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# Opportunities for disaster resilience learning in the Australian curriculum

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Neil Dufty, Molino Stewart Pty Ltd, provides a perspective on emergency preparedness education in the new Australian school curriculum and identifies opportunities for development. ®

## ABSTRACT

Schools are an important avenue for youth to learn about disaster resilience. A critical success factor for the uptake of disaster resilience learning in schools is the ability to embed learning activities in school programs that are linked to relevant curriculums. With the introduction of the Australian Curriculum, it is timely to identify new opportunities for student disaster resilience learning and related curriculum development by emergency services organisations. Using a technique called 'curriculum mapping', a research project has identified disaster resilience learning opportunities and gaps across the Australian Curriculum.

## Introduction

On 26 September 2004, young Tilly Smith was enjoying a Christmas vacation with her mother on Maikhao Beach in Phuket, southern Thailand. They watched as the water along the shoreline receded, exposing a great swathe of beach that left fish stranded on the sand. Looking out to the ocean they saw the sea swell and bubble. Then Tilly's mother saw a yacht tip vertically in the bay. Tilly, using learnings from her Year 6 Geography lesson on natural disasters back in England, quickly alerted her mother to the impending tsunami - 'The Boxing Day Tsunami'.

Tilly's hysterical cries finally convinced her mother to act. With her husband, mother Penny Smith began to warn sunbathers about the impending tsunami. Then grabbing their belongings they headed up the beach to their hotel, alerting the staff, who began to evacuate the rest of the beach. Many lives were saved.

Tilly's heroic story has been told several times in interviews, magazines, books (e.g. Ripley 2009) and online (e.g. Wikipedia 2013). Her story is retold here to demonstrate the potential power of disaster-related learning in schools. It should be noted that Tilly's learnings were gleaned from 'normal' class activities as required by the school curriculum.

Researchers such as Ronan and Johnston (2005 p. 5) stress the importance of school disaster education and the youth-school-family network in building community resilience to disasters. They base this view on research which demonstrates that 'youth and families comprise risk groups for increased problems following a hazardous event'. They argue that:

*'a focus on educating youth, the adults of tomorrow, has considerable promise. However, in terms of more current concerns, youth also link into the family setting who, in turn, link into multiple community settings and groups'. They add that disaster education 'in schools can play a vital role in increasing a community being ready, willing, and able to do what is necessary to prepare for and respond to a disaster.'* (Ronan & Johnston 2005 p. 95)

The way in which students learn about disasters and hazards – both in and out of school – has been the focus of several psychological studies. For example, Towers and Paton (2007) researched how children perceive bushfire risk and mitigation as the basis for developing more effective education strategies to increase levels of awareness and preparedness in areas susceptible to bushfires. Their research raised two significant issues:

*'Firstly, children's understanding of concepts such as causality and prevention are strongly influenced by age-related changes in cognitive ability. Secondly, the acquisition of knowledge about risk and mitigation takes place in a social context, with some elements of social context exerting more influence than others.'* (Towers & Paton 2007)

In acknowledgement of the importance of school disaster education, international organisations and governments around the world have developed a broad range of major initiatives and programs. For example, the World Disaster Reduction Campaign 2006-2007 used the theme 'Disaster Risk Reduction Begins at School'. This theme was chosen because:

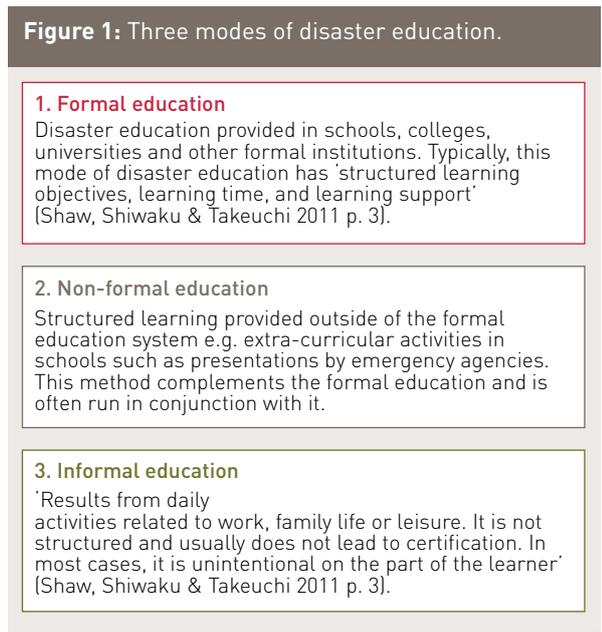
1. It was in line with the Priority 3 of the *Hyogo Framework for Action 2005-2015* 'Use knowledge, innovation and education to build a culture of safety and resilience at all levels'.
2. Schools were seen as the best venues for forging durable collective values, therefore they are

suitable for building a culture of prevention and disaster resilience.

