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Communicating with communities (CwC) during post-disaster reconstruction: an initial analysis

Serena Tagliacozzo[1] ⬤ · Michele Magni[2]

Abstract International organisations have acknowledged that providing information to and communicating with communities affected by disasters should be considered as an integral part of the humanitarian aid. Yet little is known on the information and communication needs of the population during the disaster reconstruction phase. This paper presents a case study of the information and communication needs of the population and the role of social media during the reconstruction process after the earthquake that struck Emilia-Romagna (Northern Italy) in 2012. Data were collected through field notes and a multiple choices questionnaire distributed online and by hand to community-based groups. Results show that the most sought information concerns housing and infrastructure reconstruction, funds/refunds, business recovery and damage assessment and that city councils and regional council are considered as the main source of the information. Communication channels used to search for reconstruction-related information vary between online and offline respondents. Social media technology is used by citizens affected as a platform to read and share recovery information and post queries rather than as an engagement tool with recovery agencies. Main barriers to engagement are lack of trust towards the authorities and the belief that authorities do not use social media to communicate with citizens. In this context, community-based groups, especially those supported by social media, play an important role in sharing recovery-related information to other residents, clarifying legal acts and regulations and providing informational support to the affected population.

Keywords Post-disaster communication · Citizens · Social media · Recovery · Emilia-Romagna earthquake

✉ Serena Tagliacozzo
Serena.tagliacozzo.13@ucl.ac.uk

[1] Institute for Risk and Disaster Reduction, University College London, Gower Street, London WC1E 6BT, UK

[2] Università Politecnica delle Marche, P.zza Roma 22, 60121 Ancona, Italy

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1 Introduction

Post-disaster needs assessments encompass the evaluation of physical and economic damages as well as the human recovery needs (International Recovery Platform, no date). Too often, the response from national and international rescuers has focused on addressing immediate needs such as the provision of temporary shelters, food and water and the repair of primary infrastructures. Although these interventions are crucial, it is equally important to get information to the community in order to enable people to address these needs on their own (IFRC 2005). Rather than a top-down delivery of aid, modern disaster management promotes the empowerment of the affected population. Communicating with communities (CwC), rather than communicating to communities, is part of this change in paradigm (Pearce 2003).

Knowledge of the information preferences of the targeted population is a key component of CwC activities. In the last few years, international agencies have acknowledged that the evaluation and identification of the information and communication needs of the communities affected were an integral part of post-disaster needs assessment (Internews 2014; BBC Media Action 2015). After Typhoon Haiyan hit the Philippines in November 2013 killing over 6,000 and causing widespread damage, UNOCHA for the first time deployed two new interagency working groups, designated Communicating with Communities (CwC) and Accountability to Affected Population (AAP) (CDAC network 2014).

As a result of the increased attention to CwC themes, the academic literature on information and communication habits during disaster response has increased as well (e.g. Burger et al. 2013; Steelman et al. 2014). Despite these insights, much less attention has been paid to the communication practices during long-term post-disaster reconstruction (PDR). This research provides an initial insight into the communication and information needs in a reconstruction scenario, notably into the practices supported and mediated by social media. Our purpose was to investigate whether, and in which ways, residents had used social media technology to communicate and engage with government agencies during the recovery process. Thus, this case study analyses the context of post-earthquake reconstruction in 2012, in Emilia-Romagna (Northern Italy). The scope of the research was to identify communication trends that can inform better CwC strategies during long-term disaster reconstruction.

2 Communicating with communities during disaster response and reconstruction

In the last few years, Communicating with Disaster Affected Communities (CDAC) network, a network consisting of humanitarian and media organisations, has conducted various studies on the communication and information habits of communities and social groups during disaster response and early recovery.

A study (IOM 2014) conducted in the aftermath of Typhoon Haiyan in the Philippines revealed that people preferred face-to-face, radio or television media to receive information during the disaster. Printed material was considered useful, provided that issues such as language and accessibility to the information (for example, for people displaced) were taken into consideration (International Organization for Migration (IOM) 2014). Audience characteristics changed across media channels and formats. For this reason, the report concluded that communication strategy should always be adapted to the demographic

groups targeted. Specific attention had to be paid to factors such as age, gender, education and displacement status. Studies conducted in the aftermath of Nepal Earthquake (InterNews 2015; BBC Media Action 2015) confirmed face-to-face interactions and radio as preferred communication methods. Where literacy levels were high and displacement made access to previously preferred media difficult, as it was for the case of the Iraqi population displaced by the advance of the Islamic State in Syria and Iraq, mobile phones became essential to keep in contact and share information (Internews 2014). Face-to-face communications and community meetings still played a key role to obtain information from responders (Internews 2014). Steelman et al. (2014) examined the information that people used, trusted and found useful during five wildfires that occurred in various parts of the USA in 2009 and 2010. They found that the most used information sources were family/friends/neighbours, mass media and maps. The most trusted were official and interactive sources. During hurricane Sandy, which struck the eastern coast of the USA in 2012, people obtained information from television, radio, friends and Web/emails (Burger et al. 2013).

Alongside these studies, research on social media-supported communication in the last decade showed that people affected by crises were not passive recipients of information. Rather they produced, sought and shared up-to-date, accurate and trustworthy information during disasters (Bunce et al. 2012; Fraustino et al. 2012; Vieweg et al. 2014). In the recovery period, social media provided a mean to exchange information, memorialise victims, discuss sociopolitical and scientific causes of the disaster and reconnect family members (Houston et al. 2015).

