International Journal of Business, Human and Social Sciences
ISSN: 2517-9411
Vol:7, No:6, 2013

Managing, Sustaining, and Future Proofing the Business of Educational Provision Following Large-Scale Disaster and Disruption

Judy Yarwood, Lesley Seaton, and Philippa Seaton

***Abstract*—**A catastrophic earthquake measuring 6.3 on the Richter scale struck the Christchurch, New Zealand Central Business District on February 22, 2012, abruptly disrupting the business of teaching and learning at Christchurch Polytechnic Institute of Technology. This paper presents the findings from a study undertaken about the complexity of delivering an educational programme in the face of this traumatic natural event. Nine interconnected themes emerged from this multiple method study: communication, decision making, leader- and follower-ship, balancing personal and professional responsibilities, taking action, preparedness and thinking ahead, all within a disruptive and uncertain context. Sustainable responses that maximise business continuity, and provide solutions to practical challenges, are among the study's recommendations.

***Keywords*—**Business continuity, earthquake, education, sustainability.

I. Introduction

ON February 22, 2011 at 12:51:42 pm (NZ Daylight Time) Christchurch citizens joined the rising number of people affected globally by natural disasters [1], [2]. A catastrophic earthquake measuring 6.3 on the Richter scale struck, with a focal depth of 5km, and maximum intensity of Modified Mercalli 9 as recorded by Geonet [3], leading to the greatest vertical acceleration recorded globally to date. This event was activated by a larger (7.1) but less destructive earthquake, some 5 months earlier, located 40km from the city. Three factors exacerbated the severity of the February event - the location, depth, and time: the epicentre was within 10km of the Central Business District (CBD), the depth was 5km, and it occurred in the middle of a working day when the city centre was full of people. 185 people died and 6,659 persons were injured, with many more anxious, distressed and shocked [4]. Widespread levels of property destruction and damage led to the establishing of an extensive exclusion 'red' zone in the central city, which, although slowly diminishing in size, remains to this day [5] , [6].

Right across the city, badly damaged, and in some instances impassable, roads and bridges made transport problematic. Thousands of citizens were left without public utilities, including water, electricity, and sewage disposal for days, weeks and, in many cases, months. Situated in the South Island of New Zealand, with a population of 400,000, Christchurch has, in the subsequent two years, experienced over 13,000 earthquakes in predictable, and at times, violent sequelae to those early seismic events. To date nearly 8,000 citizens have lost their homes [7].

Judy Yarwood, Lesley Seaton, and Philippa Seaton are with the Department of Nursing and Human Services, CPIT, Christchurch, New Zealand (Phone: 064 03 9408280, e-mail: Judy.Yarwood@cpit.ac.nz).

II. Educational Programme

Christchurch Polytechnic Institute of Technology (CPIT), the major vocational education provider in Christchurch, with over 24,000 students, is situated in the CBD, and houses the School of Nursing and Human Services, the focus of this study. Staff and students on campus when the February earthquake struck, evacuated buildings in some haste. However, this meant leaving behind all paper-based and electronic educational resources, as well as personal belongings, including wallets, car keys, and mobile phones. Information and Communications Technology (ICT) systems sustained considerable damage due to a severely compromised power supply throughout the city, liquefaction hazards, extensive areas of leaking sewerage and ground water. As a consequence all usual communication systems, land line and mobile telephone systems were overloaded and damaged, a situation that remained unchanged for some considerable time [8]. All of which left little or no access to existing institutional ICT services. Cordoned off by Civil Defence as part of the declaration of a 'state of national emergency', the city campus remained isolated within a prohibited 'red zone' for approximately six weeks. Four months elapsed before educational programmes were recommenced at this site.

