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# Recent research in community disaster education and its implications for emergency management

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# RECENT RESEARCH IN COMMUNITY DISASTER EDUCATION AND ITS IMPLICATIONS FOR EMERGENCY MANAGEMENT

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## **Keywords**

Learning for Disaster Resilience (LfDR), public safety, emergency management, disaster education, social media

## **Abstract**

Community disaster education is an integral component of emergency management around the world. Its main goal is to promote public safety and, to a lesser extent, reduce disaster damages. However, there has been relatively little research into the appropriateness and effectiveness of the community disaster education programs and learning activities, including those provided by emergency agencies. This is due largely to the general lack of evaluation of these programs, the difficulty in isolating education as a causal factor in aspects of disaster management performance, and disaster education not being embraced strongly by the academic field of education.

Compounding this situation is the call by many governments around the world to build community disaster resilience in addition to public safety, with education viewed as a critical mechanism. There is therefore an urgent need to not only examine current community disaster education practices based on education theory and practice, but also to align them to the broader goal of disaster resilience.

In response, an exploratory research methodology was utilised to examine possible learning content and processes that could be used by emergency agencies and other organisations to design Learning for Disaster Resilience (LfDR) plans, programs and activities for local communities.

The research found that disaster resilience learning content should not only cover preparedness aspects, but also learning about improving recovery for people, organisations (e.g. businesses) and communities. It found that disaster resilience learning should also include learning about the community itself, including how to reduce vulnerabilities and strengthen resilience.

Opportunities for disaster resilience learning were identified in four broad learning domains – behavioural, cognitive, affective and social. The findings demonstrated that many current disaster education programs are only using limited parts of this learning ‘spectrum’, although this would be significantly increased by further embracing social media as a disaster resilience learning medium.

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## Introduction

Community disaster education is an integral component of emergency management around the world. Its main goal is to promote public safety and, to a lesser extent, reduce disaster damages.

Emergency agencies provide a range of educative services to people and communities including public relations, warning communications, formal education programs (e.g. with schools), volunteer training and community engagement. These services can be carried out by different sections or divisions of the agencies. As a result, there is a tendency for emergency agencies to divide disaster educative services into at least community 'education', 'communications' and 'engagement', each of which have slightly different processes (Dufty, 2013a). What is common with education, communications and engagement (ECE) is that they all contribute to disaster-related learning for people, organisations (e.g. businesses) and communities.

Although the ECE division is used by many emergency agencies in practice, the holistic term 'disaster education' is appropriate in strategic discussion as it is synonymous with 'disaster learning'. This stance is supported by the Latin roots of the word 'education': *educare*, means 'to train or to mold', and *educere*, means to 'lead out'. Thus, in this paper the term 'disaster education' will be used for all activities that lead to learning before, during and after a disaster.

There has been considerable action in community disaster education across the world, particularly with the advent of social media. The range of these initiatives has been well-researched e.g. Molino Stewart (2012) categorised current disaster learning activities into four main groups:

1. Public communications, information products and services e.g. publications, internet sites, displays, promotional products, media liaison, advertising/marketing, social media.
2. Training, development and industry-specific programs e.g. skills development courses, leadership training, mentoring, emergency drilling and exercising.
3. Community engagement programs e.g. public participation programs, forums, discussion groups, events, developing networks, social media.
4. Comprehensive personal education programs e.g. school curriculum, university curriculum, personal development courses, action research programs, community education courses.

However, there has been relatively little research into the appropriateness and effectiveness of the community disaster education programs and learning activities, including those provided by emergency agencies. This is due largely to the general lack of evaluation of these programs (Elsworth et al, 2009) and the difficulty in isolating education as a causal factor in aspects of disaster management performance (e.g. preparedness levels, evacuation rates, business continuity).

The paucity of this research is also due to disaster education not being embraced strongly by specialist educators that are versed in education theory and practice. As Preston (2012, p.1) states "there is surprisingly little writing in the field of education/pedagogy itself". This is largely due to disaster education being a "new area of enquiry in the field of education" (Preston 2012, p.1) and because many of the disaster education programs are designed by non-educators (e.g. engineers, planners) from emergency agencies and other organisations. As a result, there is a large amount of disaster education activity around the world with little technical research into its educational veracity.

