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FireWatch: Creative responses to bushfire catastrophes

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Abstract

Introduction

Bushfires have taken numerous lives and destroyed communities throughout Australia over many years. Catastrophic fire weather alerts have occurred during the Australian summer of 2012–13, and long-term forecasts predict increased bushfire events throughout several areas of Australia. This article highlights how organisational and individual responses to bushfire in Australia often entail creative responses—either improvised responses at the time of bushfire emergencies or innovative (organisational, strategic, or technological) changes which help protect the community from, or mitigate against, future bushfire catastrophes. These improvised or innovative responses include emergency communications systems, practices, and devices.

This article reports on findings from a research project funded by the Australian Research Council titled *Using Community Engagement and Enhanced Visual Information to Promote FireWatch Satellite Communications as a Support for Collaborative Decision-making*. FireWatch is a Web-based public information product based on near real time satellite data produced by the West Australian (WA) Government entity, Landgate. The project researches ways in which remote and regional publics can be engaged and mobilised through the development of a more user-friendly FireWatch site to make fire information accessible and usable, allowing a community-focused response to risk.

The significance of the research project is evident both in how it addresses the important and life-threatening challenge of bushfires; and also in how Australia's increasingly hot, dry, long summers are adding to historically-established risks. This innovative project uses an iterative, participatory design process incorporating action-research practices. This will ensure that the new Firewatch interface is redesigned, tested, observed, and reflected upon multiple times—and will incorporate the collective creativity of users, designers, and researchers.

The qualitative findings reported on in this article are based on 19 interviews with community members in the town of Kununurra in the remote Kimberley region of WA. The findings are positioned within a reconceptualised framework in which creativity is viewed as an essential component of successful emergency responses. This includes, we argue, two critical aspects of creativity: improvisation during a catastrophic event; and ongoing innovation to improve future responses to catastrophes—including communication practices and technologies. This shifts the discourse within the literature in relation to the effective management and community responses to the changing phenomenon of fire catastrophes. Findings from the first round of interviews, and results of enquiries into previous bushfires in Australia, are used to highlight how these elements of creativity often entail a collective creativity on the part of emergency responders or the community in general. An additional focus is on the importance of the critical use of communication during a bushfire event.

Improvisation

The notion of "improvisation" is often associated with artistic performance. Nonetheless, improvisation is also integral to making effectual responses during natural catastrophes. "Extreme events present unforeseen conditions and problems, requiring a need for adaptation, creativity, and improvisation while demanding efficient and rapid delivery of services under extreme conditions" (Harrald 257).Catastrophes present us with unexpected scenarios and require rapid, on the spot problem solving and "even if you plan for a bushfire it is not going to go to plan. When the wind changes direction there has to be a new plan" (Jeff. Personal Interview. 2012). Jazz musicians or improvisational actors "work to build their knowledge across a range of fields, and this knowledge provides the elements for each improvisational outcome" (Kendra and Wachendorf 2). Similarly, emergency responders' knowledge and preparation can be drawn "upon in the ambiguous and dynamic conditions of a disaster where not every need has been anticipated or accounted for" (Kendra and Wachtendorf 2).

Individuals and community organisations not associated with emergency services also improvise in a creative and intuitive manner in the way they respond to catastrophes (Webb and Chevreau). For example, during the 9/11 terrorism catastrophe in the USA an assorted group of boat owners rapidly self-organised to evacuate Lower Manhattan. On their return trips, they carried emergency personnel and supplies to the area (Kendra and Wachendorf 5). An interviewee in our study also recalls bush fire incidents where creative problem solving and intuitive decision-making are called for. "It's like in a fire, you have to be thinking fast. You need to be semi self-sufficient until help arrives. But without doing anything stupid and creating a worse situation" (Kelly. Personal Interview. 2012). Kelly then describes the rapid community response she witnessed during a recent fire on the outskirts of Kununurra, WA.

> Everyone had to be accounted for, moving cars, getting the tractors out, protecting the bores because you need the water. It happens really fast and it is a matter of rustling everyone up with the machinery. (2012)

In this sense, the strength of communities in responding to catastrophes or disasters "results largely from the abilities of [both] individuals and organisations to adapt and improvise under conditions of uncertainty" (Webb and Chevreau 67). These improvised responses frequently involve a collective creativity—where groups of neighbours or emergency workers act in response to the unforseen, often in a unified and self-organising manner.

Innovation

Catastrophes also stimulate change and innovation for the future. Disasters create a new environment that must be explored, assessed, and comprehended.

> Disasters change the physical and social landscape, and thereby require a period of exploration, learning, and the development of new approaches. (Kendra and Wachtendorf 6)

These new approaches can include organisational change, new response strategies, and technologies and communication improvements.