However, communications that take place during acute crises can be different from the ones that occur during long-term reconstruction (Government of Australia 2014; BBC Media Action 2015). During acute crises, communication practices require a rapid gathering, verification and distribution of information to multiple social groups about what actions have to be taken in order to reduce risk. Long-term communication initiatives are instead typically developed in a context with lower risk and tend to convey messages aimed at social and behavioural change, policy reform, capacity building and promotion of accountability and feedback mechanisms. During disaster recovery, more time is allowed to undertake a formative research aimed at single out vulnerable social groups, identify information and communication needs for each of these and target actions accordingly (Government of Australia 2014). According to the Australian Red Cross (2010), a communication needs assessment (CNA) during disaster recovery includes an initial analysis of the broader context, of the resources available, of the community stakeholders, the definition of the objectives and methods, of the communication strategy and the implementation of feedback loops and evaluation mechanisms. The World Bank (2010) proposes a communication-based assessment methodology, which gives details on the perceptions and expectations of the stakeholders and informs appropriate communication strategies. Whilst a CBA should be ideally carried out immediately after a disaster, along with other forms of assessments, its outcomes and the communication strategy built upon it have to be continuously reviewed as population move from response to early recovery to reconstruction.

Despite the differences between acute crises and disaster reconstruction, some common best practices in communication can be highlighted. (Australian Red Cross 2010; Government of Australia 2014). For example, in both response and recovery contexts it is advisable to make use of a range of communication channels to reach out a broader audience (Australian Red Cross 2010). It is also appropriate to examine existing communication practices and needs in each social group in order to better target the content of

the communication. Face-to-face communications, word of mouth and community meetings are preferable communication channels both immediately after a disaster and in the long term. Collaboration with local organisations and community structures is crucial to guarantee full community participation and build dialogue. Seeking community feedback enables the evaluation of the impact of the communication strategy on the targeted community and its review.

Finally, coordination is a core component in both crisis and recovery stages, since the risk of duplicating efforts is high (CDAC network 2013). Many different actors participate in the disaster response and disaster reconstruction efforts, including governmental agencies, NGOs, private companies, media and professional groups, and community-based organisations and groups. Whist the weight and roles of each of these actors change from disaster response to disaster reconstruction, coordinated communication activities have to be implemented to produce the desired outcomes and outreach.

3 Research gaps and questions

Reports on communication in post-disaster reconstruction provide general guidelines for government and emergency management agencies on the development of communication strategies (World Bank 2010; Australian Red Cross 2010). To our knowledge, no study has specifically investigated information and communication habits of a population in the context of long-term reconstruction.

This study sought to provide an analysis of the communication needs and preferences of residents when communicating with government agencies during a reconstruction process. In accord with the distinction proposed in the model of Kates and Pijawka (1977) between disaster response, early recovery, disaster reconstruction and community betterment, we defined the reconstruction phase as the period beginning after immediate needs have been met and when the recovery of the whole economic, physical, social and cultural system starts. For the purpose of this study and consistent with the literature on disaster recovery, we define the reconstruction phase as starting 3 months after the disaster. As well as the general communication preferences, we investigated the role of social media in the long-term reconstruction as mediator and enhancer of the communications between residents and government agencies. Whilst studies over the last decade have shed light on the prominent role of social media technology during disaster response, there are few studies that focus on the long-term period. The research questions that this study sought to answer are the following:-

1. What information do people seek from the authorities during the reconstruction period? From which government agencies do they seek this information? Through which channels?
2. What is the role, if any, of social media technology during the reconstruction period? Do people make use of this technology to receive information and engage in conversations with recovery agencies? What is the people's attitude in this regard? What are the barriers to the use of social media technology for this purpose?
3. How do demographic characteristics (e.g. age, gender, employment and size of the city of residence) affect the communication practices mentioned above?

4 Research design and methodology

Given the complexity of the area investigated and the general lack of previous studies on this theme, we made use of a case study approach (Yin 1984) to answer the research questions mentioned above. This approach enables the researcher to collect information in a real-life context using a mix of data collection methods, including both qualitative and quantitative. Data were collected through a multiple-choice questionnaire and through field notes. The questionnaire was distributed through earthquake-related groups and associations. It could be filled in either online or by hand and it was self-completed by the respondents.

This approach presented several advantages in terms of: (a) distributing the questionnaire to a broader audience; (b) harnessing existing groups of citizens living in the affected areas and interested in recovery issues; (c) getting in contact with groups considered to be a valuable source of insight into the post-disaster context. Indeed formal and informal groups and associations of citizens that emerge in the wake of a disaster take over recovery tasks and deal with government agencies in the resolution of recovery-related issues (Quarantelli 1985; Storr and Haeffele-Balch 2012; Olshansky et al. 2006). With the emergence of social media, these groups found a fertile environment to grow and expand. The rapid onset of online groups changed the terminology used to indicate those who participate in these groups. Indeed whilst for the associations that have a legal head office and steering committee, being a "member" often implies that formal procedures have to be made, in the online groups participants are simply "followers" who show a general interest in the group's activities and discussions without necessarily adhering to the group's goals or ideas.

The use of both online and paper versions of the questionnaire allowed us to maximise the outreach potential to the social media groups (also in terms of having a more distributed covering of the respondents across the affected area), whilst at the same time avoiding the exclusion of people with little to no access to the Internet. Indeed the main scope of this research was to investigate communication practices and dynamics during disaster reconstruction. Social media-supported practices are one part, among others, of the recovery communication landscape. One concern that we had to address pertained to the potential discrepancies between the datasets collected online and offline. Indeed the literature shows that results obtained through online and offline data collection differed notably with regard to technology adoption and Internet use behaviour (Schillewaert and Meulemeester 2005). For this reason, online and offline datasets were analysed separately for the questions concerning *the type of communication technologies used* and *the motivations for using social media* during post-disaster reconstruction.

4.1 Case study: Emilia-Romagna earthquakes (20–29 May 2012)

On the 20 May 2012, a 5.9 magnitude earthquake struck the Emilia-Romagna Region in Northern Italy. The main shock was followed by other several minor aftershocks and a larger event, of magnitude 5.8, on the 29 May, the epicentre of which was 15 km northwest of the first event (Moretti et al. 2013). The two events resulted in 29 deaths, 390 injuries and 58 municipalities affected (involving a total of 900,000 people). More specifically, 33 municipalities near the epicentre and 550,000 residents were affected (Action Aid 2014).