III. Research Project and Methods

Unlike other studies of educational provision in and following a disaster, which have focused on the initial responses, and revealed the distress, emotional burden, and coping strategies used by various groups within education, this study looked at our educational business through an earthquake sequence that occurred over a nearly two year period, moving successively through multiple cycles of continued instability and disarray. The overall research goal was to describe the impact of a sudden, traumatic natural event on the capacity and processes required to continue the

business of delivering a Bachelor of Nursing programme. We aimed to determine and embed sustainability in maximising business continuity and disaster future-proofing of programme delivery and student learning. In doing so, we drew on the Bruntland Commission's [9] approach to sustainable development, that of 'the kind of development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. Sustainable disaster plans evolve from knowing what processes were relied upon in a particular event, what assumptions were drawn on, and whether the organisational response actually worked during the event and its aftermath.

A descriptive/exploratory case study design, incorporating the three stages of Asghar, Alahakoon and Churilov's [10] post recovery phase of disaster management; disaster response, recovery, and rehabilitation, was utilised. Study participants included academic and management School of Nursing staff, and CPIT management, corporate services, and operational staff. CPIT's ethics committee approved the project. Over a 12 month period the research team gathered a wide range of data from individual interviews, an online survey, relevant documents, electronic artefacts, and social media including Facebook and mobile phone texts. An inductive and interpretive data analysis was undertaken with all qualitative data. Participant quotes are italicised.

Fig. 1 below illustrates the 9 interconnected themes that emerged from the study, all of which point to ways of sustaining business continuity in education delivery. *Context* in this model surrounds, and is a major influence on all the other themes. *Action Plans*, located outside the circle, due to their formal and pre-planned nature, provide the foundation for other facets of the model. Written before a disaster to provide guidance during an emergency, these plans, static in nature, can be superseded over time by dynamic decision-making and taking action. *Communication*, an essential component in developing business sustainability, occupies a central place, having a fundamental and vital influence on *Leadership and Followership*, while the process of *Making Decisions* is foundational to *Taking Action*. *Balancing Shifting Priorities* is shown as a pivot point in this model, demonstrating the competing demands on educators between *Personal Imperatives* and *Professional Responsibilities* and how the priority at any given time may be 'see-sawing' and overlaying capacity for leadership and followership, or making decisions.

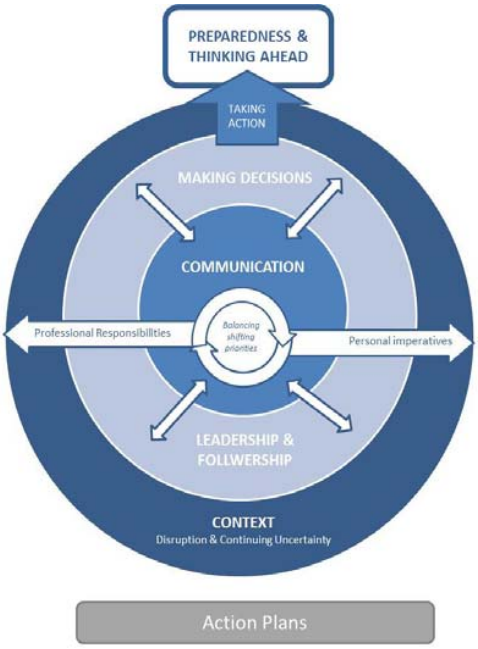

Fig. 1 Interconnecting themes

IV. Practical Challenges Encountered

A. A Constantly Changing and Unstable Context

With the earthquakes affecting the whole city to a greater or lesser extent, and not just CPIT campus, the challenges encountered involved managing both intangible and tangible resources, such as place and space, time, physical assets, roles and relationships. '*It wasn't just an event which impacted on home, or work, or social life, or whatever, it was everything*'. Change and uncertainty were continuous in what was quickly labelled the 'new normal' of the post-earthquake organisation. The size, scope and continuing nature of the disaster created a relentlessly challenging and unpredictable context. A persistent and enduring question was - what were we to expect – will this get better or worse? As time passed, there was less variability in terms of changes to context. The environment became more resilient, in that there were, for example, fewer buildings to collapse or become unstable and fewer items to break; therefore what infrastructure remained became more secure.

