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FireWatch

Community Engagement and the Communication of Bushfire Information

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Abstract

Successive bushfire inquiries in Australia have called for authorities to more effectively harness and disseminate bushfire information. Recommendations from these inquiries suggest a new approach to bushfires involving greater co-ordination, in which home dwellers, emergency fire services and government work more closely together and acknowledge that education, safety, planning and emergency management can be effective responses to the threat of bushfire. Policymakers and community members are seeking to revise bushfire protocols and access new sources of authoritative information, which may help guide public responses. Nonetheless, the effective communication of information regarding bushfires still seems to be problematic (Department of Justice, 2013).

This paper reports on findings from an ARC-funded research project, titled Using Community Engagement and Enhanced Visual Information to Promote FireWatch Satellite Communications as a Support for Collaborative Decision-Making. The project investigated the fire information communications environment of remote Australia in order to develop a suitable, user-friendly bushfire information website. Using a 'communicative ecologies' framework, this paper analyses findings from interviews held in 2012 and 2013 with community members living in the remote area of Kununurra, Western Australia. Interviewees described a fragile 'communicative ecology' where the coverage or reach of different communications technologies is variable, and where there are reception and compatibility problems. They also expressed disappointment and frustration about the lack of fire information in times of bushfire – as well as a lack of operational transparency and effective community engagement on the part of emergency organisations.

Keywords: FireWatch; bushfire communications; communicative ecology; satellite remote sensing; community engagement

Introduction

This paper discusses qualitative findings from an Australian Research Council (ARC) funded project, titled Using Community Engagement and Enhanced Visual Information to Promote FireWatch Satellite Communications as a Support for Collaborative Decision-Making. The project is concerned with the redevelopment of FireWatch – an existing mapping website which provides near real-time satellite information about current fires, and other fire related information such as lightning strikes, fire scar areas, vegetation coverage, vegetation greenness, topographic information and weather information – to a more publically accessible, or user-friendly, website. The FireWatch service is produced by Landgate, a government statutory authority in Western Australia (WA). The current site is dense with layers of highly technical information primarily for the use of fire and emergency services experts. The redevelopment of this product will reduce the heavy cognitive burden manifest in the existing site, making the site more

navigable and accessible. It will extend the usability of the product from experts to everyday users in order to facilitate community-based decision-making and action both before and during bushfire emergencies.

The two main research questions this project poses are: how can FireWatch be integrated into communities as part of a holistic fire awareness program, and how can FireWatch be redesigned to incorporate global best practice and modern principles of dynamic information design to develop a more intuitive version for ordinary users? In order to answer these questions the project has two complementary strands: the first (Community Strand) involves gathering information about remote community communication ecology in relation to fire communications to resolve whether the user-friendly FireWatch site would be a ‘good fit’ with the existing communications ecology; the second (Design Strand) involves utilising design best practice to produce an overall interface which is easily navigable, user-friendly and incorporates the most relevant information data in times of fire stress (Figure 1).

