

Author accepted manuscript

Dark Clouds and Silver Linings: An Epistemological Lens on Disaster Recovery

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Journal of the Australian Library and Information Association 2020

ABSTRACT

Changing environmental conditions are creating conditions that are leading to an increasing number of disasters. University libraries are at risk of impact from these disasters. The nature of library collections and services is highly intertwined with the physical spaces within the institutions. Thus, the consequences of these disasters have a significant effect on the knowledge ecosystem. Epistemological theories have rarely been explored and yet are important theoretical foundations to frame disaster recovery activities. Traditionally disaster management and recovery have lacked theoretical frameworks and been operationally focused. Approaches have been based on a rationalist framing of the problem and a presumption that there is a justified truth belief that the previous state is the ideal state. In this article, the nature of knowledge through three epistemological approaches is explored and tested on two case studies. Victoria University of Wellington (New Zealand) and the Australian National University (Australia) are used to assess the operational and epistemological issues of disaster recovery. The paper reflects on challenges to the role of the library and the application of epistemological theories to learn lessons for future approaches to disaster recovery. It poses questions about how libraries can take the opportunity to rethink in the digital environment.

KEYWORDS: Disasters, disaster recovery, collection management, collection building, emergency management, University libraries

Implications for best practice

Collection rebuilding and service delivery during and after disasters can be rethought using an epistemological lens. Key issues covered are how an understanding of the value of library services and collections in a digital age, engagement with the academic community, disaster planning and service delivery strategies can be assessed within a framework build around theories of knowledge.

Introduction

Disasters capture headlines and attention in higher education institutions across the globe. Their impact can be lengthy and devastating. The nature and impact of disasters are increasingly visible as these disasters become more dramatic. Disasters are an international issue affecting all communities and libraries.

In 2019, environmental disasters included flooding of 85% of Venice (BBC, 2019), catastrophic bushfires in California (Barclay, 2019), drought in Cape Town (Muller, 2019) and extraordinarily early and devastating bushfires in Australia (Australian Broadcasting Service, 2019). From the Mayor of Venice to scientists across the globe, significant weight is given to the impact of human habitation and its manifestation in climate change as a factor in the number and impact of disasters. BBC meteorologist Nikki Berry comments, 'While we should try to avoid attributing a single event to climate change, the increased frequency of these exceptional tides is obviously a big concern' (BBC, 2019).

The reports of the United Nations Intergovernmental Panel on Climate Change (IPCC) provide a synthesis of the work of the international scientific community. These reports highlight the complexities of the impact of humans on the planet, historic change and factors relating to the

dramatic changes now facing the world. In their most recent special report (United Nations Intergovernmental Panel on Climate Change (IPCC), 2019a, 2019c), the leading expert body outlines issues contributing to greater climate variability. The advice for policy makers notes:

Since the pre-industrial period, the land surface air temperature has risen nearly twice as much as the global average temperature (high confidence). Climate change, including increases in frequency and intensity of extremes, has adversely impacted food security and terrestrial ecosystems as well as contributed to desertification and land degradation in many regions (high confidence) ...

Warming has resulted in an increased frequency, intensity and duration of heat related events, including heat waves in most land regions (high confidence). Frequency and intensity of droughts has increased in some regions (including the Mediterranean, west Asia, many parts of South America, much of Africa, and north-eastern Asia) (medium confidence) and there has been an increase in the intensity of heavy precipitation events at a global scale (medium confidence).

(United Nations Intergovernmental Panel on Climate Change, 2019b, p. 5)

The disasters faced are exacerbated by, and to some degree created by, the major environment situations that have been shaped by human impact. For libraries, consideration of approaches to be prepared with and in fact deal with in relation to disasters has never been more important.

In developing approaches and knowledge to enable the marshalling of current resources and changes to physical infrastructure to be prepared for these events, it is important to understand and reflect on contemporary practices across collection-based institutions. Fundamentally, preparation can be informed by an assessment of lived experiences in addition to reasoned thinking. To assess and understand disaster recovery practice-based approaches, assessment of operational activities currently delivered by libraries does not provide a holistic framework. Situating the development of approaches within an understanding from the theory of knowledge will bring strength in strategically creating successful disaster recovery approaches.