Initially, a lack of physical resources was challenging. People depend on having access to what are considered essential external infrastructure; power, water, toilets, food sources, heating and shelter were, for many, gone for the foreseeable future and adaptations had to be made. A realisation of the scale and total catastrophe was described as deepening over several days following the February event, leading to a stunned shock. For some this was a deeper experience than for others, as was the response and reaction during an event. Interestingly, this was not necessarily linked to any immediate experience(s) of personal harm or loss. Some people were calm and collected and others agitated, irrespective of their previous experiences. '*Everybody's*

affected in such different ways in such a major event. And you have no idea how you're going to be affected.' Adaptation to the earthquake events happened over time and all participants (those with prolonged exposure) stated that over time seismic events of the same magnitude, which had seemed very alarming at first, were now perceived differently. *'I mean people would react differently now I think; now they know … It got better the next time 'cause we were better at it and I think the third time it was better again'*

B. Balancing Professional Responsibilities and Personal Imperatives

Characterised by prioritising, balancing professional responsibilities and personal imperatives saw the latter as more important during the first days post-earthquake. Attention focussed on personal safety: for self, those in immediate proximity such as students, and for family and friends. Only then did professional responsibility take priority. Inherent in balancing responsibilities were people's coping strategies, their resilience and capabilities, all of which were dynamic and dependant on individual circumstances. Due to the nature of departmental staff, all of whom are registered nurses (RN's), academic staff in a position to do so volunteered to work with health facilities and local communities. Once personal imperatives were addressed, and the immediate needs of health care facilities and community tackled, staff could then turn their attention to resuming teaching and learning activities.

C. Communication

International literature points to communication being a critical component in disaster management [11]. Following a rapid evacuation of CPIT buildings a state of confusion occurred. People wanted clear and consistent instructions to tell them about what to do and where to go, alluded to in this participant excerpt. '*I mean the communication I think it was absolutely key… Probably the one thing that came through for me around the people side was how valuable people are that have really good communication skills and really good thinking and problem solving skills'.*

Having a disaster plan was one thing; ensuring it was widely known, and was effective at the time of the disaster was quite another. Immediate needs during and after each earthquake were unfailingly engaged with physical safety, evacuation to safe areas and information that ensured continued safety and security – key facts such as when to leave the building, where was safe, how to remain in a safe environment - needed to get to the right people at the right time. Over time, communication needs changed and were more concerned with 'what was going on' and 'the direction to take' and 'where to get what and how'. Described as a need for clarity, consistency and inclusiveness, communication was a constant challenge in the short, medium and long term.

D. Delivering an Educational Programme

When and how to resume teaching and learning challenged both staff and students as they were left with no access to physical spaces for teaching, or any teaching resources beyond that which staff already had on personal home-based systems; namely, external hard drives and USBs [data storage device]. Alternatives to face-to-face contact were initially sought, to act as a medium for communication with students, rather than delivering content. Finding a method/site to teach from or out of rather than sourcing content was the primary focus, as many experienced staff had an embedded repository in their heads, therefore were less reliant on external resources.

A Bachelor of Nursing programme offers both a theoretical and a clinical component; the latter designed for student learning in a clinical environment such as hospital or community health setting. Reconfiguring the clinical placement timetable for over 400 students, a formidable task at the best of times, was challenging in that student placements were arranged through external providers spread across a wide geographical area that included rural and urban locations. Contacting all host organisations to rearrange and/or cancel placements challenged available resources. In addition, some placements in community locations were, due to earthquake damage, closed for the foreseeable future.

V. Solutions/ Recommendations

Solutions and recommendations, derived from all the phases of the study, must be qualified in that they relate directly to this particular context, this specific disaster-related locale, and these people's responses. Moreover, whilst the following recommendations/ solutions may appear simple, what is perhaps most important to take from our experience is that a disaster plan does not, by itself, equal preparedness; it does not, nor can it, guarantee sustainable or effective actions and outcomes. Each institution must look to its own context, consider its own priorities, and design methods of preparedness which will work for them. There are, however, implications for all types of educational providers who seek to embed robust, effective and sustainable disaster plans to ensure business continuity.

