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**COMMUNITY-BASED DISASTER RESPONSE TEAMS FOR
VULNERABLE GROUPS AND DEVELOPING NATIONS:
IMPLEMENTATION, TRAINING, AND SUSTAINABILITY**

A thesis presented in partial fulfilment of the requirements
for the degree of Master of Emergency Management

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Abstract

Bystanders are often the first to respond to disasters and, for this reason, Community-Based Disaster Response Teams (CBDRTs) should be established in vulnerable communities. The literature review examines Disaster Risk Reduction initiatives and identifies that there is little information available regarding strategies and training curriculum that could be used to establish and maintain CBDRTs in developing nations and with vulnerable groups. The three research questions for this investigation ask how CBDRT courses could be adapted for these communities, what topics and activities would be most useful for such training, and how the teams could be established and maintained. The research objectives are to identify strategies that could be used to train CBDRT groups in these contexts, to propose an outline for a basic training course, and to describe techniques that could contribute to the sustainability of these teams.

Research was conducted with CBDRTs in developing nations using a mixed methods methodology with the United States Federal Emergency Management Agency's (FEMA) Community Emergency Response Team (CERT) programme being employed as a case study. Quantitative data was obtained from a questionnaire completed by CERT course graduates, and qualitative information was acquired from key informant interviews. After a review of the CERT programme that discusses its history, curriculum, success stories, and potential pitfalls, the data collected is presented through statistical analysis of the questionnaire replies and thematic analysis of the interview transcripts.

Suggested CBDRT training strategies are creating courses for adolescents, modifying the material for non-literate learners, and providing additional practical activities. Recommendations for establishing programmes include developing teams for young people, cooperating with Community-Based Organisations to solve existing problems, and offering CBDRT training in the post-disaster environment. Techniques for maintaining the teams involve developing leadership, creating support networks, and cultivating partnerships with local authorities. The final conclusion is that the CERT model could be used as the basis for an international CBDRT training programme, although it would require adaption of the course content and presentation style.

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Acronyms and abbreviations

CBDRT	Community-Based Disaster Response Team
CBDRM	Community-Based Disaster Risk Management
CBDRR	Community-Based Disaster Risk Reduction
CBO	Community-Based Organisation
CDEM	Civil Defence Emergency Management
CEM	Comprehensive Emergency Management
CERT	Community Emergency Response Team
DMO	Disaster Medical Operations
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
FEMA	Federal Emergency Management Agency
ICS	Incident Command System
INSARAG	International Search and Rescue Advisory Group
LAFD	Los Angeles Fire Department
MCDEM	Ministry of Civil Defence and Emergency Management
NGO	Non-Governmental Organisation
PFA	Psychological First Aid
PPE	Personal Protective Equipment
PTSD	Post-Traumatic Stress Disorder
SAR	Search and Rescue
UNISDR	United Nations International Strategy for Disaster Reduction

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1. Introduction

This chapter introduces the research background, highlights the need to train local communities to act as first responders for disasters, and presents the United States Federal Emergency Management Agency's (FEMA) Community Emergency Response Team (CERT) programme. It then discusses the scope and aim of this evaluation, the research questions and objectives, and the structure of the thesis.

1.1. Research background

In the years following the ratification of the Hyogo Framework for Action in 2005 (United Nations International Strategy for Disaster Reduction, 2007) and the Sendai Framework for Disaster Risk Reduction in 2015 (United Nations Office for Disaster Risk Reduction, 2015) there has been increasing international awareness of the need for Community-Based Disaster Risk Management (CBDRM) programmes that incorporate an All of Society approach for promoting community resilience (Afrose, 2017; GNDR, 2018; Van Niekerk, NemaKonde, Kruger, & Forbes-Genade, 2018). Although considerable attention has been focussed on Disaster Risk Reduction (DRR) strategies that eliminate or mitigate hazard risks, and substantial weight placed on the move away from outdated Civil Defence models that centre around the response and recovery phases of the emergency management cycle, it is nevertheless important to emphasise that effective disaster response is an essential element of a holistic DRR strategy, as underscored by Priority 4 of the Sendai Framework (United Nations Office for Disaster Risk Reduction, 2015).

Researchers, such as Wenger, Dynes, and Quarantelli (1988) with their investigation into the 1985 earthquake in Mexico City and Simpson (1999) in a paper published in a textbook, have shown that local communities are typically the first responders following a major disaster, with an estimated 85% to 90% of successful rescues being performed by bystanders in the first hours following an event (Fernandez, Barbera, & van Dorp, 2006; Gaillard & Mercer, 2013; National Research Council, 2006; United Nations Office for the Coordination of Humanitarian Affairs, 2015a). Despite the United Nations Office for Disaster

Risk Reduction (2017) recommending the creation of Community-Based Disaster Response Teams (CBDRTs), there is still a scarcity of documentation that provides practical strategies for implementing such initiatives. An exception to this rule has been the CERT programme (Department of Homeland Security, 2019), which was originally developed by the City of Los Angeles Fire Department (LAFD) and later expanded and promoted by FEMA. However, the vast majority of CERT teams formed to date have been located within the continental United States and therefore may not be representative of the challenges encountered when establishing CBDRTs with vulnerable populations or in developing nations.

As demonstrated by the literature review in the following chapter, there is a lack of published information regarding standard procedures that could be utilised for the training components of Community-Based Disaster Risk Management programmes (Walia, 2008), including curriculum for preparing Community-Based Disaster Response Teams. The paucity of readily available approaches, techniques, and strategies for establishing, training, and maintaining CBDRTs in vulnerable communities has been identified as the research gap to be investigated in this investigation.

The researcher first became interested in this topic in 2003 when he introduced the FEMA CERT programme to a Non-Governmental Organisation (NGO) that worked with underprivileged young people in an urban community in Rio de Janeiro state, Brazil (CERT Brasil, 2019b), and has had opportunities since then to implement CERT courses in Brazil and other countries. Although this experience enabled him to witness the enthusiastic reception of CBDRT training by vulnerable communities in diverse locations, it also contributed to his desire to understand more about the theoretical and practical foundations for such teams and provided the motivation behind the initiation of this research project.

1.2. Research scope

As this investigation utilises CERT programmes in developing nations and vulnerable communities as a case study, the scope of the research was limited to CERT courses that were undertaken between June 2018 and January 2019 in Latin America and the Caribbean, due to the two-semester timeframe available. Four basic CERT courses were evaluated in Dorado, Puerto Rico; Punta Gorda, Belize; Fraijanes, Guatemala; and Nova Friburgo, Brazil, with a CERT Train the Trainer course in Nova Friburgo also being studied. Since a total of 142 people participated in the basic CERT and Train the Trainer courses, with the participants representing 15 potential countries for CERT programme implementation, these cases have provided a significant sample of international CERT graduates within the financial, geographical, and chronological constraints of the research project.

1.3. Research aim

The aim of this investigation is to obtain insights and recommendations that could provide direction and guidance for the creation, training, and maintenance of CBDRT programmes in developing nations and with the vulnerable groups of the poor, young people, and communities that have been previously impacted by natural or technological disasters. Since the FEMA CERT programme will be used as a case study, information and observations will be collected and collated on the applicability of the CERT programme for these contexts, along with suggestions for possible adaption of the basic CERT curriculum for use with the target groups for this research.

1.4. Research questions

Research questions define the problem that the researcher wants to investigate and provide a framework for conducting the research by delineating the boundaries of the enquiry (Clark & Badiie, 2015; Onwuegbuzie & Leech, 2006), and are developed from the research gap that is identified following the literature review. Since the research gap that was detected is the lack of available information regarding the steps to be taken and the training curriculum

to be utilised to establish, train, and maintain CBDRT programmes with vulnerable communities and in developing nations, the following three questions will be asked:

1. How can CBDRT training courses be adapted for vulnerable groups, including adolescents, the poor, and communities that have been impacted by natural or technological disasters?
2. What topics and practical activities would be most useful for such training?
3. How can Community-Based Disaster Response Teams in these communities be implemented and made sustainable for the long-term?

1.5. Research objectives

In order to answer the research questions, this study intends to achieve the following objectives:

1. Identify strategies that could be utilised to deliver appropriate and relevant Community-Based Disaster Response Team training to vulnerable communities and developing nations.
2. Propose an outline for a basic training curriculum that would be suitable for CBDRTs in these situations.
3. Describe techniques and approaches that could be employed to ensure that such teams are successfully established and empowered for their continued sustainability.

The chart contained in Figure 1 illustrates the relationship between the research gap, the research questions, and the research objectives.

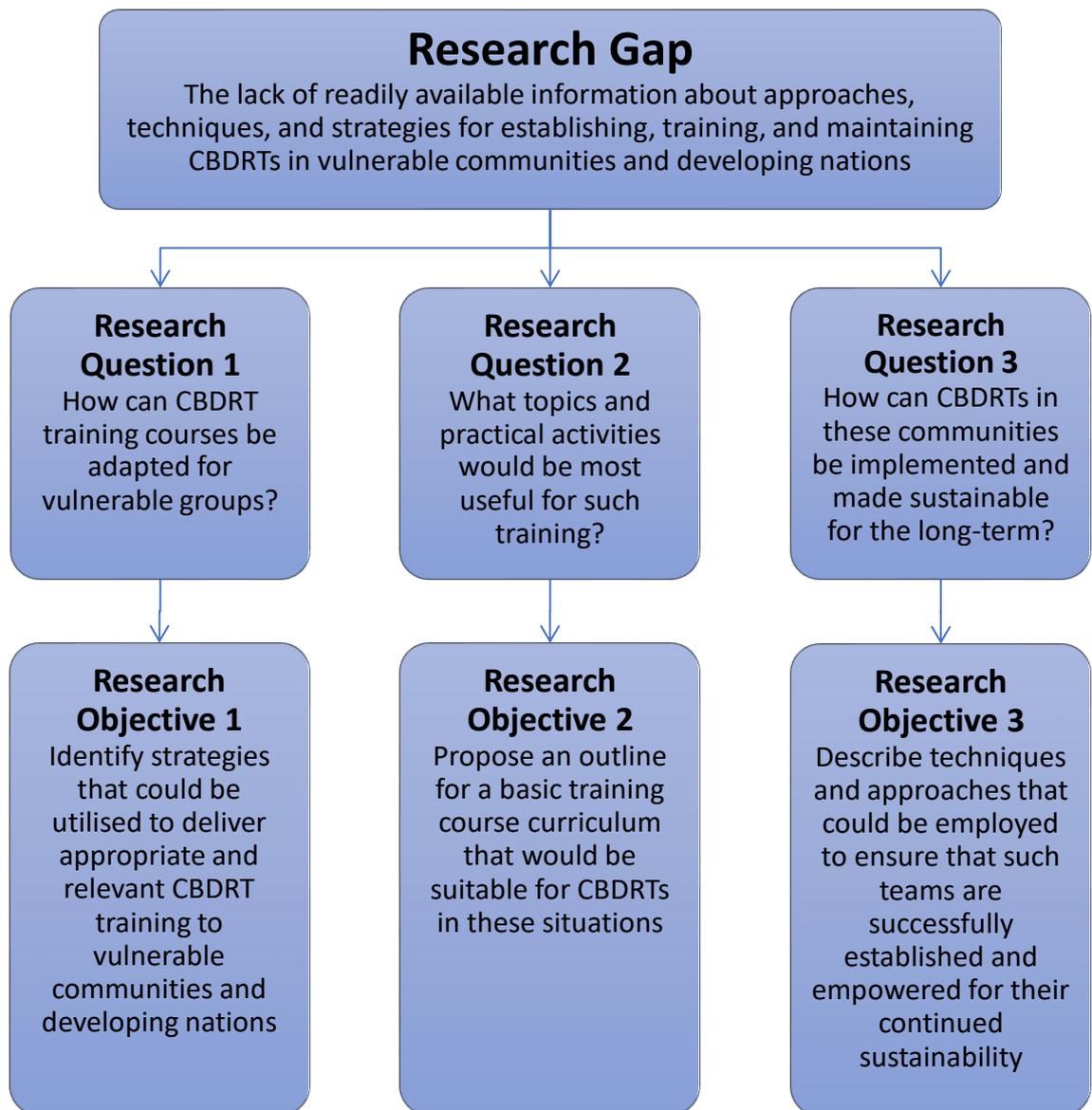


Figure 1: Research gap, questions, and objectives

1.6. Structure of this thesis

This thesis is divided into eight chapters, with each chapter being organised under headings and subheadings. Chapter 1 is an introduction to the purpose and research objectives of this evaluation, and Chapter 2 contains the literature review which examines common concepts and terminology relating to disasters and emergency management, and investigates the literature regarding Community-Based Disaster Risk Management programmes and Community-Based Disaster Response Teams. Chapter 3 discusses the research paradigm, methodology, methods, and analysis processes used throughout the

investigation, and Chapter 4 describes the research design, and the survey and interviews that were used as instruments. Chapter 5 examines the history, curriculum, and implementation of the FEMA CERT programme which was used as the case study for this research, and Chapter 6 describes the data that was collected, the analysis that was undertaken, and the results that were obtained. The research findings are then discussed in Chapter 7, and the recommendations, research limitations, and conclusions are presented in Chapter 8. Appendix 1 contains the questionnaire that was used for the online survey, and Appendix 2 documents the questions utilised during the key informant interviews. Appendix 3 lists the aggregated Likert-scale scores from the questionnaire, Appendix 4 details the interview themes and codes, and Appendix 5 specifies the codes and themes that were assigned to the questionnaire's comment field.

1.7. Summary

This chapter highlights the role of bystanders as first responders following a major disaster and presents the FEMA CERT programme as a model for the implementation of Community-Based Disaster Response Teams. It then introduces the research scope, aim, questions, and objectives, and provides an overview of the structure of this thesis.

The next chapter presents the literature review that examines disasters and emergency management, international frameworks for Disaster Risk Reduction, and volunteer and community response to disasters. It also discusses the published research regarding Community-Based Disaster Risk Management initiatives and Community-Based Disaster Response Teams.

2. Literature review

This chapter contains the literature review and begins with the definition of relevant terminology, such as disasters, hazards, risks, vulnerability, capacity, and social capital. It then discusses emergency management and the disaster cycle, and defines Disaster Risk Reduction (DRR) and Disaster Risk Management (DRM), which are foundational concepts for this investigation. It continues with an overview of the three international accords that provide the frameworks for worldwide DRR and DRM projects, and outlines the All of Society and Whole Community models that are increasingly used for such programmes, along with a definition of vulnerable populations. The first section of the literature review then concludes with an investigation into community participation during the preparedness phase of the disaster cycle, and spontaneous volunteering during the response phase, and an in-depth look into the current state of volunteerism, with an emphasis on the emergency services.

The literature review then investigates Community-Based Disaster Risk Management programmes, including their evolution, definition, and implementation, and examines Community-Based Disaster Response Teams. It discusses the rationale behind the establishment of CBDRTs, looks at examples of such teams in the available literature, and highlights challenges that have been identified in their creation and maintenance, before identifying and elaborating the research gap.

The following sections of the literature review provide the definitions for common terminology that will be used throughout this thesis.

2.1. Disasters

The English word *disaster* originally derived from Latin or Italian roots and signified a catastrophe that was provoked by an unfortunate misalignment of the celestial bodies, although by the seventeenth century it had acquired a more generic meaning that covered a range of tragic events involving injuries, fatalities, or economic loss (Coppola, 2015; Rubin & Dahlberg, 2017). During much of the twentieth century a disaster was generally considered to be a “negative, agent-caused event” (Perry, 2007, p. 4), until Fritz published his

seminal definition in 1961 which describes a disaster as being an event that inflicts damage and loss on a society or subset thereof, and consequently disrupts the structure and functioning of the impacted community (Quarantelli, 1985).

In a meta-study of 128 academic and professional definitions of disaster, Mayner and Arbon (2015) found that the most common concepts and themes were represented by the words *community*, *ability*, *event*, *society*, *affected*, and *damage*. They were able to develop a consensus definition from these results, which is “the widespread disruption and damage to a community that exceeds its ability to cope and overwhelms its resources” (p. 24). This is very similar to the definition offered by the United Nations International Strategy for Disaster Reduction (UNISDR) that describes a disaster as being a “serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources” (2009, p. 9). Such a definition is also compatible with that used by the New Zealand Ministry of Civil Defence and Emergency Management (MCDEM), which asserts that a disaster is:

a serious disruption of a community or society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, social, cultural, economic and environmental losses and impacts. (2019, p. 6)

2.2. Hazards, risks, and vulnerabilities

A *hazard* is described by UNISDR as being a “process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation” (United Nations International Strategy for Disaster Reduction, 2017). A more succinct definition of a hazard is a “source of potential harm to a community, including the community’s population, environment, private and public property, infrastructure, and business” (Coppola, 2015, p. 41).

As there are an inestimable number of possible hazards in existence, emergency managers calculate hazard or disaster *risk*, which is defined as “the combination of the probability of an event and its negative consequences” (United Nations International Strategy for Disaster Reduction, 2009, p. 25), or “the chance that a hazard could impact us in a significant way” (Ministry of Civil Defence and Emergency Management, 2019, p. 13). The quantification of hazard risk empowers emergency planners to focus on those events with a higher probability of occurrence, even though they might exercise only a moderate impact, for example, seasonal flooding, and those hazards which present a lower probability of incidence but a potentially significant effect on the community, such as a major earthquake.

Derived from the Latin verb *vulnerabilis*, which means to wound, *vulnerability* is defined as the “propensity of an object, area, individual, group, community, country or other entity to incur the consequences of a hazard” (Coppola, 2015, p. 33), or the “characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard” (United Nations International Strategy for Disaster Reduction, 2009, p. 30). The New Zealand National Disaster Resilience Strategy further classifies vulnerability as the physical vulnerability of built structures to a hazard event; social vulnerability as relating to livelihoods, social connections, and gender; and other vulnerability factors which may affect how a community responds to and recovers from an adverse event (Ministry of Civil Defence and Emergency Management, 2019).

2.3. Capacity, resilience, and social capital

Capacity is defined by MCDEM as the “combination of all the strengths, attributes and resources available within an organization, community or society to manage and reduce disaster risks and strengthen resilience” (Ministry of Civil Defence and Emergency Management, 2019, p. 6), which is the same definition as that adopted by the United Nations International Strategy for Disaster Reduction (2017). Norris et al. (2008) define community capacity as being the capability to identify social problems and to use knowledge, skills, systems, and resources in order to bring about both individual- and community-level change,

and Allen (2006) breaks the task of building capacity into the four domains of providing technical information and training, raising awareness of risk and vulnerability, accessing local knowledge and resources, and mobilising the local population to participate in DRR initiatives.

Although the original definition of the word *resilience* derives from metallurgy and commonly refers to an object's ability to "spring back into shape" (Oxford Dictionary, n.d.), it has come to acquire a richer meaning in emergency management literature than merely the return of a community to a former state following a devastating event. The ongoing development of the meaning of the word can be seen by a comparison of the definition offered by UNISDR in 2009, as the "ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner" (United Nations International Strategy for Disaster Reduction, 2009, p. 24), to that proposed in the 2017 UNISDR glossary which is expanded to include the ability to "resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard" (2017).

On the other hand, Wenger (2017) proposes that the concept of resilience in disaster management be replaced by that of adaptation, affirming that "negotiating adaptive pathways would be a better objective for disaster management than resilience" (p. 11), and Norris et al. (2008) offer a definition of resilience as being "a process linking a set of adaptive capacities to a positive trajectory of functioning and adaptation after a disturbance" (p. 130). This expanded understanding of resilience that includes the concept of adaptation can be seen in the definition utilised in the New Zealand National Disaster Resilience Strategy, where it is defined as "the ability to anticipate and resist the effects of a disruptive event, minimise adverse impacts, respond effectively post-event, maintain or recover functionality, and adapt in a way that allows for learning and thriving" (Ministry of Civil Defence and Emergency Management, 2019, p. 7).

MCDEM further characterises resilience as encompassing *social resilience* or social connectedness and cohesion; *cultural resilience* of cultural values, places, institutions, and practices; *economic resilience* of businesses,

livelihoods, financial markets, and the macroeconomic environment; *resilience of the built environment* including critical infrastructure, buildings, and housing; *resilience of the natural environment*; and *government of risk and resilience*, which includes leadership, strategy, policy, security, and the maintenance of the rule of law (Ministry of Civil Defence and Emergency Management, 2019). Likewise, Norris et al. (2008) affirm that resilience incorporates the technical, organisational, social, and economic systems that come together to constitute a community, and suggest that resilient resources contain the three properties of robustness or the ability to withstand stress, redundancy of critical components and resources, and rapidity of mobilisation and utilisation.

It is common to encounter the term *social capital* in academic discussions about community resilience. Murphy defines social capital as “the set of norms, networks and organisations through which people gain access to power and resources and through which decision making and policy formulations occur” (2007, p. 302), and Drolet et al. describe it as consisting of “relations of mutual support between neighbours, friends, community groups, and other social networks” (2015, p. 436). Hishida and Shaw cite various definitions of social capital, including Bourdieu’s description of “the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition” and the World Bank’s definition of “the internal social and cultural coherence of society, the norms and values that govern interactions among people and the institutions in which they are embedded” (2014, p. 52).

Social capital may be classified into the categories of *bonding*, *bridging*, and *linking* social capital (Aldrich & Meyer, 2015). Bonding social capital refers to “the connections among individuals who are emotionally close, such as friends or family” (p. 258), and is described by Hishida and Shaw (2014) as being a powerful motivator of spontaneous rescue attempts among members of the same school, neighbourhood, or workplace in the immediate post-disaster environment. Bridging social capital refers to the loose connections between friends or individuals that span ethnic or socio-economic groups and often help to provide a variety of information and resources that can be especially useful during crisis situations, and linking social capital defines those networking

connections that enable residents to have direct access to governing authorities and vice versa (Aldrich and Meyer, 2015). All three forms of social capital can powerfully contribute to a community's disaster resilience capability.

2.4. Disaster management and emergency management

The term *disaster management* is defined by UNISDR as being the “organization, planning and application of measures preparing for, responding to and recovering from disasters” (United Nations International Strategy for Disaster Reduction, 2017), and is considered by Helsloot and Ruitenbergh (2004) to be an improvement over the traditional Civil Defence model that was inherited from military *chaos, command, and control* organisational structures. Whereas the Civil Defence configuration was based upon a hierarchical system that contained clearly defined roles and responsibilities and a top-down information flow (Simpson, 2001), Helsloot and Ruitenbergh (2004) portray disaster management as being founded on the principles of *continuity, coordination, and cooperation* which encourage the active participation of multiple stakeholders, including emergency management authorities, businesses, NGOs, and formal and informal community groups. The advantages offered by this new structure can be contrasted with Quarantelli's observation that “the command and control model can seldom be applied well in actual combat situations; it is non-applicable and likely to be dysfunctional in a civilian context” (1988, p. 381).

Although it is common to find the phrase *emergency management* being used interchangeably with disaster management, such as in the 2009 UNISDR glossary, some researchers, including Briton (1986) and Quarantelli (2005), differentiate between everyday emergencies and large-scale disasters, and conclude that emergency management encompasses the resolution of day-to-day incidents in addition to disasters. Although the New Zealand government defines Civil Defence Emergency Management (CDEM) as being the “application of knowledge, measures, and practices that... guard against, prevent, reduce, recover from, or overcome any hazard or harm or loss that may be associated with any emergency”, it also describes an emergency as

being a situation that “cannot be dealt with by emergency services, or otherwise requires a significant and co-ordinated response” (Civil Defence Emergency Management Act, No. 33, 2002, s 4). Similarly, a working group convened by FEMA developed a definition of emergency management as being the “managerial function charged with creating the framework within which communities reduce vulnerability to hazards and cope with disasters”, thereby also associating the function directly with the management of disasters (Federal Emergency Management Agency, 2007, p.4).

The task of disaster or emergency management begins with the identification of potential hazards and the calculation of their associated risk, which is followed by an assessment of the community’s vulnerability to the identified hazard risks, and its level of resilience or capacity to deal with such risks. From this starting point, emergency managers seek to increase community resilience by reducing the occurrence of hazards or mitigating their possible adverse effects, and by increasing the community’s level of preparedness in order to respond to the impacts of the hazard risks (Coppola, 2015; Emergency Management Institute, 2008).

2.5. The emergency management cycle

Emergency management practitioners frequently refer to the *emergency management cycle* or disaster cycle in order to describe the different phases of disaster or emergency management (Figure 2). The Comprehensive Emergency Management (CEM) structure, which has been widely promoted by FEMA (Emergency Management Institute, 2008), contains the four phases of mitigation, preparedness, response, and recovery, and is similar to the 4-R model used by the New Zealand government that is composed of risk reduction, readiness, response, and recovery (Civil Defence Emergency Management Act, No. 33, 2002). Another variation of the emergency management lifecycle, proposed by Alexander (2003), defines the phases of the disaster cycle as being mitigation or reducing risks and hazards, preparation for impending impacts, management of or response to the emergency phase, recovery or

restoration of major human and infrastructural systems, and the reconstruction of damaged buildings and structures.

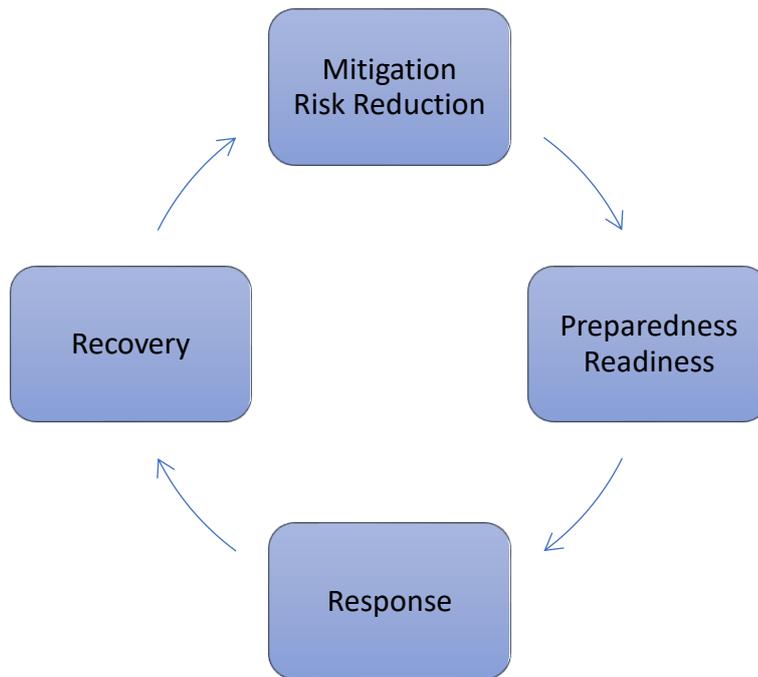


Figure 2: The emergency management cycle

All of these emergency management cycle models include the response phase, which is defined by FEMA as being when “public officials provide emergency assistance to victims of the event and try to reduce the likelihood of further damage” (Emergency Management Institute, 2008, p. 1-12). UNISDR describes response as being the “actions taken directly before, during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected” (United Nations International Strategy for Disaster Reduction, 2017), adding that “disaster response is predominantly focused on immediate and short-term needs and is sometimes called disaster relief”. The definition of response presented in the New Zealand National Disaster Resilience Strategy covers “the actions taken immediately before, during or directly after a disaster to save human and animal lives and property, and to help communities begin to recover” (Ministry of Civil Defence and Emergency Management, 2019, p. 7).

2.6. Disaster Risk Reduction (DRR) and Disaster Risk Management (DRM)

Although an integral part of the emergency management process, community-level *Disaster Risk Reduction* (DRR) projects and activities are often implemented on an ad-hoc or standalone basis by Non-Governmental Organisations (NGOs) or grassroots Community-Based Organisations (CBOs; Shaw, 2012). DRR is “aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development” (United Nations International Strategy for Disaster Reduction, 2017).

A closely related term, *Disaster Risk Management* (DRM) is defined as being the “application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses” (Ministry of Civil Defence and Emergency Management, 2019, p. 6). Christoplos, Mitchell, and Liljelund (2001) use the term *Disaster Mitigation and Preparedness* (DMP) to discuss allied concepts and risk reduction activities. They stress that NGOs should involve the communities in DRR projects at a grassroots level and highlight the need to learn from the communities about their existing coping strategies, and even about what constitutes a disaster for them.

Having established definitions for the terminology that will be most commonly used throughout this research project, the following sections of the literature review will discuss the three international accords that provide the framework for Disaster Risk Reduction and Disaster Risk Management programmes, especially in developing nations, along with definitions of the All of Society and Whole Community models that are frequently utilised for such projects, and a description of vulnerable groups in the context of disasters.

2.7. The Yokohama Strategy and Hyogo and Sendai

Frameworks

On December 22, 1989, the United Nations General Assembly adopted resolution 44/236 that launched the International Decade for Natural Disaster Reduction, which began on January 1, 1990 (UN General Assembly, 1990). The purpose of the Decade was to reduce the loss of life and social and economic disruption caused by natural disasters, especially in developing nations, through a concerted international effort focussed on capacity building. A secretariat was established in the United Nations office in Geneva to support the activities of the Decade, which was later transformed into the United Nations International Strategy for Disaster Reduction (Coppola, 2015; Housner, 1989).

The first World Congress on Natural Disaster Reduction was held in May 1994 in Yokohama, Japan to evaluate the progress of the International Decade, and the *Yokohama Strategy and Plan of Action for a Safer World* was produced as a result (United Nations International Strategy for Disaster Reduction, 1994b).

The Strategy affirms the importance of encouraging communities to participate in Disaster Risk Reduction programmes in order to “strengthen the resilience and self-confidence of local communities to cope with natural disasters” (p. 11). However, the report that was produced at the conference places a strong emphasis on mitigation and preparedness activities to the detriment of disaster response, repeating three times the mantra that prevention or preparedness is better or more important than response (United Nations International Strategy for Disaster Reduction, 1994a). This failure to recognise the role that communities play in initial disaster response is identified by Twigg (1999) in his review of the Yokohama Strategy, in which he cites the lack of official support for emergent volunteers in disaster relief activities as being one of the main reasons for the absence of community participation in DRR programmes.

The UNISDR-sponsored second World Conference on Disaster Reduction in the city of Kobe, in Hyogo prefecture, Japan in January 2005 was attended by 168 countries and adopted the *Hyogo Framework for Action*, which is based around three strategic goals and five priorities for action (United Nations International Strategy for Disaster Reduction, 2007). Under Priority 1, which

ensures that DRR is a national and local priority, paragraph 16(h) highlights the need to promote community participation in DRR, and under Priority 3, which encompasses building a culture of safety and resilience, paragraph 18(h) mentions the training of children and youth in DRR strategies, and paragraph 18(l) recommends providing community-level training and considering the role of volunteers to “enhance local capacities to mitigate and cope with disasters” (p. 10). This renewed focus on the need for effective disaster response is further emphasised in the fifth priority for action, which is to strengthen disaster preparedness for response at all levels, and mention is made of the active participation of communities in DRR, with a focus on volunteerism, in paragraph 20(l).

A document prepared by the United Nations International Strategy for Disaster Reduction (2008) provides further clarification of Priority 5 of the Hyogo Framework, and underscores the need for community participation in these initiatives, and the decentralisation and localisation of DRR activities. The report summarises the benefits of training community volunteers in basic first aid and Search and Rescue (SAR), highlighting the assistance that they can provide to the formal SAR teams, with more extensive relief activities consequently being carried out in the first hours following a disaster. It also accentuates the requirement that “all organisations, persons and volunteers responsible for maintaining preparedness are equipped and trained for effective disaster preparedness and response” (p. 39). Lamentably, a mid-term review of the implementation of the Hyogo Framework that was conducted in 2010 found that there was a consistent need for improvement of action at the local level, and observed that interviews indicated “a significant gap between national and local level action”, adding that “reports of progress fade as activities get closer to vulnerable people” (United Nations International Strategy for Disaster Reduction, 2011, p. 46).

In March 2015, at the third United Nations World Conference on Disaster Risk Reduction in Sendai, Japan, the *Sendai Framework for Disaster Risk Reduction 2015 - 2030* was adopted as the successor to the Hyogo Framework (United Nations Office for Disaster Risk Reduction, 2015). The Sendai Framework contains seven global targets and four priorities for action, with Priority 4

including enhanced preparedness for effective response. Continuing the Yokohama Framework's renewed emphasis on disaster response, the Sendai Framework provides further clarification about the need for community disaster preparedness, including paragraph 33(d), which recommends the establishment of community centres containing stockpiles of materials for relief activities, paragraph 33(f) that describes the importance of disaster response training for workers and volunteers, and paragraph 33(h) which refers to the need to conduct simulated exercises.

2.8. All of Society and Whole Community participation in DRR

One of the guiding principles of the Sendai Framework is the engagement of *All of Society* in the development and implementation of Disaster Risk Reduction procedures, plans, and frameworks, which is described in paragraph 36(a) as being the participation of “civil society, volunteers, organised voluntary work organizations and community-based organizations”, along with public authorities, businesses, the private sector, media, and academia (United Nations Office for Disaster Risk Reduction, 2015, p. 23). This is a similar concept to the FEMA *Whole Community* approach to Comprehensive Emergency Management, which is defined as being a “means by which residents, emergency management practitioners, organisational and community leaders, and government officials can collectively understand and assess the needs of their respective communities and determine the best ways to organise and strengthen their assets, capacities and interests” (Federal Emergency Management Agency, 2011c, p. 3).

The Whole Community approach is based around three fundamental principles, which are to understand and meet the actual needs of the whole community, to engage and empower all parts of the community, and to strengthen what works well in the community on a daily basis. The six strategic themes of this approach are understanding community complexity, recognising community capabilities and needs, fostering relationships with community leaders, building and maintaining partnerships, empowering local action, and leveraging and

strengthening social infrastructure, networks, and assets (Federal Emergency Management Agency, 2011c).

In a practical application of the Whole Community approach, FEMA released a guide for emergency managers on how to engage with faith-based and community organisations, which includes the suggestion of providing Community Emergency Response Team training to those entities that may desire to form their own CERT groups (Federal Emergency Management Agency, 2018b). A FEMA After Action Report of the tornado in Joplin, MO highlights the value of the Whole Community approach that “emphasises the ability to access non-traditional resources and apply them in innovative ways to save lives and sustain communities after catastrophic disasters” (Federal Emergency Management Agency, 2011b, p. 10).

2.9. Vulnerable groups and communities

The concept that some groups and communities are especially vulnerable to the effects of a disaster has been expressed in the international frameworks on DRR. The report from the 1994 Yokohama Conference states that “the least developed countries, small developing states, and land-locked countries are the most vulnerable countries, as they are the least equipped to mitigate disasters”, and includes “developed nations affected by desertification, drought and other types of natural disasters” in this category, also affirming that “in all countries the poor and socially disadvantaged groups suffer most from natural disasters and are least equipped to cope with them” (United Nations International Strategy for Disaster Reduction, 1994a, p. 8). A survey of disaster statistics over a twenty-year period was recently undertaken by Wallemacq and House (2018), and confirms that developing nations are often disproportionately impacted by disasters.

Although the Hyogo Framework refers to vulnerable groups, constituencies, and populations, it does not contain a definition of the membership of such groups beyond a reference to children in item (g) of paragraph 19 regarding social safety nets for victims of disasters, and an allusion in the same item to “the poor, the elderly and the disabled” (United Nations International Strategy for

Disaster Reduction, 2007, p. 11). The Framework also recognises that Small Island Developing States are situated in the most vulnerable areas of the world, due to the intensity and frequency of natural disasters in those regions and the severity of their impact.

Despite the Sendai Framework not specifically defining the composition of the group of vulnerable people, Stough and Kang (2015) show that the third United Nations World Conference on Disaster Risk Reduction included a focus on DRR for people with disabilities, and indicate that paragraph seven of the final Framework document highlights the need for governments to engage with “relevant stakeholders, including women, children and youth, persons with disabilities, poor people, migrants, indigenous peoples, volunteers, the community of practitioners and older persons” (United Nations Office for Disaster Risk Reduction, 2015, p. 10). They also demonstrate that people with disabilities are directly and indirectly mentioned in other parts of the Framework, and cite paragraph 19(d) which refers to “people disproportionately affected by disasters, especially the poorest” (p. 13).

Children and young people are frequently mentioned as being among the most vulnerable groups for disaster-related physical and emotional harm (Freeman, Nairn, & Gollop, 2015; Mutch, 2013). A document published by FEMA in 2010 discusses the heightened vulnerability of children and young people to loss, suffering, injury, and death during a disaster, specifying three areas of vulnerability as being psychological vulnerability, including a higher rate of Post-Traumatic Stress Disorder (PTSD) than adults; physical vulnerability to injury or excessive cold; and educational vulnerability due to post-disaster disruption to schooling (Federal Emergency Management Agency, 2010).

Research shows that 79% of adolescent victims of the Southeast Asian Tsunami presented with PTSD symptoms two months after the event (Pine et al., 2015), and Yule et al. (2000) report that 51.5% of the adolescent survivors of a shipwreck developed PTSD symptomology following the incident. In an empirical review of 160 studies of disaster victims, Norris et al. (2002) also assert that children and young people exhibit higher incidences of psychological reactions to disasters than adults, and Rønholt, Karsberg, and Elklit (2013)

likewise affirm that children who are exposed to disasters often initially report high to very high rates of PTSD-like symptoms. On the other hand, children often appear to display significant psychological resilience, and studies after Hurricane Andrew in the United States found that behaviour improved in the schools that were most highly impacted by the hurricane in the months following the disaster (Bonanno et al., 2010).

Although not mentioned in the Sendai Framework, the recent increase in human trafficking, with an estimated 600,000 to 800,000 victims being trafficked across international borders each year, has potentially enhanced the vulnerability of women and children in some post-disaster environments (Eldridge, 2019). Samuels (2015), investigating reports of child trafficking in Aceh, Indonesia following the 2004 tsunami, identified some cases of illegal adoption but did not uncover evidence of large scale child trafficking, whereas Gurung and Clark (2018) cite cases of Indian networks smuggling Nepali women to Middle Eastern countries following the 2015 earthquake, gangs abducting unaccompanied children during the European migration crisis, and orphaned children in post-earthquake Haiti being enslaved, and conclude that “in addition to rescue and relief work, governments would be wise to pay attention to domestic trafficking, providing necessary protection to vulnerable survivors, especially women and children” (p. 14). Drolet et al. (2015) also maintain that “following a disaster, young girls are particularly vulnerable to being withdrawn from education to assist with the workload, to forced child marriages, and to trafficking” (p. 438), whereas Bowersox (2018), having analysed statistics of governmental anti-trafficking measures from 2001 to 2008, concludes that “states are actually more likely to improve their performance in relation to combating trafficking” (p. 202) in the aftermath of a disaster.

The challenges of working with the wide variety of vulnerable groups are described by Christoplos et al. (2001), who emphasise that different strategies are required to deal with the diverse areas of vulnerability and underscore the danger of generically labelling people as being vulnerable. They affirm that such language has “been found to be part of a discourse of disempowerment” (p. 191), giving the example of how the use of the generic group identity of *the poor* can be problematic as it simplistically equates poverty with vulnerability.

However, the Sendai Framework affirms that the poor often lack the resources to be able to satisfactorily prepare for or recover from a disaster and are frequently adversely impacted by such events (United Nations Office for Disaster Risk Reduction, 2015), which is corroborated by a meta-regression analysis of 38 studies about poverty and natural disasters that was conducted by Karim and Noy (2016). In addition, the disproportional impact of disasters upon the urban poor is illustrated by Sarmiento, Polak, and Sandoval (2019) in their meta-study of DRR strategies for the inhabitants of informal urban settlements, who conclude that the estimated 924 million people who live in such communities worldwide often lack essential services and infrastructure, and reside in housing that is frequently situated in environmentally or geographically hazardous locations and may not be constructed according to relevant regulations.

