

A new approach to community flood education

Neil Dufty argues that community flood education programs be broadened from 'awareness' and 'preparedness' to building community resilience.

Abstract

Although of increasing importance in a future of climate change, community flood education programs have generally been poorly designed and delivered in a relatively ineffective, 'top-down' manner. A new approach to flood education is promoted that broadens its focus from increasing awareness and preparedness levels to building flood resilient communities. Four functions of flood education are identified to help communities learn to build their resilience. Other features of the new approach are increased community participation in the design, implementation and evaluation of programs and effective ongoing education provision through local flood education plans.

Introduction

There have been many attempts at community flood education both in Australia and overseas (Molino Stewart, 2007). Most of these programs aim to raise awareness about flooding; some also aim to prepare communities for flood events.

Sadly, almost all of these programs are poorly designed, not evaluated and short term. Moreover, they generally undersell the value of flood education (Dufty, 2008).

This article describes a new approach to community flood education that is showing promise in providing effective and long term benefits to flood prone communities in some parts of Australia.

Flood education and resilience

The first feature of the new approach is that it extends the reach of flood education, from just raising awareness and preparedness levels, to helping build flood resilient communities.

According to Paton (2006a, p. 8), 'resilience is a measure of how well people and societies can adapt to a changed reality and capitalise on new possibilities offered'. In terms of flooding, resilience involves the

ability of a community to not only resist and recover from a flood, but also to improve as a result of the changed realities that the flood may cause.

Flood resilient communities will be critical in an uncertain future of 'accelerated' climate change. Most climate change models predict increases in the intensity of storm events and floods exceeding the 1-in-100 year flood in parts of Australia over the next 50 years. With the limitations of structural works to protect communities already acknowledged, in a future of increased flooding risk communities may be further exposed. The ability of communities to adapt to flooding in the future is therefore paramount, not only to minimising loss of life and damages, but also in ensuring a steady path towards economic and social sustainability is maintained (Folke, 2002).

Because of its ability to help people learn and improve as a result of learning, education is well-placed to help communities build their resilience to flooding. As a result, community flood education is here defined as 'any learning process or activity that builds community resilience to flooding'. It should be noted that the term 'community' includes all spheres of government, business, industry and the general public.

In the past, raising community awareness about flooding has been the main focus of many flood education programs. The value of this focus is questionable as several researchers, such as Boura (1998) and Paton et. al. (2003), have demonstrated that there is not a strong and causal link between people being aware of a hazard and acting appropriately for that hazard.

Community educators believed some years ago that there was a linear relationship between becoming aware of an issue, clarifying attitudes and values about that issue and then acting appropriately. Awareness is now viewed as one of a nest of factors that precipitate appropriate behaviours. For example, in relation to hazards, Paton et. al. (2006a) identifies 'critical awareness' as one of a sequence of components that determine a person's adoption of a protective action.

A community flood education program should therefore be designed to not only raise awareness but also focus on the other psychological factors (including barriers) that convert people to preparedness. Furthermore,

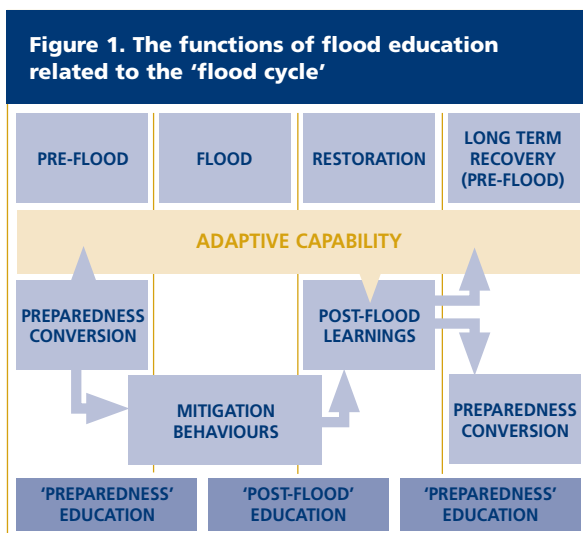
to assist in building flood resilient communities, flood education should not just focus on preparedness, it should also relate to other components of resilience (Paton, 2006a) such as adaptive systems and competencies.

The functions of flood education

A second feature of the new approach is the clear identification of the functions of flood education in building flood resilient communities. Webber and Dufty (2008) identified the following as the functions of flood education in the new approach.

