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Towards a Learning for Disaster Resilience approach: exploring content and process

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Exploring content and process

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This paper is a first attempt to scope the possible content and learning processes that could be used in a holistic Learning for Disaster Resilience (LfDR) approach as a possible improvement to current disaster education, communications and engagement practices. The research found that LfDR should not only cover public safety aspects, but also learning about the community itself, including how to reduce its vulnerabilities and strengthen resilience. In relation to learning process, a review of learning theory found four broad learning theory groups - behavioural, cognitive, affective, social – that have relevance to LfDR. The research identified a range of potential learning activities across these groups. The use of social media in disaster management is strongly supported by the research as it has relevance to three of the four groups.

Towards a Learning for Disaster Resilience approach: exploring content and process

It is becoming increasingly apparent that learning is a key component of community disaster resilience building. In several recent disasters, people and communities have had to confront and recover from the impacts of hazards largely by themselves. Their actions are swayed by what is learned before, during and after the disaster.

According to Haque and Etkin (2012, page 19), “During the last two decades, much has been written and said about the need to shift the conceptual and management approach from the technological control of geophysical forces to societal forces, where humans have more control”. Disaster resilience learning can help people, organisations and communities to have more control and work with emergency agencies for effective response and recovery.

Post-disaster learning is critical not only in helping people, organisations and communities to ‘bounce back’, but also to ‘bounce forward’ i.e. to make societal and disaster management improvements as a result of a disaster.

Disaster learning is obtained through the education, communications and engagement (ECE) services provided by emergency agencies, as well as self-learning and that provided by other members of the community. Although there has been much activity in the provision of ECE by emergency agencies around the world, it is uncertain whether these approaches actually work to help ensure public safety and, more broadly, to build community disaster resilience.

Dufty (2012) commenced an investigation to identify what could be a more effective approach to building disaster resilience for people, organisations and communities. He coined the term ‘Learning for Disaster Resilience’ (LfDR) for this approach.

Guiding principles for LfDR that were identified from this research include:

- 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 social research processes such as community profiling, surveying and social network analysis.
- The design, implementation and evaluation of disaster resilience learning programs and activities should be participatory (e.g. coordinated with residents through local committees).
- Learning should be aligned with structural and other non-structural methods used in disaster risk reduction, and be an integral part of emergency management measures such as operations and emergency planning (Molino Stewart, 2007).
- Learning programs and activities should be designed for before, during and after a disaster.

- The provision of learning programs and activities should be ongoing, as a disaster may occur at any time (Dufty, 2008).
- A cross-hazard and cross-agency approach is required for the provision of learning programs and activities (Dufty, 2008).
- Evaluation should be a critical requirement of all LfDR plans (Elsworth et al, 2009).

These LfDR guiding principles have been used to design disaster resilience learning plans and programs, including a community flood education plan for a local council in western Sydney, Australia (Molino Stewart, 2012). This research demonstrated the need to further develop guidance to design the content and process for putting the LfDR approach into practice.

Dufty (2013) commenced this research with a conceptual examination of the possible content that could be included in LfDR programs and activities. Dufty stressed that LfDR programs and activities should be developed from the learner's perspective, rather than what the providers (e.g. emergency agencies) think learners need to know and how they should learn.

This paper further explores the possible content of LfDR programs and activities. It also commences an examination of learning processes that could be used in LfDR.

Content

In the examination of possible LfDR content, Dufty (2013) found that LfDR should lead at least to:

- Public safety
- Property protection
- Efficient recovery
- Post-disaster improvement.

Dufty identified six learning content areas that could be included in LfDR plans and programs. These content areas are shown in Figure 1. It should be noted that the 'climate change adaptation' content area is only applicable for those people, organisations and communities that are impacted by weather-related hazards.

However, the six content areas may be only part of what should be considered for disaster resilience learning plans and programs. It appears that learning should occur not only in relation to the 'hazard', but also for the 'host' i.e. the at-risk community.