The most affected city in the region was Cavezzo, but historical buildings were also damaged or collapsed partially in other cities (Rossetto et al. 2012). Notably, significant damage occurred in industrial areas such as Cento, Cavezzo and San Biagio and to farms and agricultural facilities across the region. At the moment of the earthquake, Emilia-Romagna's economy produced the 2 % of the gross national product (Action Aid 2014).

The main issue to be addressed during the recovery process was therefore the regeneration of industry and employment (Arcidiacono and Cimellaro 2013). On the governance side, in June 2012, the President of the Emilia-Romagna Regional Council was appointed *Special Commissioner for the Reconstruction* and the mayors of the municipalities affected were nominated *sub-commissioners* (Regione Emilia-Romagna 2014). An Institutional Committee for the Reconstruction, consisting of regional, provincial and local authorities, was established with coordination duties (Regione Emilia-Romagna 2014). The response and early recovery phases ended after 90 days when, in August 2012, the National Department of Civil Protection handed over the management of the recovery to regional and municipal authorities. Despite the abundance of funds allocated for the reconstruction, and several tax breaks and benefits for the local businesses (Provincia Bologna 2012), delays in the way in which these funds were distributed to firms in need have made it difficult to achieve a speedy economic recovery in the area (Agricoltura24 2012).

Community-based organisations and groups had a prominent role in the Emilia-Romagna reconstruction. Emilia Romagna was already known as an area with a high level of social capital, community involvement and political participation (Putnam 1993). The groups formed after the Emilia-Romagna earthquakes varied in terms of level of involvement in the ongoing political discourse about the recovery, geographical area of activity, level of formality of the group (whether the groups had a head office or a steering committee) and number of members.

Table 1 describes some community-led groups created after the Emilia-Romagna earthquake and used to distribute our research questionnaire online and in person. For each group, the table lists its scope, geographical area where the group activities take place, Facebook and Twitter account name and whether the group has physical office or exists merely in cyberspace.

4.2 Data collection

4.2.1 Field notes

In May 2014, one of the authors undertook a week-long field trip to some of the most badly affected municipalities of Modena Province. The field trip was designed to examine the context of reconstruction, meet up with representatives of community-based groups and check the suitability of the questionnaire and feasibility of the research.

In the dialogues with two grass–roots associations, these associations as well as the ones listed in Table 1 emerged as a mediator in the communication that takes place between residents and government agencies around the recovery process. Indeed they play a key role during the recovery process in terms of: (a) amplifying the information coming from official sources (government agencies and broadcasting media); (b) as a place to openly ask questions about recovery and share ideas with people in similar conditions; (c) collecting residents' opinions on key recovery issues and present these views in meetings with government officers; (d) clarifying official information and legal acts issued for the reconstruction to residents. Evidence collected on the Facebook pages of some community-based associations and online groups confirmed these insights. Figure 1 presents a post

Table 1 Some community-based and online groups involved in earthquake recovery activities in Emilia-Romagna

Name	Scope	Just on cyber space?	Area	Facebook	Twitter
Comitato SismaPuntoDodici	A place to share ideas, projects and information the reconstruction	No	Throughout the affected area	Sisma.12—Comitato Ricostruire la Bassa dal Basso	@SISMA_21
CinquePuntoNovi	Cultural association active in many recovery activities	No	Novi di Modena (MO)	Cinque Punto Novi	@CinquepuntoNovi
Una scuola per Mirandola	Collecting funds to rebuild and repair schools damaged by the earthquake	No	Mirandola (MO)	Una Scuola Per	@1ScuolaXMiran
Magnitudo 5.9	Collecting voices and opinions from the affected area	Yes	Mirabello (FE)–Throughout the affected area	Magnitudo 5.9—Mirabello 2012	@Magnitudo59
Ricostruiamo Creva	Group to propose reconstruction initiatives	Yes	Crevalcore (BO)	Ricostruiamo Creva	–
Comitato Elementari Concordia sulla Secchia	Collecting funds for the school in Concordia sulla Secchia	No	Concordia sulla Secchia (MO)	Comitato Elementari Concordia Secchia	–

poco fa ho fatto visita a una famiglia del cratere, che ha da poco ultimato i lavori di ristrutturazione del proprio casale.
la padrona di casa mi ha abbracciato ringraziando(mi?)e ringraziando tutto il Comitato Sismapuntododici per aver loro permesso di portare a termine con successo l intero percorso burocratico; ha attribuito al gruppo il merito di averli tenuti costantemente informati e di essere stati un riferimento per il territorio.
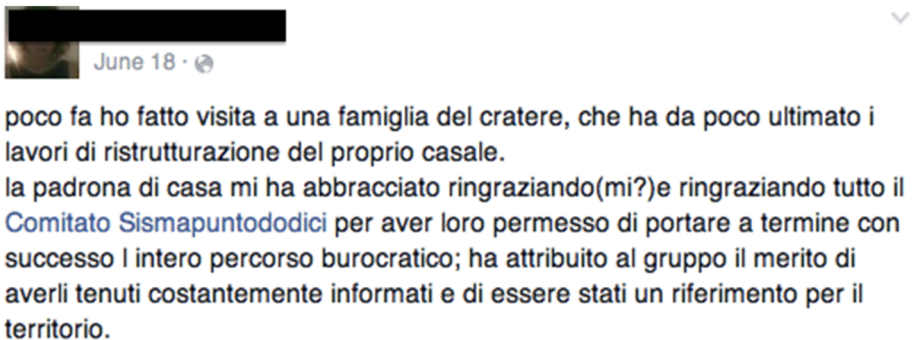
Fig. 1 A Facebook post from a member of the committee "Sisma.12". The post says: "Few moments ago I visited a family in an earthquake-affected area which has recently completed the repair works on its property. The homeowner hugged me, thanking Sisma.12 Committee for enabling them to complete successfully the bureaucratic procedures by keeping them constantly informed and by being a point of reference for all the affected area"

from a member of the committee "Sisma.12", showing that the group provided information and clarifications to the residents about the bureaucratic procedures that had to be followed to rebuild.

