



EVIDENCE-BASED RISK COMMUNICATION: AN INDUSTRY- ACADEMY RESEARCH COLLABORATION THAT ENHANCED DAM RELEASE MESSAGE EFFECTIVENESS

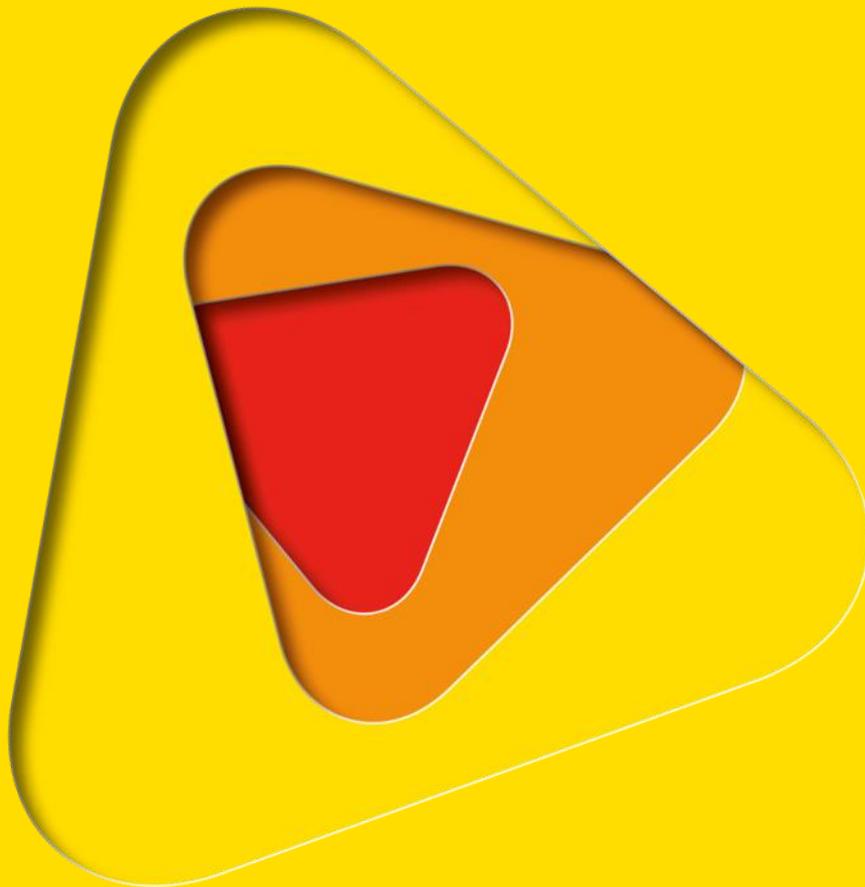
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INTRODUCTION

In the past, intuition, experience, and anecdotal information have shaped the design of public risk communication and education campaigns, potentially limiting their effectiveness (Wood et al., 2012). However, collaborations between industry and academia better use and combine theory with practice and can generate evidence to support or counter intuitive thinking. This extended abstract outlines the research collaboration between Seqwater and QUT, which supported Seqwater's response to the Inspector-General for Emergency Management's (IGEM) review of dam release messaging.

In their 2015 Review of Seqwater and SunWater Warnings Communications, the Office of the Inspector General for Emergency Management (IGEM) identified the need for more effective communication from Seqwater and SunWater during natural hazards. Specifically, under Recommendation one – Messaging, IGEM recommended that Seqwater and SunWater focus immediate attention and action on issues of collaboration with local disaster management groups, addressing information sharing, messaging responsibilities, terminology and timing (IGEM, 2015).



RISK COMMUNICATION

The research collaboration was informed by QUT researchers' synthesis of risk communication models collated for the Bushfire and Natural Hazards CRC and Seqwater's knowledge of dam operations and the capabilities of their communication system. Risk communication is an important tool for encouraging risk mitigation and response. Covello, von Winterfeldt and Slovic (1986) define risk communication as any purposeful exchange of information about risk between interested parties. How well people prepare for a natural disaster is influenced by effective communication (or the absence of it) (Basic, 2009). Failure to implement effective communication strategies can increase the risks faced by individuals and organisations during risk events (Sellnow, Ulmer, Seeger, & Littlefield, 2009).

To communicate risk effectively, emergency management organisations need to consider how warning messages are presented and whether such messages interact with individual information processing to inform protective behaviour in response to hazards (Griffin, Dunwoody, & Neuwirth, 1999). Previous research identifies eight message characteristics that may influence how community members process information to make decisions during natural hazards and ultimately contribute to protective behaviour. These characteristics are: accuracy, certainty, consistency, clarity, sufficiency, specificity, guidance, and relevance (Tippett et al., 2015). These characteristics have been central to the research and message design.



RESEARCH DESIGN

The research program adopted a multi-method, multi-phase approach. Prior to conducting empirical research, Seqwater's existing dam release messages were reviewed against the eight characteristics of effective messages (Tippett et al., 2015) and modified to add or enhance specificity, clarity, clear guidance, relevancy and consistency.