Celebrated inventor Benjamin Franklin, for instance, facilitated the formation of the first Volunteer Fire department in the 1850s as a response to previous urban fire catastrophes in the USA (Mumford 258). This organisational innovation continues to play an instrumental part in modern fire fighting practices. Indeed, people living in rural and remote areas of Australia are heavily reliant on volunteer groups, due to the sparse population and vast distances that need to be covered.

As with most inventions and innovations, new endeavours aimed at improving responses to catastrophes do not occur in a vacuum. They "are not just accidents, nor the inscrutable products of sporadic genius, but have abundant and clear causes in prior scientific and technological development" (Gifillian 61). Likewise, the development of our user-friendly and publically available FireWatch site relies on the accumulation of preceding inventions and innovations. This includes the many years spent developing the existing FireWatch site, a site dense in information of significant value to scientists, foresters, land managers, and fire experts.

Communications

Often overlooked in discussions regarding emergency communications is the microgeographical exchanges that occur in response to the threat of natural disasters. This is where neighbours fill the critical period before emergency service responders can appear on site. In this situation, it is often local knowledge that underpins improvised grassroots communication networks that inform and organise the neighbourhood. During a recent bushfire on peri-rural blocks on the outskirts of Kununurra, neighbours went into action before emergency services volunteers could respond.

> We phoned around and someone would phone and call in. Instead of 000 being rung ten times, make sure that one person rang it in. 40 channel [CB Radio] was handy – two-way communication, four wheelers – knocking on doors making sure everyone is out of the house, just in case. (Jane. Personal Interview. 2012)

Similarly, individuals and community groups have been able to inform and assist each other on a larger scale via social network technologies (SNTs). This creative application of SNTs began after the 9/11 terror attacks in 2001 when individuals created wikis in order to find missing persons (Palen and Lui). Twitter has experienced considerable growth and was used freely during the 2009 Black Saturday fires in Australia. Studies of tweeting activity during these fires indicate that "tweets made during Black Saturday are laden with actionable factual information which contrasts with earlier claims that tweets are of no value made of mere random personal notes" (Sinnappan *et al*. n.p.).

Traditionally, official alerts and warnings have been provided to the public via television and radio. However, several inquiries into the recent bushfires within Australia show concern "with the way in which fire agencies deliver information to community members during a bushfire...[and in order to] improve community safety from

bushfire, systems need to be implemented that enable community members to communicate information to fire agencies, making use of local knowledge" (Elsworth *et al*. 8).

Technological and social developments over the last decade mean the public no longer relies on a single source of official information (Sorensen and Sorensen). Therefore, SNTs such as Twitter and Facebook are being used by the media and emergency authorities to make information available to the public. These SNTs are dynamic, in that there can be a two-way flow of information between the public and emergency organisations. Nonetheless, there has been limited use of SNTs by emergency agencies to source information posted by in situ residents, in order to help in decision-making (Freeman).

Organisational use of multiple communication channels and platforms to inform citizens about bushfire emergencies ensures a greater degree of coverage—in case of communication systems breakdowns or difficulties—as in the telephone alert system breakdown in Kelmscott-Roleystone, WA or a recent fire in Warrnambool, Victoria which took out the regional telephone exchange making telephone calls, mobiles, landlines, and the Internet non-operational (Johnson). The new FireWatch site will provide an additional information option for rural and remote Australians who, often rely on visual sightings and on word-of-mouth to be informed about fires in their region. "The neighbour came over and said - there is a fire, we'd better get our act together because it is going to hit us. No sooner than I turned around, I thought shit, here it comes" (Richard. Personal Interview. 2012).

The FireWatch Project

The FireWatch project involves the redevelopment of an existing FireWatch website to extend the usability of the product from experts to ordinary users in order to facilitate community-based decision-making and action both before and during bushfire emergencies. To this purpose, the project has been broken down to two distinct, yet interdependent, strands. The community strand involves collaboration within a community (in this case the Kununurra community) in order to carry out a community-centred approach to further development of the site. The design strand involves the development of an intuitive and accessible Web presentation of complex information in clear, unambiguous ways to inform action in stressful circumstances.

At this stage, a first round of 19 semi-structured interviews with stakeholders has been conducted in Kununurra to determine fire-related information-seeking behaviours, attitudes to mediated information services in the region, as well as user feedback on a prototype website developed in the design strand of the project. Stakeholders included emergency services personnel (payed and volunteer), shire representatives, tourism operators, small business operators (including tourism operators), a forest manager, a mango farmer, an Indigenous ranger team manager as well as general community members. Interviewees reported dissatisfaction with current information systems. They gave positive feedback about the website prototype. "It's very much, very easy to follow" (David. Personal Interview. 2012). "It looks so much better than [the old site]. You couldn't get in that close on [the other site]. It is fantastic" (Lance. Personal Interview. 2012). They also added thought-provoking contributions to the design of the website (to be discussed later).