Libraries have been the custodians of knowledge for centuries. Our collections contain the books, journals, manuscripts and other physical materials that pass ideas, stories and discoveries from one generation to the next. Librarians treasure their collections, curating special material with passion and care. The nature of collections is the topic of regular discussion with the academic community. Indeed, the ownership of collections is a collaboration between the academic and library communities. This is an important framework to use to incorporate knowledge theory into disaster recovery.

Writers and researchers recognise the significance of our collections:

Books are the way that we communicate with the dead. The way that we learn lessons from those who are no longer with us, that humanity has built on itself, progressed, made knowledge incremental rather than something that has to be relearned, over and over. There are tales that are older than most countries, tales that have long outlasted the cultures and the buildings in which they were first told (Gaiman, 2013).

Sadly, disasters strike that destroy our collections or impede access. These events and the tragic loss of collections resound through history – from the fire that destroyed the Great Library of Alexandria to the book burnings of Hitler and modern terrorist groups such as ISIS (see Turku, 2018).

While regular library planning prepares for disasters of a reasonable size (Brown, 2018; Garnett, Arbon, Howard, & Ingham, 2018), the processes and theory behind these approaches are limited to knowledge from previous disasters. Library associations and cultural associations collect resources to develop our capacity and knowledge to deal with disasters again within this framework (American Library Association, 2017; Australian Library and Information Association, 2018, 2010; Blue Shield Australia, 2018).

Disasters that effect the majority of a campus or collection, however, create a level of complexity often beyond the day-to-day training and plans available to libraries. They highlight the need for thinking within broader theories of knowledge.

Disasters have wide ramifications – as events, they may cause human loss, something that achieves national attention. Even if there are no casualties, major disasters are also extremely distressing when they impact a wide range of services that cause major disruptions to people’s lives. In these circumstances, the disaster will involve many, and a library service will probably be but one aspect of an institution’s response to a major disaster. Nevertheless, any disaster that affects a library or libraries requires action and framing of library and information science.

In this paper, analysis of epistemological theory and library science and the changing global environment set the scene. Then, two case studies are used to assess disasters with a major effect of university libraries, one at the Australian National University (ANU) in Canberra, Australia and one at the Victoria University of Wellington in New Zealand. By taking an epistemological lens to the nature of the assessment and response to the disaster, insights are then drawn about the importance of incorporating new epistemological thinking into the approach to disaster recovery, overturning assumptions which have underpinned traditional practice.

Epistemology

Fundamental to library and information science is the theory and understanding of knowledge. After all, libraries are responsible for knowledge management in terms of developing collections, increasingly expanding into the digital world including research data. A major focus is on building knowledge of our users through capabilities programs. The current focus is on digital capabilities (now termed digital dexterity by the Council of Australian University Libraries, 2019).

Epistemology is the ‘study of knowledge and justified belief’ (Steup, 2005). The word is derived from the Greek ‘episteme’ meaning ‘knowledge’ and ‘logos’ meaning ‘study, or science, of’. Its history extends to Plato who posited that knowing is different from believing and that constructing knowledge is fundamental to our views of the world (Greco, 1999; Stroll & Martinich, 2019). There have been many philosophical threads in the theory of knowledge that are relevant to library and information science.

Three areas that are most relevant to the study of disaster recovery are rationality, a priori knowledge and foundationalism. Rationality has been fundamental to epistemological theory since the creation of debate in the discipline. Aristotle (as translated by Ross 1991) poses man as a rational being:

Now each man judges well the things he knows, and of these he is a good judge. And so the man who has been educated in a subject is a good judge of that subject, and the man who has received an all-round education is a good judge in general ... to such persons, as to the incontinent, knowledge brings no profit; but to those who desire and act in accordance with a rational principle knowledge about such matters will be of great benefit (Aristotle, p. 12).

The principle of rational belief has been challenged by philosophers reviewing psychological and economic evidence and assessment (Goldman, 2002 summarises and makes new arguments). Psychological studies have given further evidence to the unreliability of perception level of complexity regarding perception (Berkowitz, Laney, Morris, Garry, & Loftus, 2008; Loftus, 1998). These insights suggest that rationality cannot be based on individual perceptions and challenge the view of perceptions as rational facts. In such an environment the deterministic approach to actions needs to be reviewed based on analysis whose beliefs are incorporated into actions in addition to the basis of the belief. For libraries, this is relevant in indicating that our assessment of approaches to disasters needs to be constructed from data and analytics outside of individual past perceptions and events.