After the field trip, these associations were asked to distribute printed copies of the questionnaire to their followers. Meanwhile, the link to the online version was published on earthquake-related Facebook groups and pages.

4.3 Data analysis

The data collected via the online and paper surveys were analysed using the SPSS software for statistical analysis. Those respondents who stated that they did not reside in an area where the reconstruction was underway were excluded from the analysis. This enabled us to focus on the answers of those for whom the recovery was a relevant and contingent matter, namely on the residents of the municipalities under reconstruction. Two types of analysis were performed on the data gathered: (a) descriptive analysis—to identify recurrent trends in the citizens–government communications and use of social media and (b) inferential analysis—to identify correlations between recovery communication practices and socio-demographic factors (age, gender, employment, level of education and size of the municipality).

5 Survey results

Here we present the analysis of the surveys collected both online and offline. The two datasets have been merged and the results combined for all the questions apart from those regarding the communication technologies used and motivations for using social media during disaster reconstruction. Indeed the literature shows that results obtained from online and offline datasets differed in terms of communication technology adoption (Schillewaert and Meulemeester 2005). Patterns of other variables proved to not vary significantly between the online and offline datasets (Riva et al. 2003). The responses to the barriers to adoption have also been analysed separately to highlight potential biases resulting from the misunderstanding of the question.

5.1 Socio-demographic characteristics of the respondents

Combining the data of the two surveys, a total of 285 responses were analysed.

The majority of the respondents were females (57 %) holding a high school diploma (63 %) and living in municipalities with fewer than 20,000 inhabitants (81 %). This partially reflects the composition of the municipalities affected by the earthquake, as 83 % have fewer than 20,000 residents. The age range of the respondents ranged from 18 to 77 years (M = 44.2; SD ± 12.44). Some 18 % of the respondents declared that they held a degree, 14 % a secondary school diploma and 6 % an elementary school diploma. The large majority (82 %) claimed to be social media users. With regard to the type of employment, 41 % of the respondents were civil servants, 24.6 % self-employed, 9 % manual labourers, 8 % retired, 7 % unemployed, 6 % students and 5 % housekeepers. Whilst the general socio-demographic characteristics of the respondents to the two types of questionnaire were similar and comparable, respondents to the paper version were

generally older, had a lower level of education and were more likely to be employed in low-skilled jobs and less likely to use social media.

5.2 Communication practices during the reconstruction process

In the first part of the survey, we asked about the type of information that people had sought from authorities during the reconstruction phase, the authorities from which these information was sought and the communication channels used to obtain the information. In the first two questions, people were asked to choose from a list of information and authorities. Multiple-choice answers were provided. We also gave respondents the opportunity to add a further answer in case none of those provided was considered appropriate. For the question on the communication channels used, people were asked to indicate the frequency of use of each channel on a four-option Likert scale (never, rarely, fairly often and very often). Table 2 summarises the responses concerning the type and source of information.

Looking at the remaining type of information, results revealed that 15 % of the respondents searched for information on preservation of the historical heritage, 13 % searched for information on traffic plans and public transportation and 11 % was interested in information concerning new recovery policies and agencies, volunteering and events related to the reconstruction, educational and health services or use of donations. The least searched information concerned environmental risks (10 %), psychosocial support (6 %), citizens' committees and associations (6 %) and debris management (6 %). Respondents who held a university degree turned out to be the most likely to seek information on funds and refunds, $\chi^2 (3) = 8.59$, $p < 0.001$, Cramer's V $= .17$.

Although the large majority of the respondents (93 %) sought this information from local officials, 6 % of the people mentioned that they looked for information from community groups.

At the end of the first part of the survey, respondents were asked to state the frequency with which they had used specific channels to look for the information selected in question 1 on a scale from 0 to 3 (0—never; 1—rarely; 2—fairly often; 3—very often). For this question, online and offline datasets were analysed separately. As shown in Table 3, results demonstrated a sharp difference between online and offline responses with respect to the media used to obtain information during the reconstruction process. Phone, television and radio emerged as the least used channels.

Table 2 Type of information sought and source of information (first four most ticked items)

	Online survey
Type of information sought	Housing and infrastructure reconstruction (66 %)
	Business and industries recovery (42 %)
	Funds/refunds (40 %)
	Damage assessment (26 %)
Source of information	City council (93 %)
	Regional council (26 %)
	Civil protection departments (21 %)
	Fire department (20 %)

Table 3 Comparison of the communication channels used to search for information on the reconstruction by online and offline respondents

	Online survey	Paper survey
Communication channels	81 % Internet	85 % Face-to-face interactions
	66 % Social media	70 % Printed material 57 % Internet
	59 % Face-to-face interactions	40 % Social media
	50 % Printed material	31 % Television
	36 % Television	29 % Phone
	35 % Phone	18 % Radio
	31 % Radio	

"Very often" and "fairly often" response rate was combined

For the online questionnaire, a Mann–Whitney U test with Bonferroni correction ($\alpha = 0.025$) was performed as a follow-up to this result. This showed that people who graduated from university ($Mdn = 3$) used Internet more frequently than those with a secondary school diploma ($Mdn = 2$), $U = 512$, $p < 0.025$, $r = -0.11$. In addition, a Mann–Whitney U test indicated that females ($Mdn = 2$) used telephones more frequently than males ($Mdn = 1$), $U = 4060$, $p < 0.05$, $r = -0.15$. Female ($Mdn = 1$) also used TV more frequently than male ($Mdn = 0$), $U = 3764$, $p < 0.01$, $r = -0.2$.

For the paper survey, Kruskal–Wallis tests indicated that the use of communication means was significantly influenced by education level and age of respondents. Mann–Whitney tests (with Bonferroni correction, $\alpha = 0.008$) were performed to follow up this finding and interrogate differences among each category of education and age. Tables 4 and 5 show results of the Kruskal–Wallis test (second column), median utilisation frequency of communication channels for each category of age and education (third column) and results of Mann–Whitney tests with Bonferroni correction (significance level $\alpha = 0.008$) (fourth column). In the fourth column, letters, where present, indicate the category (or categories) from which the specific category significantly differs ($p < 0.05$).