Preparing for all eventualities is not possible. Nevertheless, immediate site securement and ensuring staff and student safety through a well-designed and executed evacuation plan is fundamental. Delivering education is a second level activity in the immediate aftermath of such a disaster. Basic human needs - clean water, warmth, food and shelter – are the main priority for any community as was the case with the students who lived in the institution's student accommodation while studying at CPIT, who in the chaotic first 24-48 hours, post-earthquake, were given shelter, food and comfort by staff in the institution's gymnasium. Nonetheless, preparing to resume the business of teaching and learning only when community members are safe and secure is important, as is the timely resumption of education, which gives some degree of life 'as normal', a proven positive impact in the aftermath of a disaster.

A. Safety

Safety on all levels must always be the first priority and is achieved through a pre-planned, considered and well-co-ordinated effort. Staff cannot react appropriately without

knowing what actions to take. Although some natural disasters, such as an earthquake, are not foreseeable, the consequences of them can, to some extent, be anticipated through risk assessment and mitigation. Well prepared health and safety personnel are essential, but are only one component of an effective response. Maintaining a well-trained 'event-ready' group of staff in each building is another, as is having all staff aware of 'what to do' in specific events. It is not unrealistic to anticipate that at some future time, a disaster of one type or another might be encountered. However, it is usual for people to be less sensitive to preparing for unknown threats unless they have recent, personal experience. Therefore, without scaremongering, straightforward plans, relevant to as many probable circumstances as possible, must be in place, widely promoted and displayed prominently. Orientation to health and safety procedures for all new staff and students is vital. All staff must be aware of their role in a disaster – and to know how to get themselves, students and colleagues to safety.

With physical harm likelihood in disasters, First Aid equipment must be readily accessible and must be stored outside buildings as well as inside, as equipment within buildings in this instance was not accessible without increasing personal risk during its retrieval. The use of high visibility vests and hard hats is recommended to identify designated health and safety personnel, as this means they can be easily identified; it is also evident that they have legitimate authority, an important status when directing people.

Accounting for the whereabouts of all staff and students is not an easy task in times of disaster. Initially knowing all personnel were clear of buildings was the job of health and safety staff that inspected all offices, classrooms, laboratories and elevators on campus. Ensuring personnel were uninjured and safe was not completed until some days following the crisis as personnel could have been on or off-site or at various locations on campus, as students and staff travel and work widely throughout Christchurch, and beyond. Plans to record student and staff attendance on campus must, however, be realistic and workable. Recording who is and is not working onsite is only as good as the people using these systems. Staff movement boards are worth considering as these can indicate whether people are on or off site. In this instance these were used initially, but within months of the disaster, use of these declined.

B. Communication

In such a disaster, a means for mass communication immediately following evacuation of buildings campus wide is the role of senior organisational management. Power supplies were disrupted, meaning all electrical and electronic equipment were rendered useless. A Tannoy or loudhailer, old- fashioned as this may seem, was essential to facilitate the transfer of vital and often lifesaving information about the evolving response and action; as was reliable information broadcast by a designated person(s), with legitimate authority, and with a direct line of communication to/from/with senior management. The broadcaster and/or deputy requires a means/medium to communicate information immediately, to counteract misinformation (inevitably associated with anxiety and panic) and to direct people to leave or remain on-site. Established protocols to guide staff as to when buildings must be evacuated and when to return to work are necessary before a disaster occurs.

Communication in each area was the responsibility of Heads of School. In Nursing, the Head of School and senior staff initiated and maintained regular information flow by text once mobile phone systems were reactivated; firstly to enquire as to staff well-being, then to ascertain availability to arrange meetings and communicate information. Current up-to-date staff contact lists, easily accessible both on and off site, are crucial and must include mobile phone and landline numbers, emails and physical addresses.

Social media proved highly successful for the over 600 nursing students, scattered across the city and beyond, in the form of a Facebook site. A key communication resource, given that student details would not necessarily be accurate and many had lost or inactive mobile phones, Facebook was actively used by students during the interim period when the CPIT website was unavailable. The use of social media in disaster management is growing exponentially, providing sustainable disaster planning development with an effective tool.