Figure 1: ‘External’ learning content areas for the LfDR approach (source: Dufty, 2013)

Still today, natural hazards and disasters are viewed by affected communities, and even by emergency managers, as an 'Act of God'. The physical domain has been seen as discrete and separate from human entities, and natural hazards have been defined as those elements of the physical environment harmful to humans and caused by forces extraneous to them (Haque, 1997). Massive amounts of money have been spent in protecting communities around the world from external risks. The battle has been with the hazard foe.

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.

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. In the 1990s, these perspectives were reinforced around the world (e.g. Blaikie et al, 1994; Cannon, 1994; Mileti, 1999).

It 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.

There is no doubt that part of the 'societal response' to natural hazards is better development planning and landuse controls, and LfDR should include related learning. However, during the past decade, thinking about the causation of disaster loss has shifted towards concerns about human vulnerability.

Vulnerability can be defined as the propensity to suffer some degree of loss from a hazardous event (Etkin et al, 2004). Researchers and emergency managers have started to distinguish between the physical exposure of people to threats and societal vulnerability. According to Cannon (1994, page 17), "the vulnerability concept is a means of 'translating' known everyday processes of the economic and political separation of people into a more specific identification of those who may be at risk in hazardous environments". Disasters occur when an environmental hazard strikes vulnerable people.

Berkes (2012, page 39) suggests that "vulnerability is materialized by exposure to hazards, but it also resides in the resilience of a system experiencing the hazard. The concepts of vulnerability and resilience come from different scholarly traditions and literatures. However, resilience is almost the flip side of vulnerability – the ability of the linked social-ecological system to deal with the hazard and make it less vulnerable". LfDR should include learning about addressing vulnerability and strengthening disaster resilience.

Apart from development planning and an understanding of vulnerability, also of importance in the societal paradigm of disasters is the role of policy and institutions. According to Handmer and Dovers (2013, pp. 38-39), institutions are "persistent, predictable arrangements, laws, processes or customs serving to structure relationships in society", whilst (public) policies are "positions taken and communicated by governments, in more or less detail – 'avowals of intent' that recognize a problem and state what will be done about it".

Handmer and Dovers (page 55) stress that "given the nature of emergencies and disasters, it is likely that existing policy and institutional capacities, which have co-evolved with other policy domains.....can reasonably be expected to struggle with emergencies and disasters. Climate change adaptation, responding to a projected frequency and intensity of climate and weather events, further complicates this". Learning to improve relevant institutions and policies should also be part of LfDR content.

From the above, particular focus should be on the following learning content areas which should be part of the LFDR approach:

1. Urban planning and landuse controls
2. Vulnerability and resilience
3. Institutions and policies.

It should be noted that these three learning areas are interrelated. For example, it may be that institutions and policies govern urban planning and land use controls which in turn are trying to address vulnerabilities in a community.

Of particular importance within the vulnerability and resilience learning milieu is social capital. Social capital has been defined as the “networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit” (Putnam, 1995). It consists of those bonds created by belonging to a group that instills trust, solidarity, and cooperation among members.

The importance of social capital in disasters has been well documented. For example, according to Schellong (2007), during and after a disaster “social systems continue to operate while new ones emerge because they have greatest knowledge of the community, and because they need to initiate recovery themselves as many of their needs will not be met by outside agencies”. Haines, Hurlbert and Beggs (1996) found that disaster victims and their social networks mostly become resources that can be used in disaster recovery.

In his recent book *Building resilience: social capital in post-disaster recovery*, Associate Professor Daniel Aldrich posits that “high levels of social capital – more than such commonly referenced factors as socioeconomic conditions, population density, amount of damage or aid – serve as the core engine of recovery” (Aldrich, 2012, page 15). Using qualitative and quantitative evidence, Aldrich proved this hypothesis to be correct for four disasters he studied around the world. “Despite different time periods, cultures, government capacities, and levels of development, all four cases showed that areas with more social capital made effective and efficient recoveries from crises through coordinated efforts and cooperative activities” (Aldrich, 2012, page 149).

Elsewhere, Aldrich (2011) concludes that, “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).

