

Disaster Education in Australian Schools

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Abstract

Australia regularly suffers floods, droughts, bushfires and cyclones, which are predicted to increase and/or intensify in the future due to climate change. While school-aged children are among the most vulnerable to natural disasters, they can be empowered through education to prepare for and respond to disasters. School disaster education is essential to raise awareness among students and their communities and to encourage preparedness action. However, evaluation of Australian school-based disaster education programs has been limited. This article presents the results of a critical literature review of peer-reviewed publications on disaster education programs in Australian schools conducted through Scopus, A Plus, PsycINFO and the Education Resources Information Center (ERIC) databases. Results highlight a significant dearth of studies examining disaster education programs in Australian schools. Recommendations for future research are proposed to bridge knowledge gaps and establish disaster preparedness resources that support children's knowledge and preparedness for disasters.

Disasters are commonly thought of as events that cause significant loss of life, damage and hardship across communities, although actual definitions of disasters vary (Quarantelli, 1998). Australia is characterised by frequent natural disasters of varying type, including flood, cyclone, drought and fire, which have been broadly increasing in frequency since reliable records began (Council of Australian Governments, 2004). In Australia and elsewhere, the frequency and intensity of natural disasters is thought to be affected by climate change. For example, a 2007 Working Group of the IPCC predicted with high confidence that there would be an increase in intensity and frequency of heat-waves and fires as well as floods, landslides, droughts and storm surges in Australia and New Zealand in the 21st century (Hennessy et al., 2007), a prediction confirmed more recently by the Commonwealth Scientific Industrial Research Organisation (CSIRO, 2011).

While disasters may cause significant hardship, damage and loss of life, the impact of a disaster depends not only on the type of disaster itself but also on the exposure and vulnerability of the individuals and communities involved (Fothergill & Peek, 2004). Research has indicated that children are among the most vulnerable to natural

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disasters (Wisner, Blaikie, Cannon, & Davis, 2004). For example, upon conducting a review of 160 studies of disaster victims worldwide, Norris, Friedman, Watson, Byrne, and Kaniasty (2002) concluded that children experience the adverse effects of disasters much more than adults and the elderly. The ongoing impact of disasters in Australia is evident in the Kinglake Ranges in Victoria. More than 4 years after their experience of the 2009 Black Saturday Bushfires, 'The Smouldering Stump Campaign' was established for the ongoing needs of children. The campaign launch brochure states 'Children and young people continue to struggle with maintaining "normal routines", and parents are exhausted and overwhelmed with the issues that face their children' (Smouldering Stump, 2013). The reasons for this are not clear. However, research has indicated that children tend to rank hazardous events, including natural disasters, as one of their major fears, even prior to a disaster occurring (e.g., Campbell & Gilmore, 2006; Ollendick, King, & Frary, 1989). Some children have even experienced problems following relatively slight hazardous events, such as those where life is not disrupted in a significant manner and there is no loss of life (Ronan, 1997a, 1997b; Ronan & Johnston, 1999). Consequently, researchers have postulated that children's vulnerability to hazardous events occurs in part because it is the realisation of one of their worst fears.

Despite their fears around disasters, children can be empowered to prepare for and respond to disasters via various means, including through school-based disaster education programs (Back, Cameron, & Tanner, 2009; Ronan, Crellin, & Johnston, 2012). As a result, children can become more resilient to disasters. Resilience has been variously defined depending on the level of analysis, which may be the individual, community or ecological system. Most definitions incorporate a stressor and the notion of adaptation, and a speedy return to pre-stressor levels of functioning (Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008). Bonanno (2004) defines individual resilience as a person's capacity to maintain overall healthy, stable functioning following stressful life events. From the perspective of communities, Norris et al. (2008) refer to the ability of communities to withstand hazards and/or recover from disasters.

Attention to the needs of children and youth before, during and after a disaster is imperative, whether considering emergency management or broader sustainability perspectives. A thorough, recent review of Australian emergency management plans (Davie, 2013) showed that emergency management planners assume that parents, primary caregivers and the education system will take care of the needs of children in emergencies and disasters in Australia. This is clearly apparent in emergency management plans that refer to schools as being charged with the responsibility of evacuating children and with their welfare in emergency recovery. It is also evident more generally in the lack of specific planning for children in emergency management plans (Davie, 2013).