C. Leadership

Business continuity is not possible without strong and sustainable leadership; leadership that recognises strengths in others, that collaborates, persuades, and partners with others [12]. Establishing leadership quickly involves identifying active key roles during each phase of the disaster to avoid duplication, and to identify contact people, to determine how and when 'to do what'. Knowledge of a clear and simple 'chain of command' assists working groups to remain functional in what can be a confusing and frequently stressful time. What was interesting in this research was where leadership emerged. Challenging traditional notions of leadership, staff without an identified organisational leadership role appeared as leaders, as seen in this quote: *'I mean there were cases of leaders who were absolutely floored by it and there were people in very unlikely places that popped up and got on and did some really practical stuff in order to get things up and going.'*

D. Preparedness

Encourage staff and students to take steps toward personal risk mitigation. This could include (but is not limited to) considering personal and family preparedness plans, carrying personal belongings at all times and talking to colleagues about strategies for preparedness. Fire/earthquake/evacuation drills need to be scheduled and carried out frequently. Make evacuation procedures clear, concise and widely available. Regular meetings with Health and Safety personnel can encourage and support preparedness. Sustainable preparedness requires staff to be aware of, and communicate regularly to students, important information such as emergency exits, evacuation procedures, and safety features such as an

earthquake response position (drop, cover, hold). Rather than asking staff to memorise a plan, an unrealistic goal, regular discussions about responding in differing disaster scenarios and questions about personal and institutional preparedness are useful.

A number of plans associated with disaster management and business continuity are necessary for different purposes. Institutional plans, such as for a building evacuation, will differ from business continuity plans, as will specific school plans for the resumption of teaching and learning. Business continuity, key to sustainable development in an organisation's economic survival following a disaster of such magnitude, must be addressed. Simultaneously staff and students' safety and wellbeing must be considered. There is a level of institutional and/or managerial responsibility to ensure plans have relevancy, are well known, and discussed at regular intervals. Knowledge of a plan, its intent and whereabouts may be as helpful, if not more so, than the plan itself in an actual disaster. Those difficult to access are unlikely to be sought independently. Assumptions, often arising without knowledge of a relevant plan, such as believing buildings can be re-entered, closure is temporary or that wider IT infrastructure will continue to exist (and function), can be dangerous, and must be questioned.

E. Resuming Programme Delivery

Closure of the institution by Civil Defence Authorities for a period of time while challenging allowed staff and students to regain personal balance and organise their individual situations. A date however, must be set and communicated widely for when business will recommence. The static (but updated) information displayed on the CPIT website gave staff and students a timeline to work towards, the value of which cannot be underestimated. It sanctioned the time spent away from education and the organisation, more usefully spent after a disaster by helping in the community, especially for nurses, who were in high demand.

As it was impossible to predict when the city campus would be useable again, temporary facilities were found at a University 30km from the city centre. Considered an important step in maintaining business continuity, it also allowed staff and students to regroup as a learning community. School staff developed a 'streamlined' curriculum for the Bachelor of Nursing, with staff directed to teach curriculum essentials. The Nursing Council of New Zealand, (the national nursing regulatory body) supported this action, particularly in respect of students due to undertake registration examinations (end of programme) within a few months. Alternative ways of delivering the 'streamlined' programme were instigated to ensure optimal usage of the limited space, services and resources of the temporary facilities.

An increased use of electronic delivery modes for teaching, already available in the form of Moodle, a free source Course Management System/ Virtual Learning Environment (VLE), supplemented the face-to-face forums. Student uptake of the online mode was significant once IT services were restored. Moodle had been in place within the School prior to the disaster, but was previously used only in a limited way for small groups of students, as an elective option. Its broader adoption was dependant on recovery of IT access and the delivery of a continuous electrical supply.