Compounding this issue is the call by governments around the world to build community disaster resilience, and not only strive for public safety. The concept of resilience has been in the disaster management literature since the 1980s (Wildavsky, 1988) but has come into

vogue as an overriding goal in the past decade. There are a multitude of definitions of 'disaster resilience'. The original notion of resilience, from the Latin word *resilio*, means to 'jump back' or 'bounce back'. According to de Bruijne, Boin and van Eeten (2010, p. 13), "In the past decades, research on resilience has been conducted at various levels of analysis – the individual level, the group level, and the organizational or community level – in a wide variety of disciplines including psychology, ecology, organization and management sciences, group/team literature and safety management".

Several researchers (e.g. Longstaff, 2005) have made an interdisciplinary effort to further refine the concept of resilience in relation to disaster management. However, a dilemma for researchers and planners is whether disaster resilience should involve the ability of a community to 'bounce back' (i.e. resume its normal functioning) as per the original notion, or to 'bounce forward' after a disaster (Manyena et al, 2011). Some researchers such as Paton (2006) opt for the latter notion arguing that the 'bounce back' idea neither captures the changed reality after a disaster, nor encapsulates the new possibilities wrought by a disaster.

Although the academic debate continues on what precisely is disaster resilience, many governments around the world have developed strategic policies and plans that aim to guide countries toward achieving it. Education (learning) is seen as a critical component of most resilience building strategies. For example, the Hyogo Framework for Action (International Strategy for Disaster Reduction, 2005) was an outcome of the 2005 World Conference on Disaster Reduction held in Kobe, Japan. One of its five priorities for action is using "knowledge, innovation and education to build a culture of safety and resilience".

In summary, there is an urgent need to not only examine current community disaster education practices based on education theory and practice, but also to align them to the broader goal of disaster resilience.

## **Theory and Method**

The challenge for an examination of what could be appropriate and effective disaster resilience education is unravelling the complexities of the relevant disaster research. Preston (2012, p.1) notes that "the disciplinary boundaries of disaster education are fluid and the literature on the topic can be found within the sociology of disasters, public health and health promotion, humanitarian response, political communication and public relations". 'Normal' confirmatory research used regularly in emergency management will struggle with this type of complex strategic and conceptual examination.

Exploratory research – heavily used in marketing and the social sciences – was identified as an appropriate research approach for this examination. According to Davies (2006, p.1), "Exploratory research is a methodological approach that is primarily concerned with discovery and with generating or building theory. In a pure sense, all research is exploratory. In the social sciences exploratory research is wedded to the notion of exploration and the researcher as explorer". Two of its main uses are to "gain additional insights before an approach can be developed" and to "isolate key variables and relationships for further examination" (Bhatia, 2010).

Exploratory research is by its very nature inter-disciplinary, and as required in this examination, should freely cast across the different social sciences. "It is precisely by adopting, comparing, and trying out a linguistic, ethnographic, anthropological, geographical, sociological, economical, or political science gaze that a new insight can emerge and rich exploration can occur" (Reiter, 2013 p. 15).

Although exploratory research is more unstructured than confirmatory research, it still requires a general framework for focus – in this case into disaster resilience learning. The main academic fields for this research were the disaster-related social sciences – education, psychology and sociology – along with disaster management itself. The exploration was

confined to a review of secondary data (e.g. papers, reports, websites) across these academic fields.

The exploration was divided into the two components of disaster education programs: content and process. These components are interlinked to design a learning program or activity.

