

The 2010 and 2011 Canterbury earthquakes and organisational learning at the University of Canterbury: Does practice make perfect?

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Abstract

In September 2010 and again in February 2011, the city of Christchurch was rocked by earthquakes of magnitude 7.1 and 6.3 respectively. The second earthquake was shallow and caused extensive damage and loss of life, destroying most of the Central Business District. This paper focuses on recovery management at the University of Canterbury, exploring the extent to which the senior management team learned lessons from the September event which informed the way that the recovery was managed after the February earthquake. It examines the counter-intuitive possibility that successfully dealing with a prior, lesser event, may not necessarily better equip managers to deal with a subsequent, more extreme event.

Keywords: organisational learning, adaptive, earthquake recovery management, disaster management, university

Introduction

At 4:35am on Saturday, 4 September 2010, the city of Christchurch was rocked by a magnitude 7.1 earthquake centred on Darfield, 40km to the west. There was extensive damage across the city, but no major building failures or fatalities. At 12:51 pm on Tuesday, 22 February 2011, the city was struck by a second major earthquake measuring magnitude 6.3. The second event was shallow (1-2km deep) and centred only 10km from the city centre (NZSEE, 2011). It devastated the Central Business District (CBD) and eastern suburbs, where buildings weakened by the September earthquake and subsequent aftershocks fully or partially collapsed. 181 people were killed in the February earthquake, making it the country's worst natural disaster after the 1931 Hawke's Bay earthquake. The Government declared a state of national emergency, which was only lifted on 1 May 2011.

This paper focuses on recovery management at the University of Canterbury following the September 2010 and February 2011 earthquakes. It explores the extent to which the senior management team learned lessons from the September event which informed the way that the recovery was managed after the February earthquake. The author was an academic member of this senior management team during both periods and this paper is offered as a critical self-reflection on events.

Critical self-reflection as a research methodology has inherent weaknesses (Reed-Danahay, 2002). Unlike more common ethnographic methods which employ first-hand observation of participants, when the researcher is an active participant in events there is a natural tendency for him/her to base conclusions on anecdotal evidence and interpret cause and effect in ways which overemphasize the significance of the actions undertaken or show the researcher in the best light.

As Fine (1993) argues, objectivity can be an illusion in ethnographic studies, while the tendency for researchers to perceive the events in which they are actors through the lens of their personal relationships with other participants is well-known. Notwithstanding the limitations of the researcher as 'candid ethnographer', 'chaste ethnographer', 'fair ethnographer' and 'literary ethnographer', this approach provides rich insights into understanding the management of a natural disaster which could not be achieved by an alternative, more remote methodology.

Interestingly, one conclusion is that the very success of the post-September recovery, documented in an internal report by Seville et al (2011), may have made the university less adaptive after February 2011. While the university has successfully recovered from the second earthquake in very difficult circumstances, it has not exhibited the same responsive organisational learning which characterised the post-September recovery. This raises the interesting, counter-intuitive possibility that successfully dealing with a prior, lesser event, may not necessarily better equip managers to deal with a subsequent, more extreme event.

The University of Canterbury

The University of Canterbury (UC) is a public, comprehensive university located in the western suburbs of Christchurch, about 5km from the CBD. It occupies a parkland campus of about 80ha, to which the university moved from its original city-centre site in the 1960s. Most of the buildings were constructed in the late 1960s and 1970s. The University has approximately 18,000 students and 2,000 academic and general staff.

Prior to September earthquake, UC already had a very well developed emergency management system. It had constructed an Emergency Operations Centre, which is a self-contained building with its own generator that houses a 'command and control' centre, with

telephone, radio and computer communications from which the whole campus can be monitored by closed-circuit television (CTV) and buildings can be remotely locked or opened.

There was a dedicated Incident Management Team (IMT), comprising security officers, engineers and technical staff, responsible for operational management following a major incident or disaster, and a Strategic Emergency Management Team (SEMT), comprising the senior management of the university, tasked with determining the longer-term strategic response to an event. Both groups routinely practised emergency management through team-based simulations of major events, which prior to September 2010 had included an earthquake, a bomb at graduation, an aircraft striking the campus and armed gunmen on a rampage.