1. 'Preparedness conversion' – learning related to commencing and maintaining preparations for flooding.
2. 'Mitigation behaviours' – learning and putting into practice the appropriate actions for before, during and after a flood.
3. 'Adaptive capability' – learning how to change and maintain adaptive systems (e.g. warning systems) and build community competencies to help minimise the impacts of flooding.
4. 'Post-flood learnings' – learning how to improve preparedness levels, mitigation behaviours and adaptive capability after a flood.

These functions are related as education interventions to the 'flood cycle' in Figure 1.



As shown in Figure 1, pre-flood or 'preparedness' education should aim to help people, organisations (e.g. businesses) and their communities commence and maintain preparations for flooding and to build competencies and systems to adapt to flood events. 'Preparedness conversion' is a prerequisite, especially in communities or parts of communities

where preparedness levels are low, for individuals, organisations and communities to commence preparedness planning. They then learn appropriate mitigation behaviours and how to improve their competencies and systems ('adaptive capability') to resist and recover from flooding. It is immediately before, during and after a flood that these behaviours, competencies and systems are activated as part of the community's resilience to the event.

After a flood, education has another important role in helping individuals, organisations and communities learn from their flood experiences (e.g. the effectiveness of mitigation behaviours and adaptive capability) and use these learnings for improvements in future flood events. Another phase of education then commences as long-term recovery becomes the pre-flood part of the new cycle.

Most attempts at flood education to date only focus on 'preparedness conversion' and improving 'mitigation behaviours', with little done on building 'adaptive capability' and community learning after floods.

Education activities related to improving the adaptive capability of a community, or part of a community, could include:

- Training SES volunteers in community education. This enables volunteers to help educate their local communities both in formal (e.g. events) and informal settings. Identifying and training community leaders in flood education so that they can help educate others in their networks.
- Developing and maintaining ongoing community discussion about flooding and coping with different local flooding scenarios. This could be achieved through the media, community group meetings and in informal settings.
- Community and agency reviews of preventative (e.g. floodplain planning) and coping systems (e.g. total warning systems, recovery systems). This could be achieved through public meetings, working groups, focus groups. Community emergency plans are another method of encapsulating many of these systems.
- Providing vulnerable community sectors (e.g. businesses), organisations (e.g. caravan parks) and groups (e.g. people of Non-English Speaking Background, aged), with specifically tailored education activities to develop their competencies to cope with a flood event.

Education activities in relation to post-flood learnings could include:

- Social research (e.g. surveys, focus groups) to find out the effectiveness of warning systems, evacuations, recovery support, flood education etc. and how they can be improved.

- Agency disaster de-briefs, the learnings from which improve systems and agency competencies.
- Oral histories. These allow people to recount their stories about the flood event and to identify learnings to better prepare and cope with future floods.
- Community de-brief meetings to identify problems in preparation, response and recovery and possible improvements.

Community participation

A third feature of the new approach is the commitment to community participation in the design, implementation and evaluation of flood education programs. The 'traditional approach' to flood education, still in widespread use, informed the community about floods and their risks through the dissemination of prepared material. It sometimes emphasised actions people could undertake to protect themselves and their property. According to O'Neill (2004, p. 5), this approach 'was often one-off and one-way, and assumed that the audience was an undistinguishable group of individuals who had the same needs and values'.

A more participatory approach to community flood and other hazard education is now promoted. According to Paton (2006b, p. 16), 'Participation in identifying shared problems and collaborating with others to develop and implement solutions to resolve them engenders the development of competencies that enhance community resilience to adversity'.

The participatory approach, although relatively new to flood education, has been well acknowledged and used in other forms of community education. For example, in education for sustainability, according to Tilbury and Wortman (2004, p. 56), 'genuine participation is essential to building people's abilities and empowering learners to take action for change toward sustainability'.

Using the participatory approach, emergency management agencies act more as facilitators to communities, rather than directing change in a 'top-down' manner. They also help the community build its capability (e.g. networks, leadership, competencies) for preparedness, response and recovery.

Flood education planning

A fourth and last feature of the new approach is the promotion of long term education planning.

Intuitively, community flood education programs should be ongoing as it is unsure when a flood event will occur. Furthermore, there is some evidence to show the value of longer term community flood education programs in comparison to short term education 'campaigns' of less than six months duration. For example, research

by the NSW State Emergency Service (Webber and Dufty, 2008) has shown that communities in NSW that received education programs for longer than one year have shown significantly higher preparedness levels and a much greater willingness to evacuate.

Using the participatory approach, a relatively new way to formalise longer term flood education activities is through 'local flood education plans'. These plans are developed, implemented and evaluated by local committees, usually consisting of resident and business representatives, local council and government agency staff.

In some communities, local flood education committees need to be formed to manage the development of the local flood education plans. In other communities, the management of a flood education plan can be subsumed into the function of an existing floodplain management or emergency management committee. In every case, there needs to be local commitment and drive to ensure the success of the plans.

It cannot be assumed that the local committee has specific education expertise, especially related to the design and evaluation of flood education programs. Education practitioners, such as those from the emergency management agencies, can provide expert education guidance for these committees as required.

Local flood education planning should address the four functions of community flood education identified above. It should also relate appropriate learning activities to the different community groups or sectors (e.g. ethnic groups, businesses, rural landholders, residents) involved in the plan.

Local flood education plans should strongly promote and support individual, home and business flood preparedness plans. They also should build community capacity where appropriate (e.g. networks for learning, training of volunteers) and involve the community in the planning, implementation and evaluation phases.

There is also research that shows that a cross-hazard approach to community resilience education has merit, not only in economies of scale and avoiding duplication of community effort, but also using standard preparedness messages and education activities e.g. preparing personal or business hazard emergency plans instead of just flood preparedness plans. Where possible, local flood education plans should be part of local hazard education plans (e.g. in communities at risk from both bushfires and flooding) developed by a local hazard education committee or, especially in smaller communities, a progress association or other community representative group.

A major deficiency of many flood education programs is a lack of evaluation to gauge their appropriateness and effectiveness. Evaluation should be part of the planning and

implementation of these programs and inform improvements for future programs and their education activities.

There are two categories of evaluation that should be related to these programs.

1. *Summative evaluation* which measures the program's success or failure by comparing outcomes with original goals
2. *Formative evaluation* which measures program progress against ongoing benchmarks and allows the manager to make course corrections.

An evaluation process should also be built into local flood education plans to determine the success of education programs and activities included in the plan. Evaluation of the plans should also be both formative and summative.

Evaluation should strive to gauge the appropriateness and effectiveness of the plans and their education activities by measuring success in the following:

- Delivery of the plan actions and education activities
- Levels of community preparedness
- Competencies and systems in place to adapt to a flood event
- Response including use of appropriate mitigation behaviours to a flood event
- Recovery after a flood event
- Learnings and improvements to preparedness, competencies and systems after a flood event.

A major tool in this evaluation should be social research to help measure these 'indicators of success'. This social research can include surveying of landholders and others affected by flooding, focus groups, interviews, de-briefing meetings and oral histories. Anecdotal observations from landholders and emergency agencies are useful in complementing the more quantitative methods such as surveying.

Where possible, the evaluation of community education plans and programs should involve the community or its representatives. Participatory evaluation involves local stakeholders in problem identification, evaluation design, data collection, analysis and use of results. Stakeholders include those who affect or are affected by the policies, decisions and actions of a program. Participatory evaluation has already shown to be effective in several fields including sustainable development, health and agriculture (McDuff, 2002).

The approach in practice

Although in its infancy and not yet fully evaluated, there are some indications that this new approach has merit in helping build community resilience to flooding.

NSW State Emergency Service and the Victoria State Emergency Service (VICSES) have developed their respective FloodSafe and FloodSmart programs that comply with some parts of the new approach. An evaluation of the pilot FloodSmart program in Benalla showed that the program had considerable impact in raising some aspects of community preparedness and increasing adaptive capability, at least in the short term (Molino Stewart, 2007).

To date, flood education plans have, or are being developed in four communities in NSW (Webber and Dufty, 2008). Although the impacts of these plans have not yet been fully evaluated, their main benefits at this stage appear to be:

- More community ownership in flood education
- Greater recognition and support of flood education by floodplain management and emergency management authorities
- Flood education activities planned for local needs
- Information and resources are better distributed in areas of need
- Feedback and engagement processes are at a wider and more complex level
- Flood education activities to be rolled out systematically over time
- Improvements to be made to local flood education through planned evaluation
- State-wide and regional education initiatives to be utilised where appropriate to the local situation.