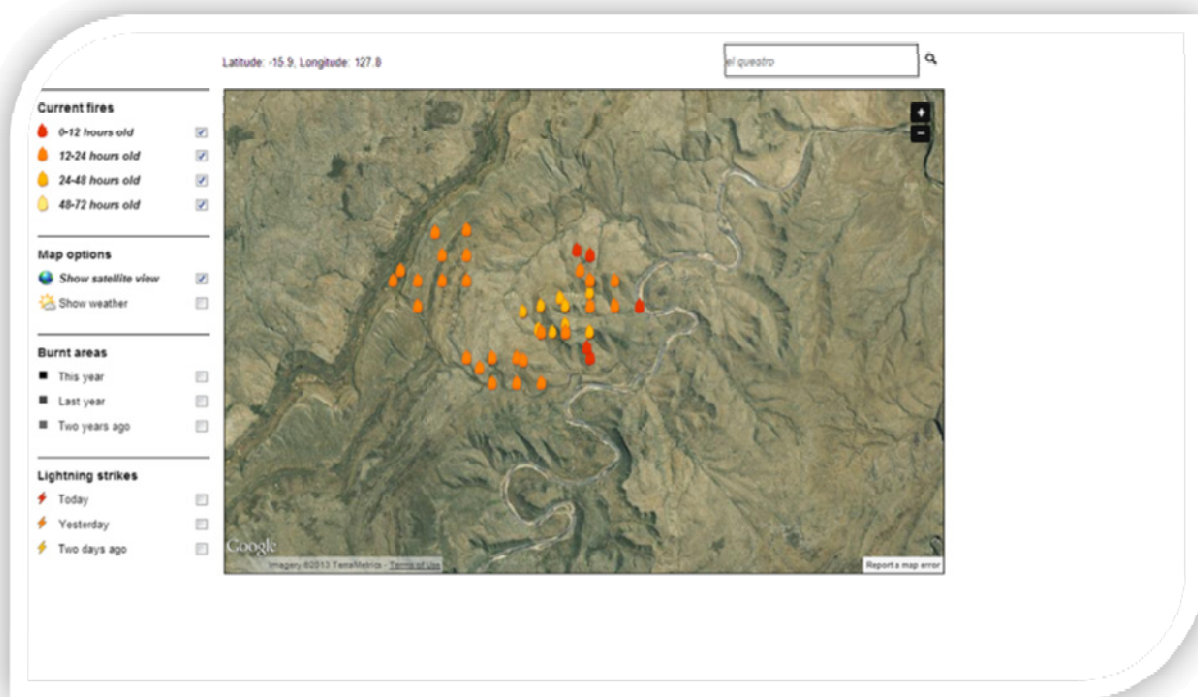


Figure 1 – Screen grab of the user-friendly FireWatch prototype

This paper is concerned with the Community Strand of the project and uses Altheide’s (1994, 1995) notion of an ‘ecology of communication’ as a framework to analyse the fire information needs of remote Australian communities and whether or not the new FireWatch site ‘fits’ these needs. Our analysis of the communication ecology of Kununurra and its surrounds indicates that the user-friendly FireWatch project will add to existing communication channels already used in times of fire stress – and ensure that local community members are kept effectively in the fire communications loop. Ultimately, the new user-friendly FireWatch site will inform the public about the size, scope and movement of large fire fronts that travel across large tracts of land in northern Australia. It will also provide the public with fire scar, weather, greenness and lightning strike information.

Community Engagement and Bushfire Preparedness and Reaction

Greater community participation in bushfire communications is a key recommendation of the multiple inquiries into bushfire disasters. Fire and emergency services organisations are under some pressure to accommodate this perceived need. Internet-based communications have a key role to play in filling the

gap, but must balance community desire for participation with government requirements to be reliable and minimise risk (e.g. Freeman & Freeman, 2010). The increasing use of social media during disaster events (Bird, Ling & Haynes, 2012; Keim & Noji, 2011) reflects the fact that, in the absence of official platforms, or sometimes even despite them, citizens will create their own unofficial channels to communicate. “If a government/official emergency services authority is not found to be communicating with the community online, or not communicating adequately, citizens will tend to create their own unofficial channels to distribute information about an emergency or crisis” (Quinn, 2012, p. 4).