The definition portion of this literature review will conclude with a description of community participation during the preparedness phase of the disaster cycle, and of spontaneous volunteering during the response phase, before looking at the current state of formal volunteerism with an emphasis on emergency response activities.

2.10. Community participation in disaster preparedness

A common theme in post-disaster evaluation reports is the need for greater preparedness of the general population for emergency situations, as was narrated by two United States federal government investigations into Hurricane Katrina (Menzel, 2006), and is highlighted in paragraph 33 of the Sendai Framework (United Nations Office for Disaster Risk Reduction, 2015). In a report released in 2012, Statistics New Zealand found that 18% of households met all of three basic criteria for adequate preparedness whereas 10% did not meet any of these conditions. In addition, 88% of households maintained a three-day supply of food, but only 47% kept a similar amount of water, and a mere 29% had prepared a family emergency plan (Statistics New Zealand, 2012). A recent survey of New Zealand schools found that, although 50% of secondary schools provided preparedness training to students every year, only

29% of high schools maintained essential supplies on hand, such as food and water (Tipler, Tarrant, Johnston, & Tuffin, 2017), and B.-Y. Lee (2010) quotes surveys as showing that merely 25% of New Zealanders are fully prepared for a disaster.

Emergency management authorities often rely upon the propagation of information about hazard risks as a primary method for stimulating community disaster preparedness measures, yet Paton and Johnston (2001) demonstrate that the link between receiving such information and actually taking appropriate action is tenuous at best. Paton (2003) identifies the three phases of disaster preparedness as being motivation, formation of intent, and undertaking preparedness action, and affirms that awareness of hazards and consequent hazard anxiety may motivate protective behaviour, provided that the public understand the importance of such activity and believe that they will be successful in their preparedness efforts. In a later publication, Paton (2007) asserts that the extent to which the general public trust the emergency management authorities is also an important indicator of their intent to prepare for a disaster. A survey of attitudes towards preparedness among residents in Iran was conducted by Najafi, Ardalan, Akbarisari, Noorbala, and Elmi (2017), who report that the Theory of Planned Behaviour (TPB) provides an important indicator of the population's motivation to prepare for disasters. TPB postulates that an individual's intention is a central factor in influencing behaviour, and that intention is determined by the three motivational factors of their attitude towards the activity, perceived social pressure surrounding the issue, and the ease or difficulty of performing the behaviour.

Discussing research undertaken with students at a decile one school in Auckland and the surrounding community, Bolton, Dirks, and Neuwelt (2014) stress that the need for preparedness "goes beyond 'educating' communities to collaborating with community groups on their terms to problem solve, and create sustainable, owned solutions", adding that "preparedness is vital for marginalised populations, and those experiencing socio-economic disadvantage, in order to prevent widening inequities in the event of a disaster" (p. 24). Paton and Johnston (2001) likewise recommend holistic community preparedness programmes, suggesting that "the process should focus on

integrating hazard education with community development and problem-solving to deal with existing or contemporary problems” (p. 275).

People who have previously experienced disasters are often more highly motivated to undertake preparedness actions, as was demonstrated by Nguyen, Shen, Ershoff, Afifi, and Bourque (2006) in their survey of residents following the January 1994 Northridge earthquake in California, which found that “proximity to the earthquake epicentre and related shaking is associated with increased post-quake preparedness and mitigation behaviour” (p. 581). They also affirm that those survey participants who had suffered physical or emotional injury or financial loss were more likely to have engaged in post-quake disaster mitigation or preparedness activities.

2.11. Spontaneous disaster response activity

A common misconception, held equally by governmental authorities and the general public, posits that societal structures and the rule of law break down following a major disaster, with victims engaging in antisocial behaviour in an egotistical attempt to ensure their own survival. Referred to as the social breakdown model by Goltz and Mileti (2011), this theory has been roundly debunked by decades of research, starting with the pioneering work of academics such as Fritz and Williams (1957) and Quarantelli and Dynes (1977), with Lindell et al. (2016) affirming that “approximately six decades of disaster research has shown that the incidence of panic is low or non-existent in most disasters and that pro-social behaviour is more common” (p. 88). The rational adaptive model explains that, rather than panicking, the vast majority of disaster survivors will continue to act in a logical manner in accordance with their pre-disaster roles (Goltz & Mileti, 2011).

2.11.1. Examples of spontaneous disaster response

The catastrophic earthquake in Mexico City, Mexico on September 19, 1985, is often mentioned by researchers as an illustration of spontaneous rescue attempts that were undertaken by untrained bystanders (Dynes, 1990; Fernandez, Barbera, & van Dorp, 2006; Whittaker, McLennan, & Handmer, 2015), and is frequently cited as being one of the impetus for the creation of the

LAFD CERT programme the following year (Gerlich, 2014; Simpson, 2001). In a report based on two surveys that were carried out by the Disaster Research Centre with assistance from Mexican authorities, Wenger et al. (1988) affirm that an estimated 9.8% of the residents of Mexico City, a volunteer workforce totalling nearly two million people, were involved in disaster relief activities in the three weeks following the earthquake, with 41.9% of the volunteers undertaking Search and Rescue activities, 33.5% providing supplies, and 7.8% giving medical or psychological first aid. They also state that 11.3% of the volunteers were aged 17 years old or younger, 48.1% were aged between 18 to 29 years old, 26.6% aged between 30 to 44, and 14% were older than 44 years of age.

Immediate response by survivors and the local community is, in fact, the norm rather than the exception following major disasters, as shown by Fernandez et al. (2006) in a systematic literature review of spontaneous volunteers. Twigg and Mosel (2017), in an evaluation of 120 articles, refer to earthquakes in Nepal and Turkey and the 2004 South East Asia tsunami as being events where spontaneous volunteers played a significant role in disaster relief operations, and Porfiriev (1996) shows that the initial response to the 1995 Sakhalin earthquake in Russia was performed by emergent groups of survivors, later joined by mining companies, with only 17 of the 406 victims that were rescued being freed by the professional emergency services. Figures from the Kobe, Japan earthquake of January 1995 show that only 5,000 of the 20,000 rescues undertaken could be attributed to organised rescue teams, with the remainder being performed by other survivors (Goltz & Mileti, 2011). Spontaneous rescue efforts undertaken by local residents and bystanders were also observed after the earthquake in Christchurch in February 2011 (McLean, Oughton, Ellis, Wakelin, & Rubin, 2012), and following the tornado in Joplin - MO in May of the same year (Federal Emergency Management Agency, 2011b).

A report on volunteer helping behaviour prepared by the National Research Council (2006) affirms that 90% of the victims rescued from an earthquake in Southern Italy in 1980 were extricated by untrained survivors using basic tools, and that over half of the population of the cities of San Francisco and Santa Cruz assisted victims following the 1989 Loma Preta earthquake in the United

States. However, Fernandez et al. (2006) also postulate that the appearance of emergent groups depends on factors such as the social climate, existing relationships, and the availability of necessary resources, and Helsloot and Ruitenbergh (2004) provide examples of earthquakes in Turkey and Morocco when the local residents did not spontaneously respond.

2.11.2. Emergent disaster response groups

In an early study of volunteer response to disasters, Quarantelli and Dynes (1977) highlight the four-fold typology of post-disaster response through established, expanding, extending, and emerging groups, and suggest that pre-disaster behaviour is the best indicator of trans- and post-disaster conduct for both groups and individuals. A later paper by Stallings and Quarantelli (1985) defines emergent groups as “private citizens who work together in pursuit of collective goals relevant to actual or potential disasters but whose organisation has not yet become institutionalised” (p. 94), categorising these groups into those that form during the response phase and others that are created during the preparedness or recovery stages, with the emergency-phase groups usually performing either damage assessment, operations, or coordination of the relief effort.

2.11.3. Emotional phases and disaster utopia

Researchers have identified the different phases of emotional responses that often accompany a disaster, with one common model containing the pre-disaster phase, the impact phase, the rescue or heroic phase, the honeymoon or remedy phase, the disillusionment or long-term recovery phase, and finally the reconstruction or new equilibrium phase (Gawith, 2013; Gluckman, 2011; Roberts, 2017). Although there are no defined rules for the length of each stage, which often depends upon the scope of the disaster and the individual's or community's level of exposure to the event, the impact phase usually passes quickly, and survivors soon begin to rally and assist one another during the heroic and honeymoon phases. As the challenges of rebuilding lives, families, and the community become apparent, the disillusionment phase begins and is often aggravated as the response operation ends and the timeframe for the recovery process become apparent. The final phase of reconstruction or long-term recovery is often referred to as the *new normal* and is characterised by the

resumption of the regular functioning of the community, albeit usually in a significantly different state to the pre-disaster reality (Coppola, 2015).

As spontaneous disaster relief operations primarily occur during the heroic or rescue phase, possibly continuing into the honeymoon or remedy phase, it is not uncommon for survivors to report a heightened sense of community at this time, as was expressed by volunteer responders to the 2011 Christchurch earthquake (Potter, Becker, Johnston, & Rossiter, 2015), with this sensation of communal solidarity and generosity sometimes being described as *disaster utopia* (Morris-Suzuki, 2017; Solnit, 2010). Although such expressions of altruistic community have generally proven to be short-lived, their effects have sometimes continued in various grassroots movements, such as the Student Volunteer Army which was formed following the September 2010 earthquake in Christchurch (Carlton & Mills, 2017) and the residents' associations that were founded following the 2003 bush fires in Canberra, Australia (Camilleri et al., 2010).

2.11.4. Dangers of spontaneous response

The mobilisation of spontaneous volunteers can also present significant challenges for emergency management authorities, including the inability to effectively utilise such volunteers, a lack of coordination of activities, the logistical needs of the volunteers themselves, and health, safety and liability issues, including the possibility that untrained volunteers may cause harm to themselves, the victims, or other responders (Fernandez et al., 2006). The uncoordinated actions of self-dispatched volunteers, some of whom lacked the necessary training to safely undertake Search and Rescue operations, was cited as being a significant problem for authorities following the 2011 Joplin tornado (Federal Emergency Management Agency, 2011b), and, in a survey of 24 NGOs regarding their use of spontaneous volunteers, Sauer, Catlett, Tosatto, and Kirsch (2014) report that three of these organisations had undergone litigation as a result of volunteers' activities and one was later sued by a spontaneous volunteer, with eight NGOs (42%) reporting volunteer injuries and two (11%) affirming that their entities had witnessed the death of a spontaneous volunteer.

Evidence that untrained or spontaneous volunteers may also encounter higher levels of post-traumatic stress than professional disaster relief workers is presented by a plethora of researchers, including Thormar et al. (2014) in their research into community responders to an earthquake in Indonesia; Bills et al. (2008) in their review of literature regarding health workers and volunteers who deployed to the 9/11 terrorist attacks in the United States; Hagh-Shenas, Goodarzi, Dehbozorgi, and Farashbandi (2005) in their investigation of responders to the Bam earthquake in Iran; and Dyregrov, Kristoffersen, and Gjestad (1996) who discuss the psychological reactions of professional and volunteer rescuers following a fatal bus accident. In order to reduce the potentially negative psychological impact of deployment, volunteers must receive appropriate training in stress reduction and self-care techniques that they can apply both before and during an incident, and obtain adequate assistance at the end of the operation (Alexander & Klein, 2009; Quevillon, Gray, Erickson, Gonzalez, & Jacobs, 2016; Thormar et al., 2013).

2.12. Formal volunteering

As the initial responders to a major disaster are usually those individuals who are already present on the scene, potential volunteers should receive prior training in emergency procedures in order to be able to safely undertake relief activities (Simpson, 2000), and researchers including Sauer et al. (2014), Fernandez et al. (2006), and Whittaker et al. (2015) suggest that interested residents should join response teams in order to obtain training and gain credibility. The utilisation of community volunteers for disaster response is encouraged under the Hyogo Framework in paragraph 16(h), and the Sendai Framework in paragraph 19(d), although both documents also refer to the need for adequate training of such personnel (United Nations International Strategy for Disaster Reduction, 2007; United Nations Office for Disaster Risk Reduction, 2015).

Whereas Garrels-Bates (2018) shows that volunteering has decreased over recent years in the United States, primarily due to the decline in membership of religious organisations and service clubs, she also observes that there has

been an upsurge of volunteerism by teenagers, possibly because of the increasing number of school and college programmes that encourage or require their students to participate in such activities. The Social Report of 2016 found that around 30% of New Zealanders are involved in volunteerism, although, contrary to the United States, young people are less likely to be engaged in voluntary endeavours than adults (Ministry of Social Development, 2016).

In a report entitled *Emergency volunteering 2030: Views from managers in volunteerism*, McLennan and Kruger (2019) present the results of interviews conducted with managers with responsibility for volunteers from 34 Australian emergency services, and observe that whilst volunteerism is essential for Australia's emergency management capability, there has been a recent decline in the availability of long-term formal volunteers and a decrease in the number of hours that they have contributed to these activities. Some of the recommendations from the report include making volunteer emergency service roles more flexible and inclusive, thus becoming "accessible to a wider range of people with varying skills, abilities and levels of commitment compared to today" (p. 39), and the need for a more community-centred model, including a "shift from being service providers to communities to become partners with community to co-deliver emergency services" (p 40).

In a survey of 44 members of the Southland Community First Response programme, Broad (2004) reports that they described their motivations for volunteering as being their own sense of goodwill towards the community, the desire to enhance their personal self-sufficiency, and an awareness of the vulnerability and remoteness of their local community, and highlights the low level of obligation to participate in activities and the fact that everyone was welcome in the group as contributing factors for ongoing volunteer involvement in the project. Kragt, Dunlop, Gagné, Holtrop, and Luksyte (2018), researching volunteer retention in the Australian emergency services, underscore the importance of the psychological contract between the agencies and their volunteers, and the need to manage volunteers' expectations in order to increase retention rates.

One of the methods that FEMA recommends for implementing the Whole Community strategy is the training of existing Community Based Organisations as CERT teams (Federal Emergency Management Agency, 2018b). In their article about community first responders, Brennan, Barnett, and Flint (2005) also state that pre-existing groups, such as neighbourhood watch chapters, community organisations, faith communities, school staff, and scouting groups, are suitable candidates for undertaking CERT training. The Teen CERT course for adolescents (Federal Emergency Management Agency, 2015b) has been found to be appropriate for use with secondary school students, as either part of the school curriculum or as an extra-curricular activity in partnership with established youth outreach programmes (Black & Powell, 2012; Powell, Smith, & Black, 2011a, 2011b).

In addition to the strategy of training existing groups as disaster response teams, the post-disaster environment also offers a unique opportunity for the recruitment and training of volunteer responders, especially during the heroic and honeymoon emotional phases when many of the survivors are interested in volunteering and have not yet returned to their daily schedules (Gawith, 2013; Roberts, 2017). Since disaster survivors often feel that they are no longer in control of their lives, volunteering at this stage can help restore a sense of agency which is also an important strategy to assist them with their own psychosocial recovery. The psychological benefits of volunteering in the post-disaster environment are extolled by both Pine et al. (2015) and Freeman et al. (2015) in their research into children and youth affected by the Christchurch earthquake, and by Carlton (2015) in a study of young people from refugee communities following the same disaster. Johal and Mounsey (2016) report on the positive psychological effects of post-disaster volunteerism for citizens who volunteered following a major flood in Australia, as do Fernando and Hebert (2011) in their research about women survivors of Hurricane Katrina in the USA and of the 2004 tsunami in Sri Lanka.

Following the definition portion of the literature review, consideration will now be given to the discussion of Community-Based Disaster Risk Management programmes and Community-Based Disaster Response Teams.

2.13. Community-Based Disaster Risk Management (CBDRM)

Community-Based Disaster Risk Management (CBDRM) is a grass-roots participatory process that recognises the capacities that are present within communities and seeks to enhance social capital in order to increase community resilience to hazards and vulnerabilities (Van Niekerk et al., 2018). CBDRM is the framework within which successful Community-Based Disaster Response Teams (CBDRTs) are often established, and for this reason, will be discussed in detail in the following sections of this thesis.

2.13.1. The evolution of CBDRM

The field of disaster and emergency management has progressed over the years from a centralised governance model to increasing utilisation of local knowledge and community-based resources in the mitigation and prevention phases of the emergency management cycle, and, more recently, also during the response and recovery stages (Ministry of Civil Defence and Emergency Management, 2019). Gaillard and Mercer (2013) attribute these advances to a move away from a hazard paradigm to that of vulnerability, which acknowledges that people and communities are not helpless in the face of hazards and that local knowledge is a valuable resource. They cite the Hyogo Framework and the promotion of Community-Based Disaster Risk Reduction (CBDRR) as important milestones along the way, and affirm that CBDRR gives priority to local resources whereas top-down or authority-initiated Disaster Risk Reduction policies have largely failed to achieve the desired goal.

In addition, Gaillard and Mercer acknowledge the existing gap between top-down actions and scientific knowledge, and bottom-up initiatives and local knowledge, and propose a road map for integrating these two disciplines through risk assessment, dialogue, and prevention activities. However, they also stress that there is a lack of evidence in the literature of successful multi-stakeholder projects that have been able to integrate the collaboration of local communities with governments, NGOs, and the scientific community, affirming that “those few projects which worked in this direction seem to have encountered serious difficulties in levelling power relationships between local people, government officials, scientists and NGO workers” (p. 102).

The change from top-down disaster management to more people-centric approaches, where the communities are viewed as a resource and a central element of Disaster Risk Management, is also highlighted by Scolobig, Prior, Schröter, Jörin, and Patt (2015), who assert that the Yokohama Strategy of 1995 signalled a change in perception in which the general public is seen as being capable rather than vulnerable. They conclude that “there are no simple formulas to resolve problems related to public participation and stakeholder engagement in disaster risk management” (p. 210), and suggest an integration of both techno- and people-centric models in order to combine community strengths with technical and scientific knowledge.

Although the move away from a hierarchical emergency management model has become more evident in the new millennium, this perspective had previously been foreseen by some visionary researchers. Dynes (1990) affirms the need for emergency planning to be built around existing community capacity and structures with a focus on the continuity of social systems and routines, and Lichterman (2000) defines citizen disaster preparedness programmes and neighbourhood response teams as soft mitigation resources, concluding that “the community as resource model of community emergency preparedness is now the accepted strategy for preparing residents of hazardous regions for disaster response” (p. 265). Paton, Bajek, Okada, and Mclvor (2010), in an investigation into earthquake preparedness initiatives in Japan and New Zealand, also highlight the need for CDEM to empower communities rather than impose solutions upon them, and for the accommodation of individual-, community- and agency-level factors in DRR programmes.

Notwithstanding the considerable overlap in the use of the terms Community-Based Disaster Risk Reduction (CBDRR), Community-Based Disaster Management (CBDM), and Community-Based Disaster Risk Management (CBDRM) in the literature, Shaw (2012; 2014) traces the evolution of emergency management from the traditional command and control-based structures to CBDM and CBDRM, and then to CBDRR. Defining CBDM as promoting a bottom-up approach that cooperates with the top-down structure to address challenges and difficulties in local emergency management, he affirms that the difference between CBDRR and CBDRM is that the former focusses

primarily on pre-disaster risk reduction measures whereas the latter encompasses the execution of DRR activities before, during, and after a disaster (Shaw, 2012).

2.13.2. Definition of community

A discussion of Community-Based Disaster Risk Management must necessarily consider the different definitions of what constitutes a community in the emergency management context. FEMA defines a community as being a place, interest, belief, or circumstance that may exist geographically or virtually (Federal Emergency Management Agency, 2011c), and Murphy (2007) affirms that the two defining characteristics of a community are that members interact on a regular basis and that they hold shared preferences or beliefs, further categorising communities as place-based geographical units and interest or kinship-based social units. Shaw (2012) states that the key elements include a sense of belonging, the feeling that members matter to each other and to the community, and a belief that their needs will be met through participation in the group, adding that communities are not limited to a single geographic location but may also include other entities such as local government, NGOs, academic bodies, and business sectors. On the other hand, Brennan et al. (2005) offer a perspective of a community as being a dynamic field of interaction, affirming that “a central part of a community’s interactional capacity is the ability to collectively construct meanings, respond to environmental and societal change, and attend to shared needs” (p. 54).

2.13.3. Definition of CBDRM

A commonly-used definition of Community-Based Disaster Risk Management describes it as being the “process in which communities at risk are actively engaged in the identification, analysis, treatment, monitoring and evaluation of disaster risks in order to reduce their vulnerabilities and enhance their capacities” (Afrose, 2018, p. 3; GNDR, 2018). UNISDR affirms that CBDRM “promotes the involvement of potentially affected communities in disaster risk management at the local level”, including “community assessments of hazards, vulnerabilities and capacities, and their involvement in planning, implementation, monitoring and evaluation of local action for disaster risk reduction” (United Nations International Strategy for Disaster Reduction, 2017).

In a discussion of the related field of Community-Based Disaster Risk Reduction, Drolet et al. (2015) affirm that programmes must involve the local people who speak the language and are familiar with the culture, in addition to multiple stakeholders and professional entities working together to produce knowledge and solutions that will prepare the people in the community to “meet their own needs through prevention, mitigation, adaption, and reconstruction strategies” (p. 436). Furthermore, Christoplos et al. (2001) affirm that Community-Based Disaster Risk Management cannot be assumed to be a set collection of activities to be implemented but must relate to the social and political processes of the communities, organisations, and individuals involved, alerting that such initiatives lose their relevance if they are “tucked away in a project” rather than being part of a strategy to create a “culture of preparedness” (p. 194).

Victoria (2003) explains that CBDRM projects in the Philippines differ from traditional DRR models because of the priority that is given to the participation of the people in the programme, adding that in CBDRM approaches risk-reduction measures are community-specific, existing coping mechanisms and capacities are recognised, and DRR is linked with community development. She also underscores the importance of limiting the participation of outsiders to supporting and facilitating roles, and of including families and people from the community, in addition to the most vulnerable groups such as the urban poor, children, the elderly, and the disabled.

In a discussion of Community Based Disaster Preparedness (CBDP), which she defines as being synonymous with Community Based Disaster Management, Walia (2008) provides the following assumptions for community participation in DRR activities:

1. Affected communities are the first responders to disasters, and usually suffer the most from these events.
2. Communities in high-risk areas have often developed their own strategies and coping mechanisms for disasters, which must be valued and improved upon in order to increase resilience.

3. The ownership of DRR initiatives must not be taken away from the local people as this would leave them disempowered if external agencies fail to follow through with promised mitigation measures.
4. Disaster Risk Reduction activities must be based upon participatory approaches that involve the local communities as much as possible.
5. The involvement and ongoing participation of the local communities in CBDRP programmes will ensure a coordinated and collective response during an emergency.
6. Developing leadership and providing training to the community can help to harness the social capital that will enable the community to cope with adverse events.
7. Sustainable solutions are only achieved when they are developed by the people themselves rather than being imposed upon them.
8. It must be recognised that small-scale disasters can often have a cumulative effect upon lives and livelihoods that exceeds the impact of large-scale events, even though they may not be reported by the media or receive external aid.

2.13.4. Implementation of CBDRM

In one of the formative works on CBDRR, Maskrey (1989) suggests a three-stage community-based mitigation process that starts with motivating the community around existing social needs that are unrelated to DRR, leading on to increasing awareness of disaster risk through the implementation of simple preparedness measures, before finally formulating specific risk mitigation proposals such as reinforcing or even rebuilding dwellings. He affirms that since Community-Based Organisations “are deeply rooted in the society and culture of each area, they enable people to express their real needs and priorities, allowing problems to be correctly defined and responsive mitigation measures to be designed” (p. 84), adding that as “CBOs use the undervalued and unrecognised contributions that all groups in the community make (including women, young people and the elderly) they maximise the use of all available local resources” (p. 90).

In a review conducted by the CDEM Monitoring and Evaluation Programme, the Ministry of Civil Defence and Emergency Management (2012) offers the following steps as best practices for building community resilience:

1. Know your communities through statistical data, risk analysis, and community surveys.
2. Find community leaders and local champions.
3. Undertake community education and preparedness activities, especially response planning.
4. Allow the community to lead. Facilitate and encourage community ownership and leadership.
5. Embed activities in the community, preferably in conjunction with existing community structures or services, e.g. community policing or church groups, to ensure long-term sustainability.
6. Allow for the integration of community-led action in response situations (both planned and spontaneous action) and provide a mechanism to integrate these activities into the Emergency Operations Centres.
(Ministry of Civil Defence and Emergency Management, 2012, p. 13).

A similar process is recommended by Norris et al. (2008), who define the five steps for enhancing community resilience as being:

1. Develop resources, reduce risk and vulnerability.
2. Involve people to create social capital.
3. Utilise pre-existing organisational networks and relationships.
4. Elaborate interventions to protect and boost naturally occurring social supports.
5. Plan with flexibility, build trusted and effective information and communication resources.

Evaluating CBDRM projects in the Philippines, Victoria (2003) outlines a seven-step process to implement such programmes:

1. Initiate the process.
2. Undertake community profiling.
3. Perform a community risk assessment.
4. Develop the initial Disaster Risk Reduction plan.
5. Create the community disaster management organisation.
6. Implement DRR measures, activities, projects, and strategies.
7. Monitor and evaluate the project.

A similar six-step model is outlined by Chen, Liu, and Chan (2006), and was used to implement a Community-Based Disaster Management project in Shang-An village, Taiwan. It is also recommended by Patterson, Weil, and Patel (2010), who highlight the importance of the early involvement of the community in the process. This strategy contains the following phases:

1. Orientation.
2. Collect disaster experiences.
3. Assess vulnerabilities.
4. Evaluate problems and develop solutions.
5. Establish Community-Based Disaster Management organisation.
6. Final presentation.

In a paper prepared for the International Federation of the Red Cross, Duggal-Chadha (2006) recommends a three-tier CBDRM model composed of family- and community-based disaster management activities, support from the private sector, and the establishment of Community-Based Disaster Response Teams. These teams would then help the local schoolteachers and students create school-based disaster plans. In a survey of ten NGOs that work with disaster preparedness activities in the Philippines, Luna (2001) shows that Community-Based Disaster Management projects often include capacity building activities such as training in disaster preparedness, evacuation, and emergency response.

2.14. Community-Based Disaster Response Teams (CBDRTs)

Community-Based Disaster Response Teams (CBDRTs) are often an integral component of CBDRM programmes and provide a cadre of trained citizens who can safely deliver immediate assistance in the event of a disaster (Åsveen, 2014; Duggal-Chadha, 2006; Simpson, 1999). As there is currently little standardisation of the nomenclature utilised for such teams, they may also be known as Disaster Response Teams (Allen, 2006), Community Disaster Response Teams (Harribans & Wade, 2011), or Neighbourhood Rescue Teams (Chen et al., 2006), to name just a few examples. The following sections of the literature review provide an overview of the rationale behind the establishment of such teams, examples of successful CBDRT programmes, and some of the challenges that have been encountered while creating and maintaining these teams.

2.14.1. Rationale

The need for Community-Based Disaster Response Teams, which is affirmed in paragraph 33(f) of the Sendai Framework (United Nations Office for Disaster Risk Reduction, 2015), is defended by Simpson (1999) on the basis that they provide a culturally-sensitive DRR planning and response capability, incorporate local situational awareness such as special assistance needs, and ensure that residents are trained for the vital activities of first aid, fire suppression, and Search and Rescue. Other advantages of CBDRTs are that they give people a sense of control, can help reduce injuries and damage through education and training for rescue and emergency care, are able to utilise peer networks for information transfer, can increase elected officials' awareness of the merits of community-based planning, and offer a structured manner for dealing with volunteers. Simpson concludes that establishing successful CBDRTs requires "the development of realistic response strategies that can be carried out under adverse conditions, while also understanding that local residents will be first responders" (p. 206).

Following the 2015 Nepal earthquake, a national workshop was held to reflect on lessons learned from a Nepali perspective. It was noted that, since external assistance often took several days to reach the impacted areas and the communities were forced to look after themselves during this time period, there

was need for further disaster preparedness training at the community level and the formation of “community-led clubs or groups responsible for immediate disaster response” (Hall et al., 2017, p. 41). Likewise, the review of the response to the 2011 Christchurch earthquake recommends the creation of community response teams (McLean et al., 2012), and, in a paper written in the aftermath of the tragic impact of Hurricane Katrina upon the city of New Orleans in 2005, Brennan et al. assert that “local volunteers and community-level action are essential to effective natural disaster preparation and response”, adding that “these citizens are, in many cases, the first responders and have the greatest chance to save lives and provide support in the hours and days immediately after disaster occurrences” (2007, p. 74).

In a publication examining Priority 5 of the Hyogo Framework, the United Nations International Strategy for Disaster Reduction (2008) affirms that “community members and organisations can be supported to develop relevant skills for disaster preparedness and response (e.g. hazard-risk vulnerability assessment, community DRM planning, SAR, first aid, management of emergency shelters, needs assessment, relief distribution, fire-fighting)”, emphasising that the advantages of CBDRTs are that they are quicker to respond than external agencies, and more cost-effective and sustainable than dedicated response teams (p. 33). Reporting on a simulation of a 7.8 magnitude earthquake along the San Andreas fault in California, Goltz and Mileti (2011) predict that there would be an immediate, spontaneous response by local citizens to meet the need for Search and Rescue, medical care, fire suppression, and sheltering, and recommend the implementation of CBDRT programmes based on the FEMA CERT model.

The SAFER Framework (Emergency Management Southland, 2018) discusses response requirements for a major alpine fault in the South Island of New Zealand, and states that “responders, including community members themselves and visitors, in seriously affected communities will immediately respond to assist injured and entrapped individuals and initiate search and rescue activities” (p. 18). The New Zealand National Disaster Resilience Strategy also “recognises individuals and communities as first responders” (Ministry of Civil Defence and Emergency Management, 2019, p. 29), affirming

the need for communities to be “empowered to respond and recover as they see fit, while having connections into official channels to source support and resources where needed” (p. 30).

In addition to the conventional disaster response activities such as first aid, firefighting, and Search and Rescue, CBDRTs can also serve an important role by providing Psychological First Aid to survivors (Jacobs, 2007; Ruzek et al., 2007). Although Bonanno et al. (2010) question the effectiveness of immediate post-impact psychological interventions for victims, Everly (2016) provides significant support for using techniques such as the Critical Incident Stress Management SAFER-R model of Psychological First Aid (PFA), and Henry (2011) states that volunteer light rescue teams that responded to the 2011 Christchurch earthquake reported the need for training in psychosocial intervention skills for dealing with the general public.

2.14.2. Examples of CBDRT programmes

The published literature refers to various CBDRT programmes that have been successfully implemented, although it usually offers minimal information about the training curriculum that was utilised. A CBDRM programme in Shang-An village, Taiwan included the creation of a Neighbourhood Rescue Team through a 12-hour course with training in first aid, Search and Rescue, walkie-talkie operations, and a final simulated exercise (Chen et al., 2006), and a World Vision project in the highlands of central Chile provided a two-day emergency response training course for local young people, which also included an exercise (GNDR, 2018). The training of CBDRTs by Helvetas Swiss Intercooperation in the Swat Valley, Pakistan is mentioned, albeit without further details, in a case study of a 2010 flood by Hussain (2015), and Balarinová, Dostál, Tu, and Ivanová (2014) describe the 60 Czech Red Cross Humanitarian Units as being similar to Community-Based Disaster Response Teams, although the only details that they provide about the groups are that they each contain 21 members and are divided into the five sections of health, accommodation, technical, catering, and psychosocial care.

Neighbourhood Disaster Volunteer groups responded to the 1999 earthquake in Marmara, Turkey (Karanci & Acarturk, 2005), Allen (2006) outlines the Red

Cross community-based disaster preparedness projects in the Philippines that resulted in the creation of local response teams, and the UNISDR guideline document for Priority 4 of the Sendai Framework briefly mentions CBDRT projects that were established in India and Jordan (United Nations Office for Disaster Risk Reduction, 2017). The Viet Nam Society of the International Federation of the Red Cross describes in its 2012 annual report the training of an additional 25 community response teams, which brought the total to 53 teams with 447 trained participants (IFRC, 2013), and Turner (2010) outlines the Youth Emergency Preparedness Programme conducted by the Dunedin Red Cross in New Zealand that trained 32 young people over three years in disaster preparedness and response.

The United Nations International Search and Rescue Advisory Group (INSARAG) has developed a Community First Responder training course for voluntary teams, which is focussed on light Search and Rescue operations in urban environments (United Nations Office for the Coordination of Humanitarian Affairs, 2015b). This course recognises that “people within the local community, typically neighbours, friends or family, undertake the vast majority of all rescues following a disaster” (United Nations Office for the Coordination of Humanitarian Affairs, 2015a, p. 4), and aims to build a local rescue capacity for immediate disaster response. The training was offered to volunteers in Timaru, New Zealand in 2017 (Timaru District Council, 2017) and Guatemala City, Guatemala in 2018 (Israel21c, 2018).

The UN-Habitat Project for Disaster Resilient Cities in Sri Lanka (UN-HABITAT, n.d.) established Community-Based Disaster Response Teams, including women’s teams, in four cities, and the Malawi Red Cross Society developed a project called *Enhancing Resilience in Malawi* that trained 110 CBDRT members from 11 Group Village Heads (Chiwanda, 2018). The Nairobi Branch of the Kenyan Red Cross Society founded seven Community-Based Disaster Response Teams as part of an Urban Risk Reduction Programme in informal urban settlements, with the major hazards being identified as fires, floods, collapsed buildings, traffic accidents, and disease outbreaks (Åsveen, 2014). The Caribbean Disaster Emergency Management Agency (CDEMA) started a CERT programme in 2013 that utilises a five-day course for groups of six

people at a time, and emphasises teamwork, leadership, problem-solving, and map reading. The training includes four practical exercises, one night-time activity, and a table-top exercise. The CERTs did not activate as teams following Tropical Storm Eike which impacted Dominica in August 2015, but individuals assisted in six communities with damage assessment, first aid, debris removal, and rescue (Lionel, 2015).

The BOKOMI programme, which was developed by the Kobe, Japan municipal government following the 1995 earthquake, is based around elementary school districts. BOKOMI groups are formed following discussions between local government, the fire brigade, leaders of residents' groups, and other stakeholders, with representation from women's and elderly associations, child committee members, youth associations, Parent-Teacher Associations, and local businesses (Shaw, 2014). The city government provides essential funding, material, rescue tools, and training through the local fire department, and BOKOMI groups perform drills and training, DRR education in schools, public awareness events, first aid and emergency equipment seminars, preparation of maps, and welfare activities which include communication within the community and supporting people with special needs. Isayama and Shaw (2014) describe another Japanese CBDRT programme called Jishu-bosai-soshiki or Jishubo, affirming that "during emergencies, members guide refugees to a shelter, rescue residents, provide the initial first-aid and supply food and water" (p. 109).

The Red Cross developed a Readiness to Respond programme as part of the 2009-2010 Caribbean Disaster Management Strategy that included the creation of Community Disaster Response Teams in Antigua and Barbuda and a training course for team members. Course participants were trained in first aid, Search and Rescue, Psychological First Aid, fire safety, response coordination, and shelter management, and members of a CBDRT in the Bendals community responded when flooding isolated their neighbourhood following Hurricane Earl in 2010 by monitoring communications, evacuating neighbours, and clearing a watercourse (Harribans & Wade, 2011). Han (n.d.) outlines the creation of Community Emergency Response Teams in the Binxi and Shuijingfang communities of Chengdu city, China as part of a resilient city programme,

although few details are offered as to the training provided which included risk assessment and “some early response” activities (p. 34).

2.14.3. Challenges faced by CBDRT programmes

Challenges encountered by the Nairobi Red Cross CBDRTs were seen as being the financial constraints for members to be able to participate in ongoing training, the short-term nature of the training that was offered which did not focus on the team’s long-term operation, the impact on professionalism of a high turnover of team members, the need to clarify the role of the CBDRTs during large fires, a lack of clarity regarding the teams’ independence and relationship with the Kenyan Red Cross, and inadequate access to information management and communication tools (Åsveen, 2014). In addition, funding for the programme lapsed in 2012 and 2013 and, as a consequence, the teams were attempting to become financially self-sufficient.

CDEMA’s CERT programme faced challenges that were identified by Lionel (2015) as being a lack of integration with the local authority’s emergency management plans, similarity with Red Cross Community Disaster Response Teams which meant that volunteers sometimes belong to both teams, the lack of a full-sized team and of assigned leadership, and insufficient awareness of the CERT project within the communities. In their review of the Japanese Jishubo groups, Isayama and Shaw (2014) state that the principal challenge was that many of the members were elderly people who were more involved socially than in the groups’ activities, and that the programme may need to adapt to take on spontaneous volunteers. Chen et al. (2006) describe problems with a CBDRM project in Taiwan as being a decline of public awareness of hazards and DRR measures with only a minority of residents participating in activities, partly due to economic conditions; insufficient CBDRM professionals, guidelines, and materials being made available; and a lack of sustained government support for the project.

The Viet Nam Red Cross Society cites the challenge of retaining Disaster Response Team members, which are mostly young people who often have to relocate away from the community for economic reasons (IFRC, 2013), with the same difficulty in sustaining volunteer staffing levels also being reported by the

Nairobi Red Cross CBDRTs (Åsveen, 2014). In a case study of the Community Disaster Response Teams that were established by the Red Cross in Antigua and Barbuda, Harribans and Wade (2011) show that initial participation in the programme was low due to the timing of the meetings that were scheduled. Upon consultation with the community, the meetings and training activities were rescheduled to more convenient times for the participants, and a team of trained volunteers was subsequently created in the Bendals neighbourhood.

2.15. Research gap

The literature that has been reviewed in this chapter, especially the research into Community-Based Disaster Risk Management programmes and the establishment of Community-Based Disaster Response Teams, has revealed a lack of readily-accessible evidence-based information regarding successful strategies and curriculum that could be utilised for the creation, training, and sustainable operation of CBDRTs with vulnerable groups and in developing nations. This does not appear to be a recent phenomenon as a report that was prepared for an Interagency Working Group of seven International Non-Governmental Organisations in 2004 identified an “absence of generally accepted standards for community participation in emergencies”, even as it observed that “the first real ‘first responders’ are the communities where the emergencies occur” (Braun, 2004, p. 29), and Walia (2008) laments the nonexistence of standardised CBDRM training programmes, highlighting the challenges of the “involvement of the more vulnerable groups and dearth of trained experts who are meant to interface with and support local communities” (p. 72).

The scarcity of published literature containing practical steps to be taken and curriculum to be utilised for the creation, training, and ongoing maintenance of Community-Based Disaster Response Teams with vulnerable groups and in developing nations has been identified as the research gap to be addressed by this investigation. It is anticipated that this research project will produce recommendations for the establishment, training, and sustainable operation of CBDRTs in these contexts.

2.16. Summary

The literature review contained in this chapter defines the terms that are used throughout the thesis, and highlights the important contributions provided to the international DRR scenario by the United Nations' Yokohama Strategy and Hyogo and Sendai Frameworks. It provides an in-depth look into Community-Based Disaster Risk Management programmes and shows that the establishment of Community-Based Disaster Response Teams is an essential component of holistic CBDRM projects, due to the need to have trained volunteers on-scene to provide the initial response to a disaster.

Moreover, this chapter identifies that there is little information currently available in the published literature regarding practical steps to be taken, and curriculum content to be utilised, for the creation, training, and ongoing maintenance of CBDRTs with vulnerable groups and in developing nations. This is the research gap that has been identified for further investigation, and it is expected that this investigation will produce recommendations for the establishment and sustainable operation of CBDRTs in these contexts.

The next chapter outlines the research paradigm, methodology, methods, and analysis processes utilised for this research project.

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3. Research methodology

This chapter discusses the research paradigm that has been selected and the methodology that will be used for this study. It then examines the methods that could be utilised and describes those methods that have been chosen to conduct the investigation. It also discusses the use of a case study as a research strategy and provides further information on the sampling approach and analysis procedures that will be employed for the project.