The role of schools in preparing children to face disasters is a critical one. Peek (2008) suggested that children's vulnerability is reduced when they are provided with information and resources, are encouraged to participate in disaster preparedness and response activities, and can access personal and communal support. Children's participation in disaster risk reduction not only builds their resilience to disaster but can also provide benefits for the community as a whole. For example, during the 2004 tsunami disaster in southern Thailand, children played significant roles in assisting their families and communities both during the event and through the aftermath and recovery period (Vanaspongse, Ratanachena, Rattanapan, Chutong, & Intraraksa 2007). Children helped adults in temporary shelters, looked after younger children, comforted friends who had lost their families, helped in the clean-up and did housework (Vanaspongse et al., 2007). The example of a British schoolgirl in the 2004 tsunami is particularly salient; having recently learned about tsunamis in class, she was able to

warn and therefore save a beach full of foreign tourists in Thailand (Back et al., 2009). Other studies support the conclusion drawn from this example that children can act to minimise risks; for instance, by working as interpreters and relaying messages to households and communities (Mitchell, Haynes, Hall, Wei, & Oven, 2008). Similarly, a study in Mozambique showed that, through participatory processes, children gained a greater knowledge and understanding of risks and began to minimise those risks within their household and at the community level (Back et al., 2009). These studies support an approach to disaster risk reduction that encourages the agency of children and youth, to work toward making their lives safer and their communities more resilient to disasters.

Back et al. (2009) suggest that investing in child-centred disaster risk reduction is important because learning and practising disaster risk reduction while young embeds changed behaviour that can be integrated into adult life. This is of particular significance in light of research that suggests that disaster preparedness rates among adults and children are often low, even in high-hazard areas (e.g., Paton & Johnston, 2001; Peek & Mileti, 2002; Whitney, Lindell, & Nguyen, 2004). For example, in an Australian study, Berry and King (1998) examined the tropical cyclone awareness and preparedness of far north Queensland school students. They found that the students had little understanding of cyclone preparedness, including the roles and responsibilities of all community members and the expectations of them in times of disaster.

Internationally, school disaster education is considered to be important to raise knowledge and awareness among students and their families and, most importantly, to encourage preparedness action (Back et al., 2009; Friedman, Rose, & Koskan, 2011; Jimerson, Brock, & Pletcher, 2005; Ronan et al., 2012). The empowerment of children to face disasters therefore has far-reaching consequences in the spheres of emergency management and sustainability. However, empirical evaluation of school-based disaster education programs has been limited. Most studies on school-based education programs have relied on cross-sectional, correlational research designs to evaluate their effectiveness (e.g., Ronan & Johnston, 2001; Shaw, Shiwaku, Kobayashi, & Kobayashi, 2004). More recent research has sought to employ quasi-experimental methodology. In 2003, Ronan and Johnston conducted a study in Auckland, New Zealand using a quasi-experimental methodology, which found that hazards education programs led to changes in knowledge, preparedness, and indicators of emotional resilience. Building on their earlier research, Ronan et al. (2012) conducted a quasi-experimental study in Napier, New Zealand, to show that following a brief school education program supplementing a larger community-wide effort, children reported significant gains in preparedness indicators, including increased knowledge as well as increases in physical and psychosocial preparedness.

In Australia, disaster-based education has been repeatedly called to be implemented in schools. For example, the National Inquiry on Bushfire Mitigation and Management asserted that it was the responsibility of all governments to jointly develop and implement national and regionally relevant education programs about bushfire (Ellis, Kanowski, & Whelan, 2004). The Australian National Curriculum (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2013) contains three cross-curricular priorities that underpin its rationale. One of these, sustainability, is designed to:

... allow young Australians to develop the knowledge, skills, values and world views necessary for them to act in ways that contribute to more sustainable patterns of living. It will enable individuals and communities to reflect on ways of interpreting and engaging with the world. The sustainability priority is futures-oriented, focusing on protecting environments and creating a more ecologically

and socially just world through informed action. Actions that support more sustainable patterns of living require consideration of environmental, social, cultural and economic systems and their interdependence. (ACARA, 2013, p. 18)