5.3 Dynamics of the social media-supported communication with authorities

In the second part of the survey, we wanted to investigate the dynamics of the social media-supported communications. First of all, we wanted to understand the attitudes of the citizens towards using social media technology to communicate with authorities about reconstruction issues. For this purpose, we presented several statements and we asked the respondents to state the extent of agreement with those on a five-option Likert scale where "1" stands for "disagree" and "5" for "agree". We then asked about the motivations for using social media during the reconstruction phase and the barriers that prevented respondents from using social media to communicate with the authorities. We did this by providing a list of options from which the respondents could choose. Up to two answers were allowed per question. The respondent was provided with the opportunity to add a further answer option in the section "other". Finally, we asked whether the respondents had used social media to engage in a two-way conversation with the authorities during the reconstruction process and which social media platforms they had used for this purpose. Figure 2 summarises the responses with respect to the attitudes towards the use of social media to communicate with recovery agencies during post-disaster reconstruction (PDR).

Table 4 Differences in communication means used to seek recovery information according to level of education

Channels	Kruskal–Wallis	Education (*Mdn*)	Specific differences among categories
Internet	$H(3) = 52.34$**	A. Primary (0)	C–D
		B. Secondary (1)	C–D
		C. High school (2)	A–B
		D. University (3)	A–B
Social	$H(3) = 36.77$**	A. Primary (0)	C–D
		B. Secondary (1)	C–D
		C. High school (2)	A–B
		D. University (2)	A–B
Face to face	$H(3) = 15.75$**	A. Primary (3)	C–D
		B. Secondary (2)	
		C. High school (2)	A
		D. University (2)	A
Telephone	$H(3) = 17.97$**	A. Primary (2)	C–D
		B. Secondary (2)	
		C. High school (1)	A
		D. University (1)	A
Printed material	$H(3) = 6.15$	A. Primary (2)	
		B. Secondary (2)	
		C. High school (1)	
		D. University (1)	
Television	$H(3) = 15.07$**	A. Primary (2)	C–D
		B. Secondary (1)	
		C. High school (1)	A
		D. University (1)	A
Radio	$H(3) = 0.76$	A. Primary (1)	
		B. Secondary (1)	
		C. High school (0)	
		D. University (2)	

Kruskal–Wallis test indicated statistically significant differences according to the age of respondents in considering social media as an important tool to discuss recovery issues, $H(3) = 18.67$, $p < 0.001$. A Mann–Whitney U test with Bonferroni correction ($\alpha = 0.008$), performed as a follow-up to this result, demonstrated that the younger the respondents were, the more they tended to consider social media important (*Mdn*: 18–34 = 5, 35–44 = 4, 45–54 = 4, 55+ = 2). A Kruskal–Wallis test also pointed out the differences in considering social media more useful to organise offline activities with other citizens rather than discussing with authorities, $H(3) = 8.06$, $p < 0.05$. A Mann–Whitney U test with Bonferroni correction ($\alpha = 0.008$) revealed that the smaller the municipality, the more the respondents considered organising offline activities via social media (*Mdn*: < 10,000 = 5, 10,000–20,000 = 4, 20,000–300,000 = 3.5, > 30,000 = 2).

Table 5 Differences in communication means used to seek recovery information according to age

Channels	Kruskal–Wallis	Age (*Mdn*)	Specific differences among categories
Internet	H(3) = 38.65**	A. 18–34 (2)	D
		B. 35–44 (2)	D
		C. 45–54 (2)	D
		D. 55 + (1)	A–B–C
Social	H(3) = 30.08**	A. 18–34 (2)	D
		B. 35–44 (2)	D
		C. 45–54 (2)	D
		D. 55 + (0)	A–B–C
Face to face	H(3) = 10.78*	A. 18–34 (2)	
		B. 35–44 (2)	
		C. 45–54 (2)	
		D. 55 + (2)	
Telephone	H(3) = 9.68*	A. 18–34 (1)	D
		B. 35–45 (1)	D
		C. 45–55 (1)	
		D. 55+ (2)	A–B
Printed material	H(3) = 14.50**	A. 18–34 (1)	D
		B. 35–45 (1)	D
		C. 45–55 (1)	
		D. 55 + (2)	A–B
Television	H(3) = 6.64	A. 18–34 (1)	
		B. 35–46 (1)	
		C. 45–56 (1)	
		D. 55 + (2)	
Radio	H(3) = 2.06	A. 18–34 (1)	
		B. 35–46 (1)	
		C. 45–56 (1)	
		D. 55 + (1)	

Responses to the question on the motivations for using social media during the post-disaster reconstruction were analysed separately for the online and offline datasets due to the literature suggesting potential differences in Internet usage among the two samples. Results revealed that people used social media mainly to read and post information and queries on recovery-related issues. This held true in both the online and offline datasets. Table 6 summarises the responses and compares the two datasets.

In general, similar usage patterns were shown in the paper and online surveys. However, online respondents seemed slightly more inclined to use social media for peer-to-peer interaction, whereas offline respondents were more willing to collaborate with authorities by the means of social media. Combining the results of the two datasets, a Chi-square analysis for independence indicated that females were two times more likely to promote offline activities and protests than men, $\chi^2 (1) = 3.95$, $p < 0.005$, $\varphi = .13$.