The 4 September Earthquake

When the September earthquake struck at 4:35am, almost all staff and students were at home asleep. Power was lost across the city. The University's IMT was on site rapidly and security officers were deployed to physically lock buildings, as the electronic locks were disabled by the power outage. Once the campus had been secured and the IMT had established that there were no injuries or fatalities on campus, the SEMT was assembled at the EOC to assess the situation and decide on the best course of action. The SEMT comprises the Vice-Chancellor, the Deputy Vice-Chancellor, the academic heads (Pro-Vice-Chancellors) of the five colleges and the directors of human resources, finance, learning resources (buildings, IT and libraries), student services and communications. Significantly, in September the last three directors – learning resources, student services and communication – were all newly appointed to positions which had been established as the result of a major restructuring of the university's central services in 2009/10.

The SEMT decided, given the risk of building failure in a subsequent aftershock, to close the campus until further notice, pending engineering inspections of each of its 80 buildings. The IMT began this work almost immediately and there were joint meetings of the SEMT/IMT each day to receive updates of this work. The SEMT also launched a multi-channel communications strategy which involved daily e-mail and web-based communications to staff and students, occasionally supplemented by video presentations by the Vice-Chancellor, with the corporate messages drafted by the director of communications supplemented by regular updates from academic heads to their college staff.

Although the recovery process was interrupted by a strong magnitude 5.4 aftershock on 8 September, which forced the reinspection of a number of buildings, by the end of 8 September the engineering inspections were complete and the buildings all deemed structurally safe to reoccupy. Small teams began entering the buildings the following day to remove hazards (e.g. fallen ceiling tiles, bookcases) and broken glass and wall tiles. UC reopened for staff on 13 September and for students on 15 September. The only major facility not available was the main library, where numerous book stacks had collapsed and required replacing with a strengthened shelving system.

In the weeks after the September earthquake, there was a general consensus amongst staff that the senior management had managed the process well. It was felt that senior managers had acted decisively, followed a clear recovery plan which had been well-communicated to staff, and that the university had been able to return to business as usual within two weeks. Evidence from students' examination performance in November 2010 showed no statistical difference from the results at the end of semester I, suggesting that the brief interruption to students' learning in early September had had no detectable negative impact on their academic attainment.

The 22 February Earthquake

The February earthquake occurred at 12:51pm, when many staff and students were at lunch on campus. After several thousand aftershocks since the previous September and regular reinforcement of earthquake procedures ('drop, cover and hold'), most staff and returning students knew to remain under cover until the shaking had stopped and then to evacuate buildings. Having moved to assembly points, there was initially some confusion as to whether the earthquake was severe enough to warrant closing the campus. In the event, a heavy aftershock some 10-15 minutes later and emerging reports of devastation and deaths in the CBD caused managers to send staff and students home. The IMT and SEMT assembled immediately afterwards in the EOC to begin the recovery operation.

In the hours after the February earthquake, the strong view amongst the senior management team was that they had successfully managed the recovery from the September earthquake and that, building on this experience and the lessons learned, they would be able to follow the same 'roadmap' to recovery as five months earlier.

There were, as it subsequently transpired, important differences between the two earthquakes. First and most importantly, there had been no major building failures or fatalities in September. Cantabrians had taken considerable pride in the fact that, with stringent earthquake building codes, the 'Garden City' had been relatively unscathed by a magnitude 7.1 earthquake, in contrast to Haiti where a magnitude 7.0 earthquake on 12 January 2010 had killed an estimated 300,000 people. The February earthquake saw major buildings collapse, killing and injuring hundreds in the CBD. Many of Christchurch's most iconic colonial-era buildings, most notably the Anglican cathedral, were fully or partially destroyed. Liquefaction damaged thousands of homes, as tonnes of wet silt was forced out of the ground, causing subsidence and buckling roads.

Secondly, and causally linked to the injuries and deaths, the February earthquake took place at lunchtime on a working day. Rather than being asleep in mostly single-storey homes, many people experienced the earthquake in swaying, multi-storey office buildings or at street level as masonry and glass fell from the buildings around them. With the power out and cellphone lines jammed, parents spent the hours after the February earthquake in traffic jams, desperately trying to collect children from damaged schools. Those finally returning home often found their houses severely damaged, mains water cut off and sewage leaking into the streets nearby.

Within hours of the February earthquake, the CBD quite literally resembled a war zone. The police and army set up a cordon around the entire central city, using armoured military vehicles from the nearby Burnham army camp and checkpoints to seal all roads into the city. Search and rescue teams from across the world began to arrive to join the search for survivors in the collapsed buildings.