Learning how to form social capital should be part of broader disaster capacity building related to community development. Kuhlicke and Steinfuhrer (2013, page 117) identified five types of social capacities related to disasters: knowledge, motivation, social networks (including social capital), financial resources and governance capacities. “These social capacities are either owned by an individual, an organisation or a community (knowledge, motivation, finances) or these actors have access to them (social networks, governance capacities). Governance capacities are considered to be a key resource to enable interactions between private and institutional actors (such as local communities and risk management organisations).”

In summary, the learning content of LfDR plans and programs should include both learning related to the 'hazard' (Figure 1) including that traditionally delivered by emergency agencies for public safety, plus that related to the 'host': the at-risk people, organisations and communities.

The suggested LfDR content learning areas are shown in Figure 2.



Figure 2: Suggested main learning content areas for the LfDR approach

Process

The above examination is about the '*what*' in LfDR; the following is about the '*how*'. The content and process should be interlinked in the design of LfDR plans and programs.

Molino Stewart (2012) categorised current disaster ECE 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.

Current community disaster ECE programs and activities provided by emergency agencies and organisations around the world tend to be delivered via the first (public communications) and the third (community engagement programs) of these categories.

Preston (2012, pp. 3-5) identified six main education delivery approaches (or pedagogies) for disaster ECE:

1. Banking and didactic pedagogies. These are constructed on the basis that they are not expected to be used except in the event of an actual emergency. Examples include airline emergency cards, 'what to in the event of a (hazard)' information.
2. Construction kit pedagogies. Designed on the basis of DIY (Do it Yourself) instructions providing guidance which is to be interpreted and acted on by the individual in the event of a crisis e.g. how to make and use sandbags in a flood, how to construct a nuclear shelter, how to prepare an emergency kit.
3. Affective preparedness pedagogies. These are not designed to deal with the cognitive processes or behavioural skills for protection but rather are designed around the principle that emotional labour is involved in preparedness. Examples include learning activities about how to be resilient in the face of adversity.
4. Family and community learning. These pedagogies make use of existing societal structures as pedagogical levers. Examples include home emergency plans, 'help your neighbour in a disaster' documents.
5. Performance pedagogies. These pedagogies use tacit performance theories and dramaturgical techniques (Davis, 2007). Rehearsal of an actual emergency is used to not only help people learn behaviours and their roles, but also to remove affective and cognitive processes that may prevent action being undertaken. Examples include evacuation drills, community exercising (e.g. 'Shake Out' drills for earthquakes).

6. Public pedagogies. These pedagogies are related to popular culture not frequently considered to be in an educational arena. An example is preparedness for a 'zombie apocalypse'.

The above classifications of disaster ECE processes are summaries of the status quo. It is possible that the current processes are not the most appropriate or effective learning methods. There could be other ways.

Of concern is that disaster ECE has been designed mainly by emergency managers who have not necessarily drawn on education theory and research. As Preston (2012, page 1) notes, there is "surprisingly little writing in the field of (disaster) education/pedagogy itself". This is largely due to disaster education being a "new area of enquiry in the field of education". Furthermore, there has been little evaluation of disaster ECE plans, programs and activities, particularly in relation to their effectiveness in a disaster (Elsworth et al, 2009).

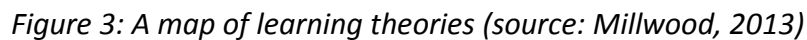
Disaster psychology and sociology are mature fields of research and provide an excellent understanding of how people behave and connect before, during and after emergencies and disasters. However, they pull up short of providing robust community disaster learning approaches and practices, which is primarily the domain of education. A linking of disaster psychology and sociology with education theory and research is therefore required to check the disaster ECE 'foundation'.

Central to an exploration of appropriate and potentially effective disaster resilience learning processes is learning theory which is derived mainly from education psychology. Figure 3 shows one view of the complex nature of learning theory that is applicable to both child development and adult lifelong learning.

Theories about human learning can be grouped into four broad 'perspectives'. These 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.

As appropriate behaviours are required before, during and after emergencies and disasters, 'behaviourism' by its name has appeal for disaster resilience learning. However, behaviourism focuses on the objective and observable components of behaviour. The behaviourist theories all share some version of stimulus-response mechanisms for learning. An example in practice is the famous Pavlov's dogs experiment.