The concept of a priori knowledge takes its roots in the work of Kant (Kant, 1787). The concept is 'a type of epistemic justification that is, in some sense, independent of experience' (Russell, 2014). The phrase associated with this concept is 'justified true belief' which postulates that a relationship of what is advocated as rational belief is actually derived from concepts formed on the basis of intuitions or insights. Many debates have occurred as to the extent that propositions might not be true or are unknowable. In arguing for a future state for a priori, Casullo suggests that 'the most promising strategy for advancing the case of a priori is to enlist empirical support for the claim that there are non experiential sources of justification' (Casullo, 2002). In relation to the topic of this paper, the fundamental approach of disaster recovery needs to build from testing propositions built of understanding the wider nature of whose knowledge is required to develop the recovery strategy.

Foundationalism considers the structure or justification of knowledge. Theorists posit that the evidence for justified belief is from non-inferential knowledge; that is the conception of truth a distinctive induction based on observed phenomenon (Alston 1989; Bergmann, 2004; BonJour, 1999). While this is contested, it forms a third pillar in framing questions around what is truth in library disaster recovery.

These three propositions are valuable to use for insights into the approach taken to disaster recovery in libraries as they provide a theoretical framework for analysing the use of knowledge and justified beliefs for development of plans and programs of action.

Library and Information Science and Epistemology

As theories on the philosophy of knowledge have emerged over the decades, library literature has engaged occasionally in descriptive writing in this area. Arguments the library and information sciences is grounded in rationalist beliefs without systematic incorporation of epistemological thinking or reflective thinking based on theories on knowledge are primarily the focus of the literature.

Library and information science has been assessed as a discipline that bases its operational practice on a positivism or rationalist theory (Budd, 1995; Capurro, 1985; Gatten, 1991; Radford & Budd, 1997; Kuhlthau, 2004). Radford outlines the need to change this approach as a fundamental crisis:

Traditional concepts of knowledge, meaning, and communication in library and information science are facing a crisis; they are unable to adequately characterize and structure the experience of interacting with the modern academic library (Radford, 1998, p 616)

Within the profession, however, the use of epistemological theory and analysis has been light:

Our epistemological analysis of the literature has corroborated the scarcity of studies on concept theory in LIS and KO, something that has already been detected ten years ago by Hjørland (Machado, Martínez-Ávila, & Simões, 2019, p. 884)

Library and information science has seen arguments that knowledge is fundamental to the education and work of the sector. Developments in understanding information behaviour have led to new theories that are based on creating new realities from the knowledge of those who are the users of our services (Pettigrew & McKechnie, 2001; Wilson, 1981). Arguably, the newer developments in ethnological research (for reviews of ethnographic practice see Goodman, 2011; Lanclos & Asher, 2016) reflect this desire to see knowledge from the perspective of the community of patrons – a potential area for challenging the a priori assumptions of the profession.

The assumptions made by the profession can be seen reflected in the earliest library and information science theorists. One example is Ranganathan's foundational laws (Ranganathan, 1931) which contains collective wisdom such as 'every reader their book'. Implicit in this is an assumption that libraries collect the resources that are necessary for readers on the basis of their rational knowledge. The collections as works of the knowledge of librarians are therefore determined by the knowledge controlled within and a priori existing in the curators and indeed in the vaults of the libraries.

Challenges to these perspectives based on assumptions in the theory have been developing in the literature. Fuller et al. assess a wide range of issues in relation to epistemology theory and library and information science. They find that there is a significant gap in the theoretical foundations of assumptions the library science and practice. Within the article, reflections were made that critical theories and knowledge concepts should be related to the community of users. While ethnographic approaches may shed light on these issues, the restriction of domains of knowledge and our 'epistemological conservative position' (Fuller et al., 2013, p. 3) may limit the ability of the professions to reflect on core issues effectively. The empirical boundaries of the profession echo the rationalist position described above.

In addition, there are questions around what is valid knowledge for activities such as collection building (Dick, 1999). His paper raises issues of relativism and the nature of collections that may be linked to contemporary issues such as finding that the corpus of published knowledge from which our collections are drawn has been subject to limitations by race, genders and ethnicity (see also Fay, 1996).