Supporting the cross-curricular priority of the Australian National Curriculum, disaster education is also currently part of the Australian Curriculum in Years 6, 7 and 8, as well as in Senior Secondary Geography; and disaster programs have been developed by emergency management authorities for distribution in schools (Dufty, 2009). In his review of emergency management programs in Australian schools, Dufty (2009) reported that an animated 'Flood Investigator' program was developed by Melbourne Water and was supported with lesson outlines, teacher's notes and worksheets. Similarly, 'The Floods and You' program in Tasmania included lessons for primary school students. Other programs noted by Dufty (2009) included one for high school geography students developed by Wollongong City Council in New South Wales. All the state and territory government websites in Australia name various bodies as being responsible for disaster education of school students (Davie, 2013). The Disaster Resilience Education for Schools website — <http://schools.aemi.edu.au> — is a curriculum-aligned resource for teachers and students that contains publications and interactive learning games designed to prepare children for emergencies. Nonetheless, empirical evaluation of the effectiveness of these programs in building student and family response to and recovery from disasters has remained minimal (Dufty, 2009).

Purpose of the Literature Review

The purpose of this critical literature review was to examine the body of peer-reviewed literature published in the English language addressing disaster/hazards education programs delivered in Australian schools. Specifically, we sought to gather evidence to develop a framework for future research designed to guide the development and implementation of effective disaster/hazards education programs for Australian schools in the context of predicted increased frequencies and intensities of weather-induced disasters due to climate change. The aim of this review was to map the existing research studies that have been undertaken in Australia on this topic, highlight the key findings of the research and identify any gaps in the available evidence.

Methods

The literature review focused exclusively upon peer-reviewed literature that was published in English and was designed to be as broad and as inclusive as possible. Four databases were searched: SciVerse Scopus using Scirus (Elsevier, Amsterdam), A + education using the Informit search engine (RMIT, Melbourne), PsycINFO and the Education Resources Information Center (ERIC), using the CSA Illumina search engine (ProQuest, Ann Arbor, MI). These databases were selected based on the relevance of their content to the focus of the literature review.

A list of all search terms expected to exhaustively cover the articles was generated by the authors, based on their salience to the subject matter and the background research that had been previously undertaken (Boon, 2011; Pagliano, 2012). Three search terms were entered into the database search engines at any one time and were employed either as a full text search or in all fields. Where a large number of citations was obtained, a further search was employed using the same search terms but limiting the search to the abstract, title and keywords. Substitutes were employed among the keywords in order to capture the breadth of articles available; for example, 'disaster' was substituted for 'natural hazard' or 'hazard'. The keywords used were: Group A:

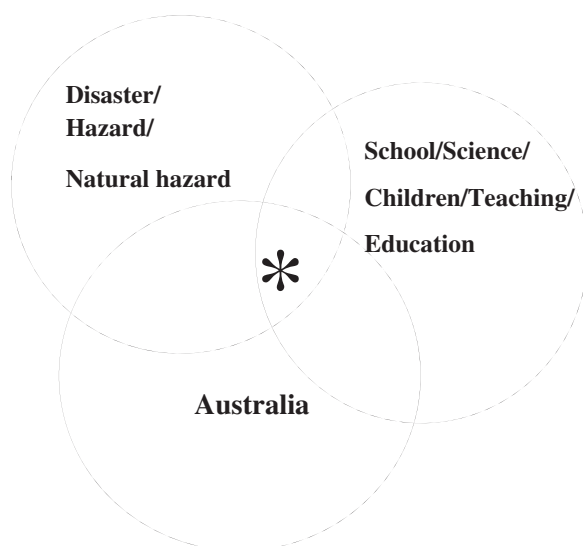


FIGURE 1: The 'Exact Match' search intersection (*).

disaster or natural hazard or hazard; Group B: education or school or science or children or teaching; Group C: Australia.