Organisational Learning at the University of Canterbury

Organisational learning refers to the way that organisations adapt their operations and strategies in response to changes in their internal and external environments (see Kim (1993), Nonaka and Takeuchi (1995) and Flood (1999)). There is considerable evidence that the UC learned quickly following the September earthquake. The IMT and SEMT met two to three times a day to assess new information and adjust both their operational responses and their communications strategies. The fact that several key members of the SEMT were new to the organisation probably helped to foster a culture of openness and willingness to consider new ideas and ways of working.

Following the second earthquake, however, the organisational response was much less adaptive. There appear to have been several explanatory factors. One was that many key staff were fatigued by months of remediation work after the September earthquake. The main library had only just reopened the day before the February earthquake. Many other buildings had extensive repair work still underway, with scores of contractors on campus. The prospect of starting again was undoubtedly emotionally draining for many staff.

The dominant factors, however, appear to have been the success of the post-September management model and the greater self-confidence of the new members of senior management with responsibility for learning resources, student services and communications. Joint meetings of IMT and SEMT were disbanded within two days of the earthquake, in the interests of streamlining the management process. Rather than discussing and taking decisions collectively in the SEMT, the key members with operational responsibilities (learning resources, etc) were tasked with chairing small sub-committees to speed up decision-making. Many of these sub-committees rarely met, as the informational asymmetry between the chair (with access to rich information from his/her direct reports) and other members of the sub-committee meant that they served little practical purpose. Communications were centralised to ensure there was one 'original source of truth' and messages from academic heads of colleges to their staff became lightly customised versions of the corporate message.

By setting recovery management into such an inflexible framework, the scope for further organisational learning was unintentionally constrained after 22 February. This might not have been problematic had the September and February earthquakes been broadly similar in their impact. But as noted above, the February earthquake was far more devastating and, critically, had led to the partial or complete collapse of several buildings in the CBD which had been declared safe for reoccupation after the September event.

On engineering advice, the Vice-Chancellor agreed to a rigorous inspection process before buildings on campus could be reoccupied. This process essentially involved a two-step engineering inspection, the first to establish that the building was structurally safe and the second to assess whether it would remain safe in the event of another magnitude 6.3 earthquake under the campus. The second step involved removing ceilings, flooring and wall panels to test seismic joints and going back to original plans to model the effect of another earthquake. In many cases, satisfying the second step meant significant remediation work, injecting resin into concrete cracks and strengthening the joints between concrete beams.

The rationale for this approach was clear. It would have been irresponsible, given what had happened in the CBD, to risk allowing hundreds of staff and students to re-enter buildings until there was confidence that they would withstand another earthquake. But this approach made it almost impossible to predict with any degree of accuracy how long it would take engineers to undertake the two-step inspection and carry out the necessary remediation work.

This created a major difficulty in the context of a principle that had evolved as part of the communications strategy after September, namely that the university would only make public information it knew to be incontrovertibly true. The lesson learned post-September was that contingent or speculative information could fuel unhelpful rumours. The unintended consequence after the February event was that official communications via e-mail, the university website and Facebook, which had been widely regarded as a key strength in September, became repetitive and devoid of informational content, since there was so little hard data on the likely availability of buildings.

Faced with this uncertainty and the threat that enrolments could precipitously collapse if teaching could not be restarted, the Vice-Chancellor decided to erect a number of marquees on car parks as temporary lecture theatres and commission 100-plus prefabricated buildings on playing fields to serve as temporary office space. These decisions were taken on the advice of a small inner group of senior management, in line with the desire to streamline decision-making. The university began a so-called 'progressive restart', with limited teaching recommencing on 14 March. By mid-April, most classes were again running as usual.

The lack of an effective communications strategy, in the face of continuing uncertainty, and the fact that major decisions had been taken without consultation caused considerable concern amongst many in the academic community. In contrast to the period after September, meetings of Academic Board after the February earthquake were more acrimonious and many staff, both privately and publicly, expressed frustration with the way that recovery was being managed. Undoubtedly, the much longer period of full or partial closure after the February earthquake, which forced many staff to work from homes and 'teach in tents' contributed to this atmosphere, but the organisation exhibited little capacity to learn and adapt to the changing conditions over the following months, apparently frozen into the management processes refined after the first earthquake.

A related consideration that may have impacted staff moral concerns the issue of governance within an academic institution. There is a strong tradition of collegial decision-making at UC and there has been an undercurrent of tension between the academic corpus and senior managers since a restructuring of the university in 2004 into a more 'managerial' model. Following the September earthquake, key academic committees recommenced functioning within two weeks of the event, so that to the extent that staff perceived that 'emergency powers' had been taken by senior managers, this was regarded as legitimate because it had been limited to the immediate aftermath of the event.