PHASE ONE. FOCUS GROUPS

In March 2016, six focus groups were conducted with participants who lived or operated businesses in areas downstream of North Pine, Wivenhoe and Hinze dams. In total 33 participants provided views on:

- flooding risk perceptions
- knowledge and expectations of dam operations
- communication expectations for Seqwater
- the efficacy of existing and modified dam release messages.

Focus groups were transcribed and thematically coded using NVivo to identify and examine the meanings and experiences of participants. In particular, participant sentiments around existing and modified messages were analysed against the eight characteristics of effective message design (Tippett et al., 2015). Collectively, these findings were used to further refine the messages for phase two testing.

PHASE TWO. COMMUNITY SURVEY

In June and July 2016, online surveys were developed and distributed to 1,334 respondents. Initially, residents within at-risk downstream suburbs and early warning notification subscribers were targeted. When this participant pool was exhausted, the approach was widened to residents of South East Queensland. Respondents were asked to report on:

- informational channels and platforms they use
- perceived trust in different information sources
- efficacy of existing or refined messages for message comprehension, risk perceptions, and information processing.

Data were analysed using descriptive statistics, paired sample t-tests, analysis of variance (ANOVA), and analysis of covariance.



FINDINGS

Key findings from the research are presented below.

INITIAL MESSAGE REVIEW

The initial review of Seqwater's existing messages against the eight characteristics of effective messages (Tippett et al., 2015) indicate that messages are accurate, certain and sufficient. However, message specificity, guidance, relevance, consistency and clarity could be improved. Modifications to the existing messages were made and tested during focus groups.

PHASE ONE: FOCUS GROUPS

Focus group findings are presented across four themes: 1) risk perceptions, 2) knowledge and expectations of dam operations, 3) expectations for Seqwater, and 4) message design. During the focus groups, participants noted that their perception of risk was influenced by past experiences, which may inadvertently increase their sensitivity to technical terms contained within messages. Participants demonstrated general understanding of dam operations and functions though were less familiar with the operational limitations of gated versus ungated dams. However, participants lacked geographical awareness about their position in relation to the dam or catchment areas despite having a strong understanding of how their local area would flood. During heavy rainfall events, participants expected to hear from Seqwater in relation to a dam release or spill but also from government and emergency management organisations, suggesting value in an integrated or collaborative response. Participants made a number of observations relating to the message design. In particular, participants expected messages to include specific information about spill timing and volume, contain clear and directive instructions, use clear and jargon-free language, and be consistent with warnings from other organisations.

PHASE TWO: COMMUNITY SURVEY

Based on focus group findings, Seqwater messages were modified in two ways. First, to assure community-centred communication, the 18 existing messages were reduced to a targeted suite of 12 messages. Second, within each message, content was modified to enhance clarity, specificity, relevance and guidance. Existing and modified messages were tested within the community survey.

Community survey findings are presented across three areas: 1) informational channels and platforms used, 2) perceived trust in information sources, and 3) effectiveness of existing or refined messages for comprehension, effectiveness, risk perception and information processing. First, respondents use a range of information platforms when seeking information about dams spilling or releasing water or the flooding of creeks and waterways. The most prevalent platforms included television, online news, radio, Google searches, and Facebook. Respondents' preferred information sources included Seqwater, local councils, media, and government agencies including the Bureau of Meteorology and Queensland Fire and Emergency Services. For both dams spilling or releasing water and flooding of creeks and waterways, the preferred overall source was local council but Seqwater was



considered to be a more preferred source of information for dams spilling or releasing water as opposed to the flooding of creeks and waterways.

Second, respondents' perceptions of trust in Seqwater's information was significantly positively correlated with the trust in information for each of the response agencies investigated (e.g. local council, Bureau of Meteorology, media, emergency management organisations). For some messages, trust increased following message exposure.

Third, the modified messages were often deemed to be more effective than existing messages. The modified messages generated greater perceived intentions to engage in mitigative action than existing messages. At the same time, results also highlighted the important role of systematic information processing and its relationship to message design.



CONCLUSION

The research yielded application-ready messages with evidence-based recommendations to improve the effectiveness of Seqwater's notification messages. The messages are based on the principles of risk communication theory and use plain language. In summary, the modified messages:

- use headings that clearly summarise the situation and add geographical markers by naming the affected dam (existing messages name the gated dam once releases commence)
- provide critical information in an uncluttered structure, removing unnecessary and potentially distracting headings (this is particularly the case for the modified message for Hinze Dam)
- phrase guidance or 'call to action' in direct and active language
- provide links to further information, categorised by type (e.g. weather) and supported by links to related organisations (e.g. Bureau of Meteorology)
- set expectations for timing of next message or notification once a flood event is declared for one or more gated dams
- perform well when compared to existing messages and can be easily integrated into appropriate manuals, procedures, and message templates.

The findings of this research program support Seqwater's response to the framework for action set by IGEM. Further, this research has the potential to inform policies and practices of other dam operators and be of interest and value to emergency management organisations. This collaboration also had mutual benefits: Industry partners strengthened skills in the theoretical basis of risk communication design and QUT researchers built understanding of the policies and practices that can enable and/or constrain applied communication research.



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