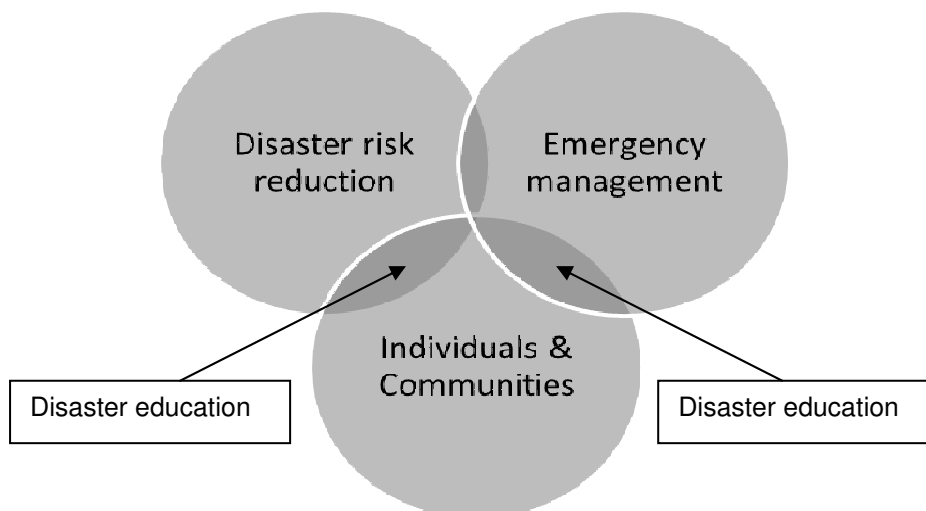
### Content

For ‘content’, exploration was conducted in relation to what should be included in disaster resilience education for before, during and after an emergency or disaster. It concentrated on the nexus between disaster risk reduction, emergency management and the dynamics of affected communities (although there are other factors involved e.g. governance, institutions). This strategic relationship is supported by the Australian National Climate Change Adaptation Research Plan for Emergency Management (Pearce et al, 2009, p. 4) which states that “When natural disasters occur, the consequences of damage and loss are a function of the effectiveness of the disaster mitigation strategies that have been implemented, the activities of the emergency services, and the resilience of the communities and economic sectors affected”.

Based on this relationship, as shown in Figure 1 (before a disaster), disaster education is located at the interfaces between both disaster risk reduction and emergency management, and the affected individuals and communities. Disaster education is thus a learning conduit between the organisations responsible for disaster risk reduction and emergency management and affected individuals/communities.

Prior to a disaster, the aim of disaster risk reduction is to reduce the risk to people and property. During and immediately after a disaster, emergency management works with individuals and communities within the ‘residual risk’ after disaster risk reduction interventions. For those hazards that are sudden (e.g. earthquakes, terrorist attacks), the disaster learning may largely be derived from warning and other communications immediately after the event. On the other hand, there is opportunity for a range of disaster education activities to be used if there is a long warning time and/or duration of the event (e.g. riverine floods, ‘campaign’ bushfires/wildfires).

Figure 1: Research framework for the exploration of disaster resilience education content (before a disaster)



After a disaster, individuals rely largely on economic support (e.g. insurance, humanitarian aid), ongoing assistance from emergency organisations, and from others in their communities. Learning in this relationship helps in the recovery phase to return individuals and communities to normal functioning (a key measure of resilience).

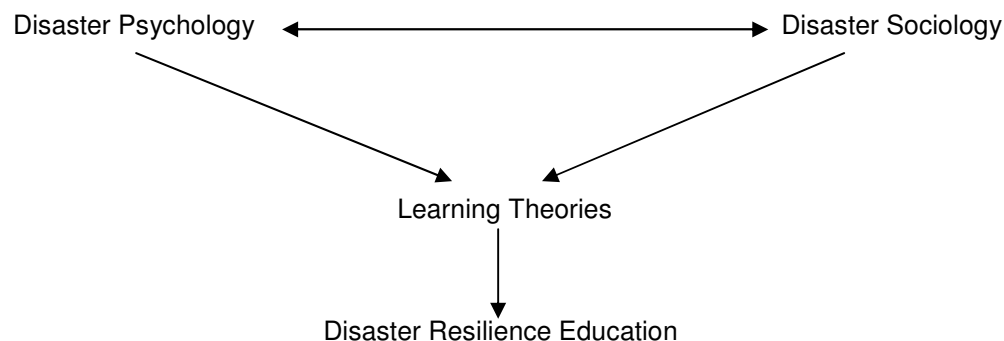
## Process

For the ‘process’ component of the research, exploration was conducted across the robust academic fields of disaster psychology and sociology which were then related to learning theory to identify potential ways in which people may best learn. This research framework is shown in Figure 2.

Central to this exploration of appropriate and potentially effective disaster resilience learning processes is ‘learning theory’ which is derived mainly from education psychology. Theories about human learning can be grouped into four broad ‘domains’. They are:

1. Behaviourism - focus on observable behaviour
2. Cognitive - learning as purely a mental/ neurological process
3. Affective - emotions and affect play a role in learning
4. Social - humans learn best in group activities.