Residents of Kununurra who were interviewed for this research project found bushfire warning communications unsatisfactory, especially during a recent fire on the outskirts of town. People who called 000 had difficulties passing the information on, having to explain exactly where Kununurra was and the location of fires to operators not familiar with the area. When asked how the Kununurra community gets their fire information a Shire representative explained:

> That is not very good at the moment. The only other way we can think about it is perhaps more updates on things like Facebook, perhaps on a website, but with this current fire there really wasn't a lot of information and a lot of people didn't know what was going on. We [the shire] knew because we were talking to the [fire] brigades and to FESA [*Fire and Emergency Services Authority]* but most residents didn't have any idea and it looks pretty bad. (Ginny. Personal Interview. 2012)

All being well, the new user-friendly FireWatch site will add another platform through which fire information messages are transmitted. Community members will be offered continuously streamed bushfire location information, which is independent of any emergency services communication systems. In particular, rural and remote areas of Australia will have fire information at the ready.

The participatory methodology used in the design of the new FireWatch website makes use of collaborative creativity, whereby users' vision of the website and context are incorporated. This iterative process "creates an equal evolving participatory process between user and designer towards sharing values and knowledge and creating new domains of collective creativity" (Park 2012). The rich and sometimes contradictory suggestions made by interviewees in this project often reflected individual visions of the tasks and information required, and individual preferences regarding the delivery of this information. "I have been thinking about how could this really work for me? I can give you feedback on what has happened in the past but how could it work for me in the future?" (Keith. Personal Interview. 2012).

Keith and other community members interviewed in Kununurra indicated a variety of extra functions on the site not expected by the product designers. Some of these unexpected functions were common to most interviewees such as the great importance placed on the inclusion of a satellite view option on the site map (example shown in Figure 1). Jeremy, a member of an Indigenous ranger unit in the Kununurra area, was very keen to incorporate the satellite view options on the site. He explained that some of the older rangers:

> can't use GPSs and don't know time zones or what zones to put in, so they'll use a satellite-style view. We'll have Google Earth up on one [screen], and also our [own] imagery up on another [screen] and go that way. Be scrolling in and see – we've got a huge fire scar for 2011 around here; another guy will be on another computer zoning in and say, I think it is here. It's quite simplistic but it works. (Personal Interview. 2012)

In the case above, where rangers are already switching between computer screens to incorporate a satellite view into their planning, the importance of a satellite view layer on the FireWatch website makes user context an essential part of the design process. Incorporating many layers on one screen, as recommended by participants also ensures a more elegant solution to an existing problem.

Figure 1: Satellite view in the Kununurra area showing features such as gorges, rivers, escarpments and dry riverbeds

This research project will involve further consultation with participants (both online and offline) regarding bushfire safety communications in their region, as well as the further design of the site. The website will be available over multiple devices (for example desktops, smart phones, and hand held tablet devices) and will be launched late this year. Further work will also be carried out to determine if social media is appropriate for this community of users in order to build awareness and share information regarding the site.

Conclusion

Community members improvise and self-organise when communicating fire information and organising help for each other. This can happen at a microgeographical (neighbourhood) level or on a wider level via social networking sites. Organisations also develop innovative communication systems or devices as a response to the threat of bushfires. Communication innovations, such as the use of Twitter and Facebook by fire emergency services, have been appropriated and fine-tuned by these organisations. Other innovations such as the user-friendly Firewatch site rely on previous technological developments in satellite-delivered imagery—as well as community input regarding the design and use of the site.

Our early research into community members' fire-related information-seeking behaviours and attitudes to mediated information services in the region of Kununurra has found unexpectedly creative responses, which range from collective creativity on the part of emergency responders or the community in general during events to creative use of existing information and communication networks. We intend to utilise this creativity in re-purposing FireWatch alongside the creative work of the designers in the project.

Although it is commonplace to think of graphic design and new technology as incorporating creativity, it is rarely acknowledged how frequently these innovations harness everyday perspectives from non-professionals. In the case of the FireWatch developments, the creativity of designers and technologists has been informed by the creative responses of members of the public who are best placed to understand the challenges posed by restricted information flows on the ground in times of crisis. In these situations, people respond not only with new ideas for the future but with innovative responses in the present as they communicate with each other to deal with the challenge of a fast-moving and unpredictable situation. Such improvisation, honed through close awareness of the contours and parameters of both community and communication, are one of the ways through which people help keep themselves and each other safe in the face of dramatic developments.

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