An analysis of six Commonwealth and state inquiries (before 2008) found that there were serious concerns with “the way in which fire agencies deliver information to community members during a bushfire” (Elsworth, Stevens, Gilbert, Goodman & Rhodes, 2008, p. 8). In addition to this, the need for fire agencies to implement systems “that enable community members to communicate information to fire agencies, making use of local knowledge” (Elsworth et al., 2008, p. 8) was stressed. Since this 2008 analysis, further bushfire inquiries have continued to stress that communications concerning bushfire information need to be improved. The Royal Commission into the Black Saturday bushfires, in which 73 people lost their lives in regional Victoria, included “numerous references to community involvement and greater co-ordination between government agencies and between authorities and home dwellers” (Brady & Webb, 2013, p. 5). Three Western Australian bushfire inquiries, about bushfires that occurred in 2011, all identified fire communication as wanting. One of these, the parliamentary inquiry into the Kimberly Ultramarathon fire, identified many communication failures between the local community and race organisers, as well as between emergency services attending to the burn victims (Economics and Industry Standing Committee, 2012). The inquiries into the 2011 Perth Hills and 2011 Margaret River bushfires also focused on organisational communications issues – both with planning and emergency responses (Keelty, 2011, 2012).

Within the scope of bushfire preparedness and response in Australia, community engagement involves a wide-ranging assembly of community interaction exercises, including:

- Media campaigns raising awareness of the risk of bushfire in areas prone to bushfire and warnings advising about fire danger conditions or specific warnings about approaching fires;
- Printed literature aimed at increasing householders’ knowledge about “making a decision to stay and defend or leave early, possible preparedness activities and what to expect during a fire” (Gilbert, 2007, p. 5);
- Interactive publications involving websites and/or DVDs which replicate similar content available in print, local brigade activity such as displays and presentations including school-based education activities; and
- Street and community meetings including those with a preparedness emphasis usually held in the build-up to the fire season, those that brief community members during a bushfire incident or post-fire meetings which occur soon after a bushfire event. (Gilbert, 2007)

These community engagement activities are important sources of information for fire preparation and information. Many inquiries have recommended that more timely and reliable fire information is needed, especially in times of crisis. Developments – technological and social – over the last decade have resulted in the general public no longer relying on a single-source of official information in times of crisis (Sorensen & Sorensen, 2007). Social network technologies are now being used by the media and the general public to provide timely information during bushfire events, and social network technologies are also being used by emergency authorities as another channel through which to push bushfire information. To date, however, emergency agencies have been slow to “source information posted by in situ residents, in order to help in decision-making” (Freeman as cited in Holloway, Green, & Brady, 2013) and are yet to “harness social media and use it as a reliable source of information and intelligence” (NSW Rural Fire Service spokesman Anthony Clark as cited in Griffith, 2013).

Nonetheless, in the case of remote Australia, where the population is sparse and where internet connectivity is often limited to townships, pastoral homesteads and some remote Indigenous communities, and 3G access is limited to towns only, the use of social media to capture and harness timely fire information is somewhat constrained. Access to the internet is available to more than 70% of remote Australians. This access forms part of a mixed-mode online/offline communications ecology reliability. Landlines, mobile telephones, satellite telephones, long and short range radios and the internet all combine to facilitate and enhance community communications, especially in times of emergency. In addition, organisational use of multiple communication channels and platforms to inform citizens about bushfire emergencies ensures a greater degree of coverage – in case of specific 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, 2012).

The timely delivery of fire information will support the public in their decision-making regarding their responses to a fire emergency. The user-friendly FireWatch site will provide an additional layer of information (for rural and remote Australians) who often rely on visual sightings and on word-of-mouth to be informed about fires in their region. This service will also provide fire information for remote media services (especially local radio) to relay fire information and warnings to people living in rural and remote Australia.

Research Methods: Community Phase

The overall aim of the project is to redesign and repurpose FireWatch for use by ordinary users and to engage a remote community in northern Western Australia in that process. Using a social shaping of technology perspective (MacKenzie & Wajcman, 2003), we consider community members to be part of an active audience, and that this active audience makes choices about when and how they access information and what they do with it. In this sense, context and relevance is just as important as the quality and usability of an information product such as the new user-friendly FireWatch site.