3.1. Research paradigm

Social research is based on the three fundamental principles of *ontology*, *epistemology*, and *methodology*. Ontology refers to the nature of reality, which is often defined as being either objective and therefore able to be discovered, or subjective and consequently able to be constructed. Epistemology relates to the nature of Knowledge, such as what can be considered a fact and where knowledge can be encountered, and can be summarised as the kind of knowledge that the researcher is seeking. Methodology is concerned with the nature of the research design and the methods utilised or, in summary, how the research is constructed and conducted (Sarantakos, 2013).

As these three research foundations could be viewed as a progression, where each level is dependent upon the previous layer, it is common to find compatible ontological, epistemological, and methodological principles grouped together as paradigms, with researchers often selecting a paradigm that expresses their preferences for each of these foundational tenets (Sarantakos, 2013). Consequently, the research paradigm utilised could be considered as being the worldview of the researcher, or their way of seeing and making sense of the world. Common paradigms include positivism, which seeks to determine objective truth; phenomenology, which focusses on lived experiences; constructivism or social constructionism, which look at constructed reality and societal perceptions thereof; and pragmatism which is concerned with the practical application and real-world consequences of the knowledge obtained (Patton, 2015).

Methodologies can be categorised as being quantitative research methodologies, which are based on positivism or compatible paradigms that seek to obtain and measure objective reality or truth, and qualitative methodologies, which are focussed on representing and interpreting the world around the observer and often utilise paradigms such as phenomenology or constructivism. However, a third methodology, known as mixed methods research, attempts to combine the advantages of both the qualitative and quantitative methodologies, often using pragmatism as the enquiry paradigm while permitting the use of other paradigms for the qualitative and quantitative instruments utilised for the research project (Sarantakos, 2013).

Pragmatism combines the positivist search for objective truth with the constructivist desire to understand perceived reality, and is considered to be a unique philosophical worldview that emphasises the outcomes of actions and the nature of experience with an underlying focus on obtaining practical understanding about the real world. Feilzer (2010) asserts that, when regarded as an alternative paradigm, pragmatism “accepts, philosophically, that there are singular and multiple realities that are open to empirical enquiry and orients itself towards solving practical problems in the ‘real world’” (p. 8). Four questions that can be used to define the pragmatic framework are:

1. Can the relevant research questions be adequately answered?
2. Can the evaluation design be successfully implemented?
3. Are design compromises suitably optimised?
4. Are the acquired results actually usable?

(Patton, 2015)

Creswell, quoted by Patton (2015), affirms that “for the mixed methods researcher, pragmatism opens the door to multiple methods, different worldviews, and different assumptions, as well as to different forms of data collection and analysis” (p. 154), and Greene and Hall (2010) state that the “pragmatic stance argues for the use of mixed and multiple methods to meaningfully generate information to address inquiry questions” (p. 16).

However, the use of pragmatism as a research paradigm raises the question of the ontological and epistemological assumptions that are being employed, with

Morgan (2014) postulating that pragmatism as a paradigm does not rely upon “metaphysical assumptions about ontology and epistemology” (p. 1049) and Hall (2013) affirming that “pragmatism itself is a philosophical perspective” (p. 19). Both of these researchers posit that Deweyan pragmatism provides the epistemological and philosophical framework for the use of the pragmatic paradigm for mixed methods research.

A pragmatic research paradigm has been chosen for this research project as it facilitates freedom of enquiry that is not tied to either the positivist or constructivist paradigms, and thus allows for an extensive investigation of the experiences and observations of the people who have participated in the CERT programmes and courses (Morgan, 2014).

3.2. Methodology

The mixed methods methodology is sometimes called the radical middle since it combines both qualitative and quantitative methodologies in a single research project (Patton, 2015). Johnson and Onwuegbuzie (2004) define mixed methods research as being “the class of research where the researcher mixes or combines quantitative and qualitative research techniques, approaches, concepts or language into a single study” (p. 17), and Sarantakos (2013) explains that the mixing of two methodologies in the same research project does not alter the structure or identity of either methodology, but rather “the methods, techniques and practices employed in the mixed-method project remain as originally constructed, and as employed when used alone” (p. 50).

There are many different ways that mixed methods research projects may be designed, which mostly involve variations of the sequence and timing of the different methods employed, and whether the output from one of these phases has an influence upon another stage of the research or if the results from the individual instruments come together during analysis. One common design, which is described by Sarantakos (2013) as being a *sequential* process, first obtains the data from one of the methods, either quantitative or qualitative, and then acquires the data from the complimentary method before finally combining the results during the analysis phase.

The design of a mixed methods research project is directly affected by the research questions that are utilised (Clark & Badiee, 2015; Onwuegbuzie & Leech, 2006). Since Research Question 1 and Research Question 3 both require qualitative answers about how the training could be adapted and the teams established and maintained, and Research Question 2 requires a primarily quantitative assessment of the applicability and utility of the various components of the basic CERT training course, a sequential mixed methods approach has been chosen as being the most appropriate design for this investigation. As the questions that will compose both the standardised open-ended interviews and the online questionnaire can be obtained from a perusal of the research questions and an understanding of the CERT curriculum, the use of an exploratory or concurrent mixed methods design is not necessary. Therefore, the quantitative results from the questionnaire will be obtained first, and then the interview transcripts will be processed using qualitative theme analysis. Finally, the data obtained from both the quantitative and qualitative methods will be combined during analysis in order to yield valuable insights into the research questions. Both of these methods will utilise the pragmatic paradigm, and the overall design can be expressed by the diagram, as described by Morse (2015), of:

QUAN → qual

The FEMA CERT course was selected as a case study for this research project due to the availability of published literature regarding the programme, which is discussed in chapter five, and because of the accessibility of CERT courses conducted in developing nations for the field research phase of this project, as outlined in the research scope (Section 1.2). However it is important to emphasise that the use of CERT as a case study is not being employed as a methodology but rather as a “boundary around some phenomenon of interest” (Patton, 2015, p. 259) which facilitates the “exploration of a phenomenon within its context using a variety of data sources” (Meyer, 2015, p. 177). The case study strategy utilised is based upon a multiple case design that will allow conclusions to be derived from a group of cases (Yin, 1981), since five different basic CERT and Train the Trainer courses will be evaluated during this research.

3.3. Methods

The quantitative method used in this study is an online questionnaire to be completed by recent graduates of CERT basic- or instructor-level training courses. A questionnaire is considered to be a written or computer-curated survey, and can be categorised into standardised questionnaires, which have a rigid structure and allow for the selection of pre-determined answers, unstandardized questionnaires that are often small and allow for open-ended answers, and semi-structured questionnaires which utilise a combination of both of these approaches. A semi-structured questionnaire has been employed since it allows for the collection of quantitative data through the use of the Likert scale along with optional free-text qualitative observations about the course, and is a more appropriate method for this task than other purely quantitative tools based around experimental or quasi-experimental designs, such as pre- and post-tests (Sarantakos, 2013).

The qualitative component of this research project employs a standardised open-ended interview technique with key informants who possess knowledge about CERT training in developing nations or with vulnerable groups. Patton (2015) emphasises the importance of interviewing as a qualitative research tool and affirms that pragmatic interviews pose “straightforward questions about real-world issues aimed at getting straightforward answers that can yield practical and useful insights” (p. 436). He identifies the four types of interview instrument as being the informal conversational interview, the interview-guide approach, the standardised open-ended interview, and the closed fixed-response interview. According to Parsons (2008), a key informant interview is an in-depth interview with carefully selected individuals who are knowledgeable about specific aspects of an issue or an organisation. A standardised open-ended key informant interview was chosen as the qualitative method since it allows the interviewer to ask the same questions of all of the interviewees whilst giving them the liberty to express their experiences and perspectives in their own words, and is more appropriate for this purpose than other qualitative methods such as focus groups, field observations, or document analysis (Patton, 2015).

3.4. Sampling and data collection

As this mixed methods research project uses a multi-case study approach, five courses have been selected as the cases to be investigated. The sampling strategy employed could, therefore, be considered to be purposive sampling as the cases were selected in accordance with the limitations defined by the scope of the research (Sarantakos, 2013).

Participants of the basic CERT and Train the Trainer courses that were conducted in Puerto Rico, Belize, and Guatemala between June and August of 2018, and in Brazil in January 2019, were encouraged to complete the online survey that was used as the quantitative method for data collection. The questionnaire was offered in English for participants of the CERT courses in Puerto Rico, Belize, and Guatemala, and in Portuguese for the graduates of the courses in Brazil. These surveys were hosted on an online service, and, since the content and structure of both questionnaires were identical, the answers were downloaded and combined into a single spreadsheet for analysis.

Key informants for the standardised open-ended interviews were also selected using purposive sampling. Five of the seven interviewees were chosen from amongst the participants in the courses who had indicated their willingness to take part in an interview, the sixth person to be interviewed was chosen due to their association with CERT courses with Non-Governmental Organisations in Brazil, and the seventh key informant was selected because of their participation in the CERT programme for many years in Brazil and overseas. Data for the qualitative part of this research project will be obtained through the analysis of the transcripts of the standardised open-ended interviews that were held in February and March 2019 with these CERT course participants, instructors, and facilitators.

3.5. Data analysis

In the analysis phase of this sequential mixed methods research project, the quantitative component will be processed first followed by the qualitative instrument, with both phases operating within the pragmatic paradigm (Johnson & Onwuegbuzie, 2004). Computer software will be utilised to assist in the analysis of the data obtained, which, following the application categories outlined by Bazeley (2010), will consist of the Microsoft Excel general-purpose spreadsheet for quantitative statistical analysis and QDA Miner Lite by Provalis Research for qualitative thematic analysis.

The internal consistency of the Likert-scale questionnaire results will be authenticated through the calculation of their Cronbach's Alpha value (Vogt, 2007). The answers for each question, represented by numerical values ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) or 0 if the question was not answered, will be summed for each respondent, with subtotals being calculated for the nine subsets of questions that relate to the nine units of the basic CERT training course, in accordance with standard Likert analysis procedures (Likert, 1932; Warmbrod, 2014). Although there has long been debate among academics as to whether Likert-scale data is ordinal or parametric, and the corresponding mathematical and statistical analysis that can be performed on such results (Joshi, Kale, Chandel, & Pal, 2015), Norman (2010) presents a compelling argument for the use of such analysis tools, and Harpe (2015) affirms that scales containing at least five response items can be treated as parametric data for the purpose of statistical analysis.

The audio recordings of the standardised open-ended key informant interviews will first be transcribed, either by a professional service, in the case of the interviews conducted in Brazilian Portuguese, or by an automated online site for those that were undertaken in English. The Portuguese-language transcripts will be translated using an online service. Finally, the transcripts of the interviews will be manually corrected and sent by email to all of the interviewees for their records, including the English translations as well as the Portuguese-language transcripts for the Brazilian interviewees.

Qualitative Data Analysis Software (QDAS) is a tool that can assist analysts with the storage, coding, comparing, and linking of the data acquired, although the actual analysis is always performed by the researcher rather than by the computer itself (Patton, 2015). The transcripts of the standardised open-ended interviews will be stored in the QDA Miner Lite programme, and the text will be coded using a deductive thematic analysis process which will focus on semantic themes identified by the research questions using an essentialist-realist epistemology within the pragmatic research paradigm (Braun & Clarke, 2006). This process will follow the six steps outlined by Braun, Clarke, Hayfield, and Terry (2019) of familiarisation, generating initial codes, constructing themes, revising and reviewing themes, defining and naming themes, and producing the report. The codes and themes generated will be exported to Microsoft Excel and represented through numeric and graphical means, including the use of charts and graphs.

In addition to the transcript of the interviews, a free-form text field that was included in the questionnaire will also be analysed as qualitative data. This data will be coded using the codes developed from the interview transcripts, and the results presented along with those from the key informant interviews.

The last step in the analysis phase will be to combine the results from both the quantitative and qualitative methods to produce the final report. The analysis will be conducted for the first and third research questions using the themes obtained from the qualitative data, whereas the second question will use the quantitative results from the survey which will be compared with the themes derived from the qualitative data. Since analysis first involves the description of the data obtained, this will form the basis for chapter six of this thesis, with the interpretation of the results then being discussed in chapter seven, and the recommendations and conclusions presented in the final chapter (Patton, 2015).

3.6. Summary

This chapter discusses the selection of the pragmatic research paradigm and the mixed methods methodology for this project, and provides information about the quantitative semi-structured questionnaire and qualitative standardised open-ended key informant interviews that will be employed as methods. It also contains an overview of the case study research strategy, and of the sampling and data collection procedures adopted, in addition to the analysis processes that will be undertaken on the qualitative and quantitative data obtained.

The next chapter looks at the selection of the cases that were studied, the design of the semi-structured questionnaire and open-ended key informant interview which were used as the instruments, and the sampling strategies that were utilised for this investigation. It also discusses ethical and cross-cultural considerations that apply to this study.

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4. Research design

This chapter discusses the design of the research that was undertaken, including the specification of the cases that were studied, the creation of the questionnaire, and the selection of the survey participants. It also describes the construction of the interview questions and procurement of the key informants, and examines ethical and cross-cultural considerations that have guided this investigation.

4.1. Selection of the cases

The selection of cases for a case study depends upon the nature of the underlying research questions. As this is a multiple case study investigation that employs descriptive research questions, it will examine “a series of cases with common characteristics” with the cases being described individually before the “specific features and characteristics of the cases are compared” (Mills, Wiebe, & Durepos, 2010, p. 61). The five courses utilised as cases for this project were chosen through a process of selective sampling within the constraints of the research scope (Patton, 2015), with the four basic CERT courses being held in different countries and representing distinct groups of trainees, and the Train the Trainer course exemplifying another demographic of participants.

The first CERT course was held in Dorado, Puerto Rico, from June 27 to July 8, 2018, for a group of 20 volunteers from an international faith-based disaster relief organisation. Although the majority of the participants were from developed countries, many had previous experience working in developing nations or with vulnerable groups. The second CERT course took place in Punta Gorda, Belize from July 6 to 10, 2018, and was offered to soldiers from the Belize Defence Force, staff from the National Emergency Management Office, and members of local Non-Governmental Organisations. The third CERT course was taught to a group of 48 disaster response volunteers from a large church in Fraijanes, Guatemala from August 16 to 18, 2018, and many of the participants were also emergency services or medical professionals. The final CERT course was taught in Nova Friburgo - RJ, Brazil from January 28 to 30, 2019, and the 20 participants were all workers or volunteers with a Day Care

Centre for rural children that is operated by an international humanitarian organisation.

The Train the Trainer course was held in Nova Friburgo from January 18 to 20, 2019, and taught to volunteers from the CERT Brasil NGO, all of whom had participated as adolescents in Teen CERT courses offered to young people from the informal urban community of Cordoeira and had served in leadership roles in the project in more recent years. The selection of these five courses as cases provides data from a wide range of participants, including NGO workers and volunteers from developed and developing nations, emergency management and military staff from a developing nation, and young people from an urban slum.

4.2. Semi-structured online questionnaire

The quantitative portion of the research was conducted using a semi-structured questionnaire that was made available to participants of four basic CERT courses that were held in in Puerto Rico, Belize, and Guatemala between June and August 2018, and in Brazil in January 2019, and a Train the Trainer course that was undertaken in Brazil the same month. A total of 41 valid replies were received for the English-language questionnaire and 14 for the Portuguese edition, giving a total of 55 suitable survey responses that were obtained.

4.2.1. Questionnaire design

The quantitative instrument for this mixed methods research project is the questionnaire that was designed to acquire primarily numerical data to evaluate the respondent's assessment of the relevance of the various components of the basic CERT course curriculum. This data will be utilised to provide insights regarding Research Question 2, which enquires about topics and activities that would be most useful for CBDRT training in developing nations and with vulnerable groups.

The survey contains 56 questions, the majority of which relate to each of the nine units of the basic CERT course or specific topics or activities therein, to which the respondent indicates their evaluation of the applicability of that item for the location that they have selected for the possible implementation of a

CERT programme. A five-point Likert scale (Likert, 1932) is used to indicate whether the participant agrees that the item described in the question is relevant to their locale, with the answers ranging from 1 (*strongly disagree*) through to 5 (*strongly agree*), as well as the option to skip the question altogether. The use of a Likert scale for programme evaluation questionnaires is recommended by Vogt (2007) as each question provides information about a specific aspect of the programme and “the researcher can add up the answers to the questions to get a general overall rating” (p. 88).

The questionnaire also includes several additional fields, such as the respondent’s name, the CERT course that they completed, the country that they are considering for the implementation of the CERT programme, and a free-text field for optional additional comments. The English-language version of the full questionnaire is presented in Appendix 1.

4.2.2. Sampling strategy

The questionnaire was provided in English for the graduates of the courses in Puerto Rico, Belize, and Guatemala, and was made available on the Survey Monkey site from August 5 to September 31, 2018, with a Portuguese-language translation of the survey for Brazilian respondents accessible from January 27 to February 28, 2019. The trainees were informed about the questionnaire and encouraged to complete it online, although it was also explained that participation in the research was completely voluntary.

4.3. Standardised open-ended interviews

The qualitative component of this research project consisted of seven standardised open-ended interviews that were conducted with key informants in February and March 2019. Standardised open-ended interviews make use of a fixed set of questions which are asked of all the interviewees, who then reply in an unrestricted manner (Patton, 2015).

Although it is common to find disaster researchers referring to interviews with key informants (Chang et al., 2014; Jones, Owen, Manyena, & Aryal, 2014; Le Dé & Gaillard, 2017; Murphy, 2007), it is more difficult to encounter a definition

of what constitutes a key informant. However, Taylor, Bogdan, and DeVault (2015) describe key informants as being “respected and knowledgeable people” who are often the researcher’s “primary sources of information” (p. 80), and Patton (2015) defines them as being “people with in-depth understanding of the setting being studied and willing and able to share what they know” (p. 403).

4.3.1. Interview design

A standardised open-ended interview was selected for the qualitative method of this research project. Patton (2015) affirms that this method requires “carefully and fully wording each question before the interview” so that the interviewer can take each informant through the same list of questions in the same sequence, utilising “essentially the same wording” (p. 439). The standardised open-ended interviews were guided by four questions which have been included in Appendix 2 of this thesis, and asked the participants to comment on the relevance of the different units of the basic CERT course for their situation, and for other observations and suggestions regarding the implementation and ongoing maintenance of CBDRT programmes among the target groups for this research.

The first question requests some background information about the interviewee and their association with the CERT programme in order to validate their status as a key informant. The second question, which asks for comments on each of the nine units of the basic CERT course and is aligned with Research Question 2, could be considered to be a funnel question as it “starts with a broad question and narrows down progressively to the specific point or points” (Kerlinger & Lee, 2000, p. 696). The third question then asks whether the respondent considers the CERT programme to be useful for their context and requests specific suggestions for improvement, which could apply to Research Question 1. The final interview question is associated with Research Question 3 and asks for recommendations for establishing or maintaining a CERT programme amongst the target groups for this investigation.

4.3.2. Selection of key informants

The seven key informants that were interviewed were selected using purposive sampling, which entails “the use of judgement and a deliberate effort to obtain representative samples” (Kerlinger & Lee, 2000, p. 179). Five of the

interviewees participated in the courses surveyed during the quantitative portion of this study and completed the online questionnaire, and the sixth and seventh participants were chosen due to their involvement with CERT programmes in developing nations. In addition, five of the seven informants had completed the CERT Train the Trainer course outside of the continental United States, and all seven had relevant experience with conducting or facilitating the basic CERT course in the developing nations of Belize, Brazil, or Guatemala.

Since one of the key informants requested anonymity, all seven of the interviewees will be identified only by a letter ranging from A to G. Informant A participated in the Train the Trainer course in Nova Friburgo, Brazil as a student and in the CERT course in the same city as an instructor, and has been a volunteer with CERT Brasil for over seven years, whilst Informant B was responsible for organising five basic CERT courses, a combined-team simulated exercise, and 17 CERT Disaster Medical Operations classes in Brazil over the past seven years. Informant C participated in the Train the Trainer course in Nova Friburgo and has been involved with CERT Brasil since taking his first Teen CERT course in 2003, and currently works full-time for an international humanitarian organisation. Informants D and E both completed the basic CERT and Train the Trainer courses in Puerto Rico in June and July 2018, and Informant D also assisted as an instructor with the CERT course that was held in Belize in August of that year. Informant F completed the basic CERT course in Belize and a Train the Trainer course in Guatemala in August 2018, and subsequently helped to conduct two basic CERT courses in Guatemala, and Informant G participated in the Teen CERT project in Nova Friburgo, Brazil for many years and taught CERT classes in Guatemala following a volcanic eruption in June 2018.

All of the key informants have had extensive experience with the CERT programme in developing nations. They represent a broad range of CERT implementation scenarios, ranging from slums and rural communities in Brazil to the jungle of Belize to both an urban slum and a mega-church in Guatemala, and cover all of the courses that were selected as cases and surveyed using the questionnaire component of this study.

The use of seven interviews for this research project fits within the rule of thumb for thematic analysis of qualitative studies proposed by Braun et al. (2019) that recommends at least five or six interviews for a small research project. This also aligns with Daniel Miller's suggestion of six to ten formal interviews as a minimum for MA dissertations, as quoted by Baker, Edwards, and Doidge (2012).

4.4. Ethical considerations

This research was conducted according to Massey University's *Code of Ethical Conduct for Research, Teaching and Evaluation of Human Participants* (Massey University, 2017). Human Ethics Application Risk Assessment Forms were completed for the questionnaire research in Central America and the Caribbean in July 2017, and for the survey in Brazil and the key informant interviews in January 2019, with the research being judged to be of low risk by peer review.

Informed consent was obtained from the respondents to the online questionnaire through a message that advised them of the ethical issues surrounding the research before they started the survey, and all of the interviewees were given a document containing this information at the beginning of their interview. Confidentiality for the participants in the questionnaire and the interviews has been carefully preserved throughout the research process, and the interviewees are identified within this thesis using a code rather than their names. Participation in both the interviews and the surveys was on a voluntary opt-in basis, and interviewees and respondents were given the opportunity to skip any questions if they so desired. Participants were verbally asked for their permission before the interviews were recorded, and were later sent a document containing the transcript of their interview, and, where appropriate, another file containing the English-language translation of the transcript.

4.5. Cross-cultural efficacy

As this study was conducted in four different nations with participants from diverse countries including Belize, Brazil, Guatemala, South Africa, and the United States, the cross-cultural efficacy of the investigation was taken into consideration throughout the research process. The English-language questionnaire was reviewed by a South African evaluator before it was implemented, and input was also obtained from a Puerto Rican advisor, in order to minimise the possibility of equivalence, which is when concepts or terms can acquire different meanings in different cultural settings (Cohen, Manion, & Morrison, 2011). In addition, the Portuguese-language translation of the questionnaire was evaluated by a Brazilian university student who is familiar with the CERT programme before it was made available online.

Since the researcher is fluent in Brazilian Portuguese, having lived in Brazil for twenty-four years, three of the interviews were conducted in Portuguese and the other four interviews in English. This allowed for a significant level of spontaneity in the interviews, as all were undertaken in a language with which both the interviewer and the interviewee were fluent, and the transcripts of the Portuguese-language interviews were then translated into English for analysis.

The question of possible cultural bias with the use of Likert-scale questionnaires is raised by Flaskerud (1988), who cites research based upon the results of surveys undertaken with Central American and Vietnamese respondents and later reiterates that “the degree of variation that Likert-scales attempt to measure is meaningless to some cultural groups” (Flaskerud, 2012, p. 130). However, Lee, Jones, Mineyama, and Zhang (2002) affirm that their research with Japanese and Chinese respondents does not present evidence of any such differences in responses to a Likert-scale questionnaire, and the comparison of the survey results and free-text comment fields that was conducted during this investigation to assess the internal reliability of the questionnaire appears to support the assumption that cultural differences have not had a significant impact on this instrument.

4.6. Summary

This chapter provides information about the design of the questionnaire that was used for this research project and the participation of the survey respondents, and examines the key informant interview questions and discusses the selection of the interviewees. It then discusses the ethical considerations underlying the investigation, and the cross-cultural factors that were taken into account during this evaluation.

The next chapter contains an overview of the FEMA CERT programme that was used as a case study for this investigation, including its history, training curriculum, and a summary of relevant literature.

5. Community Emergency Response Teams (CERTs)

This chapter discusses the FEMA Community Emergency Response Team (CERT) programme, which will be used as the case study for the research. It examines the history of the LAFD and FEMA CERT programmes, the basic training course and additional modules that are available, and variations of the standard CERT model. The recommended implementation process, some success stories, and challenges and concerns that have been observed are also presented.

5.1. History

The Community Emergency Response Team programme began in February 1985 when Los Angeles City officials, including Assistant Chief Frank Borden of the Los Angeles Fire Department, visited Tokyo, Japan to study the city's earthquake preparedness plans and the training of neighbourhood response teams. Following the major earthquake in Mexico City, Mexico in September of that year, Borden headed a delegation to that city to investigate the spontaneous community-led response to the tragedy, and, upon returning to Los Angeles, he developed a pilot programme to train volunteers from a neighbourhood watch group as first responders for disasters. The first course for 30 volunteers was held in early 1986 although, despite the concept of citizen emergency response being proven by the success of the training and subsequent drills and demonstrations, the city government decided that it was unable to further fund the programme at that time due to budget constraints. However, following the Whittier Narrows earthquake in October 1987 which resulted in over 100 injuries and six fatalities, the Los Angeles City Council created a Disaster Preparedness Division within the LAFD in order to promote public and governmental preparedness and to actively develop the CERT programme (Borden, 1991; Gerlich, 2014).

The initial CERT training course consisted of seven lessons of two and a half hours each for classes of between 25 and 60 participants drawn from either community groups, business and industry sectors, or municipal departments. The 17½ hour curriculum was focused on earthquakes and included lessons on

disaster preparedness, fire suppression, Disaster Medical Operations, light Search and Rescue, and disaster psychology, and concluded with a simulated disaster exercise (Borden, 1991). Simpson (2001) highlights the similarities of the CERT concept to the Civil Defence movement in California in the 1950s, referring to a programme in the city of Albany that trained block wardens in first aid, firefighting, and crowd control, and affirms that CERT is “reminiscent of social organisation models (notably civil defence) from the past” (p. 54).

The CERT model soon expanded to other cities in the state of California, albeit under different names, with the city of Sunnyvale in the San Francisco Bay area starting the Sunnyvale Neighbourhoods Actively Prepare (SNAP) programme the same year. This was quickly followed by the San Francisco Fire Department’s Neighbourhood Emergency Response Team (NERT), Oakland’s Citizens of Oakland Responding to Emergencies (CORE), the El Cerrito Neighbourhood Emergency Action Team (NEAT), the Albany Local Emergency Response Team (ALERT), the Novato Fire District’s Homeowners’ Emergency Response Team (HERT), and a CERT programme in Berkeley. At this point, there was little commonality in the curriculum or sharing of training resources, and many of the programmes differed significantly from each other in content and implementation. Following the impact of Hurricane Andrew in Florida in 1992, the Orlando Fire Department sent a team to visit the LAFD CERT programme with the intention of adapting the training for hurricanes and implementing CERT in Orlando (Simpson, 2001).

The United States Federal Emergency Management Agency, in cooperation with LAFD, began to offer a CERT Train the Trainer course at the Emergency Management Institute (EMI) in Emmitsburg - MD in 1993, and also modified the basic CERT training course to embrace an all-hazards approach to emergency management, with the new curriculum becoming the national standard the following year. This resulted in uniformity in the utilisation of the CERT name, logo, and training material, and the consequent widespread expansion of the programme throughout the United States. The CERT programme was integrated into the Citizen Corps division of the Department of Homeland Security in 2002, and a revision of the core curriculum was released the following year which included units on CERT team organisation and the

prevention of, and response to, acts of terrorism (Simpson, 2001; Takahashi et al., 2014).

A further update to the basic training curriculum was published in 2011, and a CERT Programme Manager course was initiated at EMI (Takahashi et al., 2014). According to the FEMA CERT website, there are now over 2,700 CERT programmes in the United States, and more than 600,000 people have completed the basic training course (Department of Homeland Security, 2019), and the LAFD CERT webpage reports that CERT programmes are active in seven other countries (CERT-LA, 2019).

5.2. Curriculum

The CERT basic training curriculum is defined in the participant manual (National CERT Program, 2011b) and instructor guide (National CERT Program, 2011a), along with the accompanying video clips and PowerPoint presentations. The course consists of eight classroom-based lessons, and a final review, post-test, and simulated exercise, and requires approximately 24 hours to complete.

Participants in FEMA's Train the Trainer instructor course are told that they must display all of the slides in the PowerPoint presentations, and may not delete any of the content, although they can add further material as appropriate, including local hazards, vulnerabilities, and response protocols (personal observation, February 4, 2013). However, as the last official update of the basic course material was released in 2011, some of the information presented is no longer in alignment with international protocols, such as the use of pressure points to stop serious bleeding (Rossaint et al., 2016).

5.2.1. Unit 1: Disaster Preparedness

The first lesson covers individual, family, and community disaster preparedness, and the role of the CERT team, and takes approximately two and a half hours to complete. In addition to the Unit 1 PowerPoint presentation, it also requires the use of appropriate hazard annexe slideshows in order to discuss hazard risks

that are relevant to the local community. The lesson contains a tower building exercise as a practical activity in spontaneous teamwork.

This unit outlines the roles and responsibility for disaster preparedness at the governmental, community, and individual levels, and discusses the types of disasters that are applicable for the community, in addition to the possible impact of a disaster upon the local infrastructure. Specific hazard mitigation and preparedness activities are mentioned, including preparing for sheltering and evacuation, developing an emergency plan, and assembling a disaster supply kit. The mobilisation, operation, and role of CERT teams are also reviewed, along with the purpose and utilisation of Personal Protective Equipment (PPE), which is then distributed for use throughout the course.

5.2.2. Unit 2: Fire Safety and Utility Control

The second lesson takes approximately two and a half hours, and discusses fire chemistry, fire prevention, the nine-step CERT scene size-up protocol, safety measures including the buddy system, and the use of fire extinguishers to combat small fires. It also provides information on the correct procedures to be used to disconnect and reconnect lifeline utilities such as electric power and natural gas, and the identification of hazardous materials, and concludes with a practical exercise on using handheld fire extinguishers to put out a real or simulated fire.

5.2.3. Unit 3: Disaster Medical Operations 1

The third lesson, which also takes an estimated two and a half hours to complete, is the first of two units about Disaster Medical Operations. It discusses the immediate treatment of three life-threatening conditions, described as the three killers, which are airway obstruction, excessive bleeding, and hypovolemic shock. Procedures for opening airways and for controlling bleeding through direct pressure and bandaging are demonstrated by instructors and practised by the participants, along with measures for treating shock. Pressure points are taught as an alternative method for controlling severe bleeding, and a procedure for removing examination gloves is practised by the class using shaving cream to simulate blood on the gloves. The Simple Triage and Rapid Treatment (START) triage protocol is taught, utilising the

evaluation of respiration rate, capillary refill or radial pulse, and level of consciousness, and participants practise triaging under simulated disaster conditions.

5.2.4. Unit 4: Disaster Medical Operations 2

The fourth lesson continues the subject of Disaster Medical Operations and takes approximately three hours. It covers public health considerations and the operation of Medical Treatment Areas, and teaches the head-to-toe secondary assessment of victims, which is then practised by the course participants. It also contains an extended first aid section that covers injuries which are more likely to be encountered in disaster situations, such as fractures, burns, nasal injuries, heat- and cold-related conditions, and insect bites and stings, with a practical activity that involves applying splints made out of improvised materials such as cardboard boxes.

5.2.5. Unit 5: Light Search and Rescue Operations

The fifth lesson, which takes around two and a half hours, looks at light Search and Rescue operations, including size-up procedures, safety considerations, building markings, and both interior and exterior search procedures. Practical activities include the use of wooden cribbing and levers to extricate victims that are trapped under heavy objects, and the removal of survivors using a variety of methods such as chairs, blankets, and two-rescuer carries.

5.2.6. Unit 6: CERT Organisation

The sixth unit, which takes approximately one hour and forty-five minutes, discuss CERT team organisation and deployment protocols, and the Incident Command System (ICS). Although this could vary depending on the jurisdiction, most CERT teams have a pre-determined staging area and may self-deploy to their own neighbourhoods following a major event, and the team leader is normally selected upon mobilisation and determined to be the first person to arrive at the staging area. This unit also contains an overview of the CERT forms which are used for communication and documentation purposes, and a desktop exercise relating to ICS functions.

5.2.7. Unit 7: Disaster Psychology

The seventh lesson takes approximately forty-five minutes and provides an overview of disaster psychology, including the emotional impact of deployment on the responders. It offers practical steps for preparing the team for the psychological effects of a traumatic incident and includes simple strategies for working with survivors and for informing family members about a fatality. It recommends the Critical Incident Stress Debriefing protocol (CISD) as a tool for first responders following a traumatic event, and does not contain any practical activities.

5.2.8. Unit 8: Terrorism and CERT

The final classroom-based unit in the basic course takes an estimated two and a half hours to complete and describes the role of CERT teams in terrorism incidents. It includes an overview of possible indicators of a terrorist attack, and a discussion of the potential weapons that a terrorist may use, and advises that CERT members must not respond to a terrorism event or any other situation involving hazardous materials. It includes a desktop exercise regarding the identification of, and response to, a terrorist attack.

5.2.9. Unit 9: Course review, final exam, and disaster simulation

The ninth lesson in the basic course contains a 13-page multiple-choice post-test, a review of the course content, and a disaster simulation. The exercise usually consists of an imitation disaster scene with actors playing the role of victims to which the team is expected to respond appropriately, although it may entail a series of rodeo-style activities in which participants practise the different skills that were taught during the course, such as triage, firefighting, victim extrication, and patient transport. It is customary for CERT graduates to receive their course completion certificates at the end of unit nine.

5.2.10. Other CERT training modules

In addition to the basic course, supplementary modules for ongoing training of certified CERT responders are available on the official website (Department of Homeland Security, 2019). These additional units are:

- **CERT Animal Response I**

This is a three-hour lesson that looks at animal-related issues in

disasters. It discusses creating an animal disaster plan and preparing to evacuate or shelter-in-place with pets or service animals. This module also contains a section on general animal behaviour.

- **CERT Animal Response II**

This unit, which takes approximately four hours, continues with the role of CERT teams in responding to animal issues in disasters, and discusses responder safety. It also examines caring for injured animals and contains a roleplay exercise regarding communicating with an animal's owner.

- **CERT Emergency Communications**

This is a four-hour module that discusses the role of communication during a CERT deployment, the preparation of communication plans, and different modes of communication, ranging from the use of runners and fixed, mobile, and satellite telephones through to the operation of different type of two-way radios. It also provides an in-depth look at Family Radio Service and General Mobile Radio Service walkie-talkies, and includes a practical activity on the operation of these devices.

- **CERT Tools for Leadership Success**

This lesson is a four-hour module that discusses the roles and characteristics of leaders and team members, and looks at the decisive, participative, and delegative leadership styles. It covers the challenges of leadership in stressful situations, and contains practical activities relating to the leadership competence model, preferred and situationally appropriate leaderships styles, and leading in stressful situations.

- **CERT Traffic and Crowd Management**

This unit, which requires an estimated four hours to complete, identifies possible CERT roles in crowd and traffic management, and teaches about effective hand signals for directing traffic and crowds, and verbal communication with the public. It also discusses the use of flags for

traffic control and radios for communication within the team, and contains a practical activity on directing traffic around an incident scene.

- **CERT Firefighter Rehabilitation**

This four-hour module discusses the task of firefighter rehabilitation, which is the process of providing rest, rehydration, nourishment, and medical evaluation to firefighters who have been responding to an extended or extreme incident. CERT team members are taught about the physiological stress of firefighting and the effects of heat and cold, as well as other incident-related factors. They are also shown how to set up a rehabilitation area and undertake simple tasks, such as assisting firefighters with gear removal, offering food and drink, providing cooling or heating, and monitoring firefighters for signs of distress. The unit includes an exercise involving the simulated operation of a firefighter rehabilitation area.

- **Flood Response for CERT**

This lesson, which requires four hours to complete, discusses the CERT response to flooding and associated safety issues, including common flood-related injuries. It focusses on the appropriate use of sandbags, and contains practical activities related to filling and moving sandbags and constructing a sandbag barrier.

Despite the existence of a standardised CERT training course since 1994, Waldvogel (2005) reports significant differences in the curriculums used in CERT programmes in San Francisco Bay, with courses varying from 12 to 25 hours in duration and containing between six and nine modules. One of the programmes surveyed omitted Unit 4 on Disaster Medical Operations 2, and two courses removed both the Disaster Psychology and Terrorism modules. The City of Rochester - NY CERT course also eliminates Unit 8 on terrorism, although it does include additional Automatic External Defibrillator (AED) and Cardio-Pulmonary Resuscitation (CPR) training (Mitrano, 2004).

5.3. Variations of the standard CERT programme

In addition to the standard CERT model which is intended for community-based volunteers from either pre-existing or CERT-specific groups, FEMA also offers the Teen CERT, Campus CERT, and Workplace CERT versions of the programme. Workplace CERT is centred around the basic CERT training curriculum, with an emphasis on equipping employees, as individuals or teams, to respond to emergencies in their places of work, and Campus CERT is designed to operate on university or college campuses, often in partnership with existing emergency management structures (Connolly, 2012; Department of Homeland Security, 2019).

Teen CERT (Federal Emergency Management Agency, 2015b) is built on the same 24-hour training course as the other versions of the CERT programme, although, as it is intended for use with adolescents, it commonly contains more hands-on activities and other alterations to some of the exercise. It may be taught as a component of a school curriculum on disaster preparedness, or as a part-time activity provided by religious entities, scouting groups, or other Community-Based Organisations. Powell, Smith, et al. (2011b) discuss a two-day 4-H Teen CERT course that was conducted in 2011 in Nevada which contained units on disaster preparedness, hazard management, fire suppression, Search and Rescue, disaster first aid, Psychological First Aid, terrorism, and working with animals on the first day, and teamwork, the final exercise, and developing community project plans on the second day.

In a webinar hosted in July 2015, FEMA provided orientation for programme managers and instructors about including people with disabilities or access and functional needs in CERT programmes, and advised that a braille version of the basic course participant manual was available free-of-charge (Individual and Community Preparedness Division, 2015). The FEMA website also states that a low-vision version of the manual is available for download and customisation, although the webpage does not appear to currently contain any links to these files (National CERT Program, 2012). The December 2018 CERT eBrief presents an article describing a CERT course that was conducted in Washington State for government employees with disabilities, including blind, deaf, and deaf-blind participants (Federal Emergency Management Agency,

2018a). FEMA has also published an *Instructor Guide Annex for All Abilities* document that contains suggestions for adapting the basic CERT training for people with disabilities and participants with access and functional needs (Federal Emergency Management Agency, 2015a).

CERT programmes in rural areas may need to assume a more diverse CBDRM role in order to help communities face challenges such as economic downturn, declining population, and a lack of resources for effective risk mitigation. Flint and Brennan (2006) recommend that such teams are equipped to assist local authorities in non-disaster emergency response and, in a later paper, affirm that CERT is a promising strategy for “local empowerment and effective disaster mitigation in rural communities” (Brennan and Flint, 2007, p. 112).

A strategy for forming CERT teams with elderly residents of high-rise buildings is discussed by Bovyn (2005), who affirms that “while this type of Community Emergency Response Team is non-traditional, the goals remain the same, and the benefits to our communities are greater as we encourage our citizens to take partial ownership of their lives and safety” (p. 14). In a survey of 20 CERT coordinators in Illinois, Flint and Stevenson (2010) highlight the importance of CERT programmes being open to a wide range of participants, with one team reporting that their membership included Spanish and English speakers, 14-year-old youth, an 83-year-old couple, and a person that they describe as being severely brain-damaged.

