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Learning for disaster resilience

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Abstract *Is emergency management sufficient to build disaster resilient communities? This paper reviews current research and Australia's National Strategy for Disaster Resilience which indicates that the fields of 'disaster risk reduction' and 'community development' should be joined with 'emergency management' to form a disaster resilience-building triumvirate. Using this strategic alliance, the paper then shows how learning is a critical component of building disaster resilience through 'communities of practice'. It also investigates how people and communities learn before, during and after disasters. The paper concludes by outlining a new approach - 'Learning for Disaster Resilience' - that is designed to develop and activate 'disaster resilient learning communities' in line with the strategic triumvirate.*

Keywords: *resilience, education, engagement, communications, learning, communities*

Introduction

*I've seen fire and I've seen rain
I've seen sunny days that I thought would never end
I've seen lonely times when I could not find a friend
But I always thought that I'd see you again*

- James Taylor, 'Fire and Rain'

The above verse from the appropriately named song for this conference provides an entrée to the concept of resilience: although there might be 'ups and downs' in life, the resilient are able to return to normal functioning regardless (a liberal interpretation, especially on the last line!). And like the song, this paper is about connections between people - in this case, how communities learn to resist, recover and improve from, the impacts of disasters.

The paper investigates whether emergency management by itself is sufficient to build community disaster resilience. As a result, the paper posits that the field of 'community development' should be integrated with 'disaster risk reduction' and 'emergency management' to build disaster resilient communities. Based on this strategic alliance, it argues that 'disaster resilience learning communities' should be developed and that education, communications and engagement (ECE) programs run by emergency agencies be re-scoped and further refined to this end.

Disaster resilience

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 ten years. This has been mainly due to its importance as a factor in achieving sustainability (Dovers, 2004), its role as a strategy in climate change adaptation (Gero, Méheux and Dominey-Howes, 2010), and as a perceived future requirement for communities based on learnings from disasters such as 9/11 and Hurricane Katrina (Boin, Comfort and Demchak, 2010).

Like the term 'sustainability', 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), "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 has been 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.

This paper supports the 'bounce forward' notion based on Paton's reasoning. It defines disaster resilience as the ability of a community to not only resist and recover from a disaster, but also to adapt to the changes that the event may cause. It includes the ability of a community to learn from the disaster and to improve its networks, systems and capabilities for the next event.

Figure 1 shows theoretically what might be the difference between, in this case, a flood-resilient community and a less resilient community. Note that the y-axis is 'community functioning' – how well individuals and organisations are performing their normal functions.

As shown in Figure 1, the 'resilient community' will often experience less disaster impacts to its normal functioning, while the 'less resilient community' will experience greater impacts to the same level of flooding. It is also clear that the less resilient community will take longer to recover i.e. to return to normal functioning. Furthermore, the resilient community will most likely improve its functioning especially through learning from the flood disaster.