A central tenet of behaviourism is that thoughts, feelings, intentions, and mental processes, do not determine what we do. This is contrary to what many psychologists have found for disasters where cognitive and emotional learning determine behaviours (e.g. Terpstra, 2011). Moreover, behaviourism requires the regular conditioning of behaviours; with a disaster event occurring at any time (and possibly well into the future) it appears to not hold much relevance for disaster resilience learning. However, there may be some relevance to preparedness training, exercising and drilling where behaviours are pre-determined, tested and then quickly evaluated.

The cognitive theories see learning as a mental process. They include information processing theories and Gestalt theories which attempt to explain how people learn through perception, decision-making, attention, memory, and problem-solving. A gestalt factor is a condition that aids in perceiving situations as a whole or totality.

Numerous disaster psychology models (e.g. Paton, 2006; Grothmann & Reusswig, 2006) identify a range of cognitive processes that link well with cognitive learning theories. Information processing is particularly important for taking appropriate actions related to warning messages. Perception, decision making, attention, memory, and problem solving are cognitive processes identified by disaster psychologists as important for preparedness, response and resilience. LfDR activities derived from cognitive theories could include preparedness problem solving, sending and receiving disaster information (e.g. using social media), decision making learning through scenarios, and information provision to raise awareness and risk perception.

A type of cognitive learning theory (or some would argue a broad perspective by itself) is 'constructivism'. The common thread that unites constructivist theories is that learning is an active process, unique to the individual, and consists of constructing conceptual relationships and meaning from information and experiences already in the learner's repertoire. Constructivism claims that each learner constructs knowledge individually and socially. The 'glue' that holds the constructs together is meaning.

Constructivism also should be of relevance to disaster learning in that people by themselves, or together in organisations and communities, construct meaning for disasters from the information they receive (e.g. warnings) and their prior experience. LfDR constructivist activities could include oral histories of disasters, social media, reflections through diaries and specific personal research.

There are three pedagogies in the affective learning approaches that have relevance to disaster resilience learning. 'Experiential learning' was pioneered by Carl Rogers. Rogers was discouraged by the emphasis on cognitivism in education. He believed that the highest levels of significant learning included personal involvement at both the affective and cognitive levels, were self-initiated, and were so pervasive they could change attitudes, behaviour, and in some cases, even the personality of the learner. Learnings are needed to be evaluated by the learner and take on meaning as part of the total experience.

There is strong evidence (e.g. Grothmann & Reusswig, 2006) that prior emergency/disaster experience is an important psychological factor in determining the preparedness, response and recovery behaviours of people. Although untested, it may be that realistic 'experiences' provided by disaster ECE programs could substitute for those that have not experienced disasters, and support those that have. Suggested experiential learning activities for LfDR are gaming, emergency simulations, virtual reality training and exercising.

'Social and emotional learning' (SEL) is a process for learning life skills, including how to deal with oneself, others and relationships, and work in an effective manner. In dealing with oneself, SEL helps in recognising emotions and learning how to manage those feelings. As there can be significant mental health impacts of disasters such as post-traumatic stress disorder (PTSD), social and emotional learning can help ready both children and adults for disasters, and help them become more resilient after the disaster strikes. Suggested SEL learning activities could include resilient therapy (see <http://www.boingboing.org.uk/>), community arts activities related to emotions, expressing emotions workshops, social media and counselling.

The third relevant affective pedagogy is 'transformational learning' which has strongly been acknowledged in adult education. Transformational learning is defined as learning that induces more far-reaching change in the learner than other kinds of learning and produces a significant impact, or paradigm shift, which affects the learner's subsequent experiences.

Mezirow (1981) saw meaning perspectives as the raw material of the changes that occur in transformational learning. Meaning perspectives naturally change and evolve in response to life experiences, especially those which induce powerful emotional responses in the individual. Often these life-changing events are personal crises such as divorce, death of a loved one, natural or man-made disasters and accidents, health crises, financial upheaval, or unexpected job changes.