The matter of knowledge can be seen as framed within cultural limitations from either conservatism or bias (possibly unconscious) within our profession is increasingly visible in the literature. Branum argues:

Though librarians may attempt to maintain an air of objective and neutral professionalism, institutions that claim neutrality are in danger of unconsciously adopting the values of the dominant paradigm (Branum, 2014).

The bias in publishing contributes to factors that limit the materiality of the knowledge constructed through our collections. Research on gender representation in publishing (such as Holman, 2018; LaHaie, 2018; Luke, Stuart-Fox, & Hauser, 2018; Mathews & Andersen, 2001; Schiermeier, 2019) has demonstrated this bias across a wide range of disciplines. Quinn has noted that there are dimensions of bias beyond that of the publishing industry:

The psychological research suggests that addressing bias is not simply a matter of intending to act in an ethical manner with regard to developing the collection or of subscribing to certain values. Rather, it is understanding how cognitive and emotional processes affect the selector and acting to counter the underlying forces that contribute to biased behavior (Quinn, 2012, p. 299).

Thus, the nature of epistemological theory in library and information science needs to take into consideration library theory and practice as well as the impact of the sector in which we exist (for example, the bias and new ways of education – Friere, 1996) as well as the broader scholarly communication and publication environment. The framework (taking Bolman & Deal, 2003) needs to consider both the role of libraries as agents (including structural and human resource frames) and as knowledge facilitators within the scholarly communication environment (symbolic and political frames).

In respect of the three epistemological threads, rationality, a priori knowledge and foundationalism, for academic libraries, these are complex both in terms of their approaches to disaster recovery and the environmental considerations about library institutions and scholarly communication. Seeking to impose recovery approaches that are based on external pre-existing information is a characteristic of the profession which is tested in the case studies. These raise the matter of how knowledge is acquired and what intrinsic knowledge is applied through the historic development of collections. The case studies are used to provide a rich depth of professional practice to exercise the philosophical questions.

Case Studies

A Flood that Reshaped a Collection: The ANU Library Experience

On Sunday 26 February 2018 the JB Chifley Library at the ANU experienced a major flood. For ANU the flood and its impact on the library collection was dramatic. The JB Chifley Library is the most heavily used library of the university's 5 libraries with the largest physical on campus collection. The ANU Library lost approximately 8% of the ANU Library's total physical collection – around 113,000 monographs, many serials, audio visual resources, official documents and reference resources.

The heavy rain and flash flooding had a significant impact on the whole university. Five buildings were under water, with the Library taking the greatest impact.

The extent of the damage meant that the University managed the flood as a university-wide disaster. The whole University was closed on Monday and over the following week, actions were coordinated to ensure people and buildings were made safe and to commence a program to address the damage. The level of coordination was very extensive – resources were marshalled from all relevant areas and the Disaster Management Committee operated consistent with the University's planned approach.

The Library's previous experience with Business Continuity Processes had been with smaller events or outages, so being supported by the whole of University response which drew on the skills of many areas contributed to the best possible outcomes.

The first major challenge was the need to close the JB Chifley Library for safety reasons to both library staff and users. Initially, the closure was for an undefined period.

A second challenge was the timing of the flood. It occurred in the first week of semester, so reinstating student access to resources held in the library and the library itself as a study

space were priorities. Library staff were committed to understanding the impact of the flood and restoring service to patrons by prioritising relocation and service delivery.

The major impact was on the collection in level one (the lowest floor of the library). This area was under one metre of water for more than 3 days. The humidity was over 75% for the whole week. That area was inaccessible other than to a small number of staff for the whole week following the flood. The conservator from Art and Archival gave expert advice through that week to advise on actions that needed to be taken for dealing with the collection.

Bearing the access priority in mind, immediate actions by dedicated staff included:

- Moving the two-hour loan collection to the Hancock Library within 2 days so students had access to in-demand short loans.
- Moving staff from the JB Chifley Library to the Menzies Library (another of the ANU libraries) with the retrieval of personal items to enable continuity from a staff perspective.
- A high level of communications with library users including academics and students for regular updates.
- Coordination to retrieve material that could be rescued from level one – prioritising two-day loan material and items identified as possibly the only copy held in Australia.

