). Framing and tone-of-voice of disaster media coverage: The aftermath of the Enschede fireworks disaster in the Netherlands. *Health, Risk & Society*, 13(3), 201–220

Landau, J. & Saul, J. (2004) Facilitating family and community resilience in response to major disaster. In F. Walsh & M. McGoldrick (eds.), *Living Beyond Loss*. New York: Norton, pp. 285- 309.

Latonero, M. & Shklovski, I. (2010) *Respectfully yours in safety and service: Emergency management & social media evangelism*, in *Proceedings of the 2010international ISCRAM conference*.

Liebes, T. (1998). Television's disaster marathons: A danger to democratic processes? In T. Liebes & J. Curran (Eds.), *Media, Ritual and Identity*. London and New York: Routledge, 71-84.

Liu, B.F; Austin, L; & Jin, Y. (2011) How publics respond to crisis communication strategies: The interplay of information form and source, *Public Relations Review* 37 345–353.

Lönnermark, A., Criel, X., Johansson, J. Cedergren, A., Van Heuverswyn, K., Judek, c., Lange, Arnell, K., Paul Reilly, P. (2016) [D1.6],EC FP7 CascEff Glossary and Definitions Deliverable 1.6, European Commission FP7, http://casceff.eu/publications/ (accessed 29 May 2017).

Lotan, G., Graeff, E., Ananny, M., Gaffney, D., Pearce, I., and boyd, D. (2011) The Revolutions Were Tweeted: Information Flows during the 2011 Tunisian and Egyptian Revolutions, *International Journal of Communications* 5:1375-1405.

Lowrey, W., Evans, W., Gower, K. K., Robinson, J. A., Ginter, P. M., McCormick, L. C., & Abdolrasulnia, M. (2007) Effective media communication of disasters: Pressing problems and recommendations. *BMC Public Health*, 7, 97–98

Madianou, M. (2015) Digital Inequality and Second-Order Disasters: Social Media in the Typhoon Haiyan Recovery, *Social Media + Society July-December*: 1–11

McCombs, M.E., & Shaw, D.L. (1972). The Agenda-Setting Function of Mass Media,*Public Opinion Quarterly*, 36 176-187. 37

McKinnon, S., Gorman-Murray, A., & Dominey-Howes, D. (2016). Disasters, Queer Narratives and the News: How are LGBT Disaster Experiences Reported by the Mainstream and LGBTI Media? *Journal of Homosexuality*, 8369.

Meier, P. (2014)*Digital humanitarians: How Big Data is changing the face of humanitarian response.* London: CRC Press.

Miles, B., & Morse, S. (2007) The role of news media in natural disaster risk and recovery. *Ecological Economics,* 63(2-3), 365–373

Mileti, D. (2000) The social psychology of public response to warnings of a nuclear power plant accident, *Journal of Hazardous Materials*, 75, 181-194.

Murthy, D. (2012)*Twitter: Social communication in the Twitter Age*. Cambridge: Polity Press.

Neubaum G, Rosner L, Rosner L, Rosenthal-vonder Pütten AM, Kramer NC (2014) Psychosocial functions of social media usage in a disaster situation: A multi-methodological approach. *Computer Human Behaviour*, 34: 28–38.

Norris, F.H., Stevens, S.P., Pfefferbaum, B., Wyche, K.F. and Pfefferbaum, R.J (2007) Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology* 41, 127-150.

Oosterhof, L., Heuvelman, A. and Peters, O. (2009) Donation to disaster relief campaigns: Underlying social cognitive factors exposed. *Evaluation and Program Planning* 32, 148–157.

Pantti, M, Wahl-Jorgensen, K., and Cottle, S. (2012) *Disasters and the Media*. New York: Peter Lang.

Pantti, M. K. and Wahl-Jorgensen, K. (2011) 'Not an act of God': anger and citizenship in press coverage of British man-made disasters,*Media Culture Society* 33(1) 105-122.

Pipes,S.T. (2007) Information Disasters and Disaster Information: where information science meets emergency management, in McEntire, D. (ed) (2007) *Disciplines, Disasters and Emergency Management: the convergence and divergence of concepts, issues and trends from the research literature,* Charles C Thomas Pub Ltd, 293-319.

Popoola, A., Krasnoshtan, D., Toth, A., Naroditskiy, V., Rahwan, I., Castillo, C., and Meier, P. (2013) Information Verification during Natural Disasters, in *Proceedings of the 22nd International Conference on World Wide Web*.

Potts, L. (2014)*Social media in disaster response: how experience architects can build for participation.* New York: Routledge, Taylor & Francis Group.

Procter, R., Crump,J., Karstedt, S., Voss, A.& Cantijoch, M. (2013) Reading the riots: what were the police doing on Twitter?, *Policing and Society: An International Journal of Research and Policy*23(4) 413-436.

Purohit, H., Castillo, C., Diaz, F., Sheth, A. & Meier, P. (2014) Emergency–relief coordination on social media: Automatically matching resource requests and offers,*First Monday* 19(1) DOI: http://dx.doi.org/10.5210/fm.v19i1.4848.

Quarantelli, E., & Dynes, R. (1970) Property Norms and Looting: Their Patterns in Community Crises*, Phylon*31(2) 168-182.