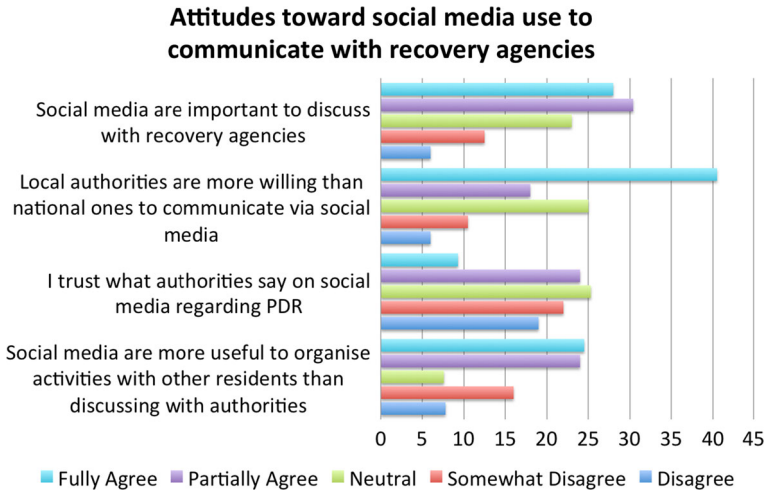**Attitudes toward social media use to communicate with recovery agencies**

Fig. 2 Attitudes of survey respondents towards social media use to communicate with recovery agencies

Table 6 Motivations for using social media in the post-disaster reconstruction phase

I used social media during the reconstruction process:	Online (%)	Paper (%)
To read information about the reconstruction	74	85
To post information and queries	32	44
To promote activities and protests with other residents	18	11
To contact a government officer	14	18
To collaborate with authorities in the resolution of a recovery-related problem	4	10
I did not use social media for purposes related to the reconstruction	9	3
I used social media for other purposes during the reconstruction	3	0

Despite that the questionnaire was tested during the field trip and prior to its distribution, a confusion arose regarding the question on the barriers to the use of social media to communicate with authorities, resulting in the question being answered mainly by those who did not use social media. The online responses were compensated by making this question mandatory, which could not be done for the paper survey. Eventually a total of one hundred thirty people ($N = 130$) answered this question on the online survey (with forty-seven missing responses) and fifty-seven people ($N = 57$) (with fifty-one missing responses) in the paper survey. Results for this question will be presented separately to highlight potential biases in the responses. With regard to the online questionnaire, the most mentioned barriers to the use of social media to communicate with authorities were: belief that authorities do not communicate with residents via social media (40 %), lack of trust in the authorities (19 %), preference to use social media for other purposes (19 %) and lack of time (13 %). Chi-square tests revealed significant associations between the age of the respondents and the lack of trust in authorities, $\chi^2 (3) = 16.22$, $p < 0.005$, Cramer's V = .36, and between the level of education and the lack of IT skills, $\chi^2 (3) = 23.27$, $p < 0.001$, Cramer's V = .43. Older respondents (55 +) were more likely to

distrust authorities than the others, whilst the less educated respondents were the most likely to lack IT skills.

Lack of IT skills was the most mentioned barrier in the paper survey (41 %). This is probably due to the fact that mainly non-IT users answered the question. However, 25 % still mentioned lack of time as a barrier, 16 % did not trust authorities and 13 % did not believe that authorities communicate with residents via social media regarding reconstruction. Chi-square tests revealed significant associations between both the age (χ^2 (3) = 27.07, $p < 0.001$, Cramer's V = .69) and the education of the respondents (χ^2 (3) = 16.94, $p < 0.005$, Cramer's V = .55) and the lack of IT skills. Older people (55+) with elementary school diploma were the most likely to lack IT skills.

Finally, we asked whether the respondents had used social media to have a two-way communication with authorities during the reconstruction process and which platform(s) they had used. Only 36 % of the respondents used social media to communicate bidirectionally with authorities. The more the respondents were educated (χ^2 (3) = 8.69, $p < 0.05$, Cramer's V = .18) and the younger they were (χ^2 (3) = 11.38, $p < 0.05$, Cramer's V = .20), the more likely they were to use social media with bidirectionally purposes. Respondents mostly used Facebook (84 %) followed by websites created for the reconstruction (38 %). Twitter was used by 10 % of the respondents, blogs and forums within institutional websites were used by 8 %, GooglePlus by 6 % and Youtube by 5 %. Males showed to be almost 4 times more likely to use Twitter than females, χ^2 (1) = 3.86, $p < 0.05$, φ = .20.

6 Discussion and limitations

Information collected through field notes and questionnaires provide an interesting insight into the recovery communication landscape. Community-based organisations and online groups, especially social media-supported groups, play an important role in sharing recovery-related information to other residents, clarify legal acts and regulations and provide informational support to the affected population. As a confirmation of this finding, some respondents declared that they looked for information from community groups and associations in addition to official government agencies. Thus, community-based groups and organisations should be fully included into rebuild plans (Nigg 1995).

Housing and infrastructure reconstruction, business recovery, funds/refunds and damage assessment were found to be the most relevant information that people searched for. The reconstruction of the physical and economic environment after disasters is a core component for the community to move forward. Indeed a recent report produced for the World Humanitarian Summit 2016 revealed that as well as the obvious need for medical treatments and food, people living in countries under humanitarian crises focus primarily on shelters and access to employment (Jones et al. 2016).

Local government (city council) was the main source of information for the population, followed by the regional council, fire departments and civil protection departments. The literature on post-disaster reconstruction highlights that local government often shoulders the burden of the reconstruction activities and expenditure (Stehr 2001). Results from this study show that this is also true for the provision of recovery-related information to the population. Arguably, the decentralisation of the recovery and reconstruction management after the earthquake in Emilia-Romagna contributed to this result: local officials were

tasked with adapting official decrees to the specific situation of their municipalities and to inform the population accordingly.