Search Execution and Article Screening

The research was undertaken in May, June and August 2013. The search result of primary interest was the intersection of the three search subsets marked with an asterisk (see Figure 1).

The citations for all of the articles identified by the intersection of the three search subsets ('Exact match') were distributed among two of the authors, who independently reviewed each title to determine the article's potential relevance to the research question. Authors were blinded to each other's appraisal. Those titles for which both reviewers indicated a lack of relevance were excluded. For the remaining citations, the study abstracts were obtained, with the process of independent, blinded review repeated. Again, studies were only excluded if both reviewers indicated a lack of relevance. Finally, the full manuscripts for the retained citations were reviewed using a data collection sheet to further screen and characterise the article, and to extract relevant information about each study.

A similar process was undertaken to screen citations identified by the intersection of any two of the three search terms ('Near match'). The titles of these articles were again checked by two authors independently reviewing each title to determine the article's relevance to the research question. If either reviewer identified a title for inclusion or further review, the abstract for that study was obtained with the process of independent blinded review by two authors repeated. Again, studies were only excluded if both reviewing study team members indicated a lack of relevance. In summary, citations for all the articles were reviewed to determine each article's potential relevance to the research question. Where articles were deemed to be relevant, the abstract was obtained and reviewed. Finally, the full manuscripts for the retained citations were reviewed to extract relevant information about each study. We used content analysis to interpret each relevant article. This process involves several steps: (1) close reading of the text, (2) relevant coding of subject matter within the text, (3) categorising the

TABLE 1: Searches of Online Databases

Search terms	A Plus Education (search in all fields but not full text)	PSYCInfo (search in all fields)	SCOPUS (search in all fields)	SCOPUS (search in abstract, title and keyword)	ERIC (search in all fields)
disaster AND education AND Australia	19	35	2,143	101	34
disaster AND teaching AND Australia	9	11	558	12	8
disaster AND children AND Australia	2	70	2,289	77	6
disaster AND science AND Australia	6	104	8,598	67	7
disaster AND school AND Australia	12	166	4,510	28	13
hazard AND education AND Australia	10	52	4,613	258	36
hazard AND teaching AND Australia	5	7	1027	37	4
hazard AND children AND Australia	1	51	6,310	313	11
hazard AND science AND Australia	2	190	23,881	188	10
hazard AND school AND Australia	6	215	11,858	116	16
natural hazard AND education AND Australia	0	2	332	-	1
natural hazard AND teaching AND Australia	0	0	39	-	0
natural hazard AND children AND Australia	0	3	150	-	0
natural hazard AND science AND Australia	0	14	2,699	12	0
natural hazard AND school AND Australia	0	11	919	2	0
Total number of citations	72	931	69,926	14	146

codes, and (4) the generation of appropriate frameworks or models from the gathered data. Our purpose was to inductively derive a framework from the ground up for future research pertinent to the study area.

Results

The searches of the four online databases generated 71,075 citations (Table 1). This number of citations was based upon searches of the databases using either all fields or full text. Where a particular search generated a large number of citations, a further

search was performed using the same keywords but limiting the search areas to the abstract, title and keywords. This reduced the total number of citations to 2,881.

After reviewing the citations and abstracts as described above, a shortlist of 35 relevant articles was obtained.

The results indicate a paucity of research on school-based disaster education in the Australian context, precluding our purpose to develop a framework for future research and analysis. Only three of the shortlisted thirty-five papers had direct relevance to school-based disaster education in Australia. For example, in 2003, the Australian Geography Teachers Association 'mapped' the teaching and learning of hazards or disasters (Kriewaldt et al., 2003). This study indicated that curriculum frameworks in each state and territory had common elements, with education being mainly present in Years 5–6 and more comprehensively in Years 7–10. Hazard or disaster education was evident, particularly in the 'Studies of Society and Environment (SOSE) — Human Society and Its Environment (HSIE)' in New South Wales. In the SOSE geography strand, it was found in 'Place, Space and Environment' in South Australia, 'Place and Space' in Western Australia, and, in the optional Queensland geography syllabus, the strand was 'Place and Space'. However, this research has not been updated in light of the National Curriculum changes that are taking place across Australia. Moreover, research had not been conducted to determine whether the aforementioned programs were effective in increasing knowledge and awareness among children and/or to encourage disaster preparedness.