Normalising the programme delivery, a key component to managing this disaster, included managing students' clinical placements. Knowledge of clinical placement needs was achieved entirely by drawing on the memory of individual staff. This experience led to the future storage of all clinical placement records and contact details for individual organisations being placed on a USB. This in turn was duplicated and carried with individuals, rather than continuing to rely on a central repository system within the CPIT building as in the past, although the current IT structure has now been strengthened.

VI. Conclusion

Sustaining the business of educational provision following a disaster involves many interrelated components, of which resuming teaching and learning is but one. This research study explored the impact of a traumatic natural event on the capacity, processes required to deliver a Bachelor of Nursing programme, and has identified practical challenges and offered solutions and recommendations. The ability to manage and cope in a disaster depends on the capacity and resilience of any given community, at a point in time; it is more complex than following any document-based disaster plan. People's ability to lead, to communicate, to balance personal and professional responsibilities in a constantly changing and unstable context, shaped and informed this disaster response. Today Christchurch city remains the largest demolition site of a central business district in the world. Infrastructure repair in Christchurch is expected to continue for several decades. Despite over 13,000 seismic aftershocks occurring since the initial earthquake, with 100 recorded events ranking over 4.6 on the Richter scale, the work of building and sustaining the business of teaching and learning has continued.

Acknowledgment

Study funded by Ako Aotearoa National Centre for Tertiary Teaching Excellence, New Zealand.

References

[1] S. Al-Shaqai, R.Gauld, S. Lovell, D.McBride, A. Al-Kashmiri, andA. Al-Harthy, "Challenges to the New Zealand healthcare disaster preparedness prior to the Canterbury earthquakes: a qualitative analysis," The New Zealand Medical Journal, vol.126, no.1371, 2013, pp. 9-18.

[2] B. Pandey and K. Okazaki., "Community based disaster management: Empowering communities to cope with disaster risks," retrieved from http://unpan1.un.org/intradoc/groups/public/documents/un/unpan020698.pdf,2013

[3] Geonet, retrieved from http://www.geonet.org.nz/quakes/region/newzealand/3468575, 2013.

[4] M.W. Ardagh, S.K Richardson, V. Robinson, M. Than, P. Gee, S. Henderson, L. Khodaverdi, and J.M. Deely, "The initial health-system response to the earthquake in Christchurch, New Zealand, in February, 2011," Lancet, vol.379, 2012, pp. 2109-2115. Doi: 10.1016/SO140-6736(12)60313-4.

[5] F. O'Connor, D.Johnston, andI.M. Evans, "The context in which we examine disasters in New Zealand: An Editorial," New Zealand Journal of Psychology, vol. 40, no. 4, 2011, pp. 2-6.
[6] Canterbury Earthquake Recovery Authority, "Community based disaster management: Empowering communities to cope with disaster risks," retrieved from http://unpan1.un.org/intradoc/groups/public/documents/un/unpan020698.pdf, 2012
[7] Stuff, retrieved from http://www.stuff.co.nz/the-press/business/7585640/Red-zone-to-go-by-mid-2013, 2013
[8] J. Meyer, Christchurch Polytechnic Institute of Technology, CIO New Zealand, www.cio.co.nz, 2011.
[9] Bruntland Commission, http://www.un-documents.net/our-common-future.pdf, 2013, p.3..
[10] S. Asghar, D. Alahakoon, and L. Churilov, "A comprehensive conceptual model for disaster management." Journal of Humanitarian Assistance, vol. July 20, 2006, pp. 1 – 15. http://www.jha.ac/articles/a193.pdf
[11] R. Simon and S. Teperman, "The world trade centre attack: Lessons for disaster management," Critical Care, vol. 5, 2001, pp. 318-320. Retrieved from: http://ccforum.com/content/5/6/318
[12] P. Sanchez, P. Hucles, J . Sanchez-Hucles, andA.C. Mehta, "Increasing diverse women leadership in corporate America: Climbing concrete walls and shattering glass ceilings." In J. L. Chin, B. Lott, J.K. Rice, and J Sanchez-Hucles (Eds.) Women and leadership. Oxford, England: Blackwell Publishing, 2007.