Interestingly, communication channels varied depending on whether the question was answered online or filled in the paper survey. This is consistent with the literature showing that results from online and offline data collection may differ notably with regard to technology adoption and Internet use behaviour (Schillewaert and Meulemeester 2005). Being that the respondents to the paper survey were in general older and less educated, they were also more likely to use face-to-face interactions and printed material to get information. Conversely, online respondents were more inclined to search for information through websites, emails or social media. When considering the results within each dataset, the effects of the digital divide were far more evident in the offline than in the online dataset. In the offline dataset, it appeared evident that older and less educated people remained excluded from the online discussions and did not take any advantage of new communication technology to receive recovery information. Indeed they preferred to get information through more traditional channels such as television and telephone. To the contrary, the online dataset showed less significant differences in the technology adoption between people with different age or education, implying that Internet use and behaviour of the population that engages regularly in online discussion are less influenced by socio-demographic factors. The data also suggest that males and females looked for information related to reconstruction through different means: females preferred more relational channels such as telephone, selected Facebook over Twitter among the social media platforms and adopted social media more often to self-organise with other residents. The literature shows that females differ by males in media preferences and usage, preferring to use media to build relationships and for interpersonal communication (Weiser 2004). This finding suggests that government agencies should aim to get the message across through different communication channels, depending on the social group targeted. Opposite to what was found in the studies on disaster response (Burger et al. 2013; International Organization for Migration (IOM) 2014; BBC Media Action 2015; Steelman et al. 2014), television and radio were not considered as a useful channel to look for information during the reconstruction process. This may imply that traditional mass media are not appropriate to convey messages about reconstruction. Arguably, this is the case because the coverage of the disaster in mass media declines in few weeks after the event (Lobb et al. 2012). Social media platforms provide more sustained coverage instead (Lobb et al. 2012).

In terms of use of social media, results show little evidence of use of these tools by the population to engage in a two-way dialogue with authorities regarding reconstruction-related matters, for both the online and offline dataset. Rather, social media has widely been used as a platform to read and share recovery information, post queries, exchange opinions and research support from like-minded people facing similar issues. Those who responded to the online survey were also more likely to use these platforms to promote activities and protests. This suggests that those participating in social media and online groups are more inclined to use this technology for civic and political engagement purposes and to share information among peers. Consistent with previous research, online political participation solicits involvement in civic activities aimed at social change (Warren et al. 2014).

Despite that respondents acknowledged that social media was important to communicate with authorities, lack of trust in what the authorities say about the reconstruction and the belief that they did not communicate via social media refrained people from using these tools to build dialogue with recovery agencies. Additionally, the effects of the digital divide were evident when it came to communicating via social media. Indeed younger and

more educated respondents were also more likely to use social media to communicate bidirectionally and have more positive attitudes towards the use of social media to communicate with authorities. Overall the less people were educated the less they had IT skills to engage in a conversation with authorities via social media. Local government agencies were seen as more willing to use social media to build dialogue via social media compared to regional and national ones. Facebook was the most used platform to have a two-way conversation with authorities. However, according to national statistics, Facebook is also the social media platform most used by the Italian population (We are Social 2015) and by Italian government agencies (OPERA 2011). This may suggest that the communications during a reconstruction process take place through channels already in use prior the disaster.

This study presents some limitations that should be considered when analysing the results. First of all, the sample reached is probably not representative of the whole population: paper surveys were collected in a homogenous area and online responses, although arguably coming from a more widespread geographical area, cannot be verified in their representativeness as respondents were not asked about the municipality they resided in. However, as a point of note, similar communication trends were found in both the online and paper survey response. This may suggest that results provide a good snapshot of communications by the population during the post-disaster reconstruction process. Another element that can limit the representativeness of the sample analysed is that people were reached through community-based organisations and groups, resulting in just members or followers of these groups being surveyed. Future studies should try to verify or challenge the results of this study by approaching a representative sample of the population in order to get a clearer and less biased snapshot of the recovery communication landscape.

7 Conclusions

This research has sought to provide an initial insight into the information and communication practices and role of social media platforms during a reconstruction process. We used a case study approach to investigate this theme. Future research should aim to further pin down this topic, possibly looking at how these practices evolve over the reconstruction period. Additionally, it would be interesting to provide a comparison between several case studies so to allow the identification of repetitive practices and to account for differences and variations in these practices across reconstruction processes taking place after different types of disasters or in different sociocultural contexts.

References

Action Aid (2014) Se l'Italia tornasse a tremare? Lezioni dal terremoto in Emilia Romagna. Action Aid Report. http://www.actionaid.it/sites/files/actionaid/open_ricostruzione_.pdf

Agricoltura24 (2012) Sisma: Indennizzi ancora in ritardo. Newspaper article. http://www.agricoltura24.com/sisma-indennizzi-ancora-in-ritardo/0,1254,54_ART_6262,00.html

Arcidiacono V, Cimellaro GP (2013) Damage Report with Smartphones during Emilia Earthquake. Proceedings of the COMPDYN 4th ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake, Kos Island, Greece

Australian Red Cross (2010) Communicating in Recovery. Online report. www.redcross.org.au/communicatinginrecovery

BBC Media Action (2015) Humanitarian broadcasting in emergencies: a synthesis of evaluation findings. Online report. http://downloads.bbc.co.uk/mediaaction/pdf/research/humanitarian-broadcasting-in-emergencies-2015-report.pdf

Bunce S, Partridge HL, Davis K (2012) Exploring information experience using social media during the 2011 Queensland floods: a pilot study. Aust Libr J 61(1):34–45

Burger B, 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. J Toxicol Environ Health 76(20):1138–1150

CDAC Network (2013) Typhoon Bopha Learning Review. A Review of UNOCHA's Communicating with Communities (CwC) Work. Executive Summary http://www.alnap.org/resource/11532

CDAC Network (2014) CDAC Network Typhoon Haiyan learning review case study: consolidating community feedback through CwC and AAP technical working groups in the Philippines. Online report. http://www.cdacnetwork.org/contentAsset/raw-data/7561706b-cf63-4754-8c2e-aa342de580c8/attachedFile

Fraustino JD, Liu BF, Jin Y (2012) Social media use during disasters: a review of the knowledge base and gaps. Final Report to Human Factors/Behavioral Sciences Division, Science and Technology Directorate, U.S. Department of Homeland Security. National Consortium for the Study of Terrorism and Responses to Terrorism (START), College Park, MD

Government of Australia (2014). Communication and Complex Emergencies: A Resource Guide. Online report. http://reliefweb.int/report/world/communication-and-complex-emergencies-resource-guide