The CERT course material is available in Spanish from the FEMA CERT website (Department of Homeland Security, 2019), and has been translated into Brazilian Portuguese (CERT Brasil, 2019a), Arabic (Takahashi et al., 2014), and Haitian Creole (Federal Emergency Management Agency, 2011a). Drolet et al. (2015) discuss the activities of Limited English Proficiency (LEP) migrant farmers in Volusia County - FL following hurricanes in 2004 and 2005 which resulted in the creation of a bilingual CERT programme known as *El Grupo Comunitario de Respuesta a Desastres* (The Community Disaster Response Group), which is composed of men and women, both bilingual and LEP, and contains youth and adult members.

The Communities of Oakland Responding to Emergencies (CORE) programme in Oakland - CA is reviewed by Ray (2009), who reports that the CORE course is offered in English, Spanish, and Chinese, and has trained over 18,000 residents. The CORE curriculum is organised differently to the standard CERT course with disaster preparedness spread over two lessons, and additional modules on assisting people with special needs and neighbourhood emergency communications.

5.4. CERT programme implementation

The FEMA CERT website suggests the following seven steps for implementing a CERT programme (Federal Emergency Management Agency, 2014):

1. Assess needs.
2. Identify resources.
3. Gain support and recruit personnel.
4. Acquire training materials.
5. Tailor the training.
6. Establish a training cadre.
7. Deliver the training.

A similar seven-step process for starting a CERT programme is offered by Takahashi et al. (2014), although it has a different sequence, more details, and a slightly altered wording:

1. Identify needs.

What are the potential hazards in the community? Are there geographical obstacles, such as rivers, or critical infrastructure, for example, bridges?

2. Establish community partnerships and obtain permission.

Identify CBOs that may want to partner with a CERT programme, and obtain permission from the authorities.

3. Increase community awareness.

Advise the community, business groups, educational institutions, and

faith-based organisations about the proposal, and publicise the identified needs for implementing the programme.

4. Identify resources.

Obtain required resources, such as unused equipment at hospitals or fire stations or wood scraps from construction sites. Equipment may be purchased if funding permits and donations are not available.

5. Recruit community members.

Invite people to attend the CERT training courses.

6. Train CERT instructors.

Graduates of the basic CERT course make excellent instructors who are members of their local community and can help encourage participation in the programme.

7. Begin classes.

CERT basic training is often offered free-of-charge to communities, with the students providing their own Personal Protective Equipment (PPE), although some programmes may charge a small fee but will often provide the PPE to course participants.

In an investigation for the Odessa Fire Department in Odessa - TX, Drake (2006) looks at implementing a CERT team, which is called a Citizen Emergency Response Team, and recommends the following six steps for implementation:

1. Assess the community's need for a CERT programme using risk, hazard, and vulnerability assessment worksheets.
2. Obtain internal support from the leadership of the community and of the fire department, and external support from the community at large.

3. Form a local Citizen Corps Council to give strategic direction, administer the programme, and receive and oversee the use of FEMA grant money.
4. Organise the structure of the CERT programme according to FEMA guidelines, including the use of appropriate forms and the development of a database to track resources.
5. Secure the support of the local business community, including possible financial sponsorship of the CERT programme.
6. Produce recruitment material for prospective volunteers and for the business sector, non-profit organisations, and the wider community.

As the Los Angeles Fire Department founded the original CERT programme, it is common for CERTs to be implemented by municipal fire departments in the United States (Simpson, 2001), and Garrels-Bates (2018) and Gerlich (2014) both recommend that CERT programmes continue to be hosted by fire brigades with the use of their personnel as instructors. In a survey of all 13 fire departments in Washington County - WI, Kudek (2009) found that, although none of them currently had CERT programmes, 60% were interested in developing one in the future, and in an evaluation of 92 fire departments in the state of North Carolina, Cox (2003) reported that 27% offered CERT programmes. However, TeKippe (2003), in a survey of 31 existing CERT programmes in the US Midwest, found that only seven received their primary funding from a fire department and 15 were trained by fire brigade personnel, and research by Schmidt (2011) into the feasibility of the Marshfield - WI fire department establishing a CERT programme recommended further investigation, citing a lack of federal grant funding for such an endeavour.

5.5. CERT success stories

There have been many examples of successful CERT programmes that have been implemented in the United States and beyond. In an address given at the

2011 Congress of the International Association of Emergency Managers, the director of the FEMA CERT programme, Rachael Jacky, cited statistics from the previous year which showed the existence of nearly 1,850 local CERT programmes that had trained 430,000 individuals and served a total of 1.3 million volunteer hours, with 10% of registered CERT teams having been activated over 10 times (Lucas-McEwen, 2011).

Researching the successful deployment of CERT teams and members following four hurricanes in the Greater Tampa, Florida region in 2004, Gonzalez (2005), relates that team members responded to Hardee County after Hurricane Charley where they provided assistance with amateur radio communications, feeding, and other tasks until being displaced by professional responders, with some of the team members later deploying with FEMA. In an evaluation of the Kenai Peninsula Borough CERT programme in Alaska, Mohrman (2012) states that members performed many tasks for emergency management authorities including operating shelters with the Red Cross, setting up and running a pet shelter during a state-wide exercise, providing information for the public on hotlines, assisting with logistics, participating as victims in exercises, and staffing the Emergency Operations Centre (EOC) communications room.

In a survey of 10 county CERT programmes in Wisconsin state, Schmidt (2011) reports that teams had assisted with floods and H1N1 vaccination clinics, and the Arizona Division of Emergency Management (2005) describes the incorporation of two Arizona CERT teams in the 2005 state-wide exercise which simulated terrorist use of a dirty bomb, where teams were involved in evacuations and the transportation of decontaminated victims. Rodd (2018) highlights how CERT teams successfully deployed to Hurricanes Harvey and Maria and the California wildfires, and the Federal Emergency Management Agency (2013) reports that CERT teams were mobilised following the Joplin - MO tornado, with 97 members volunteering over 3,500 hours of service, undertaking Search and Rescue activities, and assisting the American Red Cross. In a survey of 11 CERT programmes that responded in Virginia following Hurricane Isabel in 2003, Franke and Simpson (2004) relate that the teams performed tasks such as answering phonelines, conducting damage assessment, disseminating information during evacuation, shutting off the

utilities of evacuated houses, collecting the names of those who did not evacuate, and distributing food and water.

Evaluating a three-day intensive Teen CERT training course, Powell, Black, and Smith (2011) state that youth knowledge, attitude change, and skill acquisition showed significant increases for 19 of the 21 topics investigated, and in another study of a Teen CERT course in Nevada, Powell, Smith, et al. (2011a) also affirm that participants showed statistically significant gains in knowledge and skills. Black and Powell (2012) also report that students at two Oregon high schools who participated in Teen CERT courses demonstrated substantial improvement in their knowledge, skills, and attitudes towards DRR at the completion of the course.

5.6. CERT programme challenges and concerns

Many CERT teams face challenges in sourcing the funding, materials, and infrastructure necessary for the creation and ongoing operation of the programme (Helsloot & Ruitenbergh, 2004). The need to obtain additional funding sources is mentioned by Franke and Simpson (2004) in their survey of CERT teams in Virginia, and by Flint and Stevenson (2010) in their investigation into rural CERT programmes, and is also cited as being a concern by Drake (2006), who quotes a cost of USD 140 per student for the initial CERT training.

In a survey of 21 CERT coordinators, Carr and Jensen (2015) observe that not all CERT programmes were effectively integrated with their local jurisdiction's emergency management authority, and the challenge of integration is also highlighted by Kudek (2009), who found that some of the fire chiefs interviewed regarded CERT merely as a training programme for individual preparedness rather than a resource for the emergency management system. An investigation into FEMA Urban Search and Rescue (USAR) teams' attitudes towards unaffiliated volunteer responders found that, although some of the USAR team leaders and members interviewed viewed CERT responders as quasi-professionals who sometimes self-deployed uninvited to the scenes of major incidents, they also recognised that, if properly integrated into the emergency management structure, CERT teams could serve an important role by helping to

coordinate spontaneous volunteers and reduce their impact on the professional responders (Barsky, Trainor, Torres, & Aguirre, 2007).

Following a survey of 12 Spanish-language CERT courses in the United States, Burnett (2004) identifies the level of literacy and educational attainment of the non-English speaking Hispanic population as being an area of concern regarding their full participation in the training. Other challenges that were identified are the need for young people to work in order to continue studying, thus reducing the time they have available to take part in a CERT course, the difficulty that parents of young children encounter in finding babysitters for the duration of the training, and a generalised distrust of public servants, and recommendations include changing the timing of the classes to accommodate the students' schedules, providing childcare for course participants, possibly in partnership with local churches, and considering cultural issues such as perceptions of authority figures (Burnett, 2004). A delegation from the New York City Office of Emergency Management that held a CERT course for Haitian earthquake survivors in 2010 also found that the participants' level of literacy was a relevant factor, and, in response, modified the course presentation to dispense with the use of the participant manual and to include a greater number of practical activities, although they acknowledge that this significantly increased the amount of time taken to complete the training (Federal Emergency Management Agency, 2011a).

Some researchers have also raised concerns about the content of the CERT basic training course. Although Simpson (2000) is favourable towards the inclusion of the START triage protocol in the Disaster Medical Operations training, he highlights the psychological stress that responders may encounter when tagging friends, family members, neighbours, or co-workers, and believes that the amount of triage practice offered during the course is insufficient. Other researchers, such as Navin and Waddell (2005), outline concerns with the START triage protocol that indicate an elevated level of variability in the tagging of victims and, more recently, Lerner, Schwartz, Coule, and Pirrallo (2010) and Silvestri et al. (2017) have found that the SALT triage model (Sort, Assess, Lifesaving Intervention and Treatment/Transport) has been more accurate and easier to apply than the START protocol. In addition, the use of pressure points

to control severe bleeding, as taught in Unit 3, is no longer considered to be an effective treatment strategy, having been replaced by the application of tourniquets (Rossaint et al., 2016).

Another area of concern with the current CERT basic training curriculum is found in Unit 7 on disaster psychology, which includes a section about Critical Incident Stress Debriefing (CISD; Mitchell, 2017) and recommends its use for CERT teams members following a deployment. However, many researchers have found CISD to be ineffectual or even counter-productive (Alexander & Klein, 2009; Bonanno et al., 2010; Jahnke et al., 2014; Ronan et al., 2008; Ruzek et al., 2007), although a study of New Zealand social workers who had experienced traumatic events reveals that many of those surveyed regarded the CISD group debriefings as a positive experience (Pack, 2012).

5.7. Summary

This chapter provides an extensive review of the history of the CERT programme, and the contents of the basic CERT training course and the additional modules that are offered by FEMA. It also looks at common variations of the standard programme and discusses suggested implementation procedures. Finally, it highlights some of the CERT success stories from the United States, and concerns and challenges that have been expressed about the CERT programme in the available literature.

The next chapter will present the data collection and analysis that was performed on the information gathered from the questionnaire and the interviews, and the results that were obtained.

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6. Data collection, analysis, and results

This chapter describes the data collection and analysis that was performed on the information received from the online questionnaire and the standardised open-ended key informant interviews, and the results that were obtained from this process. The Likert-scale answers acquired from the survey are summarised in order to convey key statistics, and the results of the thematic analysis of the interview transcripts and the free-text comments from the questionnaire are presented using the codes, themes, and sub-themes that were developed during the analysis process, along with relevant quotations from the interviews and comments.

6.1. Data collection

As this research project uses a sequential mixed methods model, the data collection process involved the acquisition of the quantitative data from the online questionnaire first, and then the capture of the qualitative information from the key informant interviews. However, as the survey contained a free-form text field for comments about the CERT course, a small amount of qualitative data was also obtained during the first phase of data collection and processed following the thematic analysis of the interview transcripts.

6.1.1. Questionnaire data collection process

Although the results obtained from the questionnaire will be discussed in the next chapter, some generalisations about the replies received will be presented in this section. The survey contained a total of 55 questions (Appendix 1), of which the first two requested the respondent's name and the CERT course that they had completed in order to validate their participation in the questionnaire.

The next question asked the respondent to select the country or territory in which they would like to see the CERT programme implemented, and that they would consider when replying to the other questions in the survey. They were encouraged to choose a country in which they had lived, or with which they were familiar, that was outside of the continental United States of America. Fourteen different countries were represented by the 55 replies that were received for the questionnaire, as shown by the graph in Figure 3. Guatemala

was selected 18 times, with Brazil being chosen by 14 respondents, and Belize being nominated seven times. Puerto Rico was represented by three of the participants, and South Africa and Haiti were both selected twice. Jamaica, Mexico, Mozambique, Panama, and Uruguay were each chosen once, as were the developed countries of Canada, Israel, Spain, and Norway.

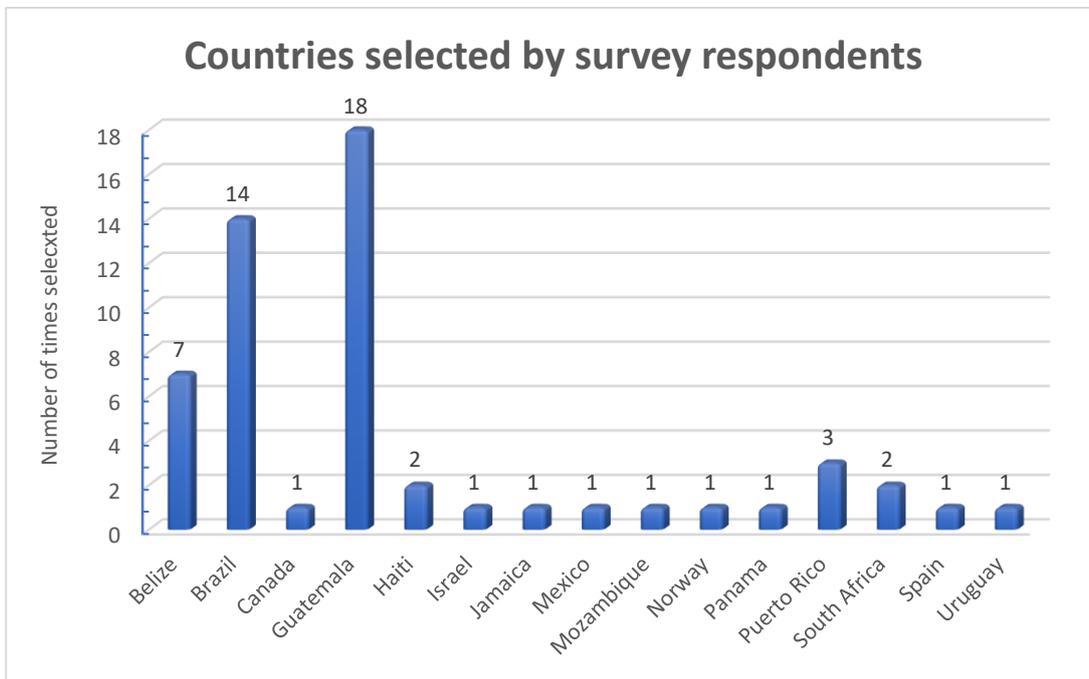


Figure 3: Countries selected by survey respondents

Questions 4 to 53 required a five-point Likert-scale reply (Likert, 1932), with the answers being selected from the range of 1 (*strongly disagree*), 2 (*disagree*), 3 (*neither agree nor disagree*), 4 (*agree*), and 5 (*strongly agree*), along with the option to skip the question. The first three questions referred to the overall CERT course and its relevance and applicability to the chosen country, while the remainder related to the nine different units of the basic curriculum. The answers to all of these questions will be discussed in the next chapter of this thesis.

Question 54 was a free-text field that asked for comments or suggestions about the adaption of the CERT course for the country selected, to which 30 replies were received, although two of these were not relevant to the question. The

remaining 28 observations will be treated as qualitative data and analysed in a similar manner to the interview transcripts. The final question allowed the respondent to provide their email address if they were interested in participating in a possible follow-up interview, with five of the survey respondents subsequently being selected to take part in the standardised open-ended key informant interviews.

6.1.2. Questionnaire response rate

The online English-language questionnaire received a total of 45 replies, of which three were substantially incomplete with less than 50% of the questions answered, and another had been completed by a person in Chile who, although interested in the CERT programme, had not participated in any of the courses under evaluation. The 14 replies to the Portuguese-language version of the questionnaire were all found to be valid entries that had been completed by participants in either the basic CERT or Train the Trainer courses in Brazil in January 2019.

Of the 20 participants in the basic CERT course in Dorado, Puerto Rico in June and July 2018, 12 completed the questionnaire, giving a response rate for this course of 60%. However, only 9 of the 50 participants in the CERT course in Punta Gorda, Belize replied to the online survey, resulting in a response rate of 18%. The low response rate could possibly be explained by limited access to the internet and the demands of work commitments for the participants, many of whom were full-time military or emergency management staff. A total of 20 participants from the basic CERT course that was held in Frijanes, Guatemala in August 2018 completed the online questionnaire, which, given the class size of 48 trainees, resulted in a response rate of 41.7%, and 10 out of the 20 participants of the course in Nova Friburgo, Brazil in January 2019 also replied to the survey, giving a 50% response rate. Finally, all four members of the CERT Train the Trainer course in Nova Friburgo completed the online questionnaire, resulting in a 100% response rate for this course.

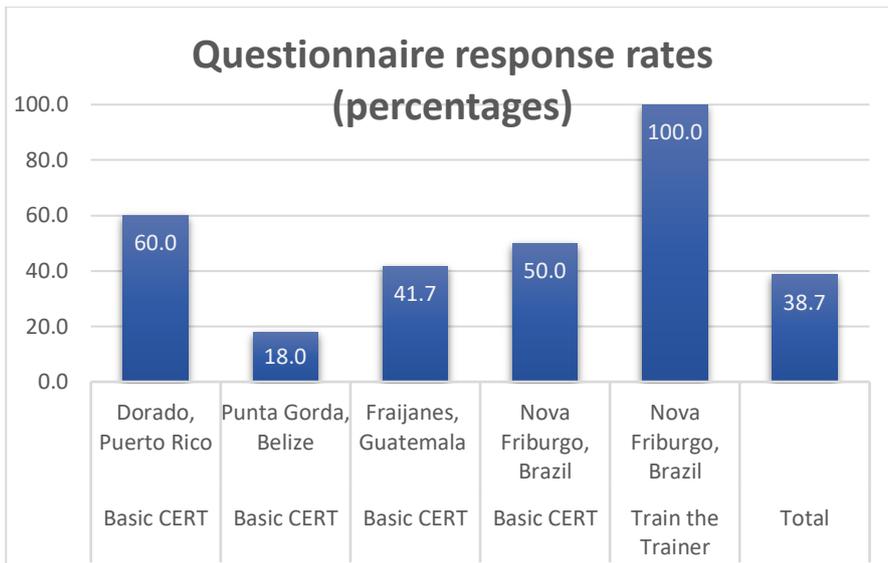


Figure 4: Questionnaire response rates (percentages)

As a total of 55 valid questionnaire replies were received out of a pool of 142 course participants, the overall response rate for the online survey was 38.7% (Figure 4). Despite being considerably less than the researcher had expected, this result is compatible with Vogt’s observation of survey response rates when he states, “in my experience, students writing doctoral dissertations seldom do better than 40%” (2007, p. 92).

6.1.3. Questionnaire reliability and validity

The internal reliability of Likert-scale data is often calculated using Cronbach’s Alpha (Vogt, 2007), with values that approach 1.0 indicating that the answers are relatively free from random measurement errors (Warmbrod, 2014). The Cronbach’s Alpha for the 55 replies to the 50 Likert-scale questions was computed in Excel using a two-factor ANOVA calculation without replication (Table 1), followed by the formula:

$$1 - (\text{Mean Square Error} \div \text{Mean Square Rows})$$

which gave a result of 0.95298. As this value is close to the maximum possible score of 1.0, it can be considered to indicate a high degree of internal reliability within the data obtained from the questionnaires, which is corroborated by the P-values of the ANOVA table both being almost zero (Norman, 2010; Vogt, 2007).

ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Rows	290.8109	54	5.385387	21.26861	1.1E-166	1.341249
Columns	47.39091	49	0.967161	3.819628	2.98E-17	1.358789
Error	669.9891	2646	0.253208			
Total	1008.191	2749				

Table 1: ANOVA calculation of questionnaire results

The validity of the questionnaire results is more difficult to calculate as the standard measurement of criterion validity would require another survey to be completed by each of the respondents in order to compare the results, which was not practical given the scope of this research project (Kerlinger & Lee, 2000). However, Ogden and Lo (2011) outline a technique for validating a Likert-scale questionnaire using a free-text response field that was included in the survey, and such a strategy would be applicable in this case since question 54 was an optional field where the respondents could provide their perceptions of the course or suggestions for improvement.

Accordingly, the 28 comments received that were relevant to the question were classified as to whether they were positive, neutral, or negative, and this value was compared to the sum of that respondent's Likert-scale replies. Of the 14 comments that were rated as being positive, all correlated to an aggregated Likert-scale score of 223 or higher out of a maximum of 250, thus falling within the top 20% of possible scores. Likewise, the 14 text fields that were classified as being neutral, most of which contained practical suggestions about the implementation of the course rather than an assessment of its value, all came from respondents who had obtained a summated Likert-scale score of 187 or higher, representing the 40% highest possible scores. This result, although by no means conclusive, is nevertheless much more consistent than that discovered by Ogden and Lo (2011) which caused them to question the validity of the survey that they were evaluating.

6.1.4. Interview data collection process

Key informants A, B, and C were interviewed in person in the cities of Mariana - MG and Nova Friburgo - RJ in Brazil in February 2019. They were given a

consent form that explained the ethical considerations of the interview, and these forms were signed and returned to the researcher. The interviews, which were conducted in Brazilian Portuguese, were recorded on a digital audio recorder and transcribed using a professional Brazilian transcription service, before being translated into English. Finally, the interviewees were sent an email containing both the Portuguese and English transcripts, to which all of them replied via email indicating that they authorised the use of their interviews for this study.

The interviews with informants D, E, F, and G took place during February and March 2019, and were conducted using the online video conferencing service Zoom. All of the participants were sent a copy of the consent and ethical considerations form in advance of the interview, although they were not expected to sign and return it due to practical considerations. They were asked for their permission to record the interview, and once they verbally consented, it was then recorded using the Zoom software. This file was later transcribed by an online transcription service, and the transcript was sent to each of the interviewees via email, with all of them subsequently authorising the use of their interview transcript for this research project.

6.1.5. Interview reliability and validity

Although the reliability of a qualitative interview cannot be confirmed through statistical analysis, the fact that five of the seven interviewees also completed the online survey allows us to compare their overall perspectives of the CERT programme, as shown from the interview transcripts, with the summated Likert-scale scores from their questionnaire replies, in a process similar to that employed by Ogden and Lo (2011). As their aggregated Likert-scale scores ranged from 217 to 250, out of a total of 250, and the tenor of all of the interview transcripts indicated an overwhelmingly positive evaluation of the CERT programme, the interviewees' questionnaire replies could be seen as not contradicting the opinions that were expressed during the interviews, thus providing a degree of equivalence reliability (Sarantakos, 2013).

Sarantakos (2013) discusses the role of validity in qualitative research, stating that many researchers affirm that the investigators "do not need to need to

demonstrate validity but rather methodological excellence, that is research performance in a professional, accurate and systematic manner” (p. 103). As a single study such as this one does not allow for cumulative validation through comparison with other research findings, and the use of communicative validation through professional review or triangulation is outside the research scope of this project, it is anticipated that the thorough exposition of the instruments and procedures utilised will confirm the robustness of the interview method that has been used.

6.2. Analysis of the questionnaire data

The questionnaire contained 50 questions that received a Likert-scale numeric answer, with values ranging from 0 to 5. This data was processed using Microsoft Excel, and the aggregated totals for the questionnaire, and for the questions that related to specific CERT units, will be presented in the following sections of this thesis.

Appendix 3 contains the summated scores for each of the 50 Likert-scale questions in the survey, which are also presented as an approval rating percentage of the total possible score. As only nine of the 2,750 Likert-scale questions were skipped from the 55 completed surveys that were received, the 0.327% non-response rate is not anticipated to have any significant impact on the results.

6.2.1. Course evaluation

An aggregated Likert-scale score was calculated for each of the 55 completed questionnaires received. As the survey contained 50 Likert-scale items, each with a maximum score of five, the highest possible value for each respondent was 250, which would signify a perfect grade for all of the questions. The results are shown in a line graph in Figure 5, with the 150-line signifying an average Likert-scale response of 3 (*neither agree nor disagree*), the 200-line representing a mean of 4 (*agree*), and the top 250-line an average of 5 (*strongly agree*).

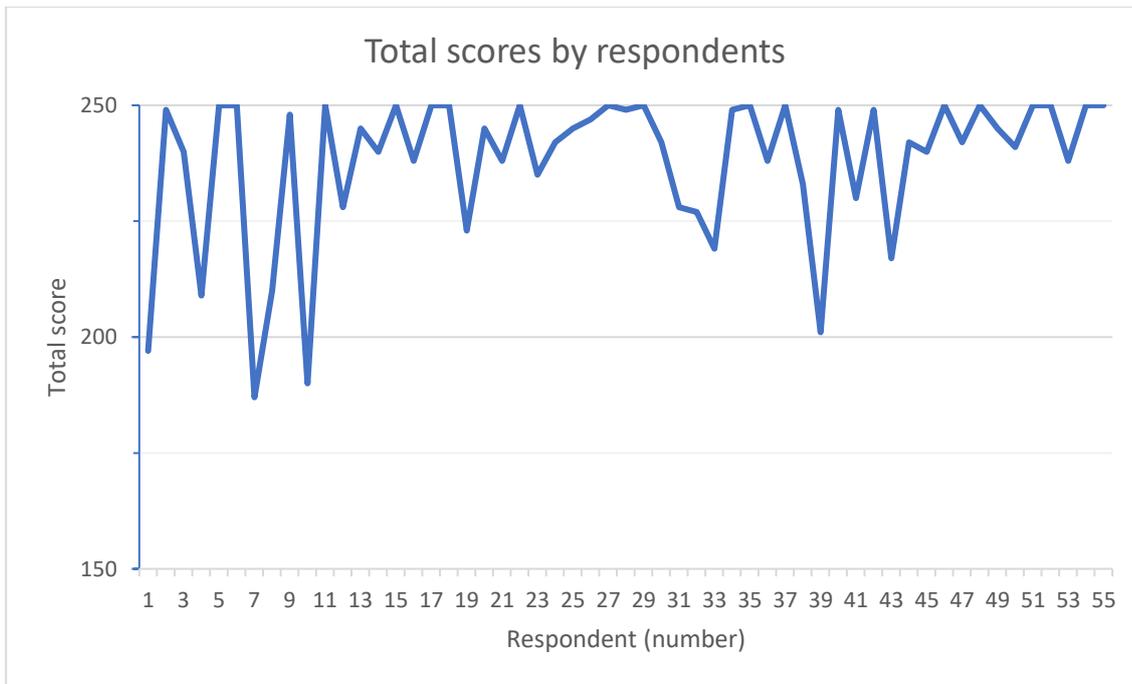


Figure 5: Total aggregated Likert scores by respondents

The totals of all of the answers received for all of the questions will be considered next, with the results separated into the five Likert-scale categories. Of the 2,750 answers obtained, 2,249 or 81.78% received a reply of 5 (*strongly agree*), 397 or 14.44% obtained a score of 4 (*agree*), and 63 or 2.29% were given a value of 3 (*neither agree nor disagree*). A further 31 questions (1.13%) were answered with 2 (*disagree*), one (0.04%) received 1 (*strongly disagree*), and nine questions (0.33%) were skipped (Figure 6). These statistics show that a total of 2,646 or 96.22% of the Likert-scale questions in the survey received an answer signifying that the respondents agreed or strongly agreed with the affirmation contained in that question.

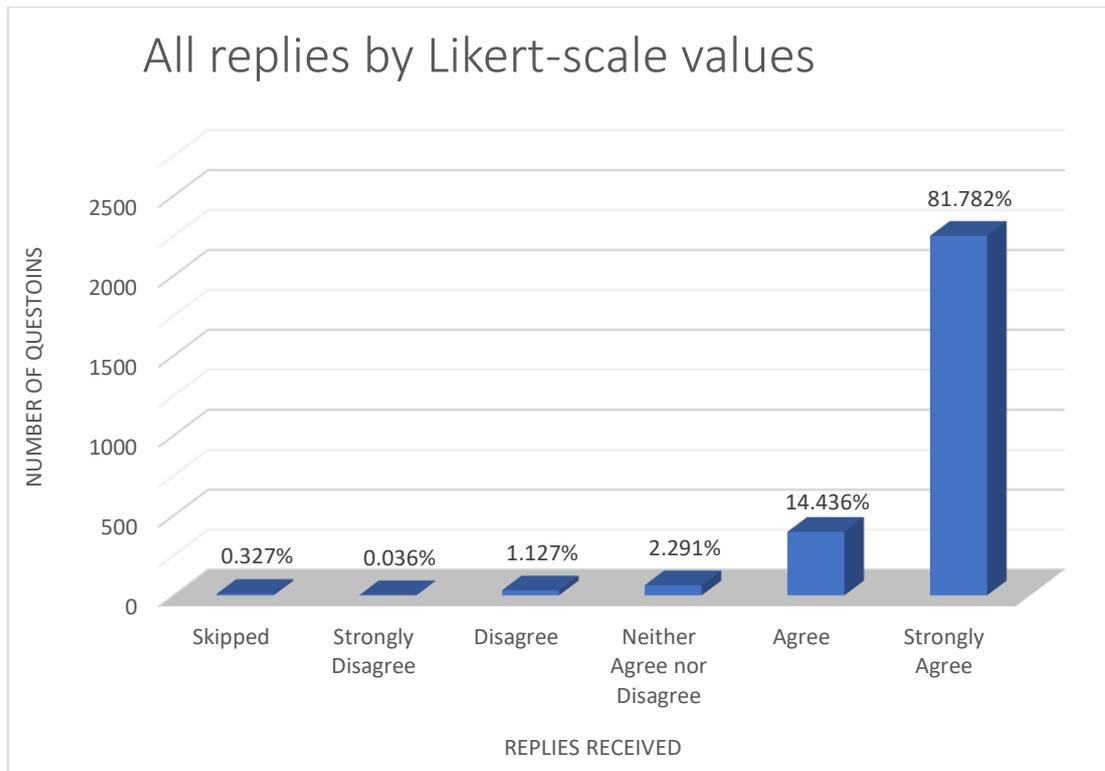


Figure 6: All questionnaire replies by summated Likert-scale values

The first three Likert-scale questions in the survey related to the respondent's general impressions about the CERT course. Question 4, which asked whether the CERT training could be useful for the country that the participant considered for possible programme implementation, received 45 (81.82%) answers of 5 (*strongly agree*), eight (14.55%) replies of 4 (*agree*), with one response of 3 (*neither agree nor disagree*), and the question being skipped once. Question 5 enquired if the course contained an appropriate amount of practical activities and received 37 replies (67.27%) of 5 (*strongly agree*), 12 answers (21.82%) of 4 (*agree*), one response (1.82%) of 3 (*neither agree nor disagree*), and 5 replies (9.09%) of 2 (*disagree*). Question 6 asked whether the course contained the appropriate amount of theory and teaching, and received 40 answers (72.73%) of 5 (*strongly agree*), 12 replies (21.82%) of 4 (*agree*), and three responses (5.45%) of 3 (*neither agree nor disagree*). The replies to the first three Likert-scale questions are illustrated in the graph presented in Figure 7.

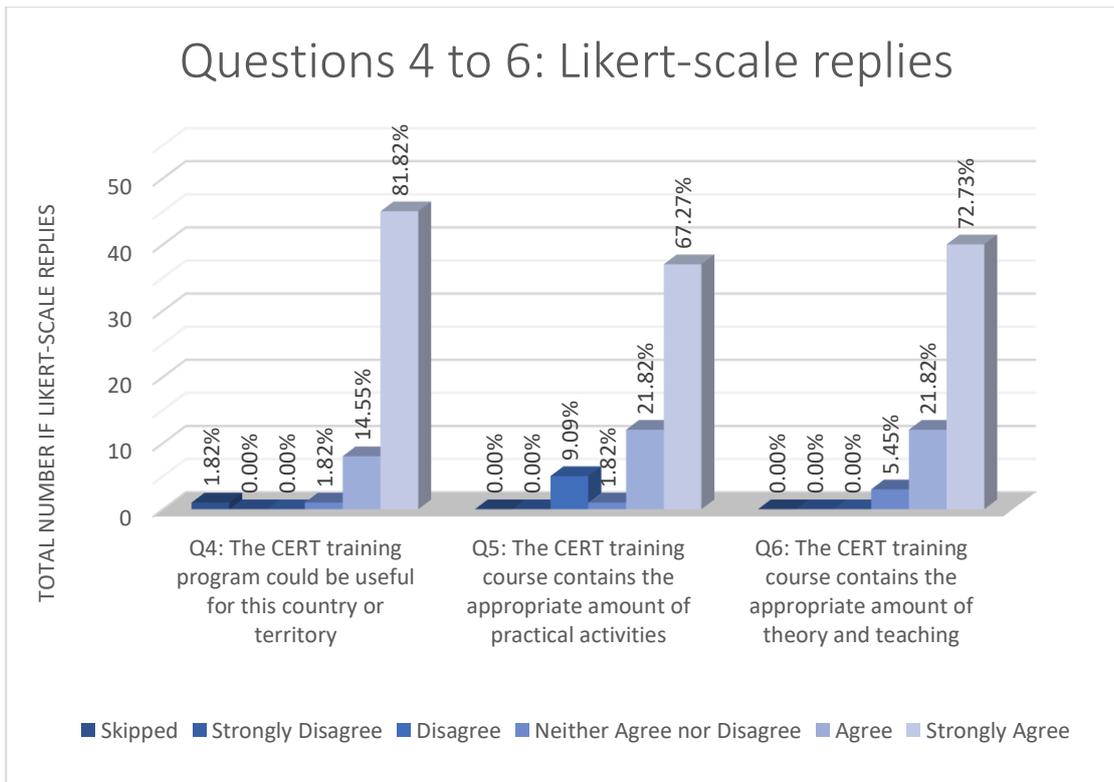


Figure 7: Summated Likert-scale replies to Questions 4 to 6

Questions 7 to 53 of the questionnaire related directly to the nine units that comprise the basic CERT training course, with questions 7, 11, 16, 21, 28, 34, 39, 43, and 49 asking for the respondent's overall impression of the applicability of a module, and the remainder of the questions relating to specific activities or topics within the various units.

As there are a variable number of questions relating to each unit, the Likert-scale scores were divided by the highest possible scores to yield approval rating percentages, and these results, along with the z-scores, are shown in Table 2. The z-scores, or standard scores (Vogt, 2007), portray the differences between the approval ratings for each CERT unit, as illustrated in Figure 8 which shows that Unit 8 had the lowest level of approval and Unit 3 obtained the highest score. Figure 9 contains the approval ratings expressed in percentages for all of the questions pertaining to each of the CERT modules, which are

compared with the answers to the questions that enquired specifically about the respondent's assessment of that unit.

CERT unit	Approval (%)	z-score
Unit 8: Terrorism and CERT	91.03%	-2.1104
Unit 1: Disaster Preparedness	94.27%	-0.5327
Unit 6: CERT Organization	94.33%	-0.5061
Unit 2: Fire Safety and Utility Controls	94.91%	-0.2230
Unit 9: Course Review, Final Exam, and Disast	94.91%	-0.2230
Unit 5: Light Search and Rescue Operations	95.88%	0.2488
Unit 4: Disaster Medical Operations - Part 2	97.14%	0.8639
Unit 7: Disaster Psychology	97.73%	1.1483
Unit 3: Disaster Medical Operations - Part 1	98.11%	1.3341

Table 2: CERT unit approval ratings sorted from lowest to highest

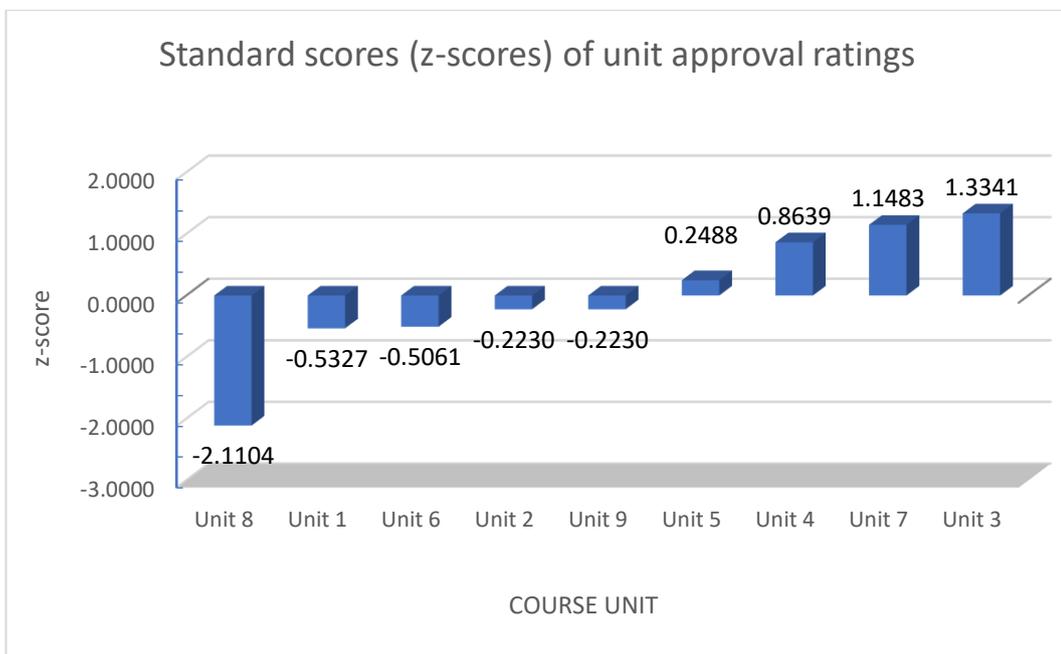


Figure 8: Standard scores (z-scores) of CERT unit approval ratings

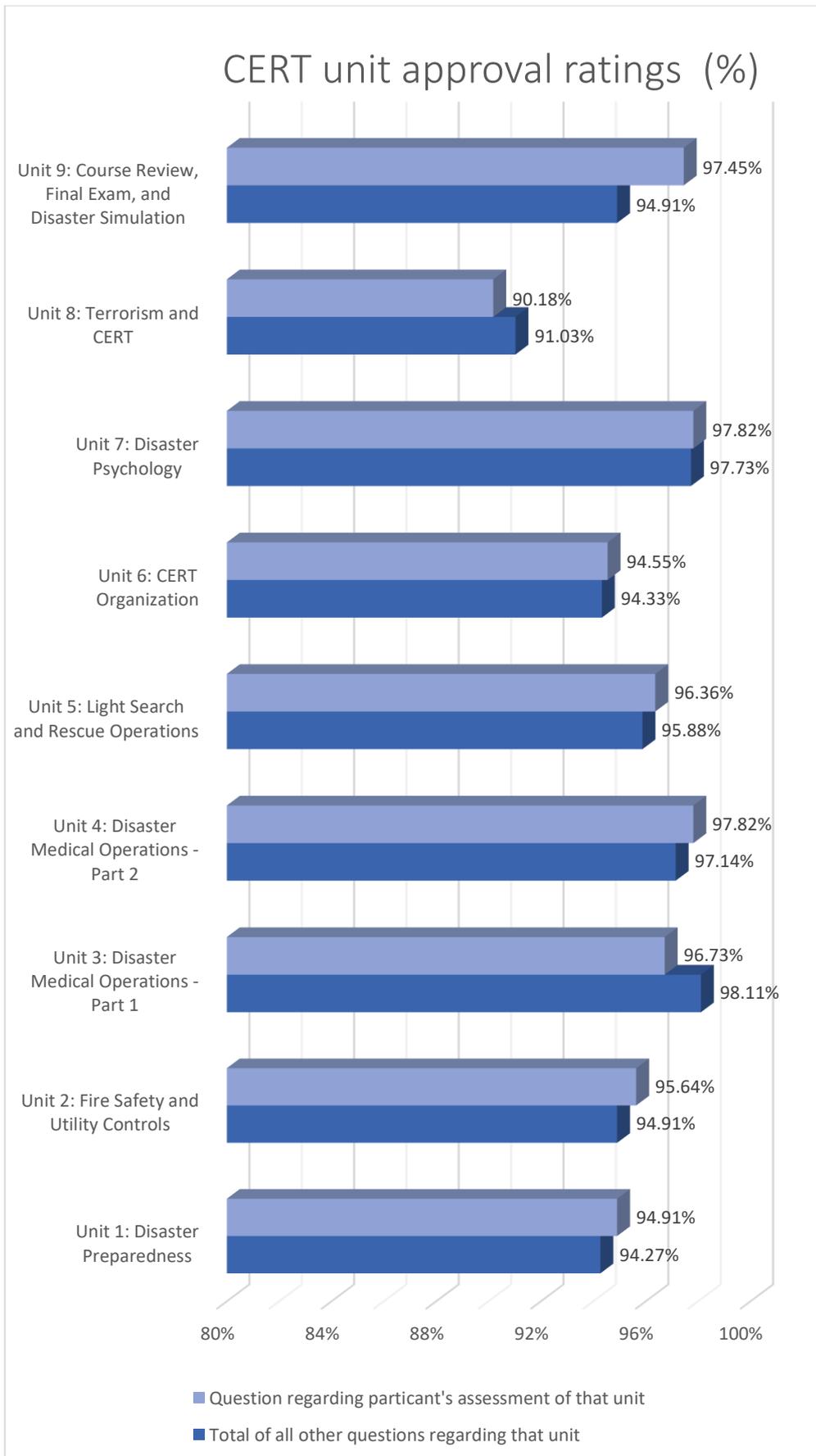


Figure 9: CERT unit approval ratings from summated Likert-scale scores (%)

6.2.2. CERT course evaluation by case

Since this investigation uses five different CERT courses for the case study, Table 3 contains the average approval ratings from the survey replies for each of these cases. The results shown are for Question 4, which asks if the CERT programme is appropriate for the respondent's location, Questions 5 and 6 that refer to the amount of practical and theoretical content in the curriculum, and the questions that relate to the participant's assessment of the nine units of the basic training curriculum.