Figure 2: Research framework for the exploration of disaster resilience education process



## **Results**

### Content

The exploration into the content component of disaster resilience learning found that if disaster education provided by emergency agencies is to help build disaster resilience through learning then it needs to not only be geared to public safety and reducing risks to property, but also to attaining an efficient recovery to ‘bounce back’ through the post-disaster relationships.

Furthermore, to help with a ‘bounce forward’ approach to building disaster resilience, learning should also be obtained by post-disaster evaluation conducted not only by agencies (e.g. after action reviews) but also with impacted communities (e.g. community de-brief meetings, resilience forums, webinars).

For weather-related hazards (e.g. flood, heatwave, drought, wildfire/bushfire), learning related to climate change adaptation should be added, as it will impact on the other content. An example of a program that couples climate change adaptation learning with public safety and risk mitigation learning is described by Stevens et al (2012).

The exploration also found that the learning content of disaster resilience education plans and programs should include both learning in response to the ‘hazard’, plus that related to the ‘host’: the at-risk people, organisations and communities.

Even though there have been great improvements (including technological) in disaster risk reduction and emergency management over the past decade, there has been no change in the general trend of increasing global disaster costs (Centre for Research on the Epidemiology of Disasters, 2012). This trend can be partly attributed to climate change, but human and societal factors appear to be a main cause (Haque and Etkin, 2012).

The idea of disasters being related to social systems is not new. In 1975, White and Haas published a pioneering report on the United States' ability to withstand and respond to natural disasters. They found that research on disasters was dominated by physical scientists and engineers; little attempt had been made to tap the social sciences to better understand the economic, social and political ramifications of extreme natural events. Hewitt (1983) suggested that too much causality was attributed to the geophysical processes: everyday societal forces and patterns of living play a great role.

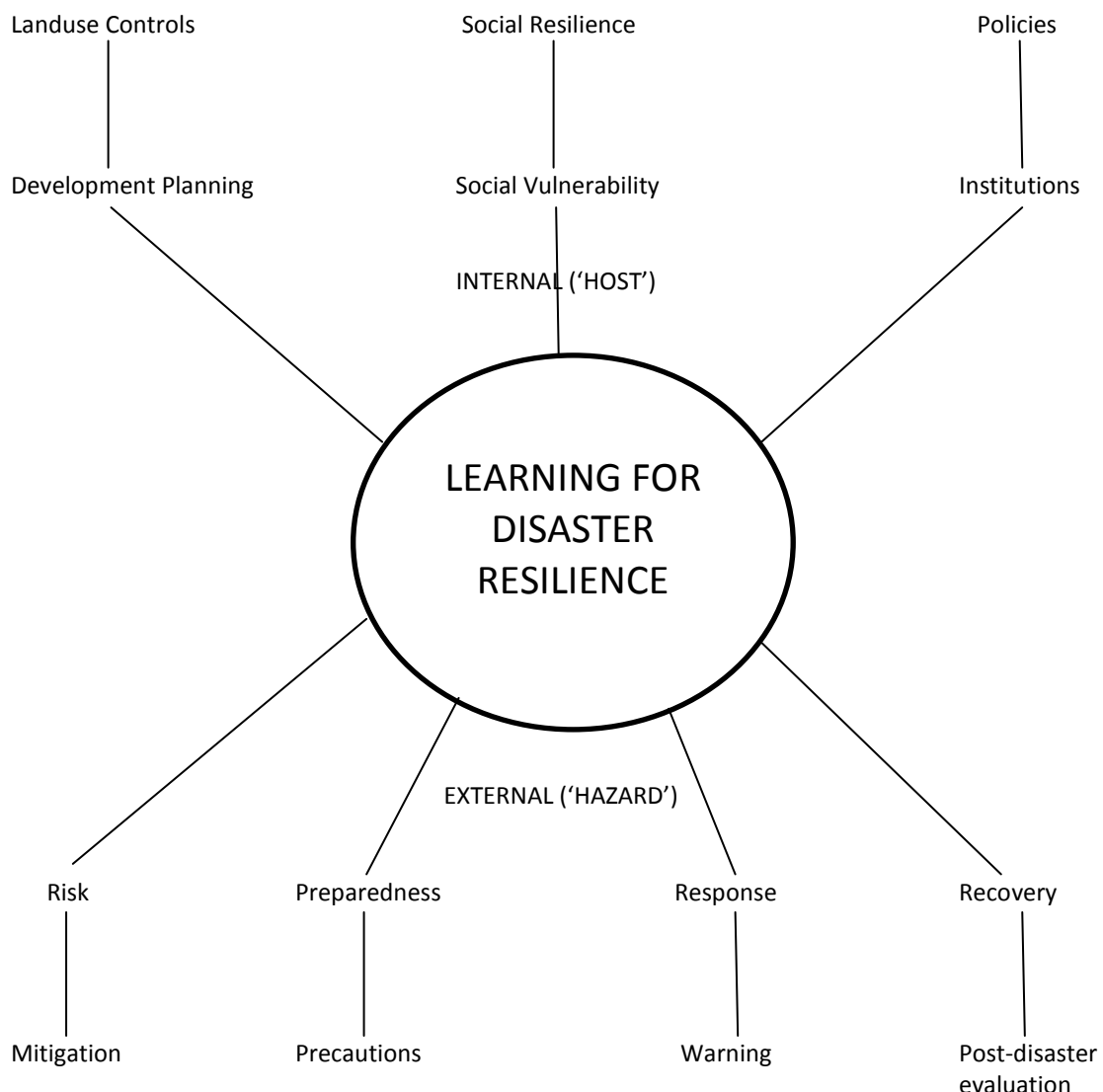
It therefore appears that people, organisations and their communities need to not only learn how to resist and recover from the hazard, but also to reflect on and learn ways to improve their social fabric ready for future disasters.