There are also several international organisations established to promote school and youth disaster education including the Coalition for Global School Safety and Disaster Prevention Education, the Disaster Risk Reduction Education Network, and the Children and Youth in Disasters Network.

Most Australian emergency agencies and other emergency services organisations provide resources for school disaster education on their websites including units of work, lesson plans, learning activities, games and fact sheets. A notable example is the resources provided by the Australian Emergency Management Institute as part of the 'Disaster Resilience Education for Schools' program (see <http://schools.aemi.edu.au/>).

Although there is considerable Australian and worldwide promotion and support for school disaster education, there are a few cautionary points that should be considered by emergency services organisations. Firstly, according to Shaw, Shiwaku & Takeuchi (2011), disaster education can be broadly classified into three modes (see Figure 1).



This classification shows that school education is only one type of formal disaster education and is only one of the three mediums through which youth (and other members of the community) can learn. Thus, emergency services organisations should attempt to deliver across all the modes of education.

Secondly, in relation to informal education, Dufty (2009 p. 14) identified the main methods of disaster learning for youth in addition to the use of social media. These are:

- Internet
- radio

- television e.g. documentaries, advertising
- magazines and other print media
- public events e.g. agricultural shows, concerts
- billboards and other signs, and
- personal conversations e.g. with people who have experienced a natural disaster.

These methods of learning should be supported by emergency services organisations where possible.

Finally, there is a view held by some emergency agencies that 'if you educate the children, you will educate the parents', and thus the concentration for disaster education should be on school education. This idea is largely unfounded, although there is research that shows some immediate knowledge transfer between students and their parents. For example, Vaughan *et al.* (2003) found that parents and the broader community increased their learning as a result of a conservation program in Costa Rican schools. The Tilly Smith anecdote is an example of the transference of learning from students to parents at the onset of a hazard event. However, as stated, disaster education should be provided to all age groups and sectors of the community, and not be solely reliant on the student-parent learning linkage.

With these points noted, formal education through school curriculums is most likely more effective than non-formal disaster education in schools. Dufty (2009 p. 15) contends that:

*'a critical success factor for the uptake of natural hazard activities in schools is the ability to embed these activities in existing school programs that are already linked to learning outcomes in curriculums and syllabuses. This helps to ensure that the school will accept the natural hazards program as a valid activity as part of its existing teaching program and not as a "one off". Moreover, as a natural hazard can occur at any time, this approach will also mean that "natural hazards" will be taught each year'.*

In Australia, up until recently each state and territory had its own curriculums. There were numerous opportunities for the development of disaster education programs and activities related to these curriculums. Kriewaldt *et al.* (2003) conducted a study of disaster education across state and territory curriculums. They found that disaster education 'is evident in years 5-6 and more comprehensively addressed in years 7-10. Most education systems in Australia include study of hazards in their post-compulsory geography course'.

In December 2008, the development of the Australian Curriculum guided by the Melbourne Declaration on Educational Goals for Young Australians was adopted by the Ministerial Council. Since then, the development of the Australian Curriculum has been overseen by the Australian Curriculum, Assessment and Reporting Authority (ACARA). It is hoped that Australian schools will be implementing all learning areas (Foundation to Year 12) in the Australian Curriculum by 2016.

With the common school curriculum soon to be implemented across Australia, it is timely to identify opportunities for student disaster learning and for related curriculum development (e.g. through teaching programs and education resources) relevant to building disaster resilience as guided by the *National Strategy for Disaster Resilience*. The aim of this paper is to identify these opportunities in the Australian Curriculum.

### Curriculum mapping: theory and methodology

The *National Strategy for Disaster Resilience* (Council of Australian Governments 2011 p. 4) focuses on the common characteristics of disaster resilient communities, individuals and organisations. These characteristics are:

- functioning well while under stress
- successful adaptation
- self-reliance, and
- social capacity.

*‘Resilient communities also share the importance of social support systems, such as neighbourhoods, family and kinship networks, social cohesion, mutual interest groups, and mutual self-help groups.’* (Council of Australian Governments 2011 p. 4)

Using these characteristics and the results of extensive disaster psychological and sociological research, Dufty (2013) scoped potential disaster resilience learning content for learners of all ages. The research found that:

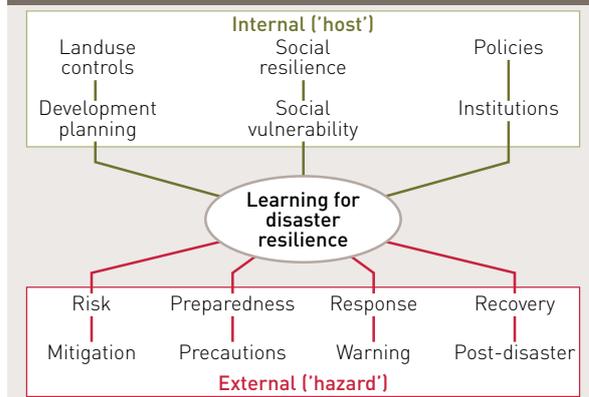
*‘disaster resilience learning content should not only cover public safety aspects, but also learning about improving recovery for people, organisations (e.g. businesses) and communities. It found that disaster resilience learning should also include learning about the community itself, including how to reduce vulnerabilities and strengthen resilience by capacity building (e.g. social capital formation).’* (Dufty 2013 p. 14)

From this research, a diagram showing the main disaster resilience learning content areas was constructed (see Figure 2).

Based on the main content areas in Figure 2, a methodology called ‘curriculum mapping’ was used to identify opportunities for disaster resilience learning across the Australian Curriculum. Curriculum mapping is a ‘technique for exploring the primary elements of curriculum: what is taught; how instruction occurs; and, when instruction is delivered’ (Rubicon Atlas 2013).

Curriculum mapping can be used to ‘retrofit’ existing school teaching programs and education in line with new curriculums. The *National Emergency Management Projects – Educating the Educators* aims to develop disaster resilience within primary and secondary students by improving teacher understanding and confidence in using Disaster Resilience Education (DRE) resources from Australian sources which are explicitly linked to the Australian Curriculum. This

**Figure 2:** Main content areas for disaster resilience learning (Dufty 2013).



project involved reviewing a sample of 47 existing Australian DRE primary and secondary school resources gathered from a range of emergency services agencies from across Australia. These resources were mapped against the learning areas (those released prior to May 2013), the general capabilities, the cross-curriculum priorities and other criteria such as stage of schooling, target audience, and resource type. A report was released in late 2013 with the outcomes of the curriculum mapping research.

A problem with this ‘retrofitting’ approach is that there may not be a strong alignment between the new curriculum and the existing school learning resources (and thus some resources may need to be discarded or largely redesigned). On the other hand, it does enable existing resources to be used if the ‘fit’ exists, thus providing cost savings.

To value add to the NEMP research, opportunities for disaster resilience learning and further curriculum development related to the Australian Curriculum were explored and identified. This exploration was carried out primarily using key words from the content areas in Figure 2 to search across learning areas (including those of draft curriculums), the general capabilities, and cross-curriculum priorities in the Australian Curriculum website<sup>4</sup>. In addition, each level (Foundation to Year 12) was scanned for relevant disaster resilience learning content that may not be found using the Figure 2 key words.

### Results

Apart from the key words from Figure 2, the following key words located relevant sections of the Australian Curriculum that have relevance to disaster resilience learning include safety, climate change, social connectedness, bushfire, flood, water scarcity, drought, plague, cyclone, earthquake, extreme weather, and volcanic eruptions.

A further scan of the content identified through this methodology was required as some key words located

4 Australian Curriculum website. At: [www.australiancurriculum.edu.au](http://www.australiancurriculum.edu.au).

sections of the curriculums that were not relevant due to an alternative meaning of the word. For example, the word 'risk' was located in the context of 'the concept of risk as applied to natural and ecological hazards', but also in terms of 'identifying potential risks to use equipment and materials safely' in experiments.

At the time of writing (October 2013), the following F-10 curriculums were finalised for implementation in Australian schools: English, Mathematics, Science, History, and Geography.

In relation to Senior Secondary (Years 11 and 12) implementation, 15 curriculums had been finalised.

As shown in the curriculum map (Table 1), the main opportunities for disaster resilience learning were found in the learning areas of Geography (F-10), Science (F-10), Health and Physical Education (F-10), Earth and Environmental Science (11-12) and Geography (11-12). There were also some opportunities in History (F-10).

The codes in the Table 1 curriculum map refer to content descriptions (codes starting with 'AC') and elaborations to content descriptions (codes including 'ELB'). The content description provides a higher level of opportunity than the elaborations. Thus, for example, there is more opportunity for curriculum development in Year 5 Geography than Year 6 Geography as the former has a content description (ACHGK030 - 'The impact of bushfires or floods on environments and communities, and how people can respond') directly pertaining to an aspect of disaster resilience learning whilst the latter only is an elaboration to a content description that is not directly related. The codes in the draft Health and Physical Education (PE) curriculum all refer to elaborations.