	CERT Puerto Rico	CERT Belize	CERT Guatemala	T-t-T Brazil	CERT Brazil	Average
Q4: CERT could be useful	93.33%	100.00%	90.00%	100.00%	98.00%	96.27%
Q5: Practical activities	76.67%	95.56%	93.00%	70.00%	100.00%	87.04%
Q6: Theory and teaching	91.67%	95.56%	96.00%	80.00%	94.00%	91.44%
Q7: Unit 1: Disaster Preparedness	90.00%	100.00%	93.00%	100.00%	98.00%	96.20%
Q11: Unit 2: Fire Safety and Utility Controls	90.00%	95.56%	96.00%	100.00%	100.00%	96.31%
Q16: Unit 3: Disaster Medical Operations - Part 1	95.00%	95.56%	97.00%	100.00%	98.00%	97.11%
Q21: Unit 4: Disaster Medical Operations - Part 2	96.67%	97.78%	97.00%	100.00%	100.00%	98.29%
Q28: Unit 5: Light Search and Rescue Operations	90.00%	100.00%	96.00%	100.00%	100.00%	97.20%
Q34: Unit 6: CERT Organization	83.33%	97.78%	96.00%	100.00%	100.00%	95.42%
Q39: Unit 7: Disaster Psychology	98.33%	95.56%	97.00%	100.00%	100.00%	98.18%
Q43: Unit 8: Terrorism and CERT	83.33%	93.33%	93.00%	65.00%	100.00%	86.93%
Q49: Unit 9: Course review, exam and simulation	91.67%	97.78%	99.00%	100.00%	100.00%	97.69%

Table 3: Average survey results by case

These statistics show that the lowest average evaluation was given to Unit 8 on Terrorism (Q43), and the highest mean approval rating was conferred on Unit 4

regarding Disaster Medical Operations 2 (Q21). They also highlight some interesting variations between the cases, such as the low assessment given to Unit 8 (Q43) by the instructors' course in Brazil and to Unit 6 (Q34) by the participants in Puerto Rico, and the inferior grade assigned to the practical activities in Question 5 by the respondents from both of these courses in comparison to the other participants.

6.2.3. Unit 1: Disaster Preparedness

With an overall approval rating of 94.27% and an associated z-score of -0.5327, Unit 1 was the second least popular module of the course amongst the respondents. Figure 10 shows the aggregated totals of Likert-scale replies that were received for each of the questions related to this module. Question 9, regarding home and workplace preparedness and hazard mitigation, was the least popular topic in the unit with a summated Likert-scale value of 254 out of 275 or 92.36%, whilst Question 10, which related to the teachings on CERT disaster response, worker protection, and additional training, received the highest approval rating of 96.0%.

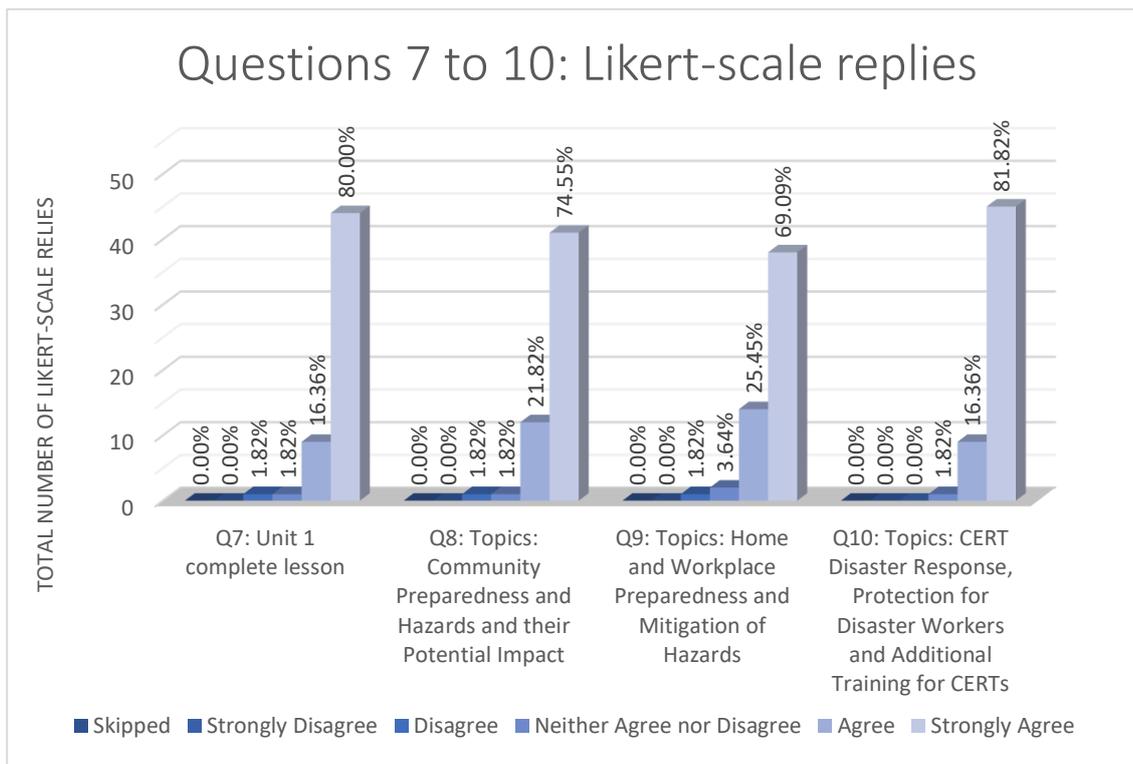


Figure 10: Summated Likert-scale replies to questions 7 to 10

6.2.4. Unit 2: Fire Safety and Utility Controls

Unit 2 received a grade equal to that of Unit 9 with an overall approval rating of 94.91% and a z-score of -0.2230. The aggregated Likert-scale replies to the questions in the survey that related to this unit are portrayed in Figure 11.

Question 14, on the topic of hazardous materials, had the lowest aggregated Likert-scale score of 250 out of 275 or 90.91% approbation, whereas Question 15, regarding the practical exercise with fire extinguishers, received the highest approval rating of 97.82%.

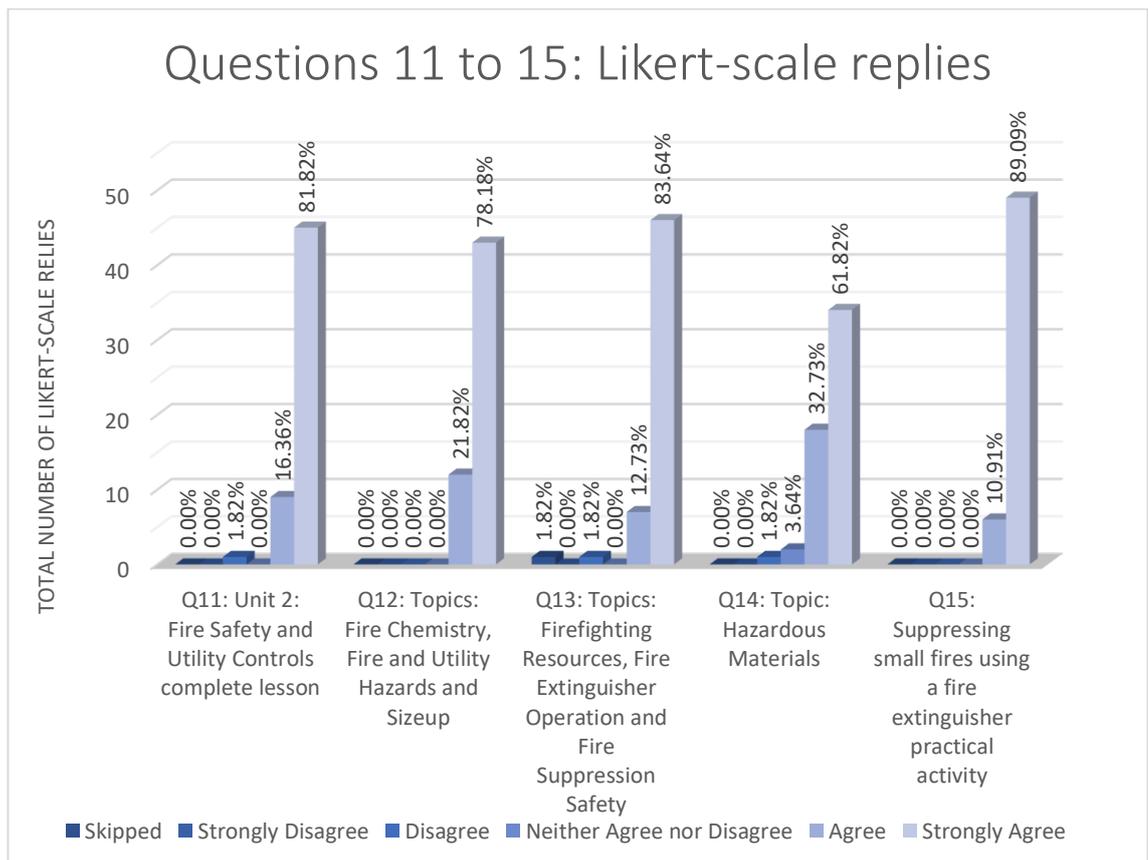


Figure 11: Summated Likert-scale replies to questions 11 to 15

6.2.5. Unit 3: Disaster Medical Operations - part 1

Unit 3 was awarded the highest ranking of all of the CERT course modules with an approval rating of 98.11% and a z-score of 1.3341. Both Question 19 and Question 20, which related to the theoretical and practical components of the START triage teaching, obtained a summated Likert-scale score of 272 out of 275, or 98.91% approval. The practical activities in Question 18 received the next highest evaluation of 98.55%, with Question 17, regarding the treatment of life-threatening conditions, in third place with an approval rating of 97.45%.

Figure 12 shows the aggregated Likert-scale results for the questions that related to CERT unit 3.

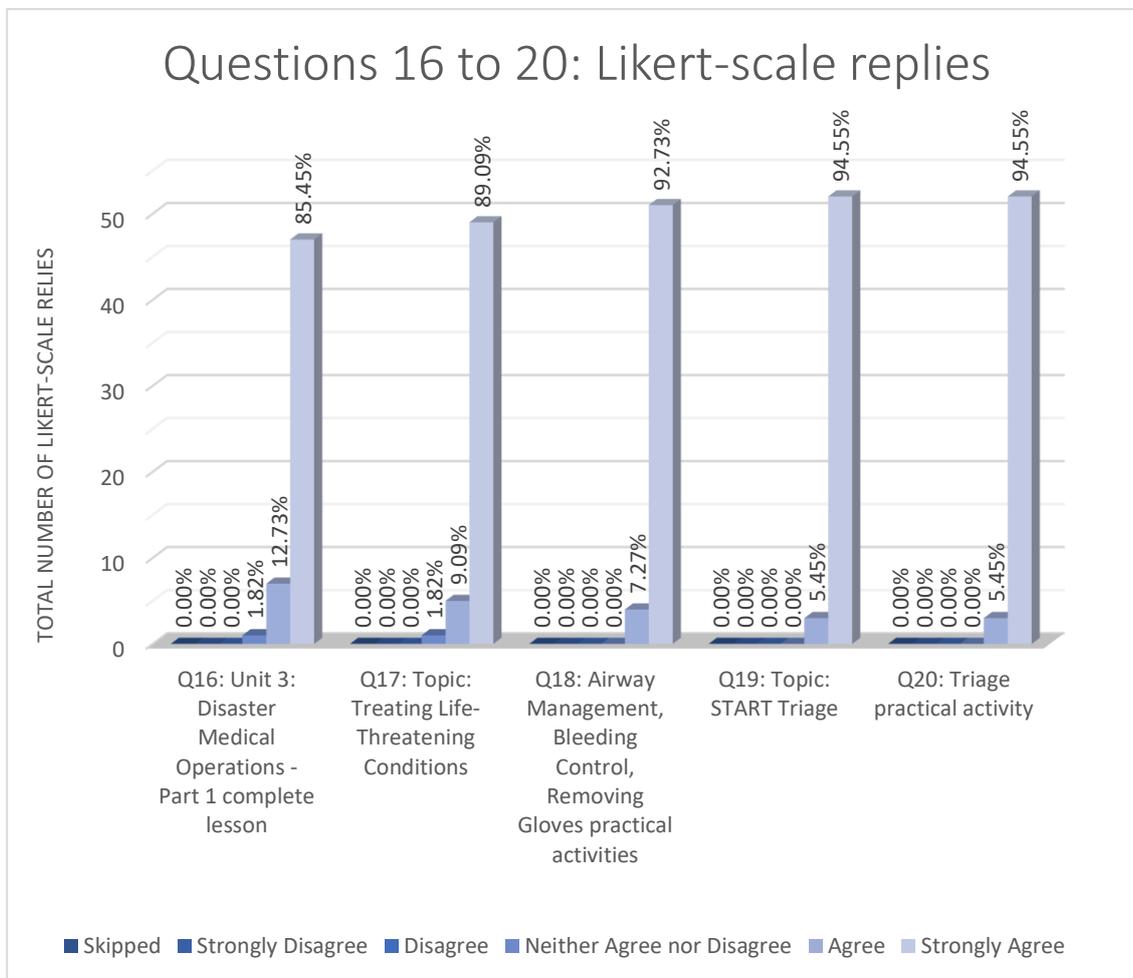


Figure 12: Summated Likert-scale replies to questions 16 to 20

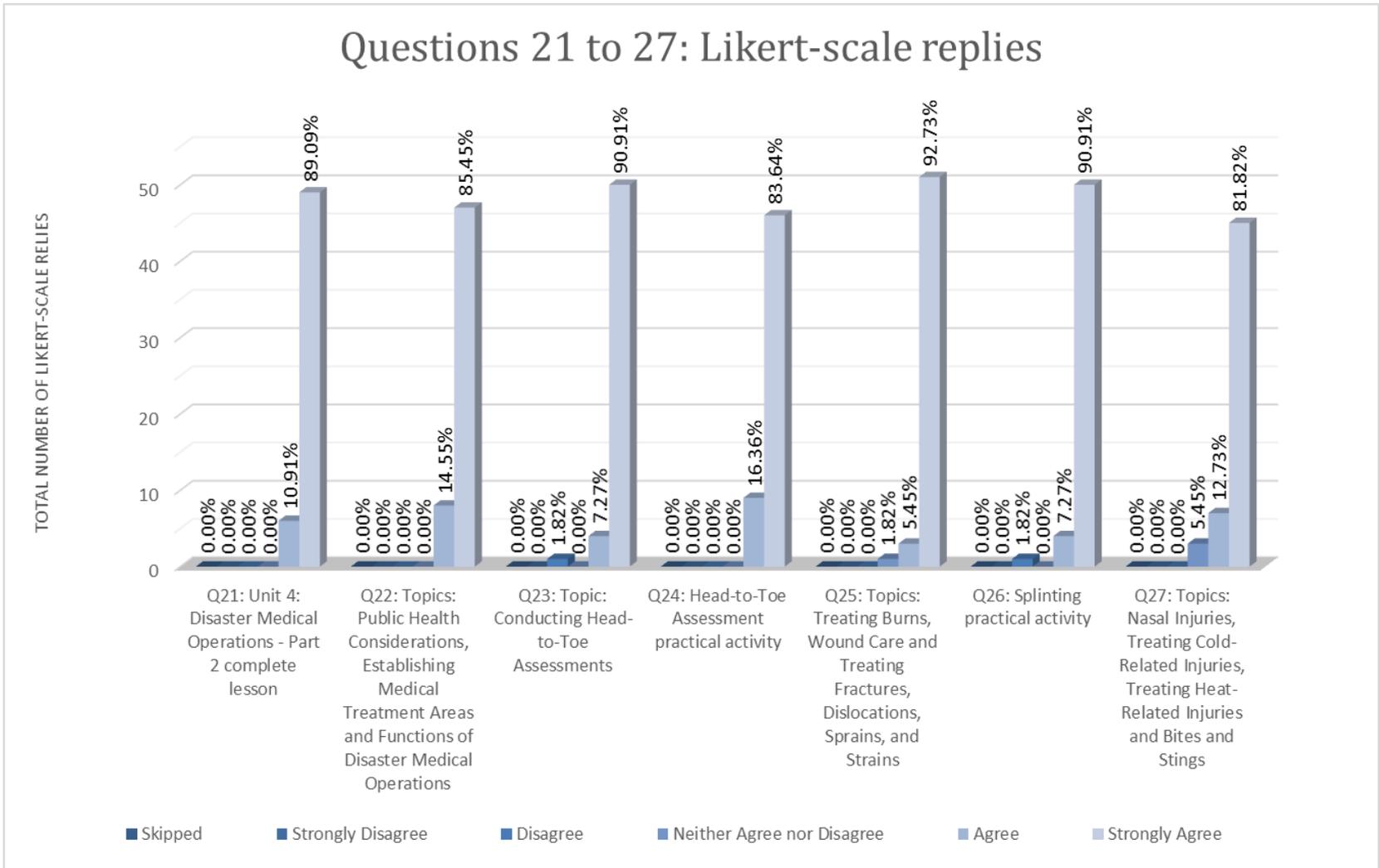


Figure 13: Summated Likert-scale replies to questions 21 to 27

6.2.6. Unit 4: Disaster Medical Operations - part 2

Unit 4 obtained the third highest evaluation from the respondents, with an approval rating of 97.14% and a z-score of 0.8639. Figure 13 displays the summated Likert-scale replies to the seven questions that pertained to this unit, with the first aid portion of the module represented by Question 25 receiving the highest grade of 98.18%. Question 23, regarding the head-to-toe secondary patient assessment, and Question 26, relating to the practical splinting activity, were tied in second place at 97.45%, with Question 22, which covered the Medical Treatment Area and public health considerations, in third place with 97.09% approbation. The lowest score was obtained by Question 27, which related to the treatment of heat- and cold-related injuries, stings and bites, and nasal injuries, and attained an approval rating of 95.27%.

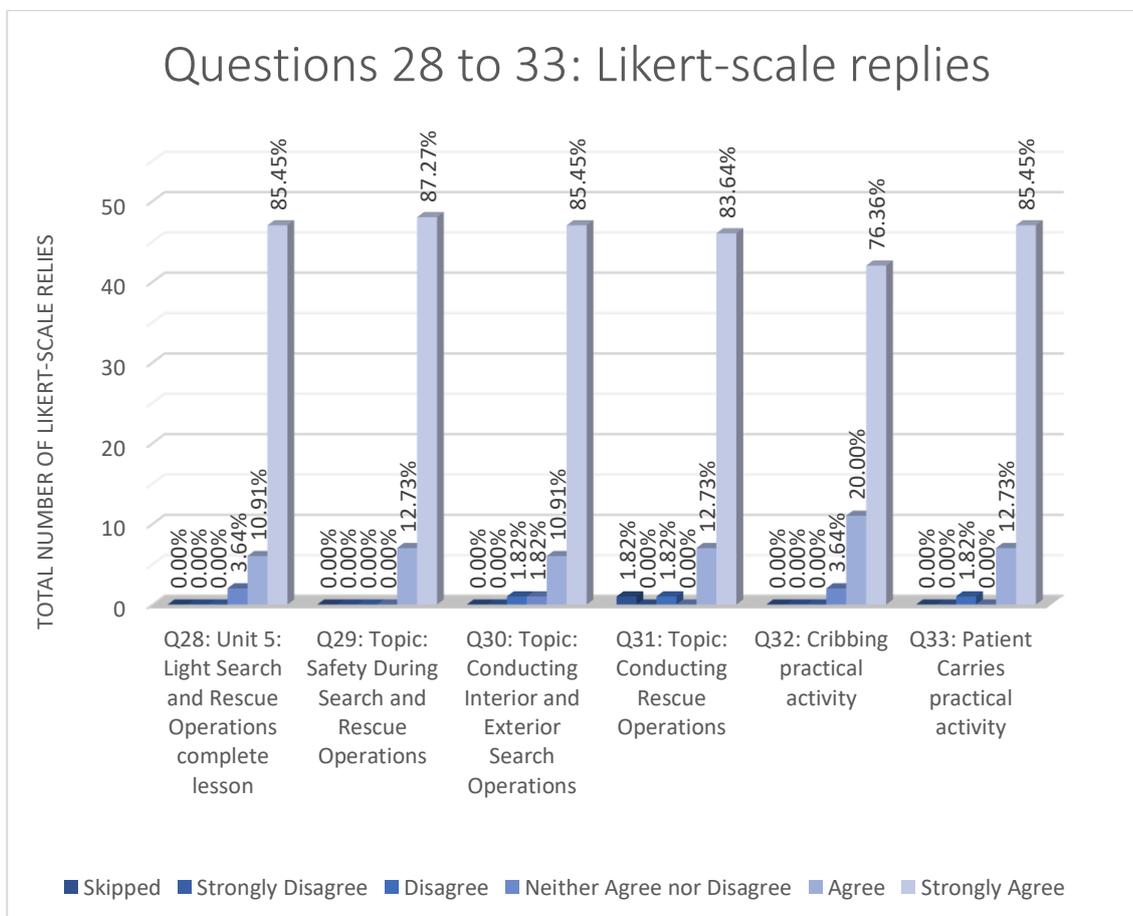


Figure 14: Summated Likert-scale replies to questions 28 to 33

6.2.7. Unit 5: Light Search and Rescue Operations

Unit 5 was awarded sixth place out of the nine modules in the CERT course, with a z-score of 0.2488 and an approval rating of 95.88%. Figure 14 presents the summated Likert-scale answers to the questions associated with this unit. Question 29, regarding safety precautions, received an approbation grade of 97.45%, followed by Question 33, representing the practical victim removal activities, at 96.36%, and then Question 30, which was related to the teaching on interior and exterior searches and obtained an approval rating of 96.0%. The practical cribbing activity, covered by Question 32, and the teaching about rescue operations referenced by Question 31, both obtained a grade of 94.55%.

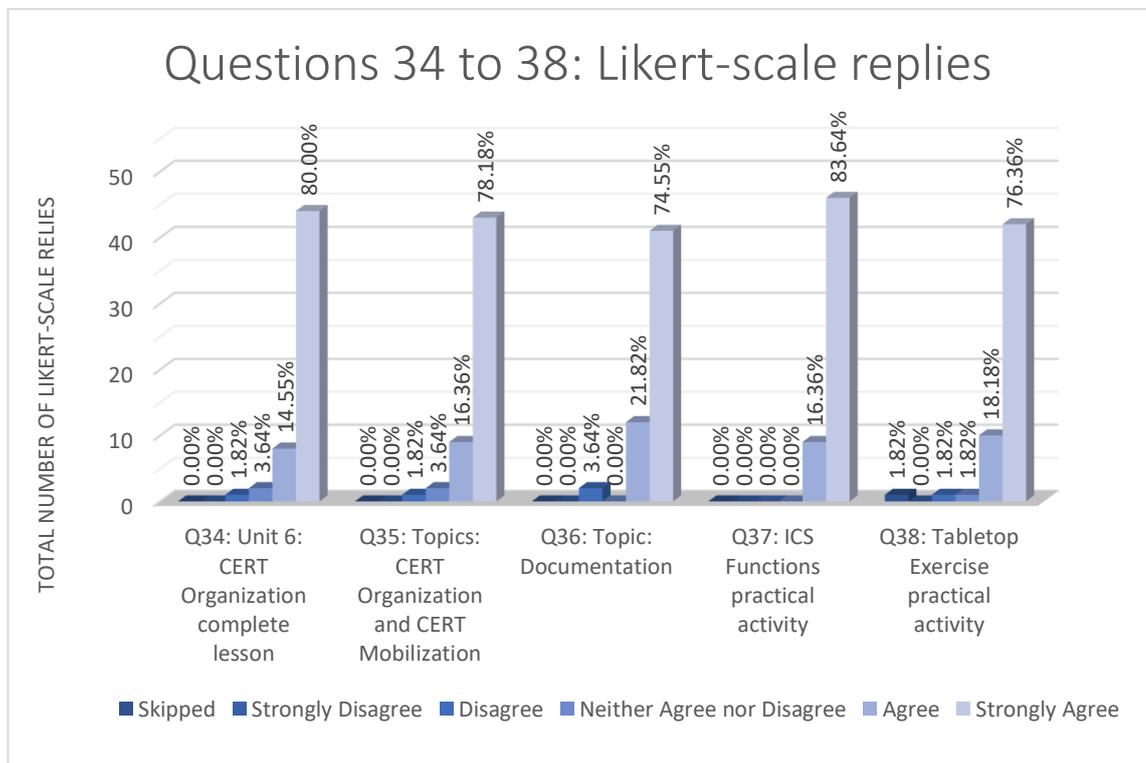


Figure 15: Summated Likert-scale replies to questions 34 to 38

6.2.8. Unit 6: CERT Organisation

Unit 6 appeared in third place in the overall evaluation of the CERT units with an approval rating of 94.33% and a z-score of -0.5061. As shown by Figure 15, the highest ranking was given to Question 37, regarding the Incident Command System practical activity, at 96.73%, which was followed by Question 35 that

covered the teaching about CERT organisation and mobilisation and obtained an approval rating of 94.18%, whilst the desktop exercise represented by Question 38 received the lowest score of 92.73%.

6.2.9. Unit 7: Disaster Psychology

With 97.73% approbation and a z-score of 1.1483, Unit 7 obtained the second-highest grade of the questionnaire (Figure 16). Question 42, relating to working with survivors' trauma, received the highest score of 98.18%, followed by Question 41, regarding team and responder wellbeing, at 97.82%. Due to the small size of the module, which takes 45 minutes to complete, only three topics were analysed in the survey.

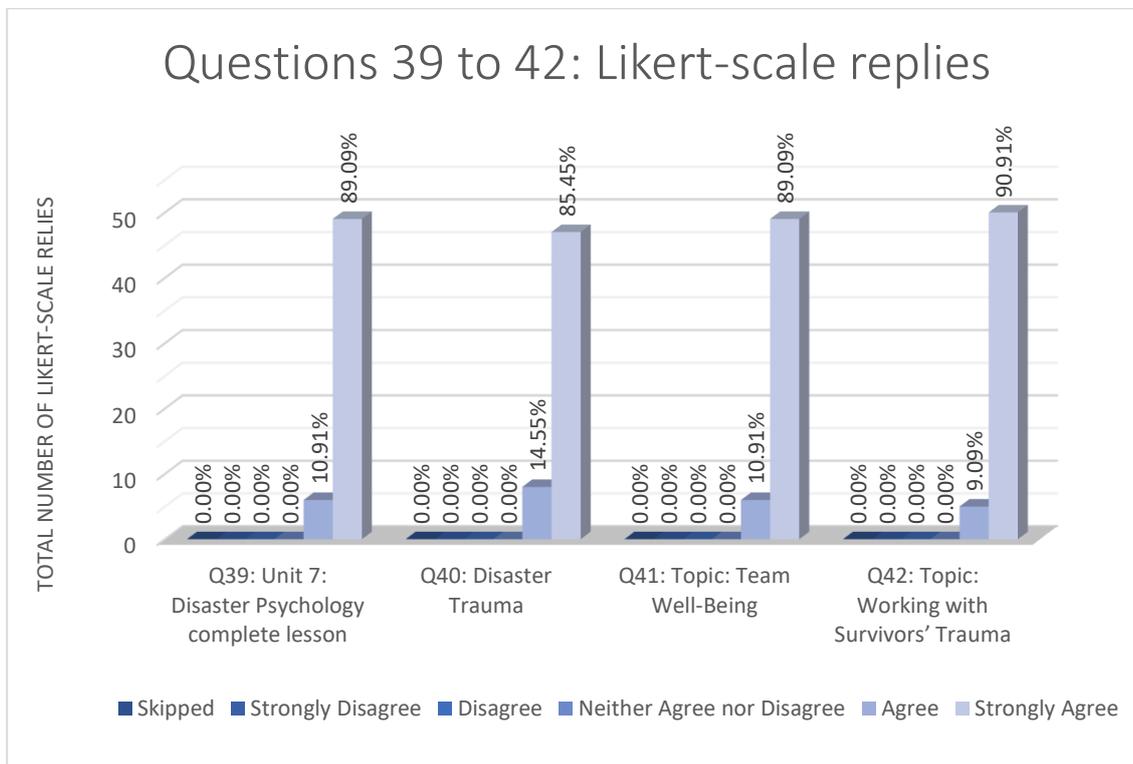


Figure 16: Summated Likert-scale replies to questions 39 to 42

6.2.10. Unit 8: Terrorism and CERT

Unit 8 was the lowest-ranked unit of the course with 91.03% approval and a z-score of -2.1104, and Figure 17 shows the aggregated Likert-scale scores of the questions related to this lesson. Question 45, concerning the teaching on terrorist targets and weapons, was given the lowest approval rating at 90.18%, while the highest score went to Question 44, regarding the definition of terrorism, with 92.36%.

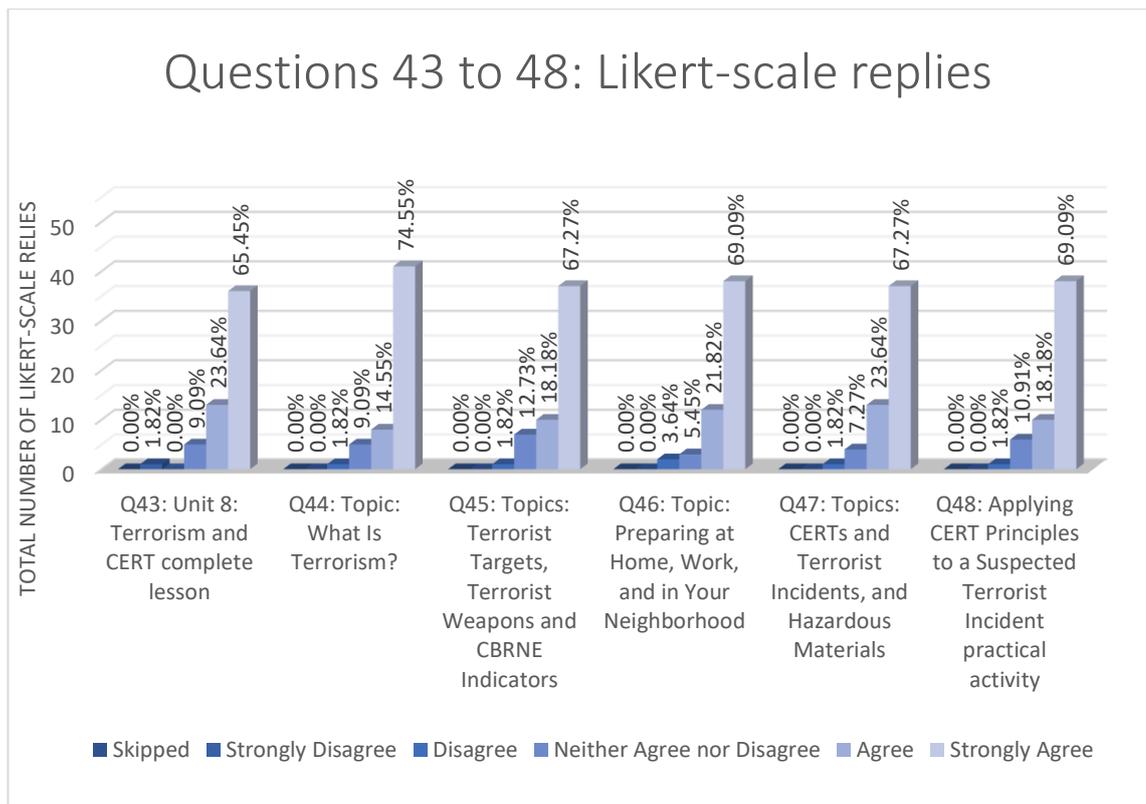


Figure 17: Summated Likert-scale replies to questions 43 to 48

6.2.11. Unit 9: Course review, final exam, and disaster simulation

Unit 9, which covered the post-test, course review, and final simulation, tied with Unit 2 with an approval rating of 94.91% and a z-score of -0.2230. Figure 18 presents the summated Likert-scale grades for the individual questions that represented this unit, with the highest overall approval rating of 97.45% being awarded to the simulated exercise denoted by Question 52, and the lowest score of 90.18% belonging to Question 51, which related to the final exam.

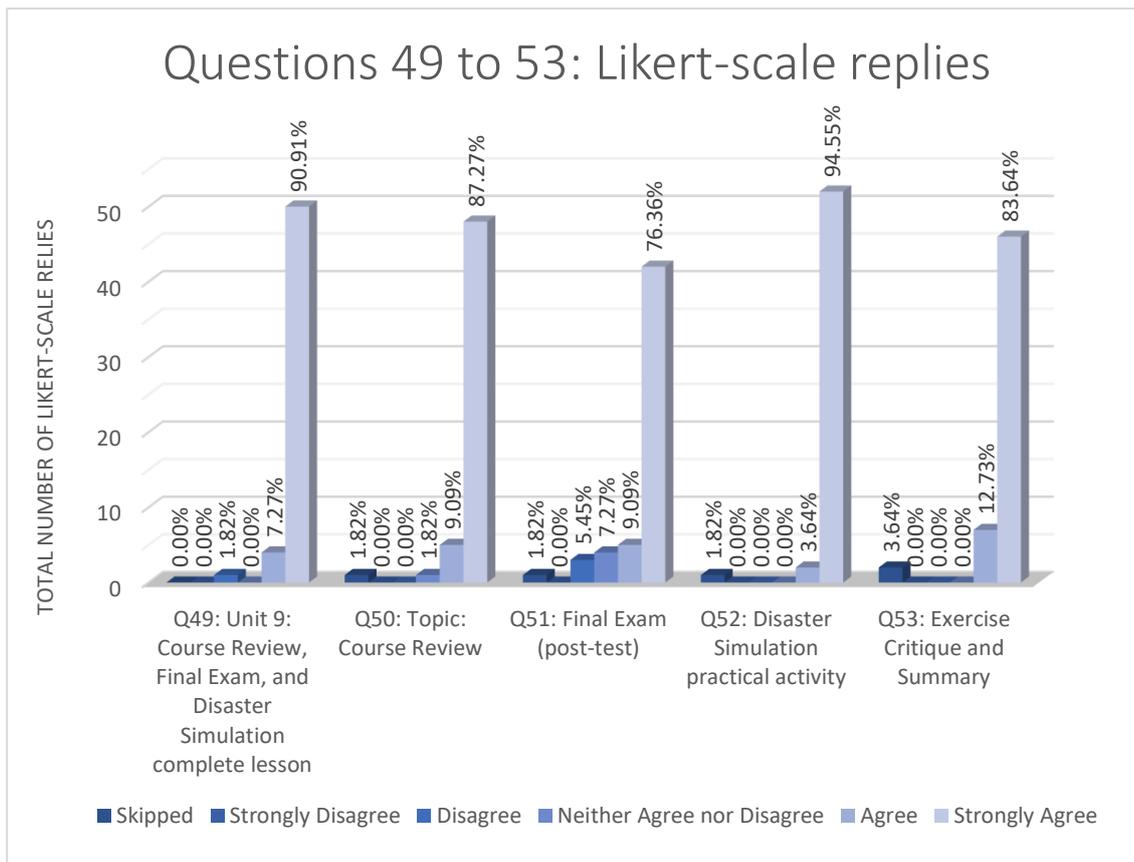


Figure 18: Summated Likert-scale replies to questions 49 to 53

6.3. Analysis of the interview data

The transcripts of the standardised open-ended interviews were evaluated using a six-step thematic analysis process (Braun & Clarke, 2006; Braun et al., 2019). Following the translation into English of the Portuguese-language interviews, the transcripts were then examined in the familiarisation phase, and a total of 87 codes were initially assigned to the text using the QDA Miner Lite software. After further analysis of the transcripts, some of the text was recoded and several codes were merged, resulting in a final total of 73 textual analysis codes. In the third stage of the process, the initial themes were generated from the three research questions that underpin this investigation, which were reviewed and revised in the fourth phase. These themes were then graphically mapped and organised into a hierarchy of themes and sub-themes in the next stage, and will now be explored and explained in this final phase of producing a written report about the data obtained from the interviews, which will continue in the following chapter with the discussion and integration of all of the data acquired during this research project.

The open-ended interviews used a standardised set of questions which led automatically to the development of one of the themes, regarding the interviewees' evaluation of the CERT curriculum, and provided the basis for two other themes that relate to recommended changes to the CERT course and suggestions for implementing and maintaining a CBDRT programme, with the sub-themes that were generated for these two themes being discovered during the analysis process. Three other themes also became apparent at this stage, which correlate to the informants' involvement with the CERT programme, their personal impressions of the training, and the perceived benefits of the CERT model.

The six major themes, and, where appropriate, the associated sub-themes, are illustrated in Figure 19, and the number of different codes and the total number of code instances for each theme are depicted in Figure 20. The list of the 73 codes that were assigned to the interview transcripts is presented in Appendix 4, along with the number of times that each code was utilised and the number of cases in which it appeared. It can be seen from these statistics that multiple codes were simultaneously allocated to some portions of the transcripts.