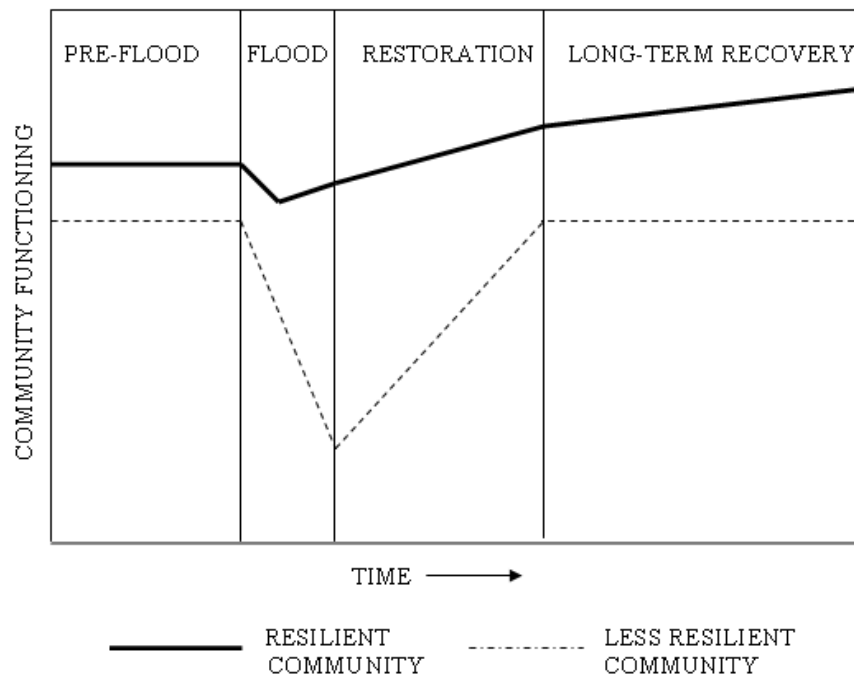


Figure 1 - Theoretical differences between a resilient and a less resilient community (modified from Mayunga, 2007)

Although the academic debate continues on what precisely disaster resilience is (and its relationship to ‘vulnerability’), governments around the world have developed strategic policies and plans that aim to guide countries toward achieving it. For example, the Hyogo Framework for Action was an outcome of the 2005 World Conference on Disaster Reduction held in Kobe, Japan. One of its five specific priorities for action was “building a culture of safety and resilience”.

In December 2009, the Council of Australian Governments (COAG) agreed to adopt a whole-of-nation, resilience-based approach to disaster management, which recognises that a national, coordinated and cooperative effort is needed to enhance Australia’s capacity to prepare for, withstand and recover from disasters. The National Emergency Management Committee subsequently developed the National Strategy for Disaster Resilience which was adopted by COAG on 13 February 2011.

The purpose of the Strategy is to “provide high-level guidance on disaster management to federal, state, territory and local governments, business and community leaders and the not-for-profit sector. While the Strategy focuses on priority areas to build disaster resilient communities across Australia, it also recognises that disaster resilience is a shared responsibility for individuals, households, businesses and communities, as well as for governments. The Strategy is the first step in a long-term, evolving process to deliver sustained behavioural

change and enduring partnerships” (Attorney-General’s Department website: www.ag.gov.au).

The Strategy (COAG, 2011) identifies seven groups of actions to build community disaster resilience in Australia.

1. Leading change and coordinating effort
2. Understanding risks
3. Communicating with and educating people about risks
4. Partnering with those who effect change
5. Empowering individuals and communities to exercise choice and take responsibility
6. Reducing risks in the built environment
7. Supporting capabilities for disaster resilience.

Disaster resilience-building fields

Is disaster and emergency management sufficient to build community disaster resilience in line with the Strategy? There is widespread recognition, particularly after recent disasters around the world, that structural and non-structural modifications related to disaster and emergency management can only provide certain levels of resilience and that the ‘residual risk’ is largely carried by the potentially impacted communities.

Analysis of the seven groups of actions identified in the Strategy suggests that a community ‘element’ is required in addition to the fields of disaster risk reduction and emergency management. For example, the actions of “communicating with and educating people about risks” and “empowering individuals and communities to exercise choice and take responsibility” call for individual and community participation. Moreover, the Strategy promotes “shared responsibility for individuals, households, businesses and governments”, thus requiring community participation to build resilience.

Recent research also supports the coupling of community-based processes (here called ‘community development’) with disaster risk reduction and emergency management. ‘Community development’ is a broad term that encompasses “the deliberate attempt by community people to work together to guide the future of their communities, and the development of a corresponding set of techniques for assisting community people in such a process” (Bennett, 1973). A more recently coined and similar process is ‘community capacity-building’.

According to CCS Strategic Management (2008), community development outcomes can include:

- People participating in social activities to overcome social isolation
- Mutual support
- Individuals developing self-esteem, confidence and assertiveness

- Increased participation in political and citizenship activities
- Heightened community satisfaction
- Increased safety and security
- More effective community satisfaction.

Psychological, sociological and education actions are required to achieve community development outcomes specifically related to building disaster resilience.

There has been extensive psychological research in the past ten years into individual aspects of disaster resilience. For example, Paton et al (2003) developed and tested a psychological model for individual preparedness that consisted of three developmental stages. Psychologists have also extensively researched and developed models for the post-disaster recovery of individuals (e.g. Whittle et al, 2010).

However, according to recent research into disaster resilient communities, not only is appropriate individual participation required, but also collective action. Several researchers (e.g. Aldrich, 2010; Chamlee-Wright, 2010) believe that the formation of 'social capital' is a critical factor in the ability of a community to quickly recover and 'bounce forward' after a disaster.