‘Make safe’ was the first principle from general disaster recovery and was applied to collection and building issues. Dehumidifiers and fans were hired from a disaster recovery company, and ran for almost 3 months until level one was certified as at acceptable spore count levels.

The expert advice identified that because of the contamination of the collection, the extent of water damage and environmental conditions, any collection material that could be saved would need to be removed in 5–6 days. Unfortunately, this was true in this case, and the material stored on the lowest level had to be disposed of due to extensive mould. Removal of this material prevented contamination of material on other levels in the library.

The strategy for rebuilding the collection has been staged to make as much as possible available as soon as possible within a long-term insurance plan.

Operational Service Model

During the recovery period, interlibrary loan was used heavily and a bus was instituted to enable the use of resources at the nearby National Library. The University’s participation in the BONUS+ consortium allows staff and students to request a monograph interlibrary loan from 12 university libraries in Australia and New Zealand with the click of a button. This service was particularly valued. Interlibrary loans were up by 3,754 in 2018 (28.7%).

The University closed on the first day after the flood, allowing for more detailed assessment and emergency planning. The major impact was the need to close the JB Chifley Library completely, a closure that lasted for 4 weeks.

As the Library was the most heavily used undergraduate library (social sciences and humanities) on the campus, services needed to be re-established rapidly through locating the services, the short loan collection (2-h loan) and library staff to other ANU libraries.

The flood occurred in the first week of the semester so while assignments were not due, students needed access to collection items, particularly textbooks. The 2-h loan collection was relocated to the Hancock Library, with twice a day retrieval from the floors in the Chifley Library that it was possible to retrieve material from (levels 3 and 4).

Staff were relocated to the Menzies Library, with a small number located in the Hancock Library for a short period. This turned out to be a solution which provided a high degree of camaraderie and team building. All staff assisted in whatever way they could, be it providing materials that made life more comfortable for visiting staff or supporting their work.

Developing a strong relationship over the issue with the academic communities was an area that took time. The support from the Deputy Vice Chancellor Academic for this activity was immensely helpful. There were town hall meetings and a sharing of anguish.

Communication with the library, ANU and wider Canberra and discipline communities was vital because of the sense of ownership of the collection and the personal sense of loss of the ANU and wider community, including library staff and academics. The damage received wide press (radio, television and newspapers) and ensuring factual conversations contributed to a better knowledge of the nature and extent of the disaster. It was a time of online newsletters and many conversations.

Strategic and Epistemological Considerations

The loss of such a significant part of the collection was considered a tragedy by both the academic community and Library. It gave time to pause and reconsider the collection and collection building. In assessing the titles that were lost, new knowledge was acquired that led to an understanding that the collection building had been focused within a rationalist frame. That is, the collection reflected an inconsistent collection based on variations in teaching and research interests. In addition, its bias reflected the bias of scholarly publishing noted above. The epistemological lens applied was to seek knowledge and justified belief based on consultation with the broader community to build a more cohesive and balanced collection; replacing lost material but adding additional dimensions to ensure an instructional focus based on externalities such as relationships with other collections through Bonus + and internalities based on new engagement around what was required to support the University.

Extending the reach of the library through assessing the environment in scholarly communication enabled knowledge of maturity in the ebook market, increases in digital alternatives to microfiche and microfilm and increasing needs for data and text mining providing a context to rethink the collection in terms of formats. Print remained the knowledge token of exchange however the knowledge of different generations contributed to a more holistic approach.

All voices have been important in building the knowledge and approach for collection reconstruction and construction. An epistemological approach was cemented through engagement with a working group with representatives of all affected disciplines. The group added an important dimension to the Library's knowledge gathering. This step served a

means of establishing activities beyond a priori theory and assumptions of service modes in the physical space that were no longer valid.

Key to the approach were an awareness of the need to frame knowledge from outside inferential knowledge (foundationalism) together with a new paradigm and framing of contemporary reality.

And the Earth Moved: Victoria University of Wellington Library

On 14 November 2016, just past midnight, a magnitude 7.8 (Mw) earthquake shook much of New Zealand. Known as the '2016 Kaikoura earthquake', it was the second largest earthquake recorded in New Zealand since European settlement. There were two deaths and damage occurred across the country, including Wellington where several buildings were damaged beyond repair.