Each of the major themes will be described in detail in the following sections of this chapter. The first theme portrays how the interviewees became involved with the CERT programme and was extracted from information that was obtained to validate their status as key informants but which also helps to provide a “rich thematic description” of the interview data set (Braun & Clarke, 2006, p. 11), whilst the second theme focusses on their evaluation of the CERT training curriculum. The third theme expresses the informants’ personal impressions of the CERT training, which presents insights into their “lived experiences” as CBDRT course participants (Braun et al., 2019, p. 850), and the next two themes offer suggestions for adapting the training curriculum for the interviewees’ cultural contexts and for ensuring that CERT projects are sustainable over the long term. The final theme encompasses the perceived benefits of the CERT programme that were articulated by the key informants.

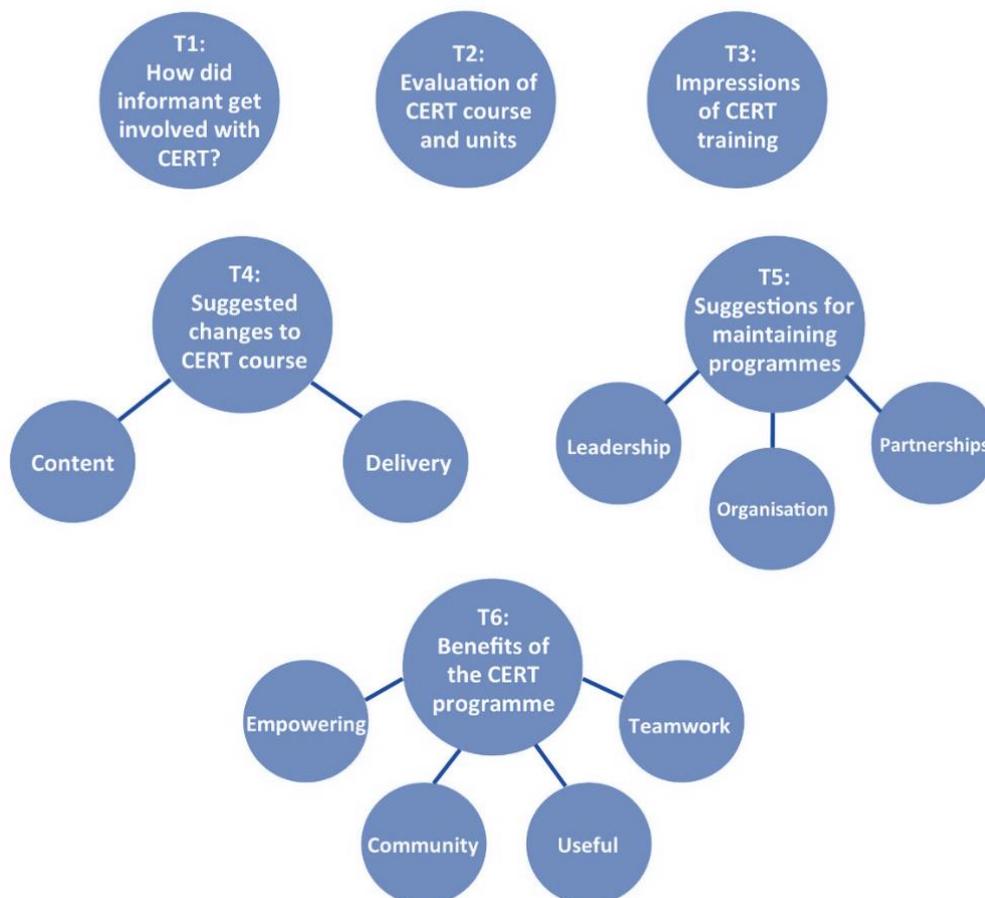


Figure 19: Themes and sub-themes that emerged from the interviews

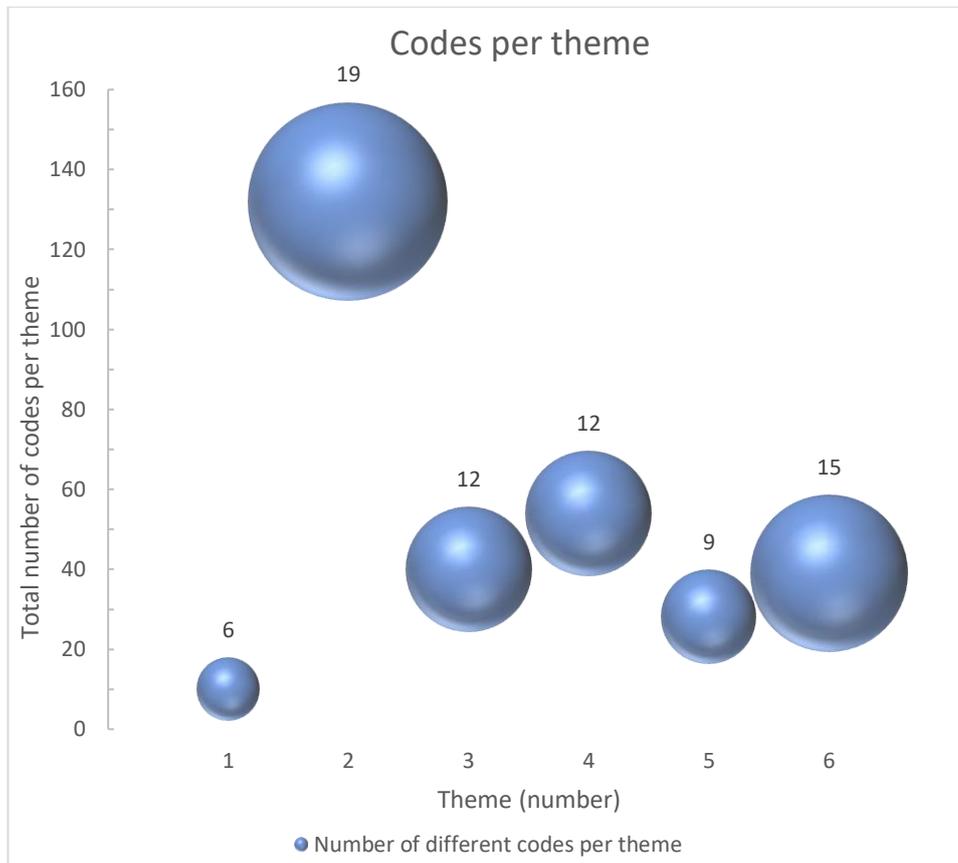


Figure 20: Total code count and number of different codes per theme

6.3.1. Theme 1: How did the informant get involved with CERT?

Theme 1 was represented by six different codes with a total of 10 instances, with three of the seven respondents (42.9%) indicating that they were involved with a CERT programme since they were young, two reporting that they had taught CERT courses as instructors, and two stating that they had accompanied the development of CERT teams. In addition, one interviewee affirmed that they developed an interest in community disaster preparedness before taking the CERT course, and another indicated that they first participated as a victim in a training exercise and later joined a CERT team.

Here are some quotations from the interviews relating to Theme 1:

- “My experience with CERT was since I was little and I lived there in a community in Friburgo, Cordoeira, and I met CERT. We participated as victims, in a simulation first and then I joined the team, did the training,

took the CERT course and then, later, I also participated in the team.”

(Informant A)

- “I had the great opportunity to get to know the CERT programme in 2011 during the disaster in the mountainous region, where we were able to get to know this partnership with this CERT programme in order to train communities vulnerable to disasters in CERT training, that is, the groups, Community Centres for Civil Defence, learning how to work in emergency prevention and response through the techniques and tools of CERT Brasil.” (Informant B)
- “I had actually had a desire to look into what communities can do to come together long before I even got to the school.” (Informant D)

6.3.2. Theme 2: Evaluation of the CERT course and its components

The second theme was represented by 19 different codes and related to both Research Question 2 and the second interview question, where the informants were asked for their appraisal of the usefulness of the various topics and components of the basic CERT course. Although specific observations will be presented in the next chapter, it is significant that all seven of the interviewees commented on the whole CERT course, Unit 7 about disaster psychology, and Unit 9 and the final simulation, with the other units being mentioned by six of the informants, with the exception of Unit 8 on terrorism, which was cited in five of the interview transcripts.

An evaluation of very useful, very good, or excellent appeared in five of the seven interviews (71.4%), while the code relating to an assessment of useful or good appeared 17 times in total, distributed throughout five of the transcripts. Four informants stated that they had no criticism or suggestions for change for a specific course element, while the same number affirmed that CERT is a good programme model. However, three interviewees declared that segments of the course were not relevant to their country, and the same number indicated their belief that a specific course component would be more important for another nation.

The following quotes from the interview transcripts refer to Theme 2:

- “Yeah, that doesn't make much sense for people in Brazil. Maybe Americans like it more, are more afraid of terrorism than we are.” (Informant A)
- “Yeah. That was really helpful, really helpful. I think that those things are going to be lifelong life lessons.” (Informant D)
- “The final simulation was really good. Like I said again the theory backed up by practical just works well and the simulation putting everything together from unit one right through to the end unit and putting it into practice, kind of like just ended off the whole process perfectly.” (Informant E)
- “So, it is actually a pretty good, pretty good program.” (Informant F)

6.3.3. Theme 3: Informants' impressions of the CERT training

The third theme was identified during the analysis phase and encompassed the interviewees' personal observations of the training experience, rather than their assessment of the course components, which was covered by the second theme. Five out of the seven informants stated that they liked the practical activities, with a similar number affirming that the exercises demonstrated how the CERT training works in practice. The observations that training was relevant and practical, and that it related to an important life skill, were both expressed in three of the interviews. Although two of the interviewees affirmed that they felt comfortable with the material that had been taught, there were also two cases each of respondents indicating that they were worried or unsure about the subject matter presented, not sure if they would be able to apply the training in real life, or that they had never encountered that topic before.

The quotations below are illustrative of respondents' descriptions of the third theme:

- “I think I do not know another program that approaches this way and has this outreach, also to take materials for people to practice, not everyone wants to invest in it, right? Having materials like that.” (Informant B)
- “Maybe it has to do with my own stress about the situation, and so I don't know how you, you know, an accident whether I'm involved in it or

someone else was involved in it. It's, you know, causes anxiety. Oh my gosh, what do I do? What do I do?" (Informant D)

- "I mean, I know how to go in and stop a fire. I know that I have to have a buddy, I know what the buddy system is. I know that I have to sweep and those are things that I won't forget." (Informant E)

6.3.4. Theme 4: Suggested changes to the CERT course

Theme 4 was derived from the third interview question, which is aligned with the first research question and enquires about the possible adaption of the CERT programme for use with vulnerable groups and communities. This theme was composed of nine specific suggestions represented by 12 different codes, which were subdivided into the two sub-themes of content and delivery. The most frequently cited recommendation for the content sub-theme, which appeared in five of the seven interviews, was the need to adapt the course material to local contexts. Four different informants requested that additional subjects be added to the curriculum, and four also commented on the need for increased cultural relevance for the material. Suggestions for improving the delivery of the training that were received included adapting the course materials for low literacy learners and becoming less reliant on computer-based PowerPoint presentations.

Both of the sub-themes of Theme 4 are illustrated in these quotations from the interviews:

- "Try to bring figures, an easier material for people, for illiterate people, for example, to be able to understand." (Informant A)
- "And the part of terrorism, of course, here is not a great threat in Brazil, and I suggest that CERT be able to adapt this unit to the contexts where they are, and seek, for example, if it is in Rio de Janeiro, in a favela, be able to contextualize about the trafficking, the violence, the war between factions, the stray bullets. In short, if you are in, depending on where you are you, address a type of issue, not just terrorism." (Informant B)
- "Again, I feel a lot of things I'm going to say like this one is, you've got to be adaptable to the reality of those countries. If we think about the favelas in Brazil, for example, where, of course, the infrastructure is not

the same as in a normal house in the United States. So, other times it is not even a house properly, it is a shack or something like that.”

(Informant G)

6.3.5. Theme 5: Suggestions for maintaining CERT programmes

The fifth theme was developed from the fourth interview question and the third research question, and encompassed recommendations for establishing and maintaining CERT programmes, grouped under the sub-themes of leadership, organisation, and partnership. The leadership sub-theme incorporated the codes relating to the importance of the leadership role, the need to train leaders, and the possibility of promoting CERT as a leadership development course, with the associated codes appearing a total of five times. The organisation sub-theme was composed of codes representing the need to obtain funding and resources, the necessity of regional networks of CERT teams, and an increased focus on promoting the CERT programme. It also included the subject of providing ongoing training for team members, which was mentioned in three interviews. The partnership sub-theme highlighted the necessity of working with public authorities, which was mentioned by four of the informants, and the importance of conducting CERT training in schools or other venues for young people, which was cited by three of the interviewees.

The following quotations from the interview transcripts illustrate the three sub-themes of Theme 5:

- “Also, since CERT came here, was in Mariana, trained 500 people, CERT has to have some instrument to ensure that these people remain in the CERT network. It can be through the internet, through membership or WhatsApp, but the fact is that CERT has to invest in the search, in the maintenance of these volunteers who have been trained by CERT.”
(Informant B)
- “Our generation, your generation, we still have these things in the back of our minds but the younger generation I think it should actually be part of the curriculum, where they're actually, that they're aware of these kinds of things, that they are aware of these are the kinds of things that can happen.” (Informant E)

- “And then at that point in time for the people that come to training then we can actually start putting them, at least looking for pulling out and extracting your incident commanders, your team leaders, your assistant team leaders and so building little teams within sight of that. So we know that when we have a deployment we already have that established instead of having to wait until actually the people show up on the scene.”
(Informant F)

6.3.6. Theme 6: Benefits of the CERT programme

Theme six emerged from the analysis of the interview transcripts and defined what the respondents perceived to be the benefits of the CERT programme. This theme was represented by 15 separate codes and was divided into four sub-themes. The sub-theme of empowering encompassed codes that affirmed that CERT empowers people to be agents of change or that the interviewee felt empowered by the course, both of which appeared two times; the declaration that the respondent utilised the CERT training following the course, which was indicated by two informants; and the understanding that CERT graduates are equipped to help people, which featured in four of the interviews.

The community sub-theme was composed of four different codes, each of which was present in two of the interview transcripts, and represented the concepts that people are not prepared for disasters, that the CERT training was shown to be necessary for a community following a disaster, that the training helps people think differently about disasters, and that the CERT programme was needed in the respondent’s own community or country. The sub-theme of usefulness comprised five different codes, with the importance of the safety procedures and the protocols that were taught both being cited in three interviews. The final sub-theme, which focussed on the teamwork element of CERT, asserted that the course teaches teamwork and the programme creates a sense of community, with the relevant codes appearing a total of three times.

Citations from the interviews, representing each of these sub-themes, are as follows:

- “We have riots, we have fires, a lot of fires. We've actually just recently had one and the first thing that came to mind was where's my emergency

kit kind of thing. So it's making, it's creating an awareness of being alert and ready should a crisis arise.” (Informant E)

- “Soon after the tragedy in 2011 we saw that we had really used the training, that practically the entire population was lacking that training and we had that foundation.” (Informant C)
- “So, we brought in, because we had people in the class that were actually at Ground Zero after Fuego and they are still dealing with the effects, but they didn't know what they were dealing with. But until this class, until that block of instruction came, they were like, a light bulb came on, ‘hey they're talking about me’, now that's what they're thinking, ‘the instructor is actually talking about me.’” (Informant F)
- “It was not the nice stuff that we used to have, what it actually did was that active conversations, deployments, you know, debates and discussions that made me realize that there was a community beyond the bubble that I had formed within my mind and within myself. I was able to get out of the bubble and realize that there was a world beyond that.” (Informant G)

6.4. Analysis of the textual questionnaire data

The themes that have emerged from the interview transcripts and from the comments provided by the questionnaire respondents are combined during the final phase of thematic analysis through a “scholarly process of making connections to existing research and literature on the topic of interest, and weaving this in to the written results and discussion” (Braun et al., 2019, p. 857). The process of final analysis of the research data was initiated in the previous section with the description of the themes from the interview transcripts, will continue in this section that examines the questionnaire comment field, and will terminate with the elaboration of the discussion in the following chapter of this thesis.

The 28 valid comments that were received from the online questionnaire were loaded into the QDA Miner Lite software and coded using the same codes that had been developed for the interview transcripts. The need for another code

was discovered during the coding process, and one was created to represent the necessity of spending more time on the course or a unit thereof, with this code being included under Theme 4, relating to suggested changes to the CERT course.

An illustration of the 25 different codes utilised for the survey comment field, out of a total of 59 code instances, is depicted in Figure 21. It shows that 23 of the code instances (39%) related to Theme 2 and referred to the respondent's assessment of the CERT course or units thereof, 18 of the code instances (30%) were associated with Theme 4 and contained suggested changes to the course, and 10 codes (17%) represented Theme 5, which encompassed recommendations about establishing or maintaining a CERT programme. Appendix 5 contains the full list of the codes that were used during this process, sorted under their respective themes.

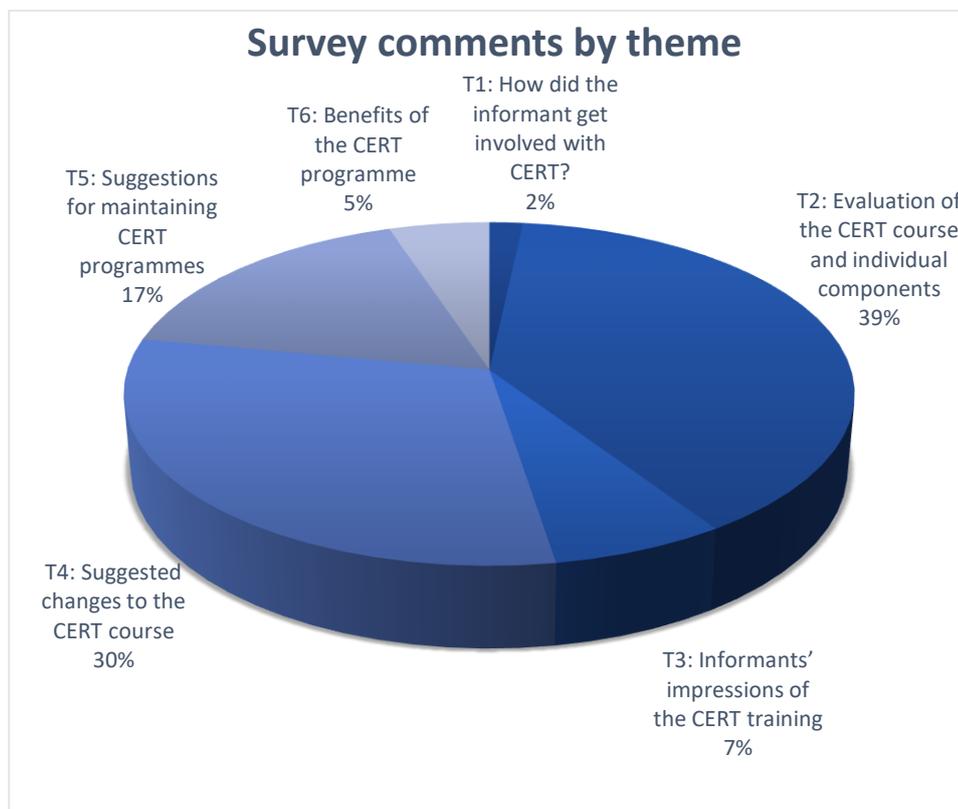


Figure 21: Survey comment codes by theme

The following quotations represent the three major themes that were identified from the survey comment field:

- “Unit 4 Medical Operations, this unit should have been given more time. I believe that CERT members should learn how to treat a victim. It should not be just at the basic level.”
- “Cert training was amazing d techniques being use makes a lot of sense, I learn that is triage is very important.”
- “I would also recommend that if there will be any follow-up training for the team so that we can develop our skills to save lives.”

6.5. Summary

This chapter presents the data collection instruments that were used to obtain the information from the online questionnaire and the key informant interviews, and discusses the reliability and validity of the data obtained. The Likert-scale data that was contained within the 55 replies to the online questionnaire is summarised in a variety of formats, organised within the topics contained in the survey. The transcripts from the seven key informant interviews that were processed using thematic analysis techniques, along with the themes and sub-themes that were developed, are discussed with the support of relevant quotations from the interviews. Finally, the 28 free-text comments that were obtained from the questionnaire and deemed to be relevant to this research were also analysed and are described, together with appropriate citations from these observations.

The next chapter will discuss both the literature that has been reviewed and the data that has been obtained with the objective of providing answers to the three research questions that have guided this investigation. It will also examine the suitability of the CERT programme model for utilisation with vulnerable communities and developing nations.

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7. Discussion

This chapter discusses the results that were obtained from the literature review and from the research that was conducted. The discussion is underpinned by the research objectives defined in Section 1.5 of this thesis and is organised around the three research questions. These questions, which were presented in Section 1.4, are as follows:

1. How can CBDRT training courses be adapted for vulnerable groups, including adolescents, the poor, and communities that have been impacted by natural or technological disasters?
2. What topics and practical activities would be most useful for such training?
3. How can Community-Based Disaster Response Teams in these communities be implemented and made sustainable for the long-term?

The themes and sub-themes that emerged from the thematic analysis of the interview transcripts and questionnaire comment field, along with the statistical analysis of the Likert-scale replies to the survey, will form the basis for the following discussion. The summary of the research data will be supported by appropriate quotations from the interview transcripts and questionnaire comment field, and, where applicable, reference will be made to published material that was presented during the literature review portion of this study. Finally, the applicability of the CERT programme for use with vulnerable groups and developing nations will also be examined.

7.1. Research Question 1

The first research question asks how CBDRT training courses could be adapted for developing nations and vulnerable groups, including adolescents, the poor, and communities that have been impacted by natural or technological disasters, and, in alignment with the structure of this investigation, uses the FEMA CERT programme as a case study. The following topics that emerged from the research findings and literature review provide possible answers to Research Question 1.

7.1.1. Offer CBDRT training for adolescents

Theme 1 shows that three of the key informants participated in Teen CERT courses as teenagers, Theme 5 reports that three of the interview participants and two of the survey respondents believed that CBDRT courses should be offered to youth, and Theme 6 reveals that two of the interviewees considered the training to be useful for young people. The Teen CERT programme, which has been modified from the basic CERT curriculum by the addition of further practical activities and the alteration of some of the exercises (Federal Emergency Management Agency, 2015b), has been found by researchers, including Black and Powell (2012) and Powell, Smith, et al. (2011a, 2011b), to be an effective instrument for teaching Disaster Risk Reduction awareness and skills to adolescents.

Key Informant G highlighted the value of his involvement with a Teen CERT programme in the following citation:

“I never actually realised how important it was to me when it comes to leadership acknowledgement and to realise that I was actually able to do something for my community and for myself and probably to others, to my neighbours or to neighbouring communities. I think that thinking about disasters is not something that a kid would like to think a lot, but I didn't care. I was excited that I was doing something, I realised that helped my cognitive abilities.”

7.1.2. Modify the training for non-literate learners

The need for training that has been adapted for non-literate learners appears under Theme 4 in both the interview transcripts and the survey comment field. The modification of the CERT material for use with impoverished communities, which often encounter a limited level of literacy amongst their inhabitants, was addressed by members of the New York Office of Emergency Management when they increased the number of hands-on activities and abandoned the use of the participant manual for a CERT course that was held for Haitian earthquake survivors (Federal Emergency Management Agency, 2011a). Similar changes to both the content and presentation of the basic curriculum were recommended by Burnett (2004) in a survey of Hispanic CERT courses,

and Informant A affirmed the need to provide the material in a format that was more accessible to non-literate learners and was less reliant on technology such as PowerPoint presentations.

7.1.3. Provide additional practical activities

The addition of further practical activities to the CERT training course also appeared under Theme 4 and was mentioned by four of the questionnaire respondents and two interviewees. Question five of the online survey asked whether the course contained the appropriate amount of practical activities and received an overall approval rating of 89.45%. When this result is compared to the following question, which related to the amount of theoretical content in the curriculum and obtained a score of 93.45%, it can be inferred that the participants were less satisfied with the quantity of practical rather than theoretical components in the curriculum.

7.1.4. Adapt the training material

The Content sub-theme of Theme 4 reflects the need to adapt the training material for the context where the course is held, which was mentioned by five of the key informants, and the necessity of the curriculum being culturally relevant, which appeared in four of the interview transcripts. Five of the questionnaire respondents also requested that further time be allocated to some of the topics, four of the interviewees and five of the survey respondents asked that additional material be added to the basic course, and two of the key informants suggested that specialist instructors be utilised to teach the disaster psychology unit. The need for the course material to be more frequently updated in order to incorporate the latest protocols was also mentioned by two of the interviewees and one of the survey participants.

7.2. Research Question 2

Research Question 2 relates directly to the basic CERT training course which has been used as the case study for this investigation, and asks what topics and practical activities would be most useful for Community-Based Disaster Response Team training. The Likert-scale questions from the online survey provide an insight into the respondents' perceptions of the utility of the various

components of the curriculum and show that 96.38% agreed or strongly agreed that CERT could be useful for their country or location, with Theme 2 likewise revealing an overwhelmingly positive evaluation of the individual units. The overall acceptance of the course was confirmed by the sub-themes of Theme 6 that described the training as being useful and empowering, with four of the interviewees asserting that they felt that they could assist other people after completing the course, an equal number affirming that CERT was a good model or programme, and two reporting that they had the opportunity to use skills learned after graduating from the basic training.

The following sections discuss the nine units of the basic CERT curriculum with a view to identifying the topics and activities that may be most applicable for CBDRT training for developing nations and vulnerable groups.

7.2.1. Unit 1: Disaster Preparedness

Unit 1 received an overall approval rating of 94.27% in the questionnaire, with the three main topics of community preparedness, home and workplace mitigation and preparedness, and CERT organisation and operation all receiving approval scores between 92.36% and 96%. Six of the seven interviewees commented favourably about this module, with Informant C describing the preparedness process as “when we literally face or start to think about how to formally prepare for that disaster”, and Informant D defining it as “the tool kit, that’s all the stuff that we need right now”.

Although most of the material covered in Unit 1 appears to be important and relevant, both Informant B and Informant E highlighted the distribution of the Personal Protective Equipment (PPE) as being especially significant for the participants. The use of PPE throughout the course helps to reinforce the importance of the CERT safety protocols and gives the trainees the opportunity to practice using the minimal protective equipment that would be required in the event of a real-life team deployment.

Unit 1 may require significant modification in order to become relevant to the local context where the CERT course is being taught, as highlighted by Theme 4. Such changes could include the definition of the local emergency management plans and warning procedures, the CERT team deployment

protocol, and the means of integration and communication with emergency management authorities. Issues such as local liability laws and health and safety requirements may also need to be investigated and incorporated into this module, while items that are specific to the United States, such as mitigation practices for mobile homes, federal flood insurance, and the Citizenships Corps programme, could be removed or replaced.

7.2.2. Unit 2: Fire Safety and Utility Control

The second unit, regarding fire safety, was also mentioned by six of the seven interviewees, who all considered it to be an important topic, and it was awarded an overall approval rating of 94.91% in the questionnaire. The practical fire extinguisher training activity was the most highly esteemed part of this module, with the teaching on hazardous substances being deemed the least relevant by the survey respondents. The topics about fire chemistry, scene size-up, and firefighting resources and procedures were given mid-range evaluations, which showed they were also regarded to be important subjects in the lesson.

The advantages of offering a practical fire extinguisher activity were mentioned by five of the interviewees, with Informant C highlighting how this training was an important life skill for the course participants. Informant F also affirmed the validity of this exercise, and stated that he considered that it was more important for the members of the CERT courses in Guatemala, who had not received prior training in the use of fire extinguishers, than for Americans who are more familiar with the operation of such equipment. Rush et al. (2019) emphasise the importance of fire prevention measures amongst vulnerable populations in their contribution to the *Global Assessment Report on Disaster Risk Reduction* (GAR 2019), affirming that more than 95% of the over 150,000 people that die each year from fires or burn-related injuries are in low- and middle-income countries, with the residents of informal settlements such as slums and refugee camps being especially at risk for trauma, injury, or death from fires.

Theme 4 reveals the need for the CERT training to be culturally relevant and adapted for the local context, and, although not specifically mentioned by the participants in the interviews or questionnaire, the fire extinguisher training may

be irrelevant for some communities where such equipment is not readily available and could possibly be substituted by an alternate firefighting exercise. Other components of this unit that may require adaption include the teaching on the classes of fire, which cites the United States categories and may need to be modified for other countries' standards, the contents and colours of the different models of fire extinguishers, and the procedures used to summon the assistance of the emergency services.

7.2.3. Unit 3: Disaster Medical Operations 1

Unit 3, which is the first of the two Disaster Medical Operations lessons, received the highest overall approval rating of 98.11% from the questionnaire respondents, and was also favourably mentioned by six of the seven key informants and two of the survey participants. Informant A and one of the questionnaire respondents both highlighted the need for the protocols that are taught to be updated frequently, and Informant G indicated that some of the course participants in Brazil might have required further instruction in order better understand this unit. However, the START triage practical and theoretical components were both awarded the highest level of approval in the survey, followed by the practical activities of airway and bleeding control and glove removal, and, in third place, the theoretical teaching about basic life support procedures.

As this unit contains a significant amount of practical activity, it can be further customised for Teen CERT classes by the use of CPR mannequins for the initial assessment and airway practice, and by the utilisation of stuffed animals for the triage exercise, with such modification of the curriculum having also been favourably received by adult course participants, as mentioned by key informant E in their interview. Whereas the triage portion of this unit was highly esteemed by the course participants, it is also important to consider the possible need to update from the START protocol to the more modern SALT model (Lerner et al., 2010; Silvestri et al., 2017).

7.2.4. Unit 4: Disaster Medical Operations 2

Unit 4 was also highly regarded by both the survey respondents and the key informants, with an overall approval rating of 97.14% in the questionnaire. The

topic about general first aid procedures relating to burns, wounds, and fractures was rated highest by the survey respondents, followed by the teaching on the head-to-toe secondary assessment and the splinting activity, then the secondary assessment practical activity, and finally the other first aid topics such as heat and cold-related conditions.

Once again, one of the interviewees requested that this teaching segment be updated with more recent protocols, and Informant E and two of the questionnaire respondents also recommended that further material be added, or additional time allocated, to this unit. As the FEMA CERT training is intended to complement rather than replace a basic first aid course, it must be recognised that vulnerable groups or people in developing nations may not have access to such training, and that, consequently, the CBDRT course may have to include more information about basic first aid, such as CPR and choking procedures.

Another essential component of Unit 4 relates to the operation of a Medical Treatment Area, which is an important task for CBDRTs in communities that may be isolated for three days or longer in the event of a major disaster. Although this subject is beyond the scope of a standard first aid course, researchers such as Simpson (2000) have shown that it is an important capability for Community-Based Disaster Response Teams, especially in remote or vulnerable areas.

7.2.5. Unit 5: Light Search and Rescue Operations

As 85% to 90% of rescues are performed by those who are initially present on the disaster scene (National Research Council, 2006), it is imperative that Community-Based Disaster Response Teams are equipped with sufficient training and equipment to be able to safely perform this task. Unit 5 of the basic CERT course covers Search and Rescue and patient extrication and transport, and received an overall approval rating of 95.88% from the questionnaire respondents. The subject of safety during Search and Rescue operations was given the highest score, followed by the practical patient transport activities, and the teaching on interior and exterior search procedures. The theory about conducting rescue operations and the practical cribbing exercise both received the lowest, yet still considerable, grade of 94.55% approval.

Six of the key informants that were interviewed indicated that they considered this unit to be helpful or significant, with Informant A affirming that “it's the best, the best unit, the coolest of all, it has the most practical activity”, and Informant E observing that “I think the nice thing is that people who think they can't do anything, I think realize that they can help”. The importance of the safety information contained in this unit was also highlighted by Informant C, who stated that “it is that care not only to try to help, but to be careful with the structures in general, to know how to relate and enter certain spaces, structures, with safety and search efficiently for lives”, and Informant B observed that it is essential that the participants are taught not only to use rescue equipment, such as long-board stretchers, but also to improvise patient transport using chairs or blankets when necessary.

Adaptation of the unit, as suggested by Theme 4, could include the utilisation of more modern Search and Rescue techniques, such as the demarcation of hazardous areas on-scene and the use of automotive jacks instead of wooden cribbing for victim extrication (United Nations Office for the Coordination of Humanitarian Affairs, 2015a). It could also be advantageous to present some of the International Search and Rescue Advisory Group's protocols, including the whistle codes for scene silence and emergency evacuation, and the structural marking symbols (United Nations Office for the Coordination of Humanitarian Affairs, 2015b).

7.2.6. Unit 6: CERT Organisation

Unit 6 is one of the more theoretical lessons in the basic CERT course as it covers team organisation, the Incident Command System (ICS), and CERT documentation, yet it received an overall approval score of 94.33% from the survey respondents. The ICS practical activity was the highest-rated component of the unit, followed by the CERT organisation and mobilisation topic, the teaching about CERT forms and documentation, and the desktop exercise.

Six of the seven key informants commented favourably about Unit 6, with Informant C stating that “you're already starting to think in a collective way, how the teams are formed, how they start, how you pass the responsibility later to a greater service, a public service, a general authority”, and Informant G affirming

that “when it comes to teenagers it actually helps a lot them to understand.... they like being in positions of leadership, of helping others, and I think it actually helps them to have a sense of organization”. The introduction to the CERT forms is also important to ensure that the team’s activities and the Medical Treatment Area are well documented, and the use of these forms to identify all of the victims who were assisted, and to record where they were sent, could also help to prevent human trafficking incidents in post-disaster situations.

Unit 6 of the FEMA CERT course contains multiple references to the United States National Incident Management System (NIMS), which would need to be updated for other countries or contexts that use alternative incident management systems. Other important changes to Unit 6 could include modification of the team deployment protocol, and clarification of the communication and coordination procedures that would be utilised in partnership with local emergency management authorities. As the CERT course makes use of some of the standard FEMA NIMS forms, it may also be necessary to simplify and adapt the documentation that is provided to the teams.

7.2.7. Unit 7: Disaster Psychology

Unit 7 of the basic CERT course, which provides a brief introduction to disaster psychology, was given the second-highest evaluation of 97.73% by the questionnaire respondents, and was also one of only two units to be cited by all seven key informants in the interviews. Although the comments were all favourable, four of the interviewees and an additional two survey respondents asked that the unit be given more content and structure, with specific requests for dynamic activities and the possible use of specialised instructors to deliver the teaching. Although all of the topics were given very high evaluation scores, ranging from 97.09% to 98.18%, the subject of working with survivors’ trauma was ranked highest overall, followed by those of team wellbeing, and disaster trauma.

The importance of teaching disaster response volunteers to deal with the stress encountered in a deployment was mentioned by Informant F as he described the reactions of volunteers who had previously deployed to the 2018 Volcán de

Fuego volcano when they participated in CERT Unit 7, and by Informant G who recounted his own experience following the 2011 landslides in Rio de Janeiro. The value of such training for responders has also been confirmed by researchers, including Alexander and Klein (2009), Quevillon et al. (2016), and Thormar et al. (2013). In addition, Informant C commented about the importance of CERT members being able to provide Psychological First Aid to disaster victims, and the benefits of such interventions have been confirmed by Ruzek et al. (2007), Jacobs (2007), and Everly (2016).

7.2.8. Unit 8: Terrorism and CERT

Unit 8 received the lowest level of approval from the survey respondents, although the score was still a very positive 91%. The topic regarding the definition of terrorism received the highest grade, with second place being awarded to the teachings about preparing for terrorist incidents at work and home and about the CERT response to terror attacks, which were then followed by the practical activity regarding a terrorist response, and, finally, the material on terrorist weapons and targets.

Although one of the survey respondents reported that “the unit related to terrorism did not make much impact”, and Informant A stated in their interview that the amount of material could be reduced as this topic was not relevant to Brazil, Informant B recommended that the unit be adapted for other realities, citing the gang warfare and stray bullets that are often part of daily life in the Rio de Janeiro favelas. Key Informant E affirmed that the content of this unit was important for South Africa, and Informant F also stated that they had encountered significant interest in the subject when teaching the CERT course in Guatemala.

It does appear, therefore, that, despite receiving the lowest approval grade from the questionnaire, the topic of terrorism is still an important subject for a CBDRT course, although it could possibly be adapted to include active shooter or urban warfare situations in order to make it more relevant to international audiences.

7.2.9. Unit 9: Course review, final exam, and disaster simulation

The final unit of the basic CERT course, which includes the course review, post-test, and simulation, was awarded an overall approval rating of 91.91% by the

respondents to the questionnaire. The simulated exercise received the highest score of 97.45%, which was closely followed by the course review and exercise critique, with the post-test written exam being given the lowest approval rating of 90.18%.

The simulated exercise and the disaster psychology unit were the only CERT topics that were cited by all seven key informants, with the final exercise receiving a very positive appraisal. Informant A stated that “this is where everyone sees how a CERT team would function in a disaster situation”, and Informant C commented that “it's when you put together everything you've learned and that becomes something practical”. Informant D highlighted the importance of conducting the simulation in an environment that was unfamiliar to the course participants in order to maximise the impact of the experience, and Informants E and G and one of the survey respondents requested that more simulations be included throughout the course to provide further opportunities to apply the CERT training under practical conditions. The validity of simulated exercises for CBDRM initiatives is cited under Priority 4 of the Sendai Framework, with UNISDR affirming that “simulation exercises also promote a culture of disaster risk reduction including preparedness for effective response, as called for by the Sendai Framework for Disaster Risk Reduction” (United Nations Office for Disaster Risk Reduction, 2017a, p. 7).

7.2.10. Additional modules

The addition of further material to the standard course was requested by four of the key informants and five of the survey respondents, and is represented under Theme 4. Topics that could be added to a CBDRT curriculum include the recommendation by Mitrano (2004) that members receive instruction in mass care and shelter operations, the value of which is confirmed by the Kenai Peninsula Borough CERT team in Alaska that has assisted the Red Cross by operating shelters, including a pet shelter (Mohrman, 2012). UNISDR suggests that community response teams receive training in vulnerability and needs assessment, relief distribution, and shelter management, in addition to topics that are already included in the CERT curriculum, such as Search and Rescue, firefighting, and first aid (United Nations International Strategy for Disaster Reduction, 2008).

Informant G raised the possibility of teaching the basic course with a focus on leadership development, which could be provided through the inclusion of the CERT Tools for Leadership Success module. He also cited the need for discussing flood response during the search and rescue unit:

“I'm just thinking about when it comes to floods, it's harder to think about doing light search, right, light search and rescue, when it comes to floods it's a little bit more complicated and I don't really know if there is an actual explanation in that model about floods, you know, how to do it, for instance, if you have to do it.”

As the optional CERT Flood Response module focusses on mitigation measures such as sandbagging rather than Search and Rescue, a swiftwater rescue awareness course could also be appropriate to ensure the safety of CERT responders in such situations (Texas A&M Engineering Extension Service, 2019).

7.3. Research Question 3

The third research question asks how Community-Based Disaster Response Teams in vulnerable communities or developing nations can be implemented and made sustainable for the long-term. In alignment with Research Objective 3, the following sections of this thesis will discuss specific techniques and approaches that could be employed to ensure that such teams are successfully established and empowered for their continued sustainability.

Researchers such as Paton and Johnston (2001) and B.-Y. Lee (2010) highlight the difficulty that emergency management authorities encounter to motivate the general public to participate in disaster preparedness initiatives, and a related challenge is shown by the statistics that reveal a decrease in the number of participants in voluntary service in recent years (Garrels-Bates, 2018; McLennan & Kruger, 2019). Although this may appear to make the task of creating and maintaining CBDRTs more difficult in the modern context than it was in the past, both the literature review and the research portion of this

investigation have revealed three strategies that may help revert the trend of declining participation in volunteer-based disaster preparedness programmes.