Social capital has been defined as the "networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit" (Putnam, 1995). It is generally agreed that there are three distinct forms of social capital: bonding, bridging and linking. Bonding social capital grows from organisations and activities connecting similar individuals who often live in close proximity to each other. Bridging activities and organisations, in contrast, bring together individuals from different neighbourhoods, ethnicities and races. According to Szreter and Woolcock (2004) linking social capital is composed of "norms of respect and networks of trusting relationships between people who are interacting across explicit, formal or institutionalized power or authority gradients in society". Where bridging social capital connects individuals of approximate equal social status, linking social capital connects those of unequal status, providing them with access to power.

Research into the recovery after the 2004 Indian Ocean tsunami (e.g. Aldrich, 2011a) and Hurricane Katrina (e.g. Boettke et al, 2007) has shown the benefits of social capital in providing resources for a faster and more efficient recovery. However, there were some minor negative effects found. For example, in villages in Southeast India impacted by the 2004 tsunami, although high levels of social capital reduced barriers to collective action for members of the *uur panchayats* (hamlet councils) and parish councils speeding up their recovery and connecting them to aid organisations, at the same time social capital reinforced obstacles to recovery for those outside of these organisations such as women, Dalits, migrants, and Muslims (Aldrich, 2011a).

It therefore appears that a triumvirate of disaster risk reduction, emergency management and community development (with a focus on individual psychological development and social capital formation) is required to build disaster-resilient communities. This is strongly supported by Aldrich (2011b) who states, “Rather than imagining that disaster mitigation and recovery are functions of characteristics external to the community – such as aid provided by the government or nongovernmental organizations, the amount of damage from the crisis, or the competency of local and national political leaders – scholars should recognize that the level of connectedness and cohesion within the neighbourhood is critical to recovery”. Like two individuals exposed to the same disease, recovery may have more to do with the quality of the host than the nature of the disease (Aldrich, 2008).

The interrelationship of the three disaster resilience-building fields is shown as a simple Venn diagram in Figure 2.



Figure 2 – Interrelationship of the three fields required to build community disaster resilience based on recent research

Depending on the resilience ‘profile’ of a community, the importance of each field can be larger or smaller (i.e. not necessarily equal as shown in Figure 2).

One could argue the value of the ‘disaster risk reduction’ and ‘emergency management’ division shown in Figure 2 when Prevention, Preparedness, Response and Recovery (PPRR) in emergency management could encapsulate both. One reason for this is that it distinguishes hazard risk mitigation (prevention) activities from preparedness activities, the boundaries of which are sometimes

confused. According to the Topping (2011), “Mitigation is distinguished from preparedness by its emphasis on creating long-term resilience through permanent modification of physical and other circumstances which create risk and vulnerability. Yet mitigation is widely misunderstood, often confused with preparedness - and not just by news media and the general public.”

The distinction between disaster risk reduction and emergency management is demonstrated practically in several parts of Australia through the demarcation of responsibility and activity. For example, in NSW, floodplain risk management is primarily the responsibility of local councils, with the NSW State Emergency Service responsible for flood preparedness and response.

Educationally, the distinction between risk mitigation and emergency management is also apposite. A common fallacy underpinning the design of some disaster-related community ECE programs is that risk awareness will directly lead to preparedness and then appropriate response and recovery behaviours. Research (e.g. Boura, 1998; Rhodes, 2011) has shown that this linear logic process appears to not exist, and that ‘risk awareness’ or perception is a part of several psychological processes leading to preparedness (Paton, McClure and Burgelt, 2006). Thus, ECE programs should be designed specifically to achieve separate risk awareness and preparedness learning outcomes.

The intersections between the fields in Figure 2 are relevant to resilience learning in addition to the fields themselves. For example, the emergency management/community development intersection can include the role of emergency volunteers in forming social capital. Researchers such as Fahey (2003) and Wollebaek and Selle (2002) have identified this link and some concerns with its potency. Hems (2011) feels that “the distinction between bonding and bridging social capital exposes the lack of robustness of the definitions and concepts we utilise in relation to volunteering. Bridging social capital is most likely to involve formal volunteering where individuals volunteer through not-for-profit organisations e.g. helping out at a drop-in centre for the homeless. Informal volunteering is undertaken on one’s own initiative and is most likely to be associated with bonding social capital e.g. babysitting for a neighbour”.