At Victoria University of Wellington, three buildings were affected: Rutherford House with water spoilage due to broken water coolers, the Old Government Building including the Law Library, with non-structural damage, and the 10 storey Rankine Brown building, including the Main Library, which was closed for 3 months due to extensive lift shaft damage. During the 3 months, there was no access to the Main Library's physical resources or study areas. After the building re-opened, there were no lifts and only one functioning stairwell. These building conditions remained for almost 2 years after the earthquake.

When the Rankine Brown building was re-opened, the basement remained inaccessible to users and the Library provided a retrieval service. The basement's 50,000 holdings were primarily for museum studies, philosophy, religious studies, psychology and classics. By the end of 2017, the basement was a full construction site and out-of-bounds to everyone. This required the Library to remove the entire print collection from the basement with high use material relocated to a higher floor and low use material stored off-site and made unavailable.

Disruption

The earthquake and its aftermath caused considerable disruption to the Library's services though it occurred at a reasonably quiet time of the academic year. Student computer laboratories, for example, were available to relocate library staff relatively quickly. Unfortunately, it was a key research time and academic staff requiring primary material were severely inconvenienced, particularly as the National Library of New Zealand and National Archives of New Zealand were also closed for a significant period.

Due to the time of the year, re-construction work did create a challenge. Engineering companies and associated services usually shut down for several weeks over the Christmas period and so it was imperative that the design and planning of the required steel supports was undertaken as fast as possible. The building and installation then occurred after the Christmas shutdown and due to everyone (property services personnel, architects, engineers, construction firms, etc.) working together, the building was re-opened in the second week of the first trimester of 2017 (March), the busiest time of the academic year.

Planning on how to deliver library services with two libraries closed was a relatively straightforward process as we used the Library's Business Continuity Plan. Each senior library staff member had this plan available both in print (kept at home) and electronically.

In its communication with stakeholders, the Library regularly stressed what was operating normally. It promoted access to electronic resources and the temporary service point. Subject librarians remained key contacts for the academic community and continued to assist staff via email and in person.

During the 3 months when the Main Library was closed, many students used the University's other libraries for study and research purposes. Due to the time of year (March to June), the numbers were manageable. After the building was re-opened, most students returned to the Main Library with minimal complaints about the inconvenience of having no lifts.

The greatest impact on physical collections was the loss of the basement. As stated previously, the basement's 50,000 holdings were primarily for museum studies, philosophy, religious studies, psychology and classics. The mitigating strategy was to determine the number of titles that were available electronically. This amounted to 30% with a further 20% purchased via Proquest's Title Matching Fast service. Due to the circumstances, Proquest offered a reasonable price for this service which helped enormously. With the additional strategy of moving high use material to an upper floor, there has been little concern from academic staff and students about the unavailability of the basement's print material. This is particularly significant since the disciplines are primarily from the humanities where scholars value print very much. Interestingly, this situation has also created a mini case-study in comparing the use of print versus electronic. Over the last 2 years, it is evident that digital resources are used significantly far more than the equivalent in print.

Strategic and Epistemological Review

For Victoria University of Wellington, the focus always remained ensuring that services could operate as normally as possible. Application of knowledge theory can be seen in the engagement with the community, at all levels including the Vice Chancellor, to understand conceptually the truth of the Library, its collections and services. The Main Library was the focus of service, identified as the knowledge hub of the campus and indeed the University. The concept of a knowledge centre was reinforced by evidence of visitation – over one million entries per annum. Disruption to library users and staff was an opportunity to frame a new approach based on both a theory of knowledge and access and community knowledge.

Operational challenges such as having no lifts required immediate focus. Understanding the new directions and the scope of knowledge being used to develop the reconstruction built new knowledge in staff. This provided a positive contribution to assist with the appreciation of the resourcefulness of staff in dealing with processing, shelving (five floors), and rubbish and cleaning management.

Re-Engaging with library users in a new way through new service points for study and staff created an interactive test area for the co-design of new services and spaces. It was a living laboratory for the new library, able to engage in the creation of knowledge beyond a priori knowledge to establish a conceptual basis for the final planning.