The research (see also Dufty, 2013b) found that this introspective societal learning should be conducted at least across three broad areas:

1. Urban planning and landuse controls
2. Social vulnerability and resilience (including capacity-building)
3. Institutions and policies.

A summary of the potential content of disaster resilience learning resulting from the exploration is provided in Figure 3.

Figure 3: Suggested main learning content areas for disaster resilience learning



## Process

The exploration into the process component of disaster resilience learning identified eight main learning theories and teaching approaches (or pedagogies) that are related to disaster psychology and sociology. These, along with examples of relevant learning activities, are summarised in Table 1.

Table 1: Summary of relevant disaster resilience learning theories and activities

<b>Learning domains</b>	<b>Theory/Pedagogy</b>	<b>Relevance</b>	<b>Learning activities</b>
Behavioural	Programmed instruction	Rehearsing behaviours required prior to a disaster	Drilling, exercising, training
Cognitive	Information processing	Disaster information needs to be processed to trigger appropriate behaviours	Warning messages, social media, media releases, signage, crowdsourcing
	Gestalt	Risk perception, decision-making, attention, memory and problem-solving are all important requirements for appropriate disaster behaviours	Awareness-raising documents and web sites (e.g. risk, preparedness actions), role plays related to disaster scenarios, maps
	Constructivist	People construct learning from disaster information and experience	Oral histories, social media, diaries, personal research
Affective	Experiential	Prior or learned experience is an important factor in people's disaster preparedness and resilience	Gaming, simulations, virtual reality training, exercising
	Social and emotional	Emotional factors play an important part in people's preparedness and resilience	Workshops, social and emotional learning programs in schools, resilient therapy, social media, counselling
	Transformational	People may need to change to prepare appropriately for future disasters	Role playing, disaster case studies, mind exploration, critical reflection
Social	Situated learning/communities of practice	Social capital has been shown to be a major factor in community resilience	Social media, post-disaster community meetings, resilience forums, community engagement

## **Discussion**

According to Reiter (2013, p. 8), “exploratory studies allow us to think, not just to measure; to use our imagination, experience, insight, and skill to propose new and innovative ways to understand and interpret reality”. This has been attempted in this research to help scope a possible new approach to disaster education called ‘Learning for Disaster Resilience’ (LfDR) (Dufty, 2012). However, a weakness of exploratory research is that it provides no definitive answers; thus, the research results described above require further confirmatory research and testing.

With that limitation acknowledged, there are several potential implications of this research for emergency agencies and other organisations involved in emergency management.