Using this understanding, some observations can be made in relation to Table 1:

1. As might be expected, the main curriculum development opportunities for disaster resilience learning are in Science and Geography.
2. Science - the main opportunities are in Year 6 Science (geological changes, extreme weather) and in Year 11-12 Earth and Environmental Science (the cause and impact of Earth hazards).
3. Geography - the main opportunities are in Year 5 (impact of and response to bushfires and floods), Year 7 (causes, impacts and responses to atmospheric or hydrological hazards), Year 8 (causes, impacts and responses to a geomorphological hazard), Year 9 (challenges of climate change) and Year 11-12 (natural and ecological hazards including a depth study).
4. History - the main opportunities are in studies of the Black Death plague (Year 8) and relating to environmental disasters such as Chernobyl (Year 10).
5. Health & PE - the main opportunities are across all years and relate mainly to personal resilience in adversity, safety measures in emergencies, and decision-making for safety.

**Table 1.** Curriculum map showing the main opportunities for disaster resilience learning in the Australian Curriculum.

Years	Science	Geography	History	Draft Health and PE
F				1.4
1				2.4, 2.5, 2.7
2		ELBH506		2.4, 2.5, 2.7
3				3.4, 3.7
4	ELBS823			3.4, 3.7
5		ACHGK030 ELBH461 ELBH551 ELBH580 ELBH609 ELBH739		4.4, 4.9
6	ACSSU096 ELBS906 ELBS907 ELBS909 ELBS910 ELBS922 ELBS924 ELBS925 ELBS931 ELBS925	ELBH656		4.4, 4.9
7		ACHGK040 ACHGK042 ACHGK046 ELBH348 ELBH416 ELBH421 ELBH437 ELBH454 ELBH458 ELBH547 ELBH574 ELBH586 ELBH690		5.4, 5.5, 5.6, 5.7
8	ELBS1065	ACHGK053 ELBH368 ELBH410 ELBH469 ELBH730	ACDSEH069 ACDSEH070 ACDSEH071 ACDSEH072 DELBH090 DELBH092 DELBH093 DELBH225	5.4, 5.5, 5.6, 5.7
9	ELBS1092 ELBS1108	ACHGK063 ELBH577		6.4, 6.5, 6.7, 6.9
10	ELBS1184 ELBS1202 ELBS 1205 ELBS1210		ACDSEH127 ACDSEH128 DELBH180	6.4, 6.5, 6.7, 6.9
11 and 12	ACSPH125 ACSBL071 ACSBL106 ACSCH123 ACSCH085 ACSES067 ACSES094 ACSES098 ACSES099 ACSES100 ACSES101 ACSES102 ACSES103 ACSES106 ACSES108	ACHGE012 ACHGE013 ACHGE014 ACHGE015 ACHGE016 ACHGE017 ACHGE018 ACHGE019 ACHGE020 ACHGE021 ACHGE022 ACHGE023 ACHGE024 ACHGE025 ACHGE026 ACHGE027		

6. From Year 5 onwards there are generally good opportunities for disaster resilience learning across the curriculums.
7. Other than a few elaborations, there are no direct opportunities for disaster resilience learning in Foundation to Year 4.

## Discussion

It should be noted that as curriculums are finalised there could be further opportunities for disaster resilience learning. For example, Civics and Citizenship 3-10 may include content about disaster-related legislation, capacity building through 'active citizenship', and volunteerism.

The gap in direct disaster resilience learning in Foundation to Year 4 means that learning may need to be encouraged in other learning areas such as English and Mathematics. It also means that emergency services organisations may need to supplement this gap with extra-curricular (non-formal) activities e.g. talks, presentations.

A limitation with the curriculum mapping methodology used is that it is content based. As such, it does not identify all capabilities (e.g. skills, behaviours) required by young people for emergency preparedness, response and recovery which may be located elsewhere across the Australian Curriculum. For example, social media is heavily used by youth in emergencies (White 2012, Gupta & Brooks 2013) and learning related to social media is covered under the Information and Communication Technology capability statement. Further research is required to identify these more subtle opportunities for disaster resilience learning.

Although there are limitations to this research, it does show that emergency services organisations can add to existing education resources by new curriculum development relating to opportunities as identified in Table 1. This curriculum development could involve designing units of work, lesson plans, worksheets, fact sheets, web pages, games, case studies, simulations, digital stories, and social media sites.

## Conclusion

This research, using a technique called curriculum mapping, found a range of opportunities for disaster resilience learning and possible related curriculum development across the Australian Curriculum. The greatest opportunities are in the learning areas of Geography and Science.

The research also found a gap in disaster resilience learning in Foundation to Year 4 which needs filling through learning areas such as English and Mathematics and through extra-curricular activities such as talks and presentations by emergency services organisations.

The research adds to that conducted for the NEMP and provides guidance for curriculum development related to disaster resilience learning across Australia.

Further research into disaster resilience learning opportunities is required as curriculums are finalised for implementation.

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### About the author

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