Houston JB, Hawthorne J, Perreault MF et al (2015) Social media and disasters: a functional framework for social media use in disaster planning, response, and research. Disasters 39(1):1–22. doi:10.1111/disa.12092

IFRC (2005) World Disasters Report 2005–Data or dialogue? The role of information in disasters. Online report http://www.ifrc.org/en/publications-and-reports/world-disasters-report/wdr2005/#sthash.I93CKd8b.dpuf

International Organization for Migration (IOM) (2014) Starting the Conversation: Information, Feedback and Accountability in Post-Typhoon Philippines. Online report http://www.cdacnetwork.org/contentAsset/raw-data/3930b1cb-c03a-4a37-8e2f-39e20bc810d7/attachedFile

International Recovery Platform (no date) Post-Disaster Needs Assessment and Recovery Framework: Overview. Online resource. http://www.recoveryplatform.org/pdna/about_the_pdna

Internews (2014) Understanding the Information and Communication Needs among IDPs in Northern. Inter-agency rapid assessment report. https://www.internews.org/sites/default/files/resources/Iraq_IA_CwC_Report_2014-08_web.pdf

Internews (2015) Communicating with Communities. Nepal Earthquake Response. Online report. https://www.internews.org/sites/default/files/resources/NepalAssessment_CwC_Chautara_May2015.pdf

Jones M, desGroseilliers M, Love K, Shams R (2016) Community Consultation on Humanitarian Aid. Overall Findings. IPSOS report presented at the World Humanitarian Summit, Istanbul, 23-24 May 2016. https://consultations.worldhumanitariansummit.org/bitcache/069aa44b39f84506ac6e6712fd2ce4fccde2cf9b?vid=579670&disposition=inline&op=view

Kates RW, Pijawka D (1977) From rubble to monument: The pace of reconstruction. In: Haas JE, Kates RW, Bowden MJ (eds) Reconstruction Following Disaster. MIT Press, Cambridge, pp 1–23

Lobb A, Mock N, Hutchinson PL (2012) Traditional and social media coverage and charitable giving following the 2010 earthquake in Haiti. Prehosp Disaster Med 27(4):319–324

Moretti M, Abbruzzese L, Augliera P, Azzara R, Vannucci G, Zaccarelli L (2013) Emergency Structure Activities Performed after Emilia Romagna earthquake: report of first month. Quaderni di Geofisica 110:2–40

Nigg, JM (1995) Disaster recovery as a social process. Preliminary Paper #219, University of Delaware, Disaster Res Center http://udspace.udel.edu/bitstream/handle/19716/625/PP219.pdf?

Olshansky RB, Johnson LA, Topping KC (2006) Rebuilding communities following disaster: lessons from Kobe and Los Angeles. Built Environ 32(4):354–374

OPERA (Unità di Ricerca del Centro di Ricerca GIUnO) (2011) Utilizzo dei social network nei comuni italiani di medie e grandi dimensioni. Online Report. http://www.qualitapa.gov.it/fileadmin/dam/customer_online/report%20comuni%202.0.pdf

Pearce L (2003) Disaster management and community planning, and public participation: how to achieve sustainable hazard mitigation. Nat Hazards 28:211–228

Provincia Bologna (2012) Contributi per gli enti locali e le imprese colpite dal sisma del 20 e 29 maggio 2012. Bologna Provincial council's website. http://www.cittametropolitana.bo.it/imprese/Engine/RAServePG.php/P/306411360303/T/Contributi-per-gli-enti-locali-e-le-imprese-colpite-dal-sisma-del-20-e-29-maggio-2012 (Retrieved September 2015)

Putnam RD (1993) Making democracy work: Civic traditions in modern Italy. Princeton University Press, Princeton

Quarantelli, EL (1985). Emergent Citizen Groups in Disaster Preparedness and Recovery Activities. Final Project Report (Report No. 33/1985). Disaster Research Center, University of Delaware:http://udspace.udel.edu/bitstream/handle/19716/1206/FPR33.pdf?sequence=1

Regione Emilia Romagna (2014). Ricostruire l'emergenza—Cronologia della gestione istituzionale del terremoto in Emilia e sintesi tematica. Online report. http://www.regione.emilia-romagna.it/urp/allegati/Dossiersisma.pdf

Riva G, Teruzzi T, Anolli L (2003) The Use of the Internet in Psychological Research: comparison of Online and Offline Questionnaires. Cyberpsychology and Behav 6(1):73–80

Rossetto T, Alexander D, Verrucci E, Ioannou I, Borg R, Melo J, Cahill B, Kongar I (2012). The 20th May 2012 Emilia-Romagna earthquake–EPICentre field observation report http://www.epicentreonline.com/news

Schillewaert N, Meulemeester P (2005) Comparing response distributions of offline and online data collection methods. Int J Mark Res 47(2):163–178

Steelman TA, McCaffrey SM, Knox Velez A, Briefel JA (2014) What information do people use, trust, and find useful during a disaster? Evidence from five large wildfires. Nat Hazards 76(1):615–634

Stehr S (2001) Community recovery and reconstruction following disasters. In A Farazmand (Ed.). Handbook of crisis and emergency management. Marcel Dekker New York, pp 419- 431

Storr VH, Haeffele-Balch S (2012) Post-disaster Community Recovery in Heterogeneous, Loosely Connected Communities. Rev of Soc Economy 70(3):295–314

Vieweg S, Castillo C, Imran M (2014) Integrating social media communications into the rapid assessment of sudden onset disasters. Soc Inform 8851:444–461

Warren AM, Sulaiman A, Jafaar NI (2014) Social media effects on fostering online civic engagement and building citizen trust and trust in institutions. Gov Inf Q 31(2):291–301

We are Social Singapore (2015). Digital, Social & Mobile in 2015. Online report http://wearesocial.it/tag/statistiche/

Weiser EB (2004) Gender differences in internet use patterns and internet application preferences: a two-sample comparison. CyberPsychology & Behavior 3(2):167–178. doi:10.1089/109493100316012

Yin RK (1984) Case study research: Design and methods. Sage, Newbury Park