In 2003, Anderson-Berry indicated that Queensland primary school students were utilising a computer-based educational game called *Stormwatchers*, which provided cyclone awareness education. However, this program had not been formally evaluated for effectiveness.

More recently, Dufty (2009) prepared a paper that sought to determine how school-based disaster education programs could be made more effective in Australia. In that paper, Dufty discussed the importance of school-based education programs in building disaster resilience. Dufty noted that most emergency management authorities in Australia have developed and implemented education programs through schools, although there was a dearth of research evaluating the effectiveness of these programs. Within this context, Dufty described important theoretical considerations in designing school-based education programs, including understanding how young people learn about hazards at different ages.

Conclusion

The results of the literature review indicate that there is very little published material on disaster programs run in Australian schools. While this does not confirm or imply the absence of materials in schools on disaster programs, it nonetheless shows that such programs are not being given adequate consideration within the research setting.

It is noted that this research was limited to an internet-based search of peer-reviewed research publications. It would be interesting to extend this research by undertaking qualitative research with school and disaster personnel across Australian states and territories to understand what programs are being run in schools, by whom, and whether any formal or informal evaluation of these programs is being undertaken. Nonetheless, the implications of this literature review, given the paucity of published peer-reviewed evidence of programs addressing disaster or hazards education in Australian schools, is that there is a need for formal and robust examination and evaluation of school-based disaster education curricula in Australia and their effectiveness.

Children and youth are vulnerable to disasters occurring in the particular physical environment in which they live. They might reside in an earthquake-, flood-, bushfire-

or cyclone-prone region but are rarely involved in school decision making, at local, state or federal levels, and have scant influence on curriculum. This lack of influence over what material is taught and how it is presented could foster a sense of apathy towards materials included in disaster education programs. Worse, poorly taught or presented disaster education programs might have adverse effects upon students by increasing their fears and anxiety. While we found no published studies reporting adverse effects of disaster education programs, it has been shown that children exposed to media disaster information have subsequently believed that they were more vulnerable to such events than was statistically likely to be the case (Comer, Furr, Beidas, Babyar, & Kendall, 2008). It is therefore important that educators are trained to present disaster education programs in a manner that is appropriate to the age of their students. This can be best achieved through formal evaluations of these programs. One such evaluation took place in Nepal (Shiwaku, Shaw, Kandel, Shrestha, & Dixit, 2007). The National Society for Earthquake Technology — Nepal conducted a survey to identify factors that enhanced students' awareness and promoted action for disaster mitigation (Shiwaku et al., 2007). Results indicated that school disaster education in Nepal was lecture based and primarily served to raise risk perception, with less attention placed on how to implement pre-disaster measures for disaster reduction. This study suggested that disaster education in schools should include practical activities based on local community features, active learning processes and activities that are based on engagement with the local community, taking into consideration the age appropriateness of those activities, and we would add, the inherent anxiety of the students as this can have a significant impact on the effectiveness of such programs. As Anderson (2005) noted in his call for research on children and disasters, educating children about disasters could pay dividends beyond youth preparedness. Given their connection to the school system, children could potentially serve as an effective way to communicate disaster mitigation, preparedness, response, and recovery information to their parents, particularly since research has suggested that higher levels of, for example, earthquake preparedness is positively correlated with the presence of children in the home (Turner, Nigg, & Paz, 1986).

Disaster preparedness is critical in Australia, particularly with the increased threat of natural disasters that climate change portends. Government inquiries have repeatedly called for school-based disaster education for children following the devastation that has occurred when disasters such as bushfires strike Australia. Disaster-based education is also embedded in the National Curriculum. Understanding whether the programs administered within schools are effective in raising knowledge and awareness about disasters among children is an important component in the delivery of these programs. Such an evaluation should also incorporate an understanding of the different developmental stages of children and how this may impact their ability to absorb and apply disaster-related information. Research in other countries has supported the benefits that may ensue from successfully delivering disaster risk reduction programs to children, not only for increasing children's agency, but also in building community resilience to disasters.