Disaster Recovery – Epistemological Theory

Disaster theory is similarly taking a new epistemological focus, within the framework of what has been a primarily operational and rational approach. Understandably, the justified truth paradigm has been disasters, based on previous memorable and documented disaster recovery projects. Programs for assessment of approaches that will be undertaken during recovery does, however, offer an insight to consider epistemological developments, particularly as means of obtaining

knowledge from areas which have previously not been present in consideration of buildings and services.

Civic epistemology has emerged as a means of assessing and reformulating civic policy for state response to decision-making in relation to disasters. Jasanoff (2005) notes that civic epistemologies need to be explored as cultural (and knowledge) specific ways for the community to assess and engage with the state's expertise, knowledge and reasoning. Her focus is on decision-making and social responsibility. Others (in particular Donovan & Oppenheimer, 2016) take this concept further to call for a new approach to knowledge responsibility, sharing and accountability in disasters including disaster recovery. Contextualising knowledge geographically, institutionally and culturally requires new social and scientific approaches, according to their analysis.

Further, rethinking disaster recovery using ethnographic and epistemological lenses is a new theme in the literature. Some (such as Barrios, 2015) suggest that rationalist knowledge approaches based on justified truth provide insufficient information to untangle the basis of environmental disasters. Still, others find inferences of a priori approaches that may limit knowledge utilised for effective decision-making. A meta-analysis (Cole et al., 2018) further adds evidence that more complex thinking is required from their study of 1336 recommendations made in 55 Australian major post-event reviews and inquiries since 2009.

The combination of insights from epistemological assessment of disasters and library and information science insights suggest that the approaches taken evidence philosophical limitations that it is timely to review to enable the application of knowledge theories.

Conclusion

Disaster recovery in libraries is an area of deep impact in terms of the effect on institutions and knowledge seekers. Traditional approaches have been framed on operational methods that reflect transactional approaches based on previous events. This paper suggests that disaster recovery should sit at the juncture of inferred knowledge from past events and foundational assessment of new knowledge from beyond those experiences.

These disasters in the case studies caused both libraries and universities to re-evaluate and rethink. The critical questioning of the concept of collection is now more holistic and reflective of the constitution of a corpus of knowledge. New innovations must come from reframing and moving from rationalism. Rebuilding can then be a springboard for the delivery of the strategic objectives of the institution and create significant value from the library.

The key messages from the case studies are:

1. Disasters can happen at any time and to anyone and no disaster (and conditions) will be the same. Business continuity plans (BCP) provide guidance; however, disaster recovery should sit in a new frame.
2. The size of the disaster adds complexity. A priori thinking can limit approaches and outcomes.
3. Rebuilding is slow and collaboration with academic staff and the broader community is vital. Knowledge building must include external environmental factors in addition to internal conditions.

4. Knowledge must be sought from new sources – expert advice assists in tough and unpopular decisions.
5. Cultural, social and geographic factors will influence communications – as the knowledge relationship with the library will be dense and beyond the institution.
6. An academic library is more than a building. The reconceptualisation of the library will require engagement that benefits from new knowledge sources.
7. Librarians are ‘contingency ninjas’ and this needs to be balanced with the opportunity to take an epistemological lens focused on opportunity.
8. The most significant silver lining of a disaster is that it can clearly illustrate the importance and value of knowledge skills, abilities and creation of new knowledge.

These disasters were not the first in the Australia and New Zealand region in libraries but were very significant in terms of effect on the collection and collection access. While the strategic response relates to the work and standards developed by others (see Jenks, 2012; National Library of Australia, n.d.; State Library of Queensland n.d) a mechanistic approach of checklists and pre-disaster conceptualisation is not viable in recovery operations of this size. New theories and analysis are required to recognise the limitations of previous approaches.

Building collections with new epistemological concepts offers the opportunity to see beyond the assumptions that the collection is a justified truth in itself. The bias and nature of scholarly publishing is recognised and strategic building encompasses access, content and delivery paradigms that match the new knowledge created during the rebuilding.

While libraries work to prevent threats to collections, it is vital to recognise that these disasters provide the opportunity for functional and institutional momentum.

Acknowledgement

The authors acknowledge and record our deep appreciation of the spirit and work of library staff in every part of the disaster recovery.

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