Learning for disaster resilience

As stated explicitly or implicitly in the groups of actions listed above from the National Strategy for Disaster Resilience, there is a need for agency and community learning to help build resilient communities. Central to this requirement is the concept of ‘communities of practice’. According to Wenger (2006), “communities of practice are groups of people who share a concern or passion for something they do and learn how to do it better as they interact regularly”. Examples of disaster-related

communities of practice include those interested in finding out about a hazard event as it unfolds or emergency managers interested in using social media to improve ECE (e.g. #smem on Twitter). It should be noted that communities of practice may extend across ethnicities, race and other backgrounds, and not be necessarily confined to geographic boundaries (e.g. potentially impacted locations - which have been the sole targets for many emergency agency ECE activities).

The notion of 'communities of practice' or 'learning communities' is not new and has already been linked to community development activities to form social capital in communities in a resilience context (Kilpatrick, 2002). Kilpatrick found that "learning, social capital and change are inter-linked. At the micro level of interactions purpose-related knowledge resources and identity resources oil the process of change to enhance outcomes. The process of change in a community is a learning process, which simultaneously draws on and builds social capital. Learning and change lead to more effective outcomes if they are able to use the knowledge and skills of community members in an integrated fashion".

Some Australian emergency agencies have shown a willingness to develop internal and external learning communities. For example, as part of one of the goals in its corporate plan, the NSW State Emergency Service will "improve its service by supporting a learning environment through a planned exercise regime, measuring performance and establishing a best practice Lessons Learned Unit" (NSW SES, 2011). However, there is a general tendency of Australian emergency agencies to provide top-down ECE to communities, rather than considering the psychological needs and social connections of the learners (Molino Stewart, 2007).

If one accepts the strategic interrelationship of the three resilience-building fields shown in Figure 2 and that developing communities of practice is an important mechanism in achieving resilience, it is possible here to define a process that combines the two. 'Learning for Disaster Resilience' (LfDR) is therefore defined as 'any learning process or activity in emergency management, disaster risk reduction and community development that helps build disaster resilience through communities of practice'.

Social learning for disasters

As LfDR is learner-centred, it is critical to understand the social learning domains used by individuals and communities before, during and after a disaster. Although, as noted above, there has been extensive research into the psychological aspects of preparedness and recovery (and ways to treat psychological problems related to disasters), there has been relative little educational research into how people learn through the parts of the disaster 'cycle'.

Goldstein (1984) believes that in terms of unplanned changes such as disasters, "social learning involves the interplay of cognition, emotion and behavior. The

importance of personal values and symbols requires attention to the emotional as well as the thinking and acting aspects of learning”.

In a study of Dutch citizens’ flood preparedness, Terpstra (2011) found two parallel learning paths – cognitive and affective – that lead from perceptions to behaviour. Both paths include multiple dependent variables and indicate how people combine affect and reason in order to respond to risk (Finucane and Holup, 2006). LfDR should recognise and assist individual learning within these domains.

Collectively, a participatory approach to learning should be supported by LfDR. According to Paton (2005), “participation in identifying shared problems and collaborating with others to develop and implement solutions to deal them facilitates the development of efficacy, sense of community, and commitment to action. That is, it engenders the development of competencies that enhance community resilience to adversity”. To implement this, Paton suggests that “hazard education could be facilitated by inviting representatives of community groups to review hazard scenarios in regard to potential challenges, opportunities and threats they could pose for the community. They would then propose strategies to capitalise on them, or to manage or contain them”.

In a national review of natural hazard community education, awareness and engagement programs for the Australian Government, Elsworth et al (2009) identified active community participation as part of their model for effective programs. They stress that programs “would be greatly improved if they involved active community participation during their development and implementation. Levels of community participation of this kind that move towards wide consultation, collaborative development of activities and programs and democratic forms of policy-related decision-making require conscious design, considerable effort in implementation and on-going evaluation”.