Fieldwork Locale

The town of Kununurra was chosen as the fieldwork site because the user-friendly FireWatch site is being developed specifically for remote and regional users. Kununurra was chosen for its remoteness as it is located in the north east of the Kimberley region in Western Australia and is about 40 kilometres from the border with the Northern Territory. It was also chosen because of its size and proximity to community groups including emergency groups such as St John's Ambulance and Kununurra Volunteer Fire and Rescue Services, service groups such as Apex and Lions and the Country Women's Association – as well as a variety of sporting groups. Kununurra also has a variety of land uses including pastoral, mining, national parks and reserves, as well as horticultural lands fed by the Ord River Irrigation Scheme.

Participants

In order to consult with a variety of stakeholders within the community of Kununurra, purposive sampling was employed as a recruitment strategy (Patton, 1990). Interviews with 42 stakeholders were conducted in Kununurra (2012/2013) to determine fire-related information-seeking behaviours and 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 (paid and volunteer), shire representatives, tourism operators, small business operators (including tourism operators), a forest manager, a mango farmer, an Indigenous ranger team manager, residents on very remote pastoral properties, visiting tourists and general community members.

Data Collection

Open-ended and semi-structured, conversational interviews were used in this phase of the project. This style of interviewing is a combination of unstructured and structured interview techniques. While unstructured interviews (those without particular questions) tend to reveal a broad range of information that can be difficult to analyse, structured interviews (such as those in a face-to-face survey) may not elicit sufficiently useful information because the right questions may not have been asked. Thus, the semi-structured interview provides the researcher and interviewee some degree of direction while, at the same time, empowering the interviewee to pursue their own agendas – other topics or issues of concern that are related to fire prevention and mitigation (Holloway & Green, 2013).

Data Analysis

The interviews were audiotaped and transcribed. The transcriptions were then read, analysed and emergent themes identified. An initial reading of the data showed heightened interest in the new user-friendly FireWatch site: “It’s very much, very easy to follow” (David, 2012); “It looks so much better than [the old site]. You couldn’t get in that close on [the other site]. It is fantastic” (Bill, 2012). Further analysis of the data revealed a number of more subtle themes also relevant to the aims of this project – about how formal and informal communication flows regarding fire information are configured in the region.

The Fire Information Communicative Ecology in Kununurra

Altheide (1994, 1995) first developed the idea of ‘an ecology of communication’ to address the variations in technology access that reflect a person’s social circle, personal competencies and available/affordable technological resources. From the importance paid to context it is clear that, at the individual level, not all ecologies of communication are equal, even in the same household, although the social element means that people’s ecologies of communication are influenced and informed by their neighbours. Hearn and Foth (2007) posit that such communicative ecologies have three layers: a technological layer; a social layer – the links between the communicating people; and a discursive layer – the content of the communication. “This more holistic model helps us better understand the dynamic interrelationships between different communication technologies and between different social dimensions” (Foth & Hearn, 2007, p. 751) and can be used at either macro or micro levels of analysis (Hearn & Foth, 2007).

Communicative ecology is used as a framework within which to describe and analyse the community phase of this project, which aims to determine whether or not, and how, the new FireWatch site will ‘fit’ into the existing communications ecology of the area. In this analysis we extend the existing work of Hearn and Foth (2007) to analyse the technological layer (form and function of communication technologies), and the social layer (how groups network and organise) to determine how the new user-friendly FireWatch site will fit into the existing communications ecologies of remote Australia.

Communicative Ecology: Technological Layer

This section analyses the accessibility and reliability of devices and connecting media (Hearn & Foth, 2007) that assist in the communication of fire mitigation and suppression information within the Kununurra area.

Fragility of the Communications Environment

People in the area of Kununurra report on the fragility of their communicative ecology and the importance of a ‘back-up plan’ for every eventuality. These remote residents fully understand that the use of multiple channels and platforms of communication helps to overcome communications breakdowns in times of emergency. They already have a relatively complex technical communication ecology which involves

different technologies being used ‘in town’ such as landlines, mobile phones and the internet – and satellite phones, long range radios and short range radios being used outside the town zone. Newer technologies such as satellite phones, mobile phones, digital radios and internet communications are displacing (but not completely replacing) older communication technologies.