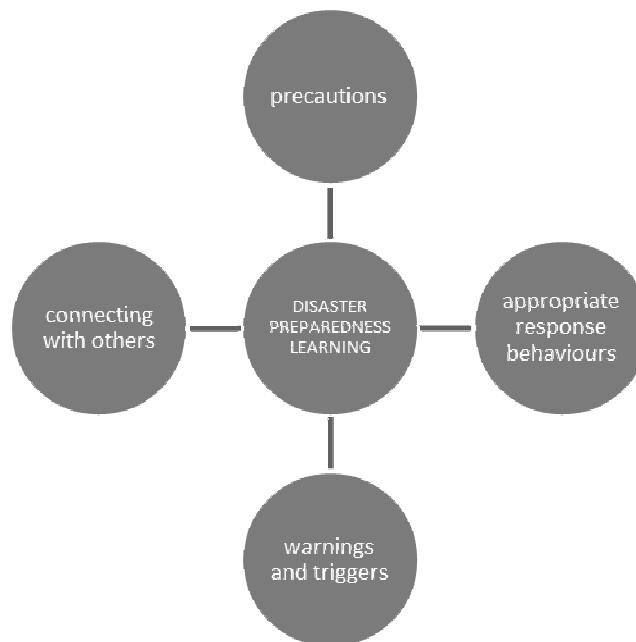


The research found that LfDR content should not only cover preparedness aspects, but also learning about improving recovery for people, organisations (e.g. businesses) and communities. It found that disaster resilience learning should also involve learning about the community itself, including how to reduce vulnerabilities and strengthen resilience by capacity building (e.g. social capital formation).

In relation to Figure 3, all LfDR content should be planned prior to a disaster (as far as possible). However, climate change adaptation learning (if relevant), disaster risk learning and disaster preparedness learning should be implemented before an event; disaster response learning during and immediately after an event; and, disaster recovery learning and post-disaster evaluation learning after an event. The introspective societal learning should be conducted prior to and soon after a disaster (as part of post-disaster evaluation).

Figure 3 enables specific LfDR content to be scoped for each potentially impacted community to help build disaster resilience. This can be achieved by unpacking the learning content segments from Figure 3. For example, the disaster preparedness learning segment in Figure 3 could be unpacked to provide the content shown in Figure 4.

Figure 4: Possible unpacking of disaster preparedness learning



The other part of the exploratory research involved looking at disaster resilience learning process. Opportunities for disaster resilience learning were identified in four broad learning domains – behavioural, cognitive, affective and social.

An observation from the exploration is that emergency agencies tend to rely primarily on information provision in relation to other opportunities (refer to Table 1). This may limit effective learning due to the possible lack of people’s motivation to seek disaster information and the one-dimensional, top-down manner in which it is delivered. The implication of this is that emergency managers should utilise a variety of learning activities including across those listed in Table 1.

Also, there has been a large amount written about the role of social media in emergency management (e.g. White, 2012; Gupta and Brooks, 2013). Table 1 supports the use of social media by identifying its potential to assist widely across three of the broad domains of disaster learning – cognitive, affective and social.

Finally, this exploratory research provides possible 'palettes' of content and process that can be used when designing local LfDR plans, programs and activities. Other factors should be then considered (e.g. community demographics, hazard risks, people's preferred ways of learning, learner profiles) to design tailored plans, programs and activities for communities.

## Conclusion

This paper is a first attempt to explore and scope the content and learning processes that could be used in the LfDR approach as a refinement of, and extension to, current disaster ECE practices.

The research found that disaster resilience learning content should not only cover public safety aspects, but also learning about improving recovery for people, organisations (e.g. businesses) and communities. It found that disaster resilience learning should also include learning about the community itself, including how to reduce vulnerabilities and strengthen resilience by capacity building (e.g. social capital formation).

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## **Author Biography**

Neil Dufty is a Principal at Molino Stewart, an environment and natural hazards consultancy based in Parramatta, NSW, Australia. Neil is a qualified earth scientist and educator, and has over 35 years of experience in education research, practice and evaluation. Over the past decade, Neil has researched, designed and evaluated disaster education plans and programs for numerous clients across Australia including the Victoria State Emergency Service, the New South Wales State Emergency Service and the Australian Bureau of Meteorology. Neil has also been regularly engaged to research other aspects of disaster management and resilience-building including community warning systems and climate change adaptation.