One of the NSW local flood education plans has been evaluated through the comparison of social research before the plan was developed with that after parts of the plan were implemented. The Maitland flood education plan was developed by representatives of local rural landholders, businesses, residents, Maitland City Council, NSW SES and the Hunter-Central Rivers Catchment Management Authority. The comparison of social research found that there were increases in the concern of Maitland residents about flooding, their preparedness and understanding of appropriate response behaviours (Micromex, 2007). It should be noted that results are somewhat clouded by the psychological impact of the flood event of June/July 2007 that occurred during the implementation of the plan.

Conclusion

Based on hazard psychological research and learnings from community education practice, a 'new approach' to flood education is promoted that should be more appropriate and effective than that implemented in the past.

The new approach has four main features.

1. It focuses on building community resilience to flooding.
2. It has four clear functions – learning related to preparedness conversion, mitigation behaviours and adaptive capability (competencies and systems), and post-flood learnings.
3. It requires community participation in the design, implementation and evaluation of flood education programs.
4. It encourages ongoing education through local flood education plans.

It should be noted that the new approach is highly transferable to education for other natural hazards. Some of the features of the approach have already been implemented in bushfire education programs. For example, for some years the Victoria Country Fire Authority has been using community participation in ongoing preparedness learning through its Community Fireguard program.

References

- Boura, J., 1998, Community Fireguard: Creating partnerships with the community to minimise the impact of bushfire, *Australian Journal of Emergency Management*, Vol. 13, pp. 59-64.
- Dufty, N., 2008, *A New Approach to Flood Education*, Molino Stewart Pty Ltd, Parramatta.
- Folke, C., and others, 2002, *Resilience and Sustainable Development: Building Adaptive Capacity in a World of Transformation*, Scientific Background Paper for the World Summit on Sustainable Development on behalf of The Environmental Advisory Council to the Swedish Government.
- McDuff, M., 2002, 'Needs Assessment for Participatory Evaluation of Environmental Education Programs', *Applied Environmental Education and Communication*, Vol. 1, pp. 25-36.
- Micromex, 2007, *Flood Education Advisory Committee Post Program Evaluation 2007*, A research report prepared for the Hunter-Central Rivers Catchment Management Authority.

Molino Stewart, 2007, *Roles and Responsibilities for VICSES in Flood Education*, published report commissioned by the Victoria State Emergency Service.

O'Neill, P., 2004, *Developing a Risk Communication Model to Encourage Community Safety from Natural Hazards*, NSW State Emergency Service paper.

Paton, D., Smith, L., Johnston, D., Johnston, M., & Ronan, K., 2003, *Developing a model to predict the adoption of natural hazard risk reduction and preparatory adjustments*, (Research Project No. 01-479): EQC Research Report.

Paton, D., 2006a, Disaster Resilience: Building Capacity to Co-exist with Natural Hazards and their Consequences, in Paton, D., and Johnston, D., *Disaster Resilience: An Integrated Approach*, Charles C Thomas Publisher, Springfield, Illinois, USA.

Paton, D., 2006b, *Community Resilience: Integrating Hazard Management and Community Engagement*. Paper from School of Psychology, University of Tasmania.

Paton, D., McClure, J., & Burgelt, P.T., 2006, Natural Hazard Resilience; The Role of Individual and Household Preparedness, in Paton, D., and Johnston, D., *Disaster Resilience: An Integrated Approach*, Charles C Thomas Publisher, Springfield, Illinois, USA.

Tilbury, D., and Wortman, D., 2004, *Engaging People in Sustainability*, Commission on Education and Communication, IUCN, Gland, Switzerland and Cambridge, UK.

Webber, D., and Dufty, N., 2008, *Being Prepared – Community Flood Education Planning in NSW*, paper presented to the 48th Annual Floodplain Management Authorities Conference, Wollongong, NSW, 26-29 February 2008.

About the Author

Neil Dufty is a Principal of Molino Stewart Pty Ltd, based at Parramatta, NSW. He has extensive experience in implementing and evaluating community education programs, especially in environmental education. Over the past four years, Neil has conducted research into flood education programs worldwide and evaluated community flood education programs including for the Victoria State Emergency Service. Neil may be contacted at ndufty@molino-stewart.com.au