In the participatory LfDR approach, the emergency management agencies assimilate and support the needs and directions of the community. They thus act as consultants to communities (e.g. facilitators, resource providers, change agents, coordinators) rather than directing the change process in a top-down manner. It should be acknowledged that many Australian emergency agencies are implementing their engagement activities in this manner.

Implications for emergency agencies

Who should be responsible for LfDR in Australia? As stressed in the National Strategy for Disaster Resilience, a basic tenet for building disaster resilience is ‘shared responsibility’. The Victorian Bushfires Royal Commission in its Final Report (2010) uses the expression ‘shared responsibility’ “to mean increased responsibility for all. It recommends that state agencies and municipal councils adopt increased or improved protective, emergency management and advisory roles. In turn, communities, individuals and households need to take greater responsibility for their

own safety and to act on advice and other cues given to them before and on the day of a bushfire.

“Shared responsibility does not mean equal responsibility ... there are some areas in which the state should assume greater responsibility than the community. For example, in most instances state fire authorities will be more capable than individuals when it comes to identifying the risks associated with bushfire; the state should therefore assume greater responsibility for working to minimise those risks.”

In line with this explanation of shared responsibility, it is reasonable and practical to expect that disaster and emergency agencies take the lead in some aspects of LfDR. For example, agencies should take the lead in communicating warnings to communities as they are privy to critical emergency intelligence (although this is not to say that communities cannot be involved in providing feedback and intelligence e.g. through ‘crowdsourcing’). On the other hand, during the preparedness and parts of the recovery phase agencies and communities can share responsibility of tasks through participatory learning.

There are several LfDR ‘best practices’ for agencies and communities to use based on current research and practice. These include:

- As noted above, LfDR ECE programs and activities should be learner-centred and thus an understanding of the learning community is important in their design (Elsworth et al, 2009; Molino Stewart, 2007). This can be achieved through processes such as community profiling, social research and social network analysis.
- As also noted above, LfDR should be participatory (e.g. coordinated through local committees) and designed for cognitive, affective and behavioural learning domains.
- Learning should be focused on outcomes for disaster risk reduction (e.g. ‘minimising residual risk’), emergency management (e.g. ‘helping to ensure community safety’) and community development (e.g. ‘forming resilience social capital’).
- Learning should be aligned with structural and other non-structural methods used in disaster risk reduction, and with emergency management measures such as operations and planning (Molino Stewart, 2007).
- Learning should be designed for before, during and after a disaster and be ongoing in delivery as a disaster can occur at any time (Dufty, 2008).
- LfDR should help build disaster resilient communities of practice.
- LfDR requires a cross-hazard and cross-agency approach to learning (Dufty, 2008).
- Program evaluation is a critical requirement of all LfDR activities (Elsworth et al, 2009). Excellent examples of this have been conducted by the Bushfire CRC (<http://www.bushfirecrc.com>).

- The use of social media should be an important component of LfDR (Dufty, 2012), as well as the more 'traditional' ECE activities (e.g. events, media, websites, meetings).
- Post-disaster learning is important to help stimulate the 'bounce forward' effect (Molino Stewart, 2007; Dufty, 2008). This learning can be derived from ECE activities such as de-brief community meetings, community resilience webinars (used extensively after the 2011 Queensland floods) and social media discussions.

Conclusion

The above argument for a more holistic LfDR approach is consistent not only with the National Strategy for Disaster Resilience and current research, but also with the findings of some major government inquiries into recent disasters. For example, the Victorian Floods Review (2011) in its final report recommended that the State:

- Involve local communities in the development and ownership of community resilience plans based on a 'all hazards' approach and tailored for the specific needs of each community
- Encouraging local communities to form resilience committees to develop and administer community resilience plans (Recommendation 93)

However, there are knowledge gaps in the literature that require further research to validate and refine the LfDR approach. These gaps include:

- The practical interrelationships between disaster risk reduction, emergency management and community development e.g. through community case studies
- How communities learn before, during and after an event
- The value of social media in building community disaster resilience
- Best practice methods to evaluate community disaster ECE activities
- Design of appropriate and effective community disaster resilience learning plans and programs.

Hopefully, this paper will encourage agencies and communities to move further down the path to holistic disaster resilience learning. In closing, in the words of Theodore Roosevelt appropriate for any community around the world:

*Americans learn only from catastrophe
and not from experience.*

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