Keywords disaster education, school children, Australia, natural hazards, sustainability

References

- Australian Curriculum, Assessment and Reporting Authority (ACARA). (2013). *The Australian Curriculum*. Retrieved October 15, 2013, from www.acara.edu.au/curriculum.html

- Anderson, W.A. (2005). Bringing the children into focus on the social science disaster research agenda. *International Journal of Mass Emergencies and Disasters*, 23, 59–175.
- Anderson-Berry, L. (2003). Community vulnerability to tropical cyclones: Cairns, 1996–2000. *Natural Hazards*, 30, 209–232.
- Boon, H.J. (2011). School disaster planning for children with disabilities: A critical review of the literature. *International Journal of Special Education*, 26, 223–237.
- Back, E., Cameron, C., & Tanner, T. (2009). *Children and disaster risk reduction: Taking stock and moving forward* (Children in a Changing Climate Coalition Research Paper). Brighton, UK: Institute of Development Studies.
- Berry, L., & King, D. (1998). Tropical cyclone awareness and education issues for far north Queensland school students. *The Australian Journal of Emergency Management*, 14, 25–30.
- Bonanno, G. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist*, 59, 20–22.
- Campbell, M., & Gilmore, L. (2006). Children's fears post September 11. In *Proceedings of the 2006 Joint Conference of the Australian Psychological Society and the New Zealand Psychological Society* (pp. 55–59). Auckland, New Zealand: The Australian Psychological Association.
- Council of Australian Governments. (2004). *Natural disasters in Australia. Reforming mitigation, relief and recovery arrangements. A report to the Council of Australian Governments by a high level officials' group, August 2002*. Canberra, Australia: Department of Transport and Regional Services.
- Comer, J.S., Furr, J.M., Beidas, R.S., Babyar, H.M., & Kendall, P.C. (2008). Media use and children's perceptions of societal threat and personal vulnerability. *Journal of Clinical Child & Adolescent Psychology*, 37, 622–630.
- CSIRO. (2011). *Climate change will continue worldwide*. Melbourne, Australia: Author. Retrieved July 15, 2013, from <http://http://www.csiro.au/Outcomes/Climate/Understanding/Climate-Change-Continues.aspx>
- Davie, S. (2013). *Don't leave me alone. Protecting children in Australian disasters and emergencies: Government report card on emergency management planning*. Melbourne, Australia: Save the Children. Retrieved from http://www.savethechildren.org.au/_data/assets/pdf_file/0019/7921/301013_Dont_Leave_Me_Alone.pdf
- Dufty, N. (2009). Natural hazards education in Australian schools: How can we make it more effective? *The Australian Journal of Emergency Management*, 24, 13–16.
- Ellis, S., Kanowski, P., & Whelan, R. (2004). *National inquiry on bushfire mitigation and management*. Canberra, Australia: Commonwealth of Australia.
- Fothergill, A., & Peek, L. (2004). Poverty and disasters in the United States: A review of recent sociological findings. *Natural Hazards*, 32, 89–110.
- Friedman, D., Rose, I., & Koskan, A. (2011). Pilot assessment of an experiential disaster communication curriculum. *Disaster Prevention and Management*, 20, 238–250.
- Hennessy, K., Fitzharris, B., Bates, B., Harvey, N., Howden, S., Hughes, L., Salinger, J., & Warrick, R. (2007). Australia and New Zealand: Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. In M. Parry, O. Canziani, J. Palutikof, P. van der Linden, & C. Hanson (Eds.), *Climate change 2007: Impacts, adaptation and vulnerability* (pp. 507–540). Cambridge: Cambridge University Press.
- Jimerson, S., Brock, S., & Pletcher, S. (2005). An Integrated model of school crisis preparedness and intervention: A shared foundation to facilitate international crisis intervention. *School Psychology International*, 26, 275–296.