7.3.1. Create youth-based CBDRT programmes

As is observed by Garrels-Bates (2018) in her research of CERT programmes, although participation by adults in voluntary projects has decreased in the United States in recent years, there has also been a corresponding increase in voluntarism by adolescents, which has been attributed to an increased emphasis on student participation in voluntary community service by many high schools, colleges, and universities. The success of the Teen CERT programme in the United States has shown that the provision of CBDRT training for young people is an important tool for motivating youth participation in Disaster Risk Reduction initiatives (Federal Emergency Management Agency, 2015b; Powell, Smith, et al., 2011b).

Delivery of the Teen CERT course for adolescents is often accomplished through integration with school curriculums, or as an additional course or extra-curricular activity, such as the two-day course held by the Nevada 4-H association (Powell, Smith, et al., 2011b). Theme 1 shows that three of the seven key informants in this investigation indicated that they first became involved in a Community-Based Disaster Response Team by participating in a Teen CERT course, and Theme 5 reveals that three of the interviewees and two of the questionnaire respondents also recommended the use of Teen CERT courses through the school system or other youth programmes, including Informant E who stated:

“I think for one it's important that the young children on high school level that they get introduced to it, that they are aware, because as they grow up they need to know how to be able to do these things.”

Research has shown that fully-functioning Teen CERT teams can provide a valuable emergency response resource to their schools or local communities (Black & Powell, 2012; Powell, Black, et al., 2011), as was confirmed by Informant G who mentioned his participation in disaster relief activities as a member of a Teen CERT group in the aftermath of landslides in Rio de Janeiro state in early 2011. Discussing the advantages of implementing Campus CERT

courses at community colleges, Connolly (2012) likewise affirms that such training empowers young people to be able to help themselves and their neighbours in the event of an emergency, thus contributing to a safer school environment, and concludes that “becoming involved in a program such as CERT encourages students to connect as citizens to the larger local community and, therefore, increases social capital” (p. 451).

7.3.2. Meet the needs of the community

Another factor that has been identified as being useful for establishing CBDRT programmes is the creation of resilience strategies that enable communities to solve existing challenges (Bolton et al., 2014), or, as defined by Paton and Johnston (2001), the implementation of community development initiatives that solve contemporary problems. This is also described by the FEMA Whole Community strategy as meeting the actual needs of the community (Federal Emergency Management Agency, 2011c).

An example of a successful CBDRT programme that, at least in part, owed its development and continuation to the fact that it also addressed an existing concern within the community is the Teen CERT group which was founded in the informal hillside community of Cordoeira, in Nova Friburgo, Brazil in 2003 with the purpose of providing adventurous activities for local adolescents that would help to keep them from becoming involved with the drug gang (CERT Brasil, 2019b). Key Informants A, C, and G are all examples of young people who participated in the Cordoeira Teen CERT group and either completed, or are currently undertaking, university courses within Brazil or overseas. Such an achievement is relatively uncommon for youth from their socio-economic background in Brazil, with a survey conducted in 2014 by the Rio de Janeiro City Council finding that a mere 2.4% of young people from the slums went on to study at the university level (Favela 247, 2014).

7.3.3. Provide post-disaster CBDRT training

An additional strategy that can be instrumental for the successful creation of a CBDRT programme is addressed by Nguyen et al. (2006) in their research with survivors of the 1994 Northridge earthquake, which found that those residents that were directly impacted by the event were more likely to subsequently

become involved in disaster preparedness initiatives. This finding was corroborated by Pine et al. (2015), who affirm the usefulness of such projects for adolescents impacted by the Christchurch earthquake, stating that “these findings emphasise the importance of giving teenagers the opportunity to be involved in a disaster's response, and in turn, support the idea of organising youth-focused volunteer groups in the event of another natural disaster” (p. 123). Informant B lauded the CERT courses and classes that were conducted following the 2011 landslides in the Mountainous Region of the state of Rio de Janeiro and with the victims of the 2016 mining dam collapse in Minas Gerais state, both in Brazil, and Informant G mentioned teaching parts of the CERT curriculum to school children and educators immediately following the eruption of the Volcán de Fuego volcano in Guatemala in June 2018.

7.3.4. Develop team leadership

Theme 5 from the thematic analysis of the interviews and questionnaire comment field provides suggestions for maintaining CERT programmes, which were divided into three sub-themes. The first of these sub-themes related to leadership formation, with two of the interviewees citing the value of defining the team leadership structure, and additional mention was made of the importance of training the team leaders, and of the possibility of teaching the CERT course as part of a leadership development programme. The recognition and development of leaders, including those participants who can become CERT instructors, is part of the implementation strategy recommended by both FEMA (2014) and Takahashi et al. (2014), and will also contribute to maintaining the motivation of the CBDRT members as they progress to assisting with further courses, and become more involved in the team's activities.

7.3.5. Establish CBDRT networks

The second sub-theme from Theme 5 was the need to develop an organisational structure for the teams, including obtaining adequate sources of funding and promoting the purpose and role of the teams throughout the community, with the necessity of publicising the CERT programme also being mentioned by two of the questionnaire respondents. The challenge of obtaining on-going funding was also encountered by CBDRT teams in Nairobi, Kenya

(Åsveen, 2014) and CERT teams in the United States (Drake, 2006; Flint & Stevenson, 2010; Franke & Simpson, 2004).

Three of the interviewees mentioned the need to provide ongoing training to CERT teams once they have been established, three of the survey respondents also cited the importance of this issue, and two of the key informants highlighted the value of networking the teams for operational and motivational purposes and ongoing skills development. The importance of offering training and regular exercises to volunteers is also emphasised in the Sendai Framework (United Nations Office for Disaster Risk Reduction, 2015) under paragraph 33 items (f) and (h), and is indicative of the necessity for CBDRM initiatives to become ongoing programmes rather than one-off projects (Christoplos et al., 2001).

CERT teams in the United States are often operated by fire departments (Garrels-Bates, 2018; Gerlich, 2014) or fostered through city- or state-level emergency management authorities (Simpson, 2001), which frequently allows for inter-team communication and ongoing training at the municipal or state level through the sponsoring agencies. However, as CBDRT projects in developing nations are commonly established by Non-Governmental Organisations or Community-Based Organisations, possibly as a part of Community-Based Disaster Management (CBDRM) initiatives, it is important to consider how these programmes could continue to be supported and networked, and whether this function would be exercised by local or regional authorities, or through an NGO or grass-roots network of CBOs.

7.3.6. Cultivate partnerships

Another sub-theme of Theme 5 expresses the importance of cultivating partnerships. Four of the key informants highlighted the need to collaborate with public authorities in order to maintain the programme, and three of the interviewees stressed the value of working with schools or with young people, which was also mentioned by two of the survey respondents. The development of partnerships with local authorities and at the community level is one of the steps in the process suggested by Takahashi et al. (2014) for establishing a CERT programme, and also appears in recommended strategies for implementing CBDRM projects, such as those proposed by Norris et al. (2008).

As a result of such cooperation, the CBDRT teams may encounter opportunities to use their skills to assist their own communities through public events, Disaster Risk Reduction activities, or simulated exercises, or by teaching disaster preparedness or first aid skills in local schools or to other community groups (Duggal-Chadha, 2006; Powell, Black, et al., 2011; Shaw, 2014). These events are also important for the teams as they keep the volunteers motivated, which will help to fulfil the psychological contract between the CBDRT and its volunteers (Kragt et al., 2018), and thus assist in retaining the trained team members.

7.4. Suitability of the CERT model

Since the FEMA Community Emergency Response Team programme has been used as the case study for this investigation, it is also important to consider the applicability of the CERT model for utilisation with the target groups for this research. The CERT and Teen CERT courses appear to be suitable for use with developing nations and the vulnerable groups of the poor, young people, and communities that have been impacted by disasters, as was affirmed by four of the interviewees under Theme 2 and supported by the positive impressions of the training revealed by the key informants and survey respondents under Theme 3. However, the curriculum requires the insertion of additional practical activities, possibly with extra time being devoted to the training, and contextual and cultural adaption of the training material is also necessary, including the facilitation of less dependence upon the PowerPoint presentations and participant manual.

Although not specifically mentioned in the interviews or survey results, two other factors that could have an important influence on the applicability of the FEMA CERT course for vulnerable groups and international communities became apparent during the literature review. The first factor is the orientation given by the FEMA Train-the-Trainer instructors that no material be omitted from the CERT curriculum (personal observation, February 4, 2013), which means that outdated or irrelevant material cannot be pruned from the training syllabus without losing the designation of being a FEMA CERT course. This limitation

may impact the ability to update the protocols presented during the training, as was requested by interviewees and survey respondents under Theme 4. The second important factor is the incorporation of the CERT programme within the United States Department of Homeland Security Department of Homeland Security (2019), which may make CERT less attractive to groups or countries that do not have a strong identification with the United States of America.

7.5. Summary

This chapter discusses the main findings from the literature review and from the research that has been conducted. Using the three research questions that have undergirded this investigation, it addresses the adaptation of CBDRT training for vulnerable groups and developing nations, examines the nine units of the basic CERT curriculum and suggested additional modules, and explores strategies to assist with the implementation and sustainability of CBDRT programmes. It also discussed the suitability of the CERT model for utilisation with the target groups for this investigation.

The next and final chapter of this thesis presents the recommendations that have been developed from this investigation, discusses possible limitations to the research, and offers final conclusions.

8. Recommendations, limitations, and conclusions

This chapter provides recommendations that have been drawn from the literature review, research data, and discussion contained in this thesis, and are grouped around the research questions that have guided the investigation. Possible limitations of the research process are also presented, along with conclusions that are aligned with the research objectives for this study.

8.1. Recommendations

The research gap that was identified following the literature review is the lack of readily available information in the published literature regarding practical steps to be taken, and curriculum content to be utilised, for the creation, training, and ongoing maintenance of Community-Based Disaster Response Teams with vulnerable groups and in developing nations. Although further research should be conducted in order to provide additional clarification of the topic, the following recommendations have emerged from the analysis and discussion of the data obtained during this study and of the literature that was reviewed.

These recommendations are clustered around the three research questions that have undergirded this investigation, and provide insights regarding the adaption and implementation of CBDRT courses and programmes for vulnerable populations

8.1.1. Research Question 1

In order to answer the first research question which enquires into how CBDRT training can be adapted for vulnerable groups, this investigation has sought to achieve Research Objective 1 by identifying strategies that could be utilised to deliver appropriate and relevant CBDRT training to vulnerable communities and developing nations. This has resulted in the following recommendations that have been elaborated from the discussion presented in Section 7.1 of this thesis.

1. Develop a CBDRT training course for adolescents

The findings in Section 7.1.1 show that a specific version of the CBDRT training course should be developed for adolescents, similar to the Teen CERT curriculum. This course must include a significant amount of

hands-on activities and incorporate appropriate modifications to the practical exercises for the participants' age group. An extended version of this curriculum could contain sufficient material to allow it to be taught as a part of a high school class on Disaster Risk Reduction.

2. Modify the CBDRT training material for non-literate learners

The discussion in Section 7.1.2 highlights the necessity of adapting the CBDRT training curriculum to be suitable for audiences that contain non-literate learners and for situations where the use of PowerPoint presentations or participant manuals may not be feasible or appropriate. This will require the development of a training model that makes more use of interactive and small group activities than the current FEMA CERT course structure, and may utilise alternative presentation aids such as flipcharts, visual media, and roleplays.

Consideration must also be given to the provision of course management information for the instructors in formats that substitute the current CERT instructor guide. The course material should also be developed in a manner that will facilitate translation into other languages, and the teaching of the theoretical and practical components with the assistance of translators, including sign language interpreters.

3. Include additional practical activities throughout the course

A common request that arose from the interviews and questionnaire, which was discussed in Section 7.1.3, was for the inclusion of additional practical activities throughout the course. This could encompass supplementary exercises in triage, first aid, and Search and Rescue, and even the insertion of another simulated exercise, possibly following the completion of the Search and Rescue unit. It is also suggested that more time be allocated to teaching the basic course in order to accommodate the additional practical activities.

4. Adapt and expand the existing course material

As identified in the discussion in Section 7.1.4, the course must also be customised for the cultural context in which it will be taught. This will include both the adaptation of the existing material to accommodate local norms, systems, and protocols, and the addition or removal of topics and activities as appropriate.

8.1.2. Research Question 2

Research Objective 2 provides a mechanism for answering the second research question by proposing an outline for a basic training course that would be suitable for CBDRTs in developing nations and vulnerable communities. Since this investigation has used the FEMA CERT course as a case study, and has examined the nine units of the basic CERT curriculum in the discussion contained in Section 7.2, the following recommendations are based around the CERT course units and seek to answer the second research question regarding which topics and practical activities would be most useful for such training.

1. Unit 1: Disaster Preparedness

The discussion of CERT Unit 1 leads to the recommendation that the first unit of the course should contain a similar structure, and cover disaster preparedness on an individual, family, and community level; examine probable disaster scenarios that would be significant for the participants; and also discuss existing emergency management procedures and protocols (Section 7.2.1). However, the sections on flood insurance and residential mitigation procedures, as well as the references to United States programmes such as Citizens Corps, will not be relevant in many international settings.

It may also be desirable to include further Disaster Risk Reduction planning activities within this module, such as the creation of a community hazard and resource map, or the establishment of a local CBDRM committee, with the unit possibly being split into two lessons in order to cover all of the material. It is also important to maintain the distribution of Personal Protective Equipment (PPE) for the course

participants, either for use throughout the course or, ideally, as the nucleus for their personal disaster response kits.

2. Unit 2: Fire Safety and Utility Control

The second unit about fire safety should follow the CERT standard since it not only teaches useful skills but also lays the groundwork for important safety protocols, such as scene size-up procedures, teamwork, and the use of PPE (Section 7.2.2). However, the contents of this module may require some customisation regarding classes of fire and fire extinguishing methods; the location, identification, and utilisation of utility controls such as electricity and natural gas shut-off mechanisms; and the activation of the local emergency services.

3. Unit 3: Disaster Medical Operations 1 and Unit 4: Disaster Medical Operations 2

The CBDRT course must include lessons that cover much of the material contained in the two CERT Disaster Medical Operations units, as discussed in Sections 7.2.3 and 7.2.4, including the treatment of airway obstruction, excessive bleeding, and shock; triage procedures; glove removal; public health considerations; the Medical Treatment Area; secondary assessment of victims; and disaster-related first aid skills, including splinting. However, as the CERT programme assumes that participants will also have access to standard first aid courses, it may require the addition of further theoretical and practical first aid training, such as CPR and choking procedures, and should be constantly updated with the latest protocols.

It may be convenient to reorder the contents of the two Disaster Medical Operations units in order to facilitate the inclusion of a basic first aid course. The addition of two or three triage exercises could also be beneficial to not only reinforce the START or SALT triage protocols but also to ensure that participants understand the team organisation and leadership structure, including the establishment of the Incident

Command Post and Medical Treatment Area.

4. Unit 5: Light Search and Rescue Operations

A recommendation derived from the discussion in Section 7.2.5 is that a module about light Search and Rescue, similar to CERT Unit 5, should be contained in the CBDRT training course. However, the content must be updated to include international protocols, such as the INSARAG warning codes and structural markings, and reference should be made to scene hazard control and the use of alternatives to cribbing and levering.

5. Unit 6: CERT Organisation

As demonstrated in the discussion contained in Section 7.2.6, a module should be included in the CBDRT curriculum, similar to CERT Unit 6, that teaches about the team leadership structure and deployment protocol, and the team's interaction and communication with the emergency management authorities. It must also include a discussion of relevant incident management systems, and stress the importance of maintaining adequate documentation, including the use of standardised forms to track survivors and record the actions taken by the team.

6. Unit 7: Disaster Psychology

The CBDRT course must also include a unit on disaster psychology, similar to CERT Unit 7, as discussed in Section 7.2.7. However, the reference to the Critical Incident Stress Debriefing (CISD) model may be removed, and further training in Psychological First Aid (PFA) techniques could be added. It may also be desirable to incorporate some practical activities and exercises relating to personal stress management or individual assistance interventions in this lesson.

7. Unit 8: Terrorism and CERT

A recommendation that surprised the researcher but emerged from the discussion contained in Section 7.2.8 is that a module similar to CERT Unit 8 should be included in the CBDRT curriculum. However, it may also be advantageous to supplement or replace the terrorism component of

this lesson with information about other relevant security-related hazards, such as urban conflict situations or active shooter events.

8. Unit 9: Course review, final exam, and disaster simulation

The course should conclude with a review of the content that was presented, and may optionally include a post-test, which could provide more relevant information about the participants' skills attainment if a pre-test exam had been previously administered at the start of Unit 1. However, it is recommended that any pre- or post-test examination papers utilised not embody the complexity of the 13-page exam developed by the FEMA CERT programme.

As was expressed by the key informants and supported by the literature (Section 7.2.9), the final module must also include a disaster simulation. It is recommended that this be a full-scale simulated exercise with actors playing the role of victims, in order to provide the course graduates with the opportunity to apply all of their disaster-response skills under simulated real-life conditions.

9. Leadership development

In addition to the components of the basic CERT curriculum, it may be beneficial to include an additional unit in the CBDRT training course regarding leadership development, as was shown in Section 7.2.10 of this thesis. The four-hour CERT Tools for Leadership Success module could provide a useful framework for this lesson.

10. Additional modules

Additional modules that may be relevant for a Community-Based Disaster Response Team could include training in swiftwater rescue awareness, communications procedures, shelter management, and needs or damage assessment. Depending on the intended audience, other units could discuss topics such as animals in disasters, crowd and traffic control, or evacuation procedures (Section 7.2.10).

8.1.3. Research Question 3

By fulfilling Research Objective 3 and describing techniques and approaches that could be employed to ensure that CBDRT teams are successfully established and empowered for their continued sustainability, this section intends to answer the third research question that asks how Community-Based Disaster Response Teams can be established and maintained in developing nations and with vulnerable groups. Consequently, the following list of recommendations has been elaborated from the research that was discussed in Section 7.3 of this thesis.

1. Promote the creation of CBDRT teams of young people

The findings discussed in Section 7.3.1 show that a priority must be placed on offering customised CBDRT training courses to adolescents and youth, either through the school system or as part of CBO-facilitated programmes. Where possible, youth-based response teams should be established and maintained in order to provide valuable emergency response capacity to their schools or communities, in addition to their role in teaching life-saving skills to the young people who participate and helping to foster a culture of disaster preparedness within the society.

2. Cooperate with CBOs to solve existing problems for the community

Another important factor for the long-term success of Community-Based Disaster Risk Management programmes, which was discussed in Section 7.3.2, is the importance of offering solutions to the perceived needs or challenges that exist within the community in cooperation with pre-existing Community-Based Organisations. It is important that the training of a Community-Based Disaster Response Team not be viewed as an additional activity inflicted on the community by an external agency, but, rather, as something that will add value to the groups and programmes that are already active in that area.

3. Offer CBDRT training to communities following a disaster

Section 7.3.3 shows that impacted communities are often open to receiving CBDRT training following a disaster, usually at the end of the

response phase or the beginning of the recovery stage. In addition to engaging with the survivors' heightened interest in disaster preparedness, the provision of Community-Based Disaster Response Team courses at this point can also help prepare the community for ongoing events, such as aftershocks from an earthquake or further rainfall following landslides or flooding. This may also assist with the residents' psychosocial recovery and help them to re-establish a sense of agency, where they no longer see themselves as mere victims of the tragedy.

4. Develop and support the leadership of the CBDRT teams

The findings contained in Section 7.3.4 highlight the importance of developing and supporting the leadership of Community-Based Disaster Response Teams so that these teams can continue to function in an autonomous manner. Members of the team could also be trained as instructors so that they could assist with subsequent CBDRT training courses, which will also help with the continued motivation and subsequent retention of the volunteers.

5. Establish a support network of CBDRT teams

If the CBDRT groups are not part of an existing emergency management structure at the local or regional level, it may be necessary for Non-Governmental Organisations or Community-Based Organisations to create a network of teams in order to enhance communication and cooperation, and to offer further training and simulated exercises (Section 7.3.5). An additional advantage of creating a network of CBDRTs is that they may be able to exchange warning information and assist each other in the event of an emergency.

6. Create partnerships with local and regional authorities

Section 7.3.6 emphasises the importance of CBDRTs cultivating partnerships with local and regional emergency management authorities wherever possible. Not only will this ensure that they are integrated into the official structure and response plans, but it may assist with publicity and promotion of the team's activities and the recruitment of potential volunteers. Teams may also be able to share their skills and knowledge with the general public at community and DRR events, or offer courses in first aid or disaster preparedness to community groups or local schools. In addition, the ongoing involvement of the team members in such activities is an important factor in maintaining their interest in the CBDRT programme and ensuring their continued participation in the team.

8.2. Research limitations

This section discusses potential limitations of the research that has been undertaken for this investigation. Although the online questionnaire and the key informant interviews have yielded significant insights into CBDRT training and programmes for vulnerable communities and developing nations, the utilisation of these methods and the Likert-scale grading system for the survey replies present some possible challenges in confirming the veracity of the information that has been obtained.

Limitations that have been encountered with the use of Likert scales include the possibility of central tendency bias, which is when respondents tend to select the options in the middle of the range of answers rather than the extremities (Douven, 2018), although this does not appear to have been the case with the questionnaire used in this study that returned mostly positive results. However, it could have been influenced by either cultural acquiescent response bias, which is described by Smith (2004) as being “the extremity of response at the positive end of response scales” (p. 50), or by what Darby (2008) defines as positive response bias, which is when students tend to give a positive evaluation of courses that they have completed.

Hartley (2014) observes that when Likert-scale questions begin with the positive option on the left and the negative selections on the right, English speaking respondents provide slightly more positive replies than when the answers begin with the negative items, and, as this was the case with the online questionnaire, it may have contributed somewhat to the largely positive responses obtained from the English-language survey. However, as the replies to the Portuguese-language survey were also consistently positive about the course and its components, it is unlikely that this factor has influenced the questionnaire results in a significant manner.

Another possible limitation to the questionnaire is due to the fact that the English-language online survey was used for the graduates of the CERT courses held in Belize and Guatemala, although only 62.9% of the population of Belize speak English, and the official language of Guatemala is Spanish (Central Intelligence Agency, 2019a, 2019b). On the other hand, the CERT course in Belize was conducted in English without translation, and many of the graduates of the CERT course in Guatemala, which was taught in or translated into Spanish, were also fluent English speakers.

Four of the survey respondents indicated that they were considering the implementation of CERT programmes in the developed nations of Canada, Israel, Norway, and Spain. Although this could be considered a potential limitation to this study which seeks to evaluate the effectiveness of CERT courses amongst developing nations and vulnerable groups, it is also possible that these survey participants were contemplating training vulnerable populations within those countries.

Another possible limitation to this study is the sample size for both the questionnaire and the key informant interviews, which was due to the low response rate to the survey and practical considerations relating to the scope of the research. However, the 55 participants from the five courses that were evaluated through the online survey, and the seven interviewees who were selected through purposive sampling, have provided a significant amount of quantitative and qualitative data about the applicability of CERT courses in developing nations and with vulnerable groups.

An anomaly that appeared during the analysis of the Likert-scale questionnaire replies, which could be considered a limitation of this research, was the slight difference in the approval ratings of the individual CERT units when compared to the sum of the answers to the questions relating to each unit (Figure 9). However, the variation in this evaluation is less than 3% and reflects the reality, expressed by researchers such as Harpe (2015) and Warmbrod (2014), that summated scores of multiple Likert-scale questions will yield more meaningful results than those of individual questions.

8.3. Contribution to knowledge

The research gap that was identified in the literature review phase of this investigation is the lack of readily accessible evidence-based information regarding successful strategies and curriculum that could be utilised for the creation, training, and sustainable operation of CBDRTs with vulnerable groups and communities. A working group of seven international NGOs also identified the absence of standards for community disaster relief initiatives (Braun, 2004), and Walia (2008) highlights the need for standardised training programmes for Community-Based Disaster Risk Management programmes.

Although the recommendations contained in this thesis could not be considered to offer a standard for CBDRT training and operation, they do provide research-based suggestions that could be utilised for the development of a framework for the creation and maintenance of Community-Based Disaster Response Teams in developing nations and with vulnerable communities. The researcher anticipates that the answers that have been obtained to the research questions will contribute to the knowledge about this important topic, and will prove to be useful in the future for the elaboration of structures to facilitate the development of international CBDRT programmes.

8.4. Conclusions

The research objectives that have underpinned this research project, which were presented in Section 1.5, are as follows:

1. Identify strategies that could be utilised to deliver appropriate and relevant Community-Based Disaster Response Team training to vulnerable communities and developing nations.
2. Propose an outline for a basic training curriculum that would be suitable for CBDRTs in these situations.
3. Describe techniques and approaches that could be employed to ensure that such teams are successfully established and empowered for their continued sustainability.

The previous sections of this chapter have identified strategies that could be employed to provide CBDRT training to the target communities, proposed the outline of a basic training curriculum for such teams, and described some practical strategies that could be utilised to establish CBDRT teams and contribute towards their longevity. Both the literature review and the information provided by the key informants and graduates of CERT courses have led to the conclusion that the basic CERT curriculum, with appropriate modifications for the cultural context and target audience, is a suitable tool for establishing and training such teams. However, it is also apparent that, in many situations, it will be necessary to add further topics to the curriculum and possibly allow more time for the course, and it may be advantageous if portions of the existing content were removed or replaced.

As the current FEMA CERT model requires that the instructors teach all of the material in the curriculum, there is a limitation as to how much of the training can be customised while still retaining its identity as a CERT course. In addition, since the United States Federal Emergency Management Agency (FEMA) is a division of the US Department of Homeland Security, the FEMA CERT course may not be acceptable in those countries or communities that are not ideologically or politically aligned with the United States of America. Therefore, as discussed in Section 7.4, it is recommended that a new CBDRT training course be developed from the existing CERT curriculum and certified by an international agency, thus producing a standardised CBDRT programme that is customisable for diverse contexts and accessible to a wide international audience.

9. Bibliography

- Afrose, T. (2017). Disaster Risk Management and the Sendai Framework. *Juniper Online Journal of Public Health*, 2(4), 1-5.
<https://doi.org/10.19080/JOJPH.2017.02.555595>
- Aldrich, D. P., & Meyer, M. A. (2015). Social capital and community resilience. *American Behavioral Scientist*, 59(2), 254-269.
- Alexander, D. (2003). Towards the development of standards in emergency management training and education. *Disaster Prevention and Management: An International Journal*, 12(2), 113-123.
<https://doi.org/doi:10.1108/09653560310474223>
- Alexander, D. A., & Klein, S. (2009). First responders after disasters: A review of stress reactions, at-risk, vulnerability, and resilience factors. *Prehospital And Disaster Medicine*, 24(2), 87-94.
- Allen, K. M. (2006). Community-based disaster preparedness and climate adaptation: Local capacity-building in the Philippines. *Disasters*, 30(1), 81-101. <https://doi.org/10.1111/j.1467-9523.2006.00308.x>
- Arizona Division of Emergency Management. (2005). The Arizona Division of Emergency Management's use of Community Emergency Response Teams in state exercises. Retrieved from <http://www.hsd.org>
- Åsveen, G. (2014). *Crowd innovations: A study of the introduction of innovations for a larger involvement of beneficiary communities in emergency aid and response*. (Master's thesis), University of Stavanger, Norway.
- Baker, S. E., Edwards, R., & Doidge, M. (2012). *How many qualitative interviews is enough? Expert voices and early career reflections on sampling and cases in qualitative research*. University of Southampton. Retrieved from <http://eprints.brighton.ac.uk/11632/>
- Balarinová, L., Dostál, J., Tu, D., & Ivanová, K. (2014). Emergency preparedness of the Czech Red Cross. *WIT Transactions on Information and Communication Technologies*, 47, 429-438.

- Barsky, L. E., Trainor, J. E., Torres, M. R., & Aguirre, B. E. (2007). Managing volunteers: FEMA's Urban Search and Rescue programme and interactions with unaffiliated responders in disaster response. *Disasters*, 31(4), 495-507.
- Bazeley, P. (2010). Computer-assisted integration of mixed methods data sources and analyses. In A. Tashakkori & C. Teddlie (Eds.), *Sage handbook of mixed methods in social & behavioral research* (2nd ed.). Los Angeles, CA: Sage.
- Bills, C. B., Levy, N. A. S., Sharma, V., Charney, D. S., Herbert, R., Moline, J., & Katz, C. L. (2008). Mental Health of Workers and Volunteers Responding to Events of 9/11: Review of the Literature. *Mount Sinai Journal of Medicine*, 75(2), 115-127. <https://doi.org/10.1002/msj.20026>
- Black, L., & Powell, P. (2012). 4-H Teen Community Emergency Response Team (CERT). *Journal of Extension*, 50(5).
- Bolton, P., Dirks, K., & Neuwelt, P. (2014). Natural hazard preparedness in an Auckland community: Child and community perceptions. *Pastoral Care in Education*, 32(1), 23-41. <https://doi.org/10.1080/02643944.2014.881909>
- Bonanno, G. A., Brewin, C. R., Kaniasty, K., & Greca, A. M. L. (2010). Weighing the costs of disaster: Consequences, risks, and resilience in individuals, families, and communities. *Psychological Science in the Public Interest*(1), 1.
- Borden, F. W. (1991). *Community preparedness and disaster response: The city of Los Angeles Community Emergency Response Team program*. Retrieved from <http://cidbimena.desastres.hn/docum/crid/Septiembre-October2005/CD-1/pdf/eng/doc6126/doc6126-contenido.pdf>
- Bovyn, B. (2005). Community Emergency Response Teams for the elderly. *IAEM Bulletin*, 22(4), 5,14.
- Bowersox, Z. (2018). Natural disasters and human trafficking: Do disasters affect state anti-trafficking performance? *International Migration*, 56(1), 196-212. <https://doi.org/10.1111/imig.12374>
- Braun, S. (2004). *Report on emergency capacity: Analysis for the Interagency Working Group on emergency capacity*. Retrieved from <https://www.alnap.org/system/files/content/resource/files/main/emergency-capacity-report-ver-july-14-final.pdf>

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- Braun, V., Clarke, V., Hayfield, N., & Terry, G. (2019). Thematic analysis. In P. Liamputtong (Ed.), *Handbook of Research Methods in Health Social Sciences* (pp. 843-860). Singapore: Springer.
- Brennan, M., Barnett, R. V., & Flint, C. G. (2005). Community volunteers: The front line of disaster response. *Journal of Volunteer Administration*, 23(4), 52-56.
- Brennan, M. A., & Flint, C. G. (2007). Uncovering the hidden dimensions of rural disaster mitigation: Capacity building through community emergency response teams. *Southern Rural Sociology*, 22(2), 111-126.
- Briton, N. R. (1986). Developing an understanding of disasters. *Australian and New Zealand Journal of Sociology*, 22(2), 254-272.
- Broad, A. (2004). *Southland community first response evaluation*. Internal St John Southern Region report: unpublished.
- Burnett, M. N. (2004). *Spanish Community Emergency Response Team training*. Retrieved from <https://www.hsdl.org>
- Camilleri, P., Healy, C., Macdonald, E. M., Nicholls, S., Sykes, J., Winkworth, G., & Woodward, M. (2010). Recovery from bushfires: The experience of the 2003 Canberra bushfires three years after. *Journal of Emergency Primary Health Care*, 8(1), 2.
- Carlton, S. (2015). Connecting, belonging: Volunteering, wellbeing and leadership among refugee youth. *International Journal of Disaster Risk Reduction*, 13, 342-349. <https://doi.org/10.1016/j.ijdr.2015.07.006>
- Carlton, S., & Mills, C. E. (2017). The Student Volunteer Army: A 'repeat emergent' emergency response organisation. *Disasters*, 41(4), 764-787. <https://doi.org/10.1111/disa.12225>
- Carr, J., & Jensen, J. (2015). Explaining the pre-disaster integration of Community Emergency Response Teams (CERTs). *Natural Hazards*, 77(3), 1551-1571. <https://doi.org/10.1007/s11069-015-1664-3>
- Central Intelligence Agency. (2019a). Central America: Belize. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/geos/bh.html>

- Central Intelligence Agency. (2019b). Central America: Guatemala. Retrieved from <https://www.cia.gov/-library/publications/the-world-factbook/geos/gt.html>
- CERT-LA. (2019). International CERT. Retrieved from <http://www.cert-la.com/cert-programs-information/international-cert/>
- CERT Brasil. (2019a). Seja bem-vindo ao site da CERT Brasil. Retrieved from <http://www.certbrasil.org>
- CERT Brasil. (2019b). Teen CERT. Retrieved from <http://www.certbrasil.org/blog/tag/2-teen-cert>
- Chang, S. E., Taylor, J. E., Elwood, K. J., Seville, E., Brunson, D., & Gartner, M. (2014). Urban disaster recovery in Christchurch: The central business district cordon and other critical decisions. *Earthquake Spectra*, 30(1), 513-532.
- Chen, L.-C., Liu, Y.-C., & Chan, K.-C. (2006). Integrated Community-Based Disaster Management program in Taiwan: A case study of Shang-An Village. *Natural Hazards*, 37(1), 209. <https://doi.org/10.1007/s11069-005-4669-5>
- Chiwanda, M. (2018). Local communities drivers of disaster resilience. Retrieved from <http://www.manaonline.gov.mw/index.php/national/environment/item/7958-local-communities-drivers-of-disaster-resilience-mrcs>
- Christoplos, I., Mitchell, J., & Liljelund, A. (2001). Re-framing risk: The changing context of disaster mitigation and preparedness. *Disasters*, 25(3), 185-198.
- Civil Defence Emergency Management Act, No. 33. (2002). Retrieved from <http://www.legislation.govt.nz/act/public/2002/0033/51.0/DLM149789.htm>
- Clark, V. L. P., & Badiie, M. (2015). Research questions in mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *Sage handbook of mixed methods in social and behavioral research* (2nd ed., pp. 275-304). Thousand Oaks, CA: Sage.
- Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education*. (7th ed.). New York, NY: Routledge.

- Connolly, M. (2012). Creating a campus based Community Emergency Response Team (CERT). *Community College Journal of Research and Practice*, 36(6), 448-452. <https://doi.org/10.1080/10668920903018134>
- Coppola, D. P. (2015). *Introduction to international disaster management* (3rd ed.): Oxford, England: Butterworth-Heinemann.
- Cox, M. (2003). *Hurricane community emergency response training for the citizens of Lumberton*. Retrieved from <https://www.hSDL.org>
- Darby, J. A. (2008). Course evaluations: A tendency to respond “favourably” on scales? *Quality Assurance in Education*, 16(1), 7-18. <https://doi.org/doi:10.1108/09684880810848387>
- Department of Homeland Security. (2019). Community Emergency Response Team. Retrieved from <https://www.ready.gov/community-emergency-response-team>
- Douven, I. (2018). A Bayesian perspective on Likert scales and central tendency. *Psychonomic Bulletin and Review*, 25(3), 1203-1211. <https://doi.org/10.3758/s13423-017-1344-2>
- Drake, T. (2006). *Development Procedures for a Citizen Emergency Response Team*. Retrieved from <https://www.usfa.fema.gov/data/library/>
- Drolet, J., Dominelli, L., Alston, M., Ersing, R., Mathbor, G., & Wu, H. (2015). Women rebuilding lives post-disaster: Innovative community practices for building resilience and promoting sustainable development. *Gender & Development*, 23(3), 433-448.
- Duggal-Chadha, A. (2006). Children and disasters. *Refugee Survey Quarterly*, 25(4), 85-90.
- Dynes, R. R. (1990). *Community emergency planning: False assumption and inappropriate analogies*. Retrieved from <http://udspace.udel.edu/handle/19716/517>
- Dyregrov, A., Kristoffersen, J. I., & Gjestad, R. (1996). Voluntary and professional disaster-workers: Similarities and differences in reactions. *Journal of Traumatic Stress*, 9(3), 541-555.
- Eldridge, A. (2019, February 7). Human trafficking and search and recovery teams. *NASAR Enews*.
- Emergency Management Institute. (2008). *IS-1: The emergency manager*. Emmitsburg, MD: Federal Emergency Management Agency.

- Emergency Management Southland. (2018). *SAFER Framework*. Retrieved from <https://projectaf8.co.nz/safer-framework/>
- Everly, G. S., Jr. (2016). *Critical Incident Stress Management (CISM): Assisting individuals in crisis* (5th ed.). Ellicott City, MD: International Critical Incident Stress Foundation.
- Favela 247. (2014). Só 2,4% dos jovens de favelas vão à faculdade. Retrieved from <https://www.brasil247.com/pt/247/favela247/146333/S%C3%B3-24-dos-jovens-de-favelas-v%C3%A3o-%C3%A0-faculdade.htm>
- Federal Emergency Management Agency. (2007). *Principles of emergency management supplement*. Retrieved from www.iaem.com/page.cfm?p=documents/POEMmonograph.pdf
- Federal Emergency Management Agency. (2010). Bringing youth preparedness education of the forefront: A literature review and recommendations. *Citizen Preparedness Review*(6).
- Federal Emergency Management Agency. (2011a). NYC CERT helps build emergency response teams in Haiti. *CERT National Newsletter*, 3, 1,6-7.
- Federal Emergency Management Agency. (2011b). *The response to the 2011 Joplin, Missouri, tornado: Lessons learned study*. Retrieved from <https://kyem.ky.gov/Who%20We%20Are/Documents/Joplin%20Tornado%20Response,%20Lessons%20Learned%20Report,%20FEMA,%20December%2020,%202011.pdf>
- Federal Emergency Management Agency. (2011c). *A Whole Community approach to emergency management: Principles, themes, and pathways for action*. Retrieved from <https://www.fema.gov/media-library/assets/documents/23781?id=4941>
- Federal Emergency Management Agency. (2013). Neighboring CERT programs help in Joplin aftermath. *CERT National Newsletter*, 4, 1-2.
- Federal Emergency Management Agency. (2014). How to start a CERT program. Retrieved from <https://www.fema.gov/faq-details/How-to-Start-a-CERT-program>
- Federal Emergency Management Agency. (2015a). *CERT basic instructor guide annex for all abilities*. Retrieved from <https://www.fema.gov/media-library/assets/documents/27368>

- Federal Emergency Management Agency. (2015b). Teen CERT resources. Retrieved from <https://www.fema.gov/media-library/assets/documents/28048?id=6218>
- Federal Emergency Management Agency. (2018a). CERT class conducted for deaf, hard of hearing, and deaf-blind state government employees. *CERT eBrief, December 2018*.
- Federal Emergency Management Agency. (2018b). *Engaging faith-based and community organizations*. Retrieved from <https://www.fema.gov/media-library/assets/documents/165937>
- Feilzer, M. Y. (2010). Doing mixed methods research pragmatically: Implications for the rediscovery of pragmatism as a research paradigm. *Journal of Mixed Methods Research, 4*(1), 6-16. <https://doi.org/10.1177/1558689809349691>
- Fernandez, L., Barbera, J., & van Dorp, J. R. (2006). Spontaneous volunteer response to disasters: The benefits and consequences of good intentions. *Journal of Emergency Management, 4*(5), 57-68.
- Fernando, D. M., & Hebert, B. B. (2011). Resiliency and recovery: lessons from the Asian tsunami and Hurricane Katrina. *Journal of Multicultural Counseling and Development*(1), 2.
- Flaskerud, J. H. (1988). Is the Likert scale format culturally biased? *Nursing research, 37*(3), 185-186. <https://doi.org/10.1097/00006199-198805000-00013>
- Flaskerud, J. H. (2012). Cultural bias and Likert-type scales revisited. *Issues in Mental Health Nursing, 33*(2), 130-132.
- Flint, C., & Brennan, M. (2006). Community Emergency Response Teams: From disaster responders to community builders. *Rural Realities, 1*.
- Flint, C. G., & Stevenson, J. (2010). Building Community Disaster Preparedness with Volunteers: Community Emergency Response Teams in Illinois. *Natural Hazards Review, 11*(3), 118-124.
- Franke, M. E., & Simpson, D. M. (2004). *Community response to Hurricane Isabel: An examination of Community Emergency Response Team (CERT) organizations in Virginia*. Natural Hazards Center, University of Colorado.

