

Introduction

The Great Southern California ShakeOut of November 2008 featured the largest earthquake drill in U.S. history. Involving 5.3 million participants the drill took place in homes, businesses, schools, places of worship and communities across California with an estimated 3.3 million school children involved. As part of an international observation team put together by RiskRed three schools were observed taking part. This paper will focus on a high school in Burbank, Los Angeles, California, comparing it with a drill observed in an elementary school in Taiwan in May 2009 in an effort to highlight good practice while examining how the drill could be integrated into wider disaster prevention education, before during and after the event. It is argued that the current practice of isolated and abstract exercises without reflection and action by students does not help them to become better prepared now or in the future as adults.

Disaster Prevention in Schools

To date, international studies suggest that school-based disaster risk education may be an effective strategy in promoting community-wide risk reduction actions, including mitigation, preparedness and insurance purchase. Ronan and Johnston (2001a), in a study of 440 New Zealand children, found that children involved in hazards education programs demonstrated "more stable risk perceptions, reduced hazard-related fears, and a much greater awareness of important hazard-related protective behaviors" when compared with children who had not experienced hazard education programs.

Later studies found that an "emergency management" style program and increased interaction between children and parents increased home-based preparedness (Ronan and Johnston, 2003). Mitchel et. al (2008) finds that in El Salvador and New Orleans, youth played important roles as informants in informal and formal communication networks. In fact, Anderson (2005) and Sharpe (2008) argue that excluding youth from the disaster planning process ignores their potential role as educators, advocates, and as active agents in protective actions.

Clearly, school-based education material that centre on protective measures - including preparedness measures, insurance coverage, and mitigation – can be an important strategy for increasing community-wide preparedness. Yet, in a stocktaking of disaster risk reduction education worldwide, Wisner (2006) found that most school-based education failed to integrate studies of hazards in science classes with preparedness and drills that could improve a child's sense of efficacy and reduce hazard-related fears. Despite growing knowledge about how to successfully create public education messages for earthquake preparedness, increasing public preparedness remains a significant challenge. However disaster risk reduction education can be improved through strategies such as experiential learning – a process which can and should put drills at the centre of the learning cycle.

Case Study Number One:

Burbank High School, Burbank California, US - Nov 2008.

The students observed knew what to do in terms of 'drop, cover and hold on' - although it should be noted that 15 year old students find it hard to get underneath the types of desk used in US high schools (see graphic right). After the simulated earthquake had passed students were evacuated outside to the school field for registration. When leaving the classroom the teacher was last out, marked the door with an 'x' to indicate the class had been cleared and there were no casualties. The door was locked behind to prevent anyone else from entering. One of the class students took an emergency 'go-bucket' containing first aid kit, gloves, crow-bar, playing cards, dust mask, chalk (which was already moved by teacher to make mark on the door).

Students knew where they were supposed to go and sat down on plastic sheets and towels. After about 3 minutes the class teacher took the register and this was passed to a runner who took this to ICS. Many students grouped together to talk and eat. They were quiet calm and knew that this was a drill and expected it to be over in an hour! The teacher had a print out of her class with photographs of students so she could quickly note any absent or missing students. This was not provided for her but she had done this herself – an example of good practice and a logical future step for each class teacher to have a set inside their emergency folder, covering every class.

The assembly area had six shade structures dotted about the place at regular intervals. The principal was the Incident Commander and informed students that as it was hot day, if they had sun screen it would be a good idea to apply it. Some students were used as 'runners' helping to relay information and collating register lists. After 5 minutes students were instructed to send a text message to parent/guardian etc explaining that the quake drill had started. After the drill was over students returned to classes.



Above: "Drop, Cover & Hold On" graphic from the shakout.org website, which was reproduced on t-shirts, banners and fliers, but wasn't practical for older students, larger students or the physically disabled.



Above: In Taiwan students acted as 'victims' while teachers acted as first-aiders, search and rescue and fire suppression teams. Although a level of realism was injected by this approach students were principally passive observers.

Case Study Number Two:

Ciao Jhen Elementary School, Taiwan - May 2009.

In the Taiwan earthquake drill, at Ciao Jhen elementary school in the west of the country, a signal was given that there was an earthquake. As an observer seated outside it was not possible to tell if students and staff, dropped, covered and held on. After a signal the school moved outside. Most students ran with bags over their heads (this could lead to students falling and becoming crushed in the event of a real earthquake when students are frightened). Students sat quietly for over an hour in the heat of the day (it was 11am-12pm) without access to water.

The only student participation was as 'victims'. 30 students were made up to have fake bruises, cuts and broken limbs for instance. School staff were used to evacuate these from the building working as search and rescue teams and first-aiders. A first aid area had already been prepared for the drill, which didn't help with realism. Additionally there was no attempt to screen this from watching students who were evacuated to the sports field. In a real earthquake this would be traumatic for the students.

There was a demonstration of fire-fighting and first aid by staff while the head teacher co-ordinated as the Incident Commander.

A local fire team, demonstrated cutting equipment and fire suppression while an ambulance and crew attended the drill and assessed the 'injured'. Communications were difficult and a loud hailer was used to communicate alongside walkie-talkies. The request and re-unification gate were not separated and a list of 'dead' and 'missing' students was posted at the front of the school.