Last year there was flooding and our fibre-optic cable got cut. There goes your internet and [...] and cell phones. About a month ago we had the same thing happen – they were excavating in the street and cut the cable, so for three days there were no cell phones or land lines. We relied on radios and satellite phones. In an emergency what is the chance of that happening again? Without cell phones and mobile phones you have to rely on satellite phones which are unreliable. (Dieter, 2012)

Last resort technologies, such as satellite phones, can also be problematic:

Satellite phone goes off all the time. Our microwave phones [radio phones relayed by a series of microwave towers] go off all the time. ... [Also, there’s] the time taken to get the phone out, find a satellite – if you are in a gully, down below where the fire was a month ago – it didn’t work at all. (Jan, 2012)

Despite the many communication channels available, the communication ecology of the Kununurra area is relatively fragile. Interviewees also report that: compatibility between different satellite phone networks is problematic; mobile phone coverage can be sketchy with relatively good coverage in the middle of town becoming sporadic to non-existent the further away from the town centre they get; the internet only works in town, on pastoral stations and within some small communities; and the long range radio towers do not cover all of the Kimberly area. In addition to this, all these technologies do not work if used in a bad location – behind a ridge or in a deep valley – or in the case of internet connectivity in town, if there is heavy cloud coverage in the wet season.

Access to the Internet

Information about access to existing communication technologies are a critical precursor in the development of an information product such as the user-friendly FireWatch site. The town area has 3G access and has an ADSL2+ exchange. Kununurra will be receiving fibre-optic broadband cables as part of the National Broadband Network (NBN) (Australian Broadcasting Corporation, 2012). Internet access is also available to people living on pastoral stations and in some small communities. Despite the remoteness of the township, interviewees in this study surprised researchers with their levels of ownership of internet connected devices. While 80% of homes in Kununurra are internet-connected (Australian Bureau of Statistics, 2013), we found that internet-connected community members do not always used fixed broadband links, preferring to use the 3G network to connect to the internet. This finding is a reminder to researchers and designers that existing data regarding internet usage around Australia does not, at this stage, include users of 3G and 4G enabled mobile networks. As a response to this finding the new FireWatch site or app will be now be available on touchscreen tablets and smartphones.

Communicative Ecology: Social Layer

Informal Information Flows

Often overlooked in an analysis of emergency communications are the local, informal communications that form part of local emergency response efforts. Local pilot Lenard describes how his air charter business puts him in a position to be able to warn relevant authorities about fires in the area:

We’ve got a national park on the eastern side. If a fire threatens the eastern boundary of that it is more than likely going to move into the park. They [Department of Environment and Conservation (DEC)] are required to do something about that. They don’t necessarily know

about it. We see the smoke ... when you are up in the air you tend to see things – not from a paid observer’s point of view but just as a casual ... oh look there is smoke there. We can see stuff everywhere. I’ll call DEC and say – did you know you have a fire out there. Or if there is one sprung up – and it is not the tip burning off or something like that – I’ll ring the shire and say we’ve got a fire there. At this time of the year you know it could potentially be a problem. (Lenard, 2013)

These informal information flows also occur between community members during “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” (Holloway et al., 2013). For example, during a bushfire on a peri-rural block on the periphery of Kununurra late in 2012, a group of neighbours went into action in the critical period before emergency services could respond. One neighbour describes how telephones, two-way radios and quad bikes were used to alert and organise the neighbourhood during a fire on the outskirts of Kununurra:

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, 2012)