- Kriewaldt, J., Butler, D., Doyle, D., Freeman, J., Hutchinson, N., Parkinson, S., Terry, E., & Boscato, M. (2003). Curriculum overview of hazard education in Australia. *The Geography Bulletin*, *35*, 62–65.
- Mitchell, T., Haynes, K., Hall, N., Wei, C., & Oven, K. (2008). The role of children and youth in communicating risk. *Children, Youth and Environments*, *18*, 254–279.
- Norris, F., Friedman, M., Watson, P., Byrne, C., & Kaniasty, K. (2002). 60,000 disaster victims speak: Part I. An empirical review of the empirical literature, 1981–2001. *Psychiatry*, *65*, 207–239.
- Norris, F., Stevens, S., Pfefferbaum, B., Wyche, K., & Pfefferbaum, R. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology*, *41*, 127–150.
- Ollendick, T., King, N., & Frary, R. (1989). Fears in children and adolescents: Reliability and generalizability across gender, age and nationality. *Behaviour Research and Therapy*, *27*, 19–26.
- Pagliano, P.J. (2012). An assessment of policies guiding school emergency disaster management for students with disabilities in Australia. *Journal of Policy and Practice in Intellectual Disabilities*, *9*, 17–26.
- Paton, D., & Johnston, D. (2001). Disasters and communities: Vulnerability, resilience and preparedness. *Disaster Prevention and Management*, *10*, 270–277.
- Peek, L. (2008). Children and disasters: Understanding vulnerability, developing capacities and promoting resilience—an introduction. *Children, Youth and Environments*, *18*, 129.
- Peek, L., & Mileti, D. (2002). The history and future of disaster research. In R. Bechtel & A. Churchman (Eds.), *Handbook of environmental psychology* (pp. 511–524). New York: Wiley.
- Quarantelli, E. (1998). *What is a disaster? Perspectives on the question*. New York: Routledge.
- Ronan, K. (1997a). The effects of a series of volcanic eruptions on emotional and behavioural functioning in children with asthma. *New Zealand Medical Journal*, *110*, 11–13.
- Ronan, K. (1997b). The effects of a 'benign' disaster: Symptoms of posttraumatic stress in children following a series of volcanic eruptions. *Australasian Journal of Disaster and Trauma Studies*, *1*. Retrieved from http://massey.ac.nz/*trauma/
- Ronan, K., Crellin, K., & Johnston, D. (2012). Community readiness for a new tsunami warning system: Quasi-experimental and benchmarking evaluation of a school education component. *Natural Hazards*, *61*, 1411–1425.
- Ronan, K., & Johnston, D. (1999). Behaviourally-based interventions for children following volcanic eruptions: an evaluation of effectiveness. *Disaster Prevention and Management*, *8*, 169–176.
- Ronan, K., & Johnston, D. (2001). Correlates of hazards education programs for youth. *Risk Analysis*, *21*, 1055–1063.
- Ronan, K., & Johnston, D. (2003). Hazards education for youth: A quasi-experimental investigation. *Risk Analysis*, *23*, 1009–1020.
- Shaw, R., Shiwaku, K., Kobayashi, H., & Kobayashi, M. (2004). Linking experience, education, perception and earthquake preparedness. *Disaster Prevention and Management*, *13*, 39–49.
- Shiwaku, K., Shaw, R., Kandel, R.C., Shrestha, R.N., & Dixit, A.M. (2007). Future perspectives of school disaster education in Nepal. *Disaster Prevention and Management*, *16*, 586–587.
- Smouldering Stump. (2013). *The Smouldering Stump campaign flyer*. Kinglake, Australia: Author.

- Turner, R.H., Nigg, J.M., & Paz, D. (1986). *Waiting for disaster: Earthquake Watch in California*. Berkeley, CA: University of California Press.
- Vanaspongse, C., Ratanachena, S., Rattanapan, J., Chutong, S., & Intraraksa, R. (2007). *Training manual child-led disaster risk reduction in schools and communities*. Bangkok: Save the Children Sweden –Southeast Asia and The Pacific Regional Office.
- Whitney, D., Lindell, M., & Nguyen, H. (2004). Earthquake beliefs and adoption of seismic hazard adjustments. *Risk Analysis*, *24*, 87–102.
- Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). *At risk: Natural hazards, people's vulnerability and disasters* (2nd ed.). New York: Routledge.

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