Reilly, P. and Atanasova, D. (2016) [D3.3] *A strategy for communication between key agencies and members of the public during crisis situations*, EC FP7 CascEff Project Deliverable 3.3, European Commission FP7, http://casceff.eu/publications/ (accessed 29 May 2017).

Reilly, P. and Atanasova, D. (2016) [D3.4] A report on the role of the media in the information flows that emerge during crisis situations, EC FP7 CascEff Project Deliverable 3.4, European Commission FP7, http://casceff.eu/publications/ (accessed 29 May 2017).

Reynolds, B., and Seeger, M.W. (2005) Crisis and emergency rick communication as an integrative model,*J. Health Communication* 10, 43 - 55.

Rubin, D.M. (1987) How the news media reported on Three Mile Island and Chernobyl, *Journal of Communication* 37(3) 42-57.

Ryan, B. (2013),"Information seeking in a flood", *Disaster Prevention and Management: An International Journal* 22(3) 229 - 242.

Scanlon, T. J. (1992) *Disaster Preparedness: Some Myths and Misconceptions*, Easingwold: The Emergency Planning College.

Schäfer, M. T. (2012) Analysing 500.000 Tweets: ProjectX Haren hackathon,http://www.newmediastudies.nl/magazine/analysing-500000-tweets-projectx-haren-hackathon(accessed 29 May 2017).

Schultz, F., Utz, S., and Goritx, A. (2011) Is the medium the message? Perceptions of andreactions to crisis communication via Twitter, blogs and traditional media, *Public RelationsReview*37, 20–27.

Shklovski, I., Palen, L. & Sutton, J. (2008) Finding community through information and communication technology during disaster events*,inProceedings of the 2008 ACM conference on Computer supported cooperative work.*

Silverman, C. (ed) *Verification Handbook: a definitive guide to verifying digital content for emergency coverage*, European Journalism Centre.

Spence, P., Lachlan, K.A., Lin, X. and del Greco, M. (2015) Variability in Twitter Content Across the Stages of a Natural Disaster: Implications for Crisis Communication, *Communication Quarterly,* 63(2) 171-186.

Starbird, K. and Palen. L. (2010)Pass It On?: Retweeting in Mass Emergencies,in *Proceedings of the 2010 ISCRAM Conference*.

Stephens, K. K., Barrett, A. K. & Mahometa, M. J. (2013) Organizational communication in emergencies: Using multiple channels and sources to combat noise and capture attention,*Human Communication Research*39, 230-251.

Sutton, J., Palen, L. & Shklovki, I. (2008) Backchannels on the front lines: Emergent use of social media in the 2007 Southern California fires, in *Proceedings of the 2008ISCRAM Conference.*

Temmerman, M and Jast, M. (2014) Reporting Disaster: the myth of the flood in the press coverage of the 2011 Flemish Pukkelpop Drama, 5th European Communication Conference, European Communication Research and Education Association, Lisbon, 13 November.

Terpstra, T., de Vries, A., Stronkman,R. & Paradies, G. L. (2012) Towards a realtime Twitter 40 analysis during crises for operational crisis management, in *Proceedings of the 9th International ISCRAM Conference*.

Tierney, K. Bevc, C. & Kuligowski, E (2006) Metaphors Matter: Disaster Myths, Media Frames, and Their Consequences in Hurricane Katrina, in*The ANNALS of the American Academy of Political and Social Science* 604(1) 57–81.

Tobin, G. A. (1999) Sustainability and community resilience: the holy grail of hazards planning,*Global Environmental Change Part B: Environmental Hazards* 1(1) 13-25.

UNISDR (2009) Terminology on Disaster Risk Reduction, http://www.unisdr.org/we/inform/publications/7817 (accessed 29 May 2017).

Van der Meer, T.G.L.A and Verhoeven, P. (2013) Public framing organizational crisis situations:Social media versus news media, *Public Relations Review* 39, 229–231.

Van Peteghem, D. & Caudron, J. (2011) Hoe het Pukkelpop-drama de echte kracht toont vansociale media, *Frankwatching.com*19 August 2011https://www.frankwatching.com/archive/2011/08/19/hoe-het-pukkelpop-drama-de-echte-kracht-toont-van-sociale-media/ (accessed 29 May 2017).

Veil, S.R., Buehner, T. and Palenchar, M.J. (2011) A work in process literature review:incorporating social media in risk and crisis communication, *Journal of Contingencies and CrisisManagement* 19, 2, 110-122.

Veil, S., Reynolds, B., Sellnow, T. L. & Seeger, M. W. (2008)CERC as a theoretical framework for research and practice,*Health Promotion Practice*, 8, 1-10.

Wei, J., Zhao, D., Yang, F., Du, S. & Marinova, D. (2010) Timing crisis information release via television, *Disasters* 34(4) 1013-1030.

Wenger, D.E. (1985) Mass media and disasters, Preliminary Paper no.98, Newark, DE: Disaster Research Center.

Westerman, D. & Spence, P. (2013) Social media as information source: Recency of updates and credibility of information,*Journal of Computer-Mediated Communication* 19, 17-183.

Zook, M., M. Graham, T. Shelton, and Gorman, S. (2010) Volunteered geographic information and crowdsourcing disaster relief: A case study of the Haitian earthquake, *World Medical and Health Policy* 2(2)7-33.

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