Gap Analysis

Persistent areas of concern related to awareness and learning from school drills in Los Angeles were uncovered in both school-site observations as well as through an open debriefing:

- 1. Wide participation is needed** for successful school disaster prevention and response planning. This includes leadership from school board members and administrators as well as initiative from teachers and staff. It also can and should include students, parents, and community members much more frequently.
- The principles underlying **'Drop, Cover and Hold'** (get down low, make yourself small, keep your head and neck covered) are not well-understood and therefore not performed well in settings without desks or tables. (Teacher desks need to also have a clear space underneath!) In classes with desks students do not fit underneath them properly - It would be better to show a student sitting with legs crossed and holding on with backsides on the floor!
- The essential part of any drill is the reflective debriefing and planning that occurs **after the drill**.
- Drills require realism and variety** in order to maximize their effectiveness. Scenarios should include elements of the unexpected that require improvisation. Drilling with advance notice, during a predictable period of the school day, seriously limits learning opportunities.
- For students the learning experience can be significantly enriched through **experiential learning**, including school and community disaster prevention activities, and activities to coincide with and follow the drill itself (some of these are outlined in recommendations below).
- Child-to-family transmission of disaster prevention lessons holds powerful and untapped potential.
- Students with disabilities** may have very specific needs in case of emergency which should be anticipated routinely as part of their Individualized Educational Plans (IEPs). This is something that special education teachers and parent advocacy groups might initiate and promote.

Recommendations:

In both US and Taiwan case studies students were predominantly passive bystanders. While it is appreciated that adults are required (often by law) to evacuate and look after students following an emergency such as an earthquake it should also be noted that this could potentially reinforce a belief that the locus of control lies not with the individual but with the 'experts' - teachers, EMT's and government. It also reinforces the oft projected stereotype of children and youth as helpless victims, whereas research has shown them to not only be aware of the dangers in their community but full of ideas for preparedness (Twigg, 2005, Sharpe 2008). Students should at least take part in lessons before during and after the drill that helps them to contextualize and place the drill in a sequence of learning events, so that it is not an abstract experience. Examples could include any or all of the following ideas:

- ▶**Emergency Go-Bag scavenger hunt or art activity for selection of items.**
- ▶**Games to develop response skills (e.g. Pull Aim Squeeze Sweep, bucket brigades transferring water in or debris out).**
- ▶**Making table-top shake table model and simulating effects on building contents.**
- ▶**Designing non-structural mitigation solutions and problem-solving; researching safety of own school buildings and homes.**
- ▶**Transportation assistance skills, Activities developing Check, Call, Care and life-saving skills.**
- ▶**Table top exercise based in an emergency scenario, with complexity added over time to test a range of thinking skills in a crisis**

Gap Analysis

Persistent areas of concern related to awareness and learning from school drills in Taiwan were uncovered in both school-site observations as well as through an open debriefing:

- The need for separate request and re-unification gates so that students can be identified and re-unioned with family. A list of dead and missing students should NOT be posted at the front of the school as this will lead to traumatic and chaotic scenes, which would be extremely difficult to manage.
- Students need water to be provided, even if it is just a drill.
- Students need to be involved more than just as passive observers. Being used as 'victims' merely reinforces this as a stereotype and does not bode well for future education projects for preparedness which may lead to a view that preparation and safety is the concern of others – teachers, emergency services and the government – an external locus of control. (see Perloff & Fetzer 1986)
- Drills require realism and variety** in order to maximize their effectiveness. Scenarios should include elements of the unexpected that require improvisation. Drilling with advance notice, during a predictable period of the school day, seriously limits learning opportunities. In the Taiwan case study *everything* was timed meticulously as there were some 120 observers of the drill. In the event of a real emergency this would not be the case and this could build a sense of false security and confidence in dealing with a very difficult situation.
- Again, for students the learning experience can be significantly enriched through **experiential learning**, including school and community disaster prevention activities, and activities to coincide with and follow the drill itself (see recommendations below).

The future:

Participatory Action Research could be used to evaluate the effect of experiential learning. This process would critically examine the social and environmental conditions as the basis for improving them. However the questions need to come from the children themselves: Are we safer? What have we learned? Have we made changes at home or at school that help us to not only be prepared, but to help others?

The perspectives of both researchers and the children's perspectives on a research question may change while carrying out action research and this change is desirable. This approach emphasizes the importance of children as researchers and agents of change in their environment and is a child rights based approach to Disaster Risk Reduction.

References:

Anderson, W. (2005). *Bringing children into focus on the social science disaster research agenda*. International Journal of Mass Emergencies and Disasters 23 3:159-175.
 Perloff, L.S., & Fetzer, B.K. (1986). *Self-other judgments and perceived vulnerability to victimization*. Journal of Personality and Social Psychology, 50, 502-511.
 Ronan, K.R. and D.M. Johnston (2001a). *Hazards Education in Schools: Current Findings, Future Directions*. APEC Workshop on Dissemination of Disaster Mitigation Technologies for Humanistic Concerns Phase I: Earthquake Disaster, Taipei, Taiwan, June 18-21, 2001.
 Ronan, K.R. and Johnston, D. (2003). *Hazard Education for Youth: A Quasi Experimental Investigation*, Risk Analysis, 23 5, 1009-1020
 Sharpe, J.E. (2008) *Engaging Students in disaster preparedness*. Emergency planning in education and schools workshop, London Local Authorities Emergency Planning Group (LLAEPG), 24th October 2008
 Twigg, J. Disaster risk reduction: Mitigation and preparedness in development and emergency programming. 2004, Overseas Development Institute, Humanitarian Practice Network.
 Wisner, B (2006). *Let Our Children Teach Us! A Review of the Role of Education and Knowledge in Disaster Risk Reduction*. India: Books for Change.