Changes in meaning perspectives related to disasters could motivate learning for preparedness. Apart from the experience of a disaster, transformational learning for disaster resilience could include role playing, disaster case studies, mind exploration (e.g. near death experiences, dreams) and critical reflection on disasters around the world.

There are two related pedagogies in the social perspectives grouping of learning theories that are potentially relevant to LfDR. They are 'situated learning' and 'communities of practice'.

Situated learning was first proposed by Jean Lave and Etienne Wenger as a model of learning in a community of practice. At its simplest, situated learning is learning that takes place in the same context in which it is applied. Lave and Wenger (1991) argue that learning should not be viewed as simply the transmission of abstract and decontextualised knowledge from one individual to another, but a social process

whereby knowledge is co-constructed; they suggest that such learning is situated in a specific context and embedded within a particular social and physical environment.

A community of practice (CoP) is, according to Lave and Wenger, a group of people who share a craft and/or a profession. The group can evolve naturally because of the members' common interest in a particular domain or area, or it can be created specifically with the goal of gaining knowledge related to their field. It is through the process of sharing information and experiences with the group that the members learn from each other, and have an opportunity to develop themselves personally and professionally (Lave & Wenger, 1991). CoPs can exist online, such as within discussion boards and newsgroups, or in real life, such as in a lunch room at work, in a field setting, on a factory floor, or elsewhere in the environment.

This type of social learning particularly links well with the evidence showing the importance of social capital (see above in the 'content' section), cooperation and shared learning before, during and after disasters. It also supports the use of social media in disasters for shared learning and developing CoPs. Several researchers (e.g. Antoci et al, 2011; Ellison et al, 2007) have assessed the value of social media in forming social capital. They found that social media have made it simpler to interact with others without the limitations geography and lack of time. "Noting that contact through social media is asynchronous, they reference studies which show that such interactions are not necessarily of inferior quality compared to simultaneous, face-to-face, interactions" (Tibbitt, 2011). In addition to the preservation and possible improvement of existing ties, interaction through social media can foster the creation of new relations. It therefore can encourage and sustain learning communities (Tibbitt, 2011) and, in this case, 'disaster resilience learning communities'.

Situated learning/CoP activities relevant to the LfDR approach include social media, post-disaster meetings and forums, disaster mitigation planning workshops, local resilience committees, field trips and community engagement.

A summary of the findings for this exploration of LfDR process is provided as Table 1. Some observations can be made regarding Table 1. Firstly, many current disaster ECE programs concentrate only on the use cognitive learning activities, with some also using engagement as part of social learning. Table 1 presents a case for the use of learning activities derived from other learning theories and pedagogies.

Secondly, there has been a large amount written (e.g. White, 2012; Gupta & Brooks, 2013) about the role of social media in disasters. Table 1 throws a new light on the value of social media by identifying its potential use to assist in three broad types of disaster learning – cognitive, affective and social.

Lastly, Table 1 identifies general learning processes that are across all ages and sectors of the community. However, further analysis is required to identify appropriate age- and sector-appropriate learning activities across the relevant learning theories and pedagogies.

Table 1: Summary of relevant learning theories and activities for LfDR

| Learning | Theory/Pedagogy | Relevance | LfDR activities |
|-----------------|---|--|---|
| 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, SEL programs in schools, resilient therapy, social media, counselling |
| | Transformational | People may need to change to prepare 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 |

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).

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 areas – behavioural, cognitive, affective and social. The findings demonstrated that many current ECE 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.

Further research is required in this space, especially to specifically link disaster psychological and sociological research with relevant learning theories and pedagogies. Following this, further identification of appropriate learning activities should be conducted.

The resultant content and processes should then be combined to help design tailored LfDR plans and programs for communities. The decision as to what LfDR content and process should be used will be determined by factors including features of the community (e.g. vulnerabilities), the local hazard risks, the learners (e.g. age, location, sector), access to technologies (e.g. social media) and preferred ways of learning.

As noted in this paper, a critical part of the LfDR approach is evaluation. Evaluation will enable LfDR plans and programs to be tested and improved as they are implemented and, most importantly, their effectiveness and appropriateness gauged as part of post-disaster learning.

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