After the February event, the centralisation of control over matters of key academic interest, including timetabling, resetting the academic year and revising assessment regulations, continued for several months. The legitimacy of senior managers retaining such powers was increasingly questioned by some members of the academic community and, over time, it was inevitable that an increasing proportion of staff began to regard the continued centralisation of authority as an unwelcome shift in the balance of power, rather than a pragmatic response to a crisis.

While there is considerable evidence that the recovery process was 'better' managed after 4 September than after 22 February, it is also undeniable that the challenges facing senior managers after the second event were far greater. Because the earthquake occurred on the second day of the new academic year, many first year students, who had little emotional or academic capital invested in the university, simply took the first flight home. Both domestic and international enrolments plummeted and the university was forced to act quickly and decisively to resume teaching, albeit initially in tents, in order to avoid a financial collapse.

The city itself was in crisis mode, with heavy casualties and a sense of stunned shock as a devastated CBD was searched for bodies. Popular trust in engineering reports of building safety was seriously eroded and many businesses relocated from city-centre high-rise blocks to low-rise warehouses in outlying residential districts. Thousands of people were either homeless or living in houses with power, water or sewage. The Government quickly mobilised support services, but the university found itself sandwiched between central government's promise of financial support and the tertiary funding agency's limited resources.

The key insight, however, is that while senior management, the author included, began the second recovery operation in the firm belief that the September event had prepared the team for what lay ahead, in fact this prior experience appears to have inhibited the team's flexibility and responsiveness in very changed circumstances. While the individual actors worked tirelessly and professionally to achieve the university's 'progressive restart', they tended to stick to a *modus operandi* developed in the much less serious era post 4 September and functioned less well as a team in dealing with the new problems and challenges thrown up by the 22 February event.

Conclusions

The September and February Canterbury earthquakes, previously regarded by geologists as 'one in four hundred years' events, caused huge stress to the city of Christchurch, devastating the CBD and significantly damaging the four major tertiary providers – UC, Christchurch Polytechnic Institute of Technology (CPIT), Lincoln University and Christchurch Medical School (University of Otago). In the aftermath of the second earthquake, there were many positive features to emerge in the tertiary education space: the four providers banded together to offer each other teaching and research space in undamaged facilities; universities in New Zealand and Australia enrolled displaced UC students as not-for-fee 'exchange students' so that they could continue studying until UC reopened; and the 'Student Volunteer Army' sent thousands of young volunteers into the worst-affected suburbs to assist with the clean-up.

From a management perspective, however, one of the most interesting features was the way that, somewhat paradoxically, the processes for managing the recovery at UC, which had flexibly evolved and proved so successful in September, became frozen and fared less well in the changed circumstances after the February earthquake. Organisations constantly face the challenge of remaining adaptable in the face of slow change in their operating environments. The UC experience is unusual, however, because organisations normally learn rapidly when faced with a major crisis. While UC proved highly adaptive after 4 September, it may be that this very success made it more vulnerable after the 22 February earthquake, because senior managers had developed a misplaced confidence in their capacity and systems to manage the recovery. Because the second earthquake was so different in terms of the scale of the physical and emotional damage to the community, this managerial commitment to 'tried and tested' methods inhibited the institution's adaptability to the changing circumstances.

This conclusion by no means detracts from the professionalism and dedication of the senior managers at UC, who worked tirelessly in extraordinarily challenging circumstances to ensure the viability of the university; nor does imply that the recovery process has not been impressively successful – UC provides an excellent case study of an institution which has acted swiftly and decisively to recover from what might have been a fatal blow. Rather the key point is that successfully managing to deal with a relatively modest crisis does not, of itself, necessarily better equip managers to deal with a more extreme version of the same event; and in some cases, may inhibit creativity and adaptability the second time around.

In their footnote to the internal report on UC's management of the September earthquake, Seville et al (2011) intuitively conclude: 'Although it did not feel like it at the time, in many ways the earthquake on 4 September was our practice run for any future critical incident. On 22 February our experience gained during the response in September, and our continued focus on preparedness, contributed to an immediate and effective response when the earthquake struck' (p48). Does practice make perfect? An alternative answer, based on the analysis in this paper, is that however well the first event is managed, if the next event is

significantly more extreme, the 'practice run' may not necessarily lead to improved managerial performance.

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