Formal Information Flows

Interviewees gave an indication of the challenges and frustrations felt in the face of information silos, where organisations seem incapable of reciprocal communications with each other. This tends to result in inadequate or disjointed communications particularly during times of fire stress. Neighbours and emergency workers want and need to work together. However, the priority has been placed on creating secure communication channels within each emergency agency. Silo-to-silo communications is made particularly difficult through the use of secure communication channels tailored for each emergency agency. Emergency worker Samuel describes the difficulties he has when trying to contact other emergency workers during a fire emergency:

I can only talk to my people on that. I’ve got no access to other services. [... there’s also] the range of your antenna. I can talk to Lake Argyle which is about 70kms from here, and I can speak to the [my] office here and to the hospital, but if a policeman is standing next to me he’ll be able to contact the police station, but the two of us won’t be able to talk to each other, because we are all on different channels. [... It would make a difference] if we could get a common emergency channel. Everybody is digital now, and it is safer, more confidential, so a common channel. (Samuel, 2012)

In response to these interoperability difficulties, the Department of Fire and Emergency Services (DFES) is rolling out the WA Emergency Radio Network (WAERN), a state-wide radio network aimed at facilitating direct interoperability with other agencies. However, it is yet to be seen whether this system will streamline communications between agencies or merely add another supervisory layer in times of bushfire emergency.

Silo-to-public communications in the Kununurra area is also seen as problematic. When asked about fire information delivery to the public during a peri-urban fire, George, a council worker and emergency service volunteer, was himself not satisfied:

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 [local council] knew because we were talking to the brigades and to FESA [Fire &

Emergency Services Authority of WA] but most residents didn't have any idea and it looks pretty bad. (George, 2012)

Silo-to-public communications can also be a sensitive area, especially when the public question the actions of emergency agencies about bushfire events. Bulldozing contractor Georgia, whose equipment was used to make fire-breaks during a local fire, was reprimanded by one emergency agency after she spoke about it during a local fire forum:

I mentioned that casually, in a local fire forum, that this chap had scoffed at the idea of actually paying for fire suppression and that got back to the department and they came marching around with their bottom lips out, saying – you'll have to say sorry about that. You shouldn't be talking about things that happen during a fire afterwards to the locals. They got a bit precious about it. (Georgia, 2013)

One of the aims of this research project is to investigate ways in which remote and regional members of the public can be engaged and mobilised through the development of FireWatch to make it more accessible and usable, allowing a community-focused response to risk. Local residents in the Kununurra area voiced their concerns about formal information flows in times of emergency, and in between emergencies, and welcomed the idea of an information source independent of emergency services organisations.

Conclusion

One of the aims of this project is to research ways in which communities in remote and regional Australia can be engaged in the development and use of a user-friendly, public information website. Our exploration of the communications ecology of the Kununurra area shows that there is a greater range of communications technologies used in remote areas of Australia than in other areas. This range of communications devices is of major importance in areas where: the communications ecology is rather fragile; the coverage or reach of different communications technologies is variable; and there are reception and compatibility problems. The use of multiple communication channels and platforms of communications by organisations and the general public ensures a greater degree of coverage – in case of communication systems breakdowns or difficulties.

The analysis also highlighted community dissatisfaction with the delivery of timely fire information in times of bushfire, as well as a lack of operational transparency and effectual community engagement, on the part of DFES and to a lesser extent DEC. It is heartening to note that within DFES's strategic plan document, *New Beginnings 2024*, DFES gives strategic priority to "community warnings and information" as well as a commitment "to being open and transparent with regard to decision making, accountability and governance" (DFES, 2012, p. 2).

In the sparsely populated north of Australia, where emergency organisations cover large areas prone to regular seasonal fires, there is clearly a role for the kind of fire information that can be provided by FireWatch. This is particularly relevant in remote areas where communication channels are often patchy or of poor quality making seamless communication difficult – and where people from outside the community, such as tourists, are exposed to risk during the dry season. Findings from this project indicate that the new user-friendly FireWatch site will be a welcome, and easy to use, information source for remote community members who currently feel under-informed about fires in their area.

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