- Freeman, C., Nairn, K., & Gollop, M. (2015). Disaster impact and recovery: What children and young people can tell us. *Kōtuitui: New Zealand Journal of Social Sciences Online*, 10(2), 103-115.
<https://doi.org/10.1080/1177083X.2015.1066400>
- Fritz, C. E., & Williams, H. B. (1957). The human being in disasters: A research perspective. *The Annals of the American Academy of Political and Social Science*, 309, 42.
- Gaillard, J. C., & Mercer, J. (2013). From knowledge to action: Bridging gaps in disaster risk reduction. *Progress in Human Geography*, 37(1), 93-114.
<https://doi.org/10.1177/0309132512446717>
- Garrels-Bates, M. J. (2018). *Using the fire service to build community engagement*. (Master's thesis), Naval Postgraduate School, Monterey, CA.
- Gawith, E. (2013). The on-going psychological toll from the Canterbury earthquakes: Stories from one community. *Disaster Prevention and Management*, 22(5), 395-404.
- Gerlich, S. E. (2014). *How LAFD CERT may be understood as a smart practice: How it is pioneering a transition to whole community CERT and how it can serve as the template for CERT programs nationally*. (Master's thesis), Naval Postgraduate School, Monterey, CA.
- Gluckman, P. (2011). *The psychosocial consequences of the Canterbury earthquakes: A briefing paper*. Wellington, New Zealand: Office of the Prime Minister's Science Advisory Committee.
- GNDR. (2018). *Cookbook on Institutionalising Sustainable CBDRM*. Retrieved from <https://cbdrm.org/cookbook/>
- Goltz, J. D., & Mileti, D. S. (2011). Public response to a catastrophic Southern California earthquake: A sociological perspective. *Earthquake Spectra*, 27(2), 487-504.
- Gonzalez, M. M. (2005). *Citizen involvement in disaster management*. (Master thesis), Naval Postgraduate School, Monterey, CA.
- Greene, J. C., & Hall, J. N. (2010). Dialectics and pragmatism: Being of consequence. In A. Tashakkori & C. Teddlie (Eds.), *Sage handbook of mixed methods in social & behavioral research* (2nd ed.). Los Angeles, CA: Sage.

- Gurung, A., & Clark, A. D. (2018). The perfect storm: The impact of disaster severity on internal human trafficking. *International Area Studies Review*. <https://doi.org/10.1177/2233865918793386>
- Hagh-Shenas, H., Goodarzi, M. A., Dehbozorgi, G., & Farashbandi, H. (2005). Psychological consequences of the Bam earthquake on professional and nonprofessional helpers. *Journal of Traumatic Stress: Official Publication of The International Society for Traumatic Stress Studies*, 18(5), 477-483.
- Hall, J. N. (2013). Pragmatism, evidence, and mixed methods evaluation. *New Directions for Evaluation*, 2013(138), 15-26.
- Hall, M. L., Lee, A. C. K., Cartwright, C., Marahatta, S., Karki, J., & Simkhada, P. (2017). The 2015 Nepal earthquake disaster: Lessons learned one year on. *Public Health*, 145, 39-44.
- Han, Z. (n.d.). *Building resilient city through integrated Community-based Disaster and Risk Management (CbDRM)*. Retrieved from <http://iccr-drr.bnu.edu.cn/wp-content/uploads/2016/12/Building-Resilient-City-through-Integrated-Community-Based-Disaster-and-Risk-Management.pdf>
- Harpe, S. E. (2015). How to analyze Likert and other rating scale data. *Currents in Pharmacy Teaching and Learning*, 7(6), 836-850. <https://doi.org/https://doi.org/10.1016/j.cptl.2015.08.001>
- Harrigans, R., & Wade, K. (2011). *Community Disaster Response Teams in action: Antigua and Barbuda, 2010*. Retrieved from <http://adore.ifrc.org/Download.aspx?FileId=83583&.pdf>
- Hartley, J. (2014). Some thoughts on Likert-type scales. *International Journal of Clinical and Health Psychology*, 14(1), 83-86.
- Helsloot, I., & Ruitenbergh, A. (2004). Citizen response to disasters: A survey of literature and some practical implications. *Journal of Contingencies and Crisis Management*, 12(3), 98-111.
- Henry, D. (2011). *The experience and effectiveness of light rescue teams in the Christchurch earthquake of February 22, 2011*. (Grad. Dip. Emerg. Mgt), Massey University.

- Hishida, N., & Shaw, R. (2014). Social capital in disaster recovery in Japan: An overview. In R. Shaw (Ed.), *Community practices for disaster risk reduction in Japan*. Tokyo, Japan: Springer.
- Housner, G. W. (1989). An International Decade of Natural Disaster Reduction: 1990–2000. *Natural Hazards*, 2(1), 45-75.
<https://doi.org/10.1007/BF00124757>
- Hussain, S. (2015). *Case study 2010 flood HSI: Linking emergency to sustainable development*. Retrieved from
https://www.researchgate.net/publication/282568096_Case_study_2010_flood_HSI_-_linking_emergency_to_sustainable_development
- IFRC. (2013). *Viet Nam annual report 2012*. Retrieved from
<https://media.ifrc.org/ifrc/wp-content/uploads/sites/5/2017/12/Annual-report-2012.pdf>
- Individual and Community Preparedness Division. (2015). *Inclusion of people with disabilities and others with access and functional needs in CERT programs*. Retrieved from https://www.fema.gov/media-library-data/1439503813639-5fc4065c2c3ebab72145eb878b8c85e7/20150715_CERT_Webinar_Master_Deck_v4_508_081215.pdf
- Isayama, K., & Shaw, R. (2014). Building disaster resilient community through healthcare networking. In R. Shaw (Ed.), *Community practices for disaster risk reduction in Japan*. Tokyo, Japan: Springer.
- Israrel21c. (2018). Israeli rescue organization trains Guatemalan first responders in UN-sponsored program. Retrieved from
<http://www.thetower.org/6008oc-israeli-rescue-organization-trains-guatemalan-first-responders-in-un-sponsored-program/>
- Jacobs, G. A. (2007). The development and maturation of humanitarian psychology. *The American Psychologist*(8), 932.
- Jahnke, S. A., Poston, W. S. C., Haddock, C. K., & Gist, R. (2014). Behavioral health interventions in the fire service: Stories from the firehouse. *Journal of Workplace Behavioral Health*, 29(2), 113-126.
<https://doi.org/10.1080/15555240.2014.898568>

- Johal, S., & Mounsey, Z. (2016). A research-based primer on the potential psychosocial impacts of flooding. *Disaster Prevention and Management*(1), 104. <https://doi.org/10.1108/DPM-09-2015-0206>
- Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, 33(7), 14-26. <https://doi.org/10.3102/0013189X033007014>
- Jones, S., Owen, K. J., Manyena, B., & Aryal, K. (2014). Governance struggles and policy processes in disaster risk reduction: A case study from Nepal. *Geoforum*, 57, 78-90. <https://doi.org/10.1016/j.geoforum.2014.07.011>
- Joshi, A., Kale, S., Chandel, S., & Pal, D. (2015). Likert scale: Explored and explained. *British Journal of Applied Science & Technology*, 7(4), 396.
- Karanci, N. A., & Acarturk. (2005). Post-traumatic growth among Marmara earthquake survivors involved in disaster preparedness as volunteers. *Traumatology*, 11(4), 307-323.
- Karim, A., & Noy, I. (2016). Poverty and natural disasters: A regression meta-analysis. *Review of Economics and Institutions*, 7(2), 26.
- Kerlinger, F. N., & Lee, H. B. (2000). *Foundations of behavioral research* (4th ed.). Orlando, FL: Harcourt College.
- Kragt, D., Dunlop, P., Gagné, M., Holtrop, D., & Luksyte, A. (2018). When joining is not enough: Emergency services volunteers and the intention to remain. *Australian Journal of Emergency Management*, 33(4), 35-39.
- Kudek, G. W. (2009). *Community Emergency Response Teams: Under used or under trained?* Retrieved from <https://www.hsdl.org>
- Le Dé, L., & Gaillard, J. C. (2017). Disaster risk reduction and emergency management in prison: A scoping study from New Zealand. *Journal of Contingencies & Crisis Management*, 25(4), 376-381. <https://doi.org/10.1111/1468-5973.12165>
- Lee, B.-Y. (2010). Working together, building capacity: A case study of Civil Defence Emergency Management in New Zealand. *Journal of Disaster Research*, 5(5), 565-576. <https://doi.org/10.20965/jdr.2010.p0565>
- Lee, J. W., Jones, P. S., Mineyama, Y., & Zhang, X. E. (2002). Cultural differences in responses to a Likert scale. *Research in Nursing & Health*, 25(4), 295-306.

- Lerner, E. B., Schwartz, R., L Coule, P., & Pirrallo, R. (2010). Use of SALT triage in a simulated Mass-Casualty Incident. *Prehospital emergency care: Official Journal of the National Association of EMS Physicians and the National Association of State EMS Directors*, 14(1), 21-25.
<https://doi.org/10.3109/10903120903349812>
- Lichterman, J. D. (2000). A "community as resource" strategy for disaster response. *Public Health Reports*, 115(2-3), 262-265.
- Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*, 22 140, 55-55.
- Lindell, M. K., Prater, C. S., Wu, H. C., Huang, S.-K., Johnston, D. M., Becker, J. S., & Shiroshita, H. (2016). Immediate behavioural responses to earthquakes in Christchurch, New Zealand, and Hitachi, Japan. *Disasters*, 40(1), 85-111. <https://doi.org/doi:10.1111/disa.12133>
- Lionel, S. T. (2015). Leveraging social capital for resilience through community teams. *The RUSI Journal*, 160(6), 68-73.
<https://doi.org/10.1080/03071847.2015.1123556>
- Lucas-McEwen, V. (2011). This ain't the same CERT that got started in the 1980s. *IAEM Bulletin*, 28(12), 22.
- Luna, E. M. (2001). Disaster mitigation and preparedness: The case of NGOs in the Philippines. *Disasters*, 25(3), 216-226. <https://doi.org/10.1111/1467-7717.00173>
- Maskrey, A. (1989). *Disaster mitigation: A community based approach*. Oxford, United Kingdom: Oxfam.
- Massey University. (2017). Code of ethical conduct for research, teaching and evaluations involving human participants. Retrieved from <http://www.massey.ac.nz/massey/research/research-ethics/human-ethics/code-ethical-conduct.cfm>
- Mayner, L., & Arbon, P. (2015). Defining disaster: The need for harmonisation of terminology. *Australasian Journal of Disaster and Trauma Studies*, 19, 21-26.
- McLean, I., Oughton, D., Ellis, S., Wakelin, B., & Rubin, C. B. (2012). *Review of the Civil Defence Emergency Management response to the 22 February Christchurch earthquake*. Wellington, New Zealand: Ministry of Civil Defence and Emergency Management.

- McLennan, B., & Kruger, T. (2019). *Emergency volunteering 2030: Views from managers in volunteerism*. Retrieved from <http://www.bnhcrc.com.au/publications/biblio/bnh-5415>
- Menzel, D. C. (2006). The Katrina aftermath: A failure of federalism or leadership? *Public Administration Review*, 66(6), 808-812. <https://doi.org/10.1111/j.1540-6210.2006.00649.x>
- Meyer, B. (2015). Case studies. In *Researching Translation and Interpreting* (1st ed., pp. 195-202). Abingdon-on-Thames: United Kingdom: Routledge.
- Mills, A. J., Wiebe, E., & Durepos, G. (2010). *Encyclopedia of case study research*. Thousand Oaks, CA: Sage.
- Ministry of Civil Defence and Emergency Management. (2012). *CDEM Capability Assessment Report: Part 2*. Retrieved from <https://www.civildefence.govt.nz/assets/Uploads/publications/cdem-capability-assessment-report-April-2012-part-2.pdf>
- Ministry of Civil Defence and Emergency Management. (2019). *National Disaster Resilience Strategy*. Retrieved from <https://www.civildefence.govt.nz/cdem-sector/plans-and-strategies/proposed-national-disaster-resilience-strategy/>
- Ministry of Social Development. (2016). *The Social Report 2016 – Te pūrongo oranga tangata*. Retrieved from <http://socialreport.msd.govt.nz/>
- Mitchell, J. T. (2017). *Group crisis intervention* (5th ed.). Ellicott City, MD: International Critical Incident Stress Foundation.
- Mitrano, S. (2004). *What training is next for the Rochester, New York Community Emergency Response Team?* Retrieved from <http://www.hsdl.org>
- Mohrman, E. (2012). CERT: Filling the personnel gap in your toolbox. *IAEM Bulletin*, 29(5), 18.
- Morgan, D. L. (2014). Pragmatism as a paradigm for social research. *Qualitative Inquiry*, 20(8), 1045-1053.
- Morris-Suzuki, T. (2017). Disaster and utopia: Looking back at 3/11. *Japanese Studies*, 37(2), 171-190. <https://doi.org/10.1080/10371397.2017.1350920>

- Morse, J. (2015). Procedures and practice of mixed method design: Maintaining control, rigor, and complexity. In A. Tashakkori & C. Teddlie (Eds.), *Sage handbook of mixed methods in social and behavioral research* (2nd ed., pp. 339-352). Thousand Oaks, CA: Sage.
- Murphy, B. L. (2007). Locating social capital in resilient community-level emergency management. *Natural Hazards*, 41(2), 297-315.
<https://doi.org/10.1007/s11069-006-9037-6>
- Mutch, C. (2013). "Sailing through a river of emotions": Capturing children's earthquake stories. *Disaster Prevention and Management*, 22(5), 445-455.
- Najafi, M., Ardalan, A., Akbarisari, A., Noorbala, A. A., & Elmi, H. (2017). The theory of planned behavior and disaster preparedness. *Plos Currents*, 9.
<https://doi.org/10.1371/currents.dis.4da18e0f1479bf6c0a94b29e0dbf4a72>
- National CERT Program. (2011a). *Community Emergency Response Team: Basic training instructor guide*. Washington, DC: Federal Emergency Management Agency.
- National CERT Program. (2011b). *Community Emergency Response Team: Basic training participant manual*. Washington, DC: Federal Emergency Management Agency.
- National CERT Program. (2012). *Community Emergency Response Team participant manual - low vision version*. Retrieved from
<https://www.fema.gov/media-library/assets/documents/27451>
- National Research Council. (2006). *Facing hazards and disasters: Understanding human dimensions*. Washington, DC: National Academies.
- Navin, M., & Waddell, B. (2005). Triage is broken. *Emergency Medical Services*, 34(8), 138.
- Nguyen, L. H., Shen, H., Ershoff, D., Afifi, A. A., & Bourque, L. B. (2006). Exploring the causal relationship between exposure to the 1994 Northridge earthquake and pre-and post-earthquake preparedness activities. *Earthquake Spectra*, 22(3), 569-587.
- Norman, G. (2010). Likert scales, levels of measurement and the "laws" of statistics. *Advances in Health Sciences Education*, 15(5), 625-632.

- Norris, F. H., Friedman, M. J., Watson, P. J., Byrne, C. M., Diaz, E., & Kaniasty, K. (2002). 60,000 disaster victims speak: Part I. An empirical review of the empirical literature, 1981–2001. *Psychiatry: Interpersonal and Biological Processes, 65*(3), 207-239.
- Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology, 41*(1), 127-150. <https://doi.org/10.1007/s10464-007-9156-6>
- Ogden, J., & Lo, J. (2011). How meaningful are data from Likert scales? An evaluation of how ratings are made and the role of the response shift in the socially disadvantaged. *Journal of Health Psychology, 17*(3), 350-361. <https://doi.org/10.1177/1359105311417192>
- Onwuegbuzie, A. J., & Leech, N. L. (2006). Linking research questions to mixed methods data analysis procedures 1. *The Qualitative Report, 11*(3), 474-498.
- Oxford Dictionary. (n.d.). Resilience. Retrieved from <https://en.oxforddictionaries.com/definition/resilience>
- Pack, M. J. (2012). Critical Incident Stress Debriefing: An exploratory study of social workers' preferred models of CISM and experiences of CISD in New Zealand. *Social Work in Mental Health, 10*(4), 273-293. <https://doi.org/10.1080/15332985.2012.657297>
- Parsons, J. (2008). Key informant. In P. J. Lavrakas (Ed.), *Encyclopedia of survey research methods*. Thousand Oaks, CA: SAGE.
- Paton, D. (2003). Disaster preparedness: A social-cognitive perspective. *Disaster Prevention and Management: An International Journal, 12*(3), 210-216. <https://doi.org/doi:10.1108/09653560310480686>
- Paton, D. (2007). Preparing for natural hazards: The role of community trust. *Disaster Prevention and Management: An International Journal, 16*(3), 370-379. <https://doi.org/doi:10.1108/09653560710758323>
- Paton, D., Bajek, R., Okada, N., & McIvor, D. (2010). Predicting community earthquake preparedness: A cross-cultural comparison of Japan and New Zealand. *Natural Hazards, 54*(3), 765-781. <https://doi.org/10.1007/s11069-010-9500-2>

- Paton, D., & Johnston, D. (2001). Disasters and communities: Vulnerability, resilience and preparedness. *Disaster Prevention and Management: An International Journal*, 10(4), 270-277.
<https://doi.org/doi:10.1108/EUM0000000005930>
- Patterson, O., Weil, F., & Patel, K. (2010). The role of community in disaster response: Conceptual models. *Population Research and Policy Review*, 29(2), 127-141. <https://doi.org/10.1007/s11113-009-9133-x>
- Patton, M. Q. (2015). *Qualitative research & evaluation methods: Integrating theory and practice* (4th ed.). Los Angeles, CA: Sage.
- Perry, R. W. (2007). What is a disaster? In H. Rodríguez, E. L. Quarantelli, & R. R. Dynes (Eds.), *Handbook of disaster research* (pp. 1-15). New York: NY: Springer.
- Pine, N. S., Tarrant, R. A., Lyons, A. C., & Leathem, J. M. (2015). Rolling with the shakes: An insight into teenagers' perceptions of recovery after the Canterbury earthquakes. *Kōtuitui: New Zealand Journal of Sciences Online*, 10(2), 116-125.
- Porfiriev, B. N. (1996). Social aftermath and organizational response to a major disaster: The case of the 1995 Sakhalin earthquake in Russia. *Journal of Contingencies and Crisis Management*, 4(4), 218-227.
- Potter, S. H., Becker, J. S., Johnston, D. M., & Rossiter, K. P. (2015). An overview of the impacts of the 2010-2011 Canterbury earthquakes. *International Journal of Disaster Risk Reduction*, 14(Part 1), 6-14.
<https://doi.org/10.1016/j.ijdr.2015.01.014>
- Powell, P., Black, L., & Smith, M. (2011). Training youth to prepare communities for disasters. Retrieved from <https://www.unce.unr.edu/publications/>
- Powell, P., Smith, M., & Black, L. (2011a). *4-H Teen CERT: An evaluation of a two-day Nevada training*. Retrieved from <https://www.unce.unr.edu/publications/>
- Powell, P., Smith, M., & Black, L. (2011b). *4-H Teen CERT: Involving youth in Community Emergency Response Teams*. Retrieved from <https://www.unce.unr.edu/publications/>

- Quarantelli, E. L. (1985). What is disaster? The need for clarification in definition and conceptualization in research. In *Disasters and mental health: selected contemporary perspectives*. Washington, DC: U.S. Government Printing Officer.
- Quarantelli, E. L. (1988). Disaster crisis management: A summary of research findings. *Journal of Management Studies*, 25(4), 373-385.
<https://doi.org/10.1111/j.1467-6486.1988.tb00043.x>
- Quarantelli, E. L. (2005). Catastrophes are different from disasters: Some implications for crisis planning and managing drawn from Katrina. In Social Science Research Council (Ed.), *Understanding Katrina: Perspectives from the social sciences*. New York, NY: Social Science Research Council.
- Quarantelli, E. L., & Dynes, R. R. (1977). Response to social crisis and disaster. *Annual Review of Sociology*, 3(1), 23-49.
- Quevillon, R. P., Gray, B. L., Erickson, S. E., Gonzalez, E. D., & Jacobs, G. A. (2016). Helping the helpers: Assisting staff and volunteer workers before, during, and after disaster relief operations. *Journal of Clinical Psychology*, 72(12), 1348-1363. <https://doi.org/10.1002/jclp.22336>
- Ray, J. (2009). *Addressing how the Oakland fire department operational division coordinates and interactions with CORE groups in emergency situations*. Retrieved from <https://www.hsdl.org>
- Roberts, S. B. (2017). The life cycle of a disaster. In W. W. C. Ashley & S. B. Roberts (Eds.), *Disaster Spiritual Care, 2nd ed.* (pp. 23-36). New York, NY: SkyLight Paths.
- Rodd, S. (2018). Caught in a disaster? Your rescuer might be an amateur. Retrieved from <https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2018/08/08/caught-in-a-disaster-your-rescuer-might-be-an-amateur>
- Ronan, K. R., Crellin, K., Johnston, D. M., Finnis, K., Paton, D., & Becker, J. (2008). Promoting child and family resilience to disasters: Effects, interventions, and prevention effectiveness. *Children, Youth and Environments*, 18(1), 332-353.

- Rønholt, S., Karsberg, S., & Elklit, A. (2013). Preliminary evidence for a classroom based psychosocial intervention for disaster exposed children with posttraumatic stress symptomatology. *Child & Youth Care Forum*, 42(6), 617-631. <https://doi.org/10.1007/s10566-013-9220-3>
- Rossaint, R., Bouillon, B., Cerny, V., Coats, T. J., Duranteau, J., Fernández-Mondéjar, E., . . . Spahn, D. R. (2016). The European guideline on management of major bleeding and coagulopathy following trauma: Fourth edition. *Critical Care*, 20, 20-100. <https://doi.org/10.1186/s13054-016-1265-x>
- Rubin, O., & Dahlberg, R. (2017). *A Dictionary of Disaster Management*. Retrieved from <http://www.oxfordreference.com/view/10.1093/acref/9780191829895.001.0001/acref-9780191829895>
- Rush, D., Bankoff, G., Cooper-Knock, S.-J., Gibson, L., Hirst, L., Jordan, S., . . . Walls, R. (2019). *Fire risk reduction on the margins of an urbanizing world*. Retrieved from <https://www.preventionweb.net/publications/view/66548>
- Ruzek, J. I. J. R. m. v. g., Brymer, M. J., Jacobs, A. K., Layne, C. M., Vernberg, E. M., & Watson, P. J. (2007). Psychological First Aid. *Journal of Mental Health Counseling*, 29(1), 17-49.
- Samuels, A. (2015). Narratives of uncertainty: The affective force of child-trafficking rumors in postdisaster Aceh, Indonesia. *American Anthropologist*, 117(2), 229-241. <https://doi.org/10.1111/aman.12226>
- Sarantakos, S. (2013). *Social research* (4th ed.). Basingstoke, United Kingdom: Palgrave Macmillan.
- Sarmiento, J., Polak, S., & Sandoval, V. (2019). An evidence-based urban DRR strategy for informal settlements. *Disaster Prevention and Management: An International Journal*, 28(3), 371-395. <https://doi.org/10.1108/DPM-08-2018-0263>
- Sauer, L. M., Catlett, C., Tosatto, R., & Kirsch, T. D. (2014). The utility of and risks associated with the use of spontaneous volunteers in disaster response: A survey. *Disaster Medicine and Public Health Preparedness*, 8(1), 65-69. <https://doi.org/10.1017/dmp.2014.12>

- Schmidt, J. B. (2011). *A Community Emergency Response Team in the Marshfield fire and rescue department*. Retrieved from <https://www.hSDL.org>
- Scolobig, A., Prior, T., Schröter, D., Jörin, J., & Patt, A. (2015). Towards people-centred approaches for effective disaster risk management: Balancing rhetoric with reality. *International Journal of Disaster Risk Reduction*, 12, 202-212. <https://doi.org/10.1016/j.ijdrr.2015.01.006>
- Shaw, R. (2012). Overview of Community-Based Disaster Risk Reduction. In R. Shaw (Ed.), *Community-Based Disaster Risk Reduction* (pp. 3-17). Bingley, England: Emerald Group.
- Shaw, R. (2014). Kobe earthquake: Turning point of community-based risk reduction in Japan. In R. Shaw (Ed.), *Community practices for disaster risk reduction in Japan*. Tokyo, Japan: Springer.
- Silvestri, S., Field, A., Mangalat, N., Weatherford, T., Hunter, C., McGowan, Z., . . . Afshari, A. (2017). Comparison of START and SALT triage methodologies to reference standard definitions and to a field mass casualty simulation. *American Journal of Disaster Medicine*, 12(1), 27-33.
- Simpson, D. (1999). Community models of disaster preparedness. In J. Ingleton (Ed.), *Natural disaster management* (pp. 204-206). Leicester, United Kingdom: Tudor Rose.
- Simpson, D. M. (2000). Non-institutional sources of assistance following a disaster: Potential triage and treatment capabilities of neighborhood-based preparedness organizations. *Prehospital and disaster medicine: The official journal of the National Association of EMS Physicians and the World Association for Emergency and Disaster Medicine in association with the Acute Care Foundation*, 15(4), 199-206.
- Simpson, D. M. (2001). Community emergency response training (CERTs): A recent history and review. *Natural Hazards Review*, 2(2), 54-63. [https://doi.org/10.1061/\(ASCE\)1527-6988\(2001\)2:2\(54\)](https://doi.org/10.1061/(ASCE)1527-6988(2001)2:2(54))
- Smith, P. B. (2004). Acquiescent response bias as an aspect of cultural communication style. *Journal of Cross-Cultural Psychology*, 35(1), 50-61. <https://doi.org/10.1177/0022022103260380>
- Solnit, R. (2010). *A paradise built in hell: The extraordinary communities that arise in disaster*. London, United Kingdom: Penguin.

- Stallings, R. A., & Quarantelli, E. L. (1985). Emergent citizen groups and emergency management. *Public Administration Review*, 45, 93-100.
- Statistics New Zealand. (2012). *How prepared are New Zealanders for a natural disaster?* Wellington: Statistics New Zealand. Retrieved from http://archive.stats.govt.nz/browse_for_stats/people_and_communities/Households/natural-disaster-how-prepared-nzers.aspx
- Stough, L. M., & Kang, D. (2015). The Sendai Framework for Disaster Risk Reduction and persons with disabilities. *International Journal Of Disaster Risk Science*, 6, 140-149. <https://doi.org/10.1007/s13753-015-0051-8>
- Takahashi, R., Anderson, R. D., Coover, S., Kikuch, K., Scott, A. D., & Smith, R. R. (2014). The FEMA and CERT: Training, guidance and managements, an analysis on cross-cultural perspectives. *Odisha Journal of Social Science*, 1(II), 14-28.
- Taylor, S. J., Bogdan, R., & DeVault, M. (2015). *Introduction to qualitative research methods : A guidebook and resource*. Hoboken, NJ: John Wiley & Sons.
- TeKippe, J. F. (2003). *Should the Des Moines fire department utilize a CERT to perform damage assessment during disasters?* Retrieved from <http://www.hsdl.org>
- Texas A&M Engineering Extension Service. (2019). Swiftwater Awareness On-Line Training. Retrieved from <https://teex.org/Pages/Class.aspx?course=TNG80A&courseTitle=Swiftwater+Awareness+On-Line+Training>
- Thormar, S. B., Gersons, B. P. R., Juen, B., Djakababa, M. N., Karlsson, T., & Olf, M. (2013). Organizational factors and mental health in community volunteers. The role of exposure, preparation, training, tasks assigned, and support. *Anxiety, Stress & Coping*, 26(6), 624-642.
- Thormar, S. B., Gersons, B. P. R., Juen, B., Djakababa, M. N., Karlsson, T., & Olf, M. (2014). The impact of disaster work on community volunteers: The role of peri-traumatic distress, level of personal affectedness, sleep quality and resource loss, on post-traumatic stress disorder symptoms and subjective health. *Journal of Anxiety Disorders*, 28, 971-977. <https://doi.org/10.1016/j.janxdis.2014.10.006>

- Timaru District Council. (2017). First in NZ for first responder accreditation. Retrieved from <https://www.timaru.govt.nz/news-and-events/latest-news/first-in-nz-for-first-responder-accreditation>
- Tipler, K., Tarrant, R., Johnston, D., & Tuffin, K. (2017). Are you ready? Emergency preparedness in New Zealand schools. *International Journal of Disaster Risk Reduction*, 25, 324-333. <https://doi.org/10.1016/j.ijdrr.2017.09.035>
- Turner, A. (2010). *Youth in an emergency: How are we educating and utilising this resource?* (Grad. Dip. Emerg. Mgt), Massey University.
- Twigg, J. (1999). The age of accountability: Future community involvement in disaster reduction. *Australian Journal of Emergency Management*, 14(4), 51.
- Twigg, J., & Mosel, I. (2017). Emergent groups and spontaneous volunteers in urban disaster response. *Environment and Urbanization*, 29(2), 443-458. <https://doi.org/10.1177/0956247817721413>
- UN-HABITAT. (n.d.). Disaster resilient city development strategies for Sri Lankan cities (completed). Retrieved from http://www.fukuoka.unhabitat.org/projects/sri_lanka/detail20_en.html
- UN General Assembly. (1990). International Decade for Natural Disaster Reduction: Resolution adopted by the General Assembly. Retrieved from <https://www.refworld.org/docid/3b00efe50.html>
- United Nations International Strategy for Disaster Reduction. (1994a). *Report of the World Conference on Natural Disaster Reduction, Yokohama, 23-27 May 1994*. Retrieved from <https://www.preventionweb.net/publications/view/10996>
- United Nations International Strategy for Disaster Reduction. (1994b). *Yokohama strategy and plan of action for a safer world: Guidelines for natural disaster prevention, preparedness and mitigation*. Retrieved from <https://www.unisdr.org/we/inform/publications/8241>
- United Nations International Strategy for Disaster Reduction. (2007). *Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters*. Retrieved from <https://www.unisdr.org/we/inform/publications/1037>

- United Nations International Strategy for Disaster Reduction. (2008). *Disaster preparedness for effective response: Guidance and indicator package for implementing priority five of the Hyogo framework*. Retrieved from <https://www.unisdr.org/we/inform/publications/2909>
- United Nations International Strategy for Disaster Reduction. (2009). *2009 UNISDR terminology on disaster risk reduction*. Retrieved from <https://www.unisdr.org/we/inform/publications/7817>
- United Nations International Strategy for Disaster Reduction. (2011). *Hyogo Framework for Action 2005-2015 mid-term review*. Retrieved from <https://www.unisdr.org/we/inform/publications/18197>
- United Nations International Strategy for Disaster Reduction. (2017). *Terminology*. Retrieved from <https://www.unisdr.org/we/inform/terminology>
- United Nations Office for Disaster Risk Reduction. (2015). *Sendai Framework for Disaster Risk Reduction 2015-2030*. Retrieved from <https://www.unisdr.org/we/inform/publications/43291>
- United Nations Office for Disaster Risk Reduction. (2017). *Words into Action guidelines: Enhancing disaster preparedness for effective response (Consultative version)*. Retrieved from <https://www.preventionweb.net/publications/view/53347>
- United Nations Office for the Coordination of Humanitarian Affairs. (2015a). *INSARAG First Responder Training Programme*. Retrieved from <https://www.insarag.org/capacity-building/first-responder-training>
- United Nations Office for the Coordination of Humanitarian Affairs. (2015b). *INSARAG Guidelines Volume II: Preparedness and Response*. Retrieved from <https://www.insarag.org/methodology/guidelines>
- Van Niekerk, D., Nema-konde, L. D., Kruger, L., & Forbes-Genade, K. (2018). Community-Based Disaster Risk Management. In H. Rodríguez, W. Donner, & J. E. Trainor (Eds.), *Handbook of Disaster Research* (2nd ed., pp. 411-429). Cham, Switzerland: Springer International.
- Victoria, L. P. (2003). Community-based disaster management in the Philippines: Making a difference in people's lives. *Philippine Sociological Review*, 51, 65-80.

- Vogt, W. P. (2007). *Quantitative research methods for professionals*. London, United Kingdom: Pearson.
- Waldvogel, K. I. (2005). *Evaluating citizen emergency response training programs in communities served by the Santa Clara County Fire Department*. Retrieved from <https://www.hSDL.org>
- Walia, A. (2008). Community based disaster preparedness: Need for a standardized training module. *Australian Journal of Emergency Management*, 23(2), 68-73.
- Wallemacq, P., & House, R. (2018). *Economic losses, poverty & disasters: 1998-2017*. Retrieved from <https://www.preventionweb.net/publications/view/61119>
- Warmbrod, J. R. (2014). Reporting and interpreting scores derived from Likert-type scales. *Journal of Agricultural Education*, 55(5), 30-47.
- Wenger, C. (2017). The oak or the reed: How resilience theories are translated into disaster management policies. *Ecology and Society*, 22(3). <https://doi.org/10.5751/ES-09491-220318>
- Wenger, D. E., Dynes, R. R., & Quarantelli, E. L. (1988). *The organizational and public response to the September 1985 earthquake in Mexico City, Mexico*. Newark, DE: University of Delaware.
- Whittaker, J., McLennan, B., & Handmer, J. (2015). A review of informal volunteerism in emergencies and disasters: Definition, opportunities and challenges. *International Journal of Disaster Risk Reduction*, 13, 358-368. <https://doi.org/https://doi.org/10.1016/j.ijdrr.2015.07.010>
- Yin, R. K. (1981). The case study as a serious research strategy. *Knowledge*, 3(1), 97-114.
- Yule, W., Bolton, D., Udwin, O., Boyle, S., O'Ryan, D., & Nurrish, J. (2000). The long-term psychological effects of a disaster experienced in adolescence: I: The incidence and course of PTSD. *The Journal of Child Psychology and Psychiatry and Allied Disciplines*, 41(4), 503-511.

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Appendix 1: Survey questionnaire

The following 55 questions compose the online survey that was used to gather the quantitative research information.

Q1 Full name

Q2 Which CERT course did you complete?

Q3 In which country or territory would you like to see the CERT Program implemented? The country that you select here will be referred to as you complete this survey. It should be outside of the continental United States of America, and ideally will be a country where you have lived or with which you are familiar.

For each of the questions below, please indicate whether you agree or disagree with the statement regarding the suitability of the CERT training for the country or territory that you have selected.

Q4 The CERT training program could be useful for this country or territory

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q5 The CERT training course contains the appropriate amount of practical activities

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q6 The CERT training course contains the appropriate amount of theory and teaching

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

For each of the following topics and activities in Unit 1: Disaster Preparedness please indicate whether you agree that it is relevant and appropriate for the country or territory that you have selected.

Q7 Unit 1: Disaster Preparedness complete lesson

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q8 Topics: Community Preparedness and Hazards and their Potential Impact

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q9 Topics: Home and Workplace Preparedness and Mitigation of Hazards

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q10 Topics: CERT Disaster Response, Protection for Disaster Workers and Additional Training for CERTs

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

For each of the following topics and activities in Unit 2: Fire Safety and Utility Controls please indicate whether you agree that it is relevant and appropriate for the country or territory that you have selected.

Q11 Unit 2: Fire Safety and Utility Controls complete lesson

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q12 Topics: Fire Chemistry, Fire and Utility Hazards and Sizeup

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q13 Topics: Firefighting Resources, Fire Extinguisher Operation and Fire Suppression Safety

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q14 Topic: Hazardous Materials

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q15 Suppressing small fires using a fire extinguisher practical activity

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

For each of the following topics and activities in Unit 3: Disaster Medical Operations - Part 1 please indicate whether you agree that it is relevant and appropriate for the country or territory that you have selected.

Q16 Unit 3: Disaster Medical Operations - Part 1 complete lesson

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q17 Topic: Treating Life-Threatening Conditions

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q18 Airway Management, Bleeding Control, Removing Gloves practical activities

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q19 Topic: START Triage

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q20 Triage practical activity

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

For each of the following topics and activities in Unit 4: Disaster Medical Operations - Part 2 please indicate whether you agree that it is relevant and appropriate for the country or territory that you have selected.

Q21 Unit 4: Disaster Medical Operations - Part 2 complete lesson

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q22 Topics: Public Health Considerations, Establishing Medical Treatment Areas and Functions of Disaster Medical Operations

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q23 Topic: Conducting Head-to-Toe Assessments

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q24 Head-to-Toe Assessment practical activity

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q25 Topics: Treating Burns, Wound Care and Treating Fractures, Dislocations, Sprains, and Strains

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q26 Splinting practical activity

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q27 Topics: Nasal Injuries, Treating Cold-Related Injuries, Treating Heat-Related Injuries and Bites and Stings

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

For each of the following topics and activities in Unit 5: Light Search and Rescue Operations please indicate whether you agree that it is relevant and appropriate for the country or territory that you have selected.

Q28 Unit 5: Light Search and Rescue Operations complete lesson

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q29 Topic: Safety During Search and Rescue Operations

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q30 Topic: Conducting Interior and Exterior Search Operations

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q31 Topic: Conducting Rescue Operations

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q32 Cribbing practical activity

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q33 Patient Carries practical activity

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

For each of the following topics and activities in Unit 6: CERT Organization please indicate whether you agree that it is relevant and appropriate for the country or territory that you have selected.

Q34 Unit 6: CERT Organization complete lesson

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q35 Topics: CERT Organization and CERT Mobilization

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q36 Topic: Documentation

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q37 ICS Functions practical activity

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q38 Tabletop Exercise practical activity

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

For each of the following topics and activities in Unit 7: Disaster Psychology please indicate whether you agree that it is relevant and appropriate for the country or territory that you have selected.

Q39 Unit 7: Disaster Psychology complete lesson

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q40 Topic: Disaster Trauma

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q41 Topic: Team Well-Being

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q42 Topic: Working with Survivors' Trauma

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

For each of the following topics and activities in Unit 8: Terrorism and CERT please indicate whether you agree that it is relevant and appropriate for the country or territory that you have selected.

Q43 Unit 8: Terrorism and CERT complete lesson

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q44 Topic: What Is Terrorism?

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q45 Topics: Terrorist Targets, Terrorist Weapons and CBRNE Indicators

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q46 Topic: Preparing at Home, Work, and in Your Neighbourhood

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q47 Topics: CERTs and Terrorist Incidents, and Hazardous Materials

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q48 Applying CERT Principles to a Suspected Terrorist Incident practical activity

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

For each of the following topics and activities in Unit 9: Course Review, Final Exam, and Disaster Simulation please indicate whether you agree that it is relevant and appropriate for the country or territory that you have selected.

Q49 Unit 9: Course Review, Final Exam, and Disaster Simulation complete lesson

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q50 Topic: Course Review

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q51 Final Exam (post-test)

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q52 Disaster Simulation practical activity

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q53 Exercise Critique and Summary

Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree

Q54 Please write any suggestions or recommendations about how the CERT course could be best adapted to your target country or territory.

Q55 If you would like to be considered for a possible follow-up online interview, please write your email address in the box below.

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Appendix 2: Standardised open-ended interview questions

The aim of this research is to obtain insights and suggestions that could be used to provide direction and guidance for the creation, training and maintenance of CBDRT programmes, especially in developing nations or among vulnerable groups such as the poor, young people, and communities that have been impacted by natural or technological disaster.

As this research seeks to investigate the use of the CERT curriculum as CBDRT training among vulnerable communities the following three research questions will be answered:

1. How can CBDRT training courses be adapted for vulnerable groups, including adolescents, the poor, and communities that have been impacted by natural or technological disasters?
2. What topics and practical activities would be most useful for such training?
3. How can Community-Based Disaster Response Teams be established and made sustