

Co-designing predictive maps for community use during a bushfire

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Climate change means that planning for and responding to future bushfire events is increasingly challenging for emergency management organisations. Arguably, meeting the challenges caused by climate requires more than an improvement in our knowledge about climate change and its likely effects. Instead, the current challenge lies in the translation of this knowledge into emergency management policy practice.

The Predictions in Public: Using Predictive Fire Spread Products to Support Public Information and Warnings project commenced in February 2022 and was funded by Natural Hazards Research Australia. The project seeks to support the translation of scientific and community knowledge into agency practice. This will be achieved by developing an evidence base for the future use of predictive fire spread maps in public information and warnings products during an emergency.

The project focuses on the use of existing and potential products that are created by trained fire behaviour analysts. These products include fire behaviour intelligence and scenarios before first attack and predictions of fire spread during an extended attack. These products are already used to inform public information and warnings. However, the way that they are used varies by jurisdiction.

The use of fire predictions has received increased attention since the 2019–20 fire season when 'Red Maps' were released to the public in NSW and the ACT. Questions about the value of producing fire-spread predictions during fire seasons have arisen. There is a focus on the need to develop a consistent approach to public information and warnings across jurisdictions as part of the Australian Warning System. This project offers an opportunity to reflect on the purpose of public-facing predictive maps and to collect empirical data to build an evidence base to support and inform agency decisions related to the future use of predictive products for public information and warnings.

Co-design: overview, challenges and opportunities

Co-design is defined as 'The process of designing with people that will use or deliver a product or service'.¹ It is a concept that is gaining popularity in a number of sectors. For example, in academia, the concept of co-design originates from product design and communication studies as a way of improving products and services. However, over the last few decades, academic literature from the climate change and disaster risk reduction discourses increasingly refers to the need for more inclusive research processes that bring a range of disciplines and practitioners together to translate knowledge and solve complex issues. While fundamental research is important, so too is collaboration across disciplines and between researchers and end users to achieve research translation. The Victorian Government defines co-design as a process that 'brings citizens and stakeholders together to design new products, services and policies'.² The increased use of the term acknowledges that simply providing products, services and policies, does not necessarily result in meaningful engagement with end users or their acceptance of those outputs.

Therefore, there is a growing acceptance that we need to work better together to improve outputs and solve complex problems. Rationally, co-design makes sense. The idea is if stakeholders are involved throughout the entire process of a project the results will be of higher quality in terms of usability and use than if they were not involved. But how do we achieve these benefits through co-design?

There are many examples of how to engage stakeholders in the academic literature and from



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public service practice. However, there is less discussion about what specifically leads to effective co-design and every project, context and stakeholder group is different and different methods are going to be required. We may not have a one-size-fits-all recipe, but we can use broad principles to help steer us in the right direction.

The co-design process requires the active involvement of stakeholders throughout a decision-making process and is built on the principles of collaboration, inclusion and flexibility.³ Collaboration refers to the opportunities that are provided for different people with different needs to participate in the decision-making process. This could include meetings, workshops, interviews or surveys. Regardless of how we collaborate, it is important that collaboration results in inclusion. Inclusion means that everyone's contribution is reflected in the decisions made throughout the entire process. Finally, flexibility allows for shifts in the process and the direction of the project if needed to meet project objectives. Importantly, for a co-designed project to work, strong project design is required to keep the project on track. A clear understanding of the decisions that need to be made and a plan for when and how opportunities for collaboration and inclusion will take place are important to successful co-design.

The Predictions in Public project and its approach to co-design

The Predictions in Public project is being led by the Victorian Country Fire Authority (CFA) and Emergency Management Victoria (EMV). The research team is made up of 4 Australian universities (RMIT, Queensland University of Technology, Deakin University and Swinburne University of Technology) that represent expertise in cartography, warning communication, evacuation behaviour and organisational learning.

We created a project steering committee, which is made up of representatives from the AFAC Warnings Group and AFAC Predictive Services Group, as well as representation from the Bureau of Meteorology. CFA and EMV play a facilitation role between the research team and the steering committee to ensure that the needs of both groups are reflected and included in decision-making. During facilitated conversations between the research team and the steering committee, we discuss the expected outcomes of the project and decisions related to the empirical research.

There are also multiple opportunities for community feedback. We have planned for surveys, interviews and focus groups to first understand current comprehension and use of existing spatially represented public information and warnings products and, later in the project, to test some map concepts to inform a consistent national approach to public-facing predictive map design, dissemination and education. It is the intention to meaningfully use all expertise and knowledge presented by the steering committee, research team and representatives of the community.

Regarding flexibility, the proposed outcomes of the project are deliberately broad. The project has been broken into 3 phases. Each phase is designed to build upon the last:

- **Phase 1:** Understand the status quo. What do agencies aim to achieve by using the current public information and warnings

products? How do members of the public comprehend and intend to use existing products?

- **Phase 2:** Develop and test national predictive map concepts. How should predictive bushfire maps be designed, communicated and disseminated across Australia?
- **Phase 3:** Develop fit-for-purpose outputs. How can the results of the project be directly translated into agency policy and practice?

Challenges

The approach requires attendance at regular meetings. This is difficult for busy researchers and emergency management staff to commit to. Rather than the steering committee communicating an evidence need and then allowing researchers to complete the research separately, this approach requires involvement by the steering committee and researchers in regular discussions about what the research should test and what the results of the research can be used for. This requires strong relationships and trust. It also requires commitment from the steering committee and flexibility and openness from researchers to listen to and adapt research as the steering committee's needs evolve.

Other challenges include research being conducted within emergency management timeframes. Research takes time and often does not work within the short timeframes desired by emergency management organisations. However, the collaborative approach used offers opportunities for emergency management staff to learn with the research team as they go. It is hoped that these lessons can be used to inform organisational decisions and practice in addition to using the results of the project once it is completed.

Opportunities

We are hopeful that this approach will lead to improvements in research utilisation and agency practice by resulting in robust research and outputs that meet agency and community needs.

We also hope that through the development of relationships and shared understandings, researchers and agencies will learn from one another. By providing opportunities for discussion, we are translating science and integrating different ways of knowing and expertise to make sense of and solve complex problems.

Scientific knowledge and evidence do not often translate into organisational contexts without assistance. Issues related to capacity and capability pose barriers to scientific results being understood, translated and implemented within organisational practice. Through the development of strong relationships and a culture of emergency management staff involvement throughout the research process, it is hoped that the legitimacy of science and appetite for its use to inform and support decision making within agencies will be improved.

Endnotes

1. Design Council, United Kingdom.
2. Vincent K, Daly M, Scannell C, & Leathes B 2018, *What can climate services learn from theory and practice of co-production?* *Climate Services*, 12, pp.48–58.
3. Victorian Government, at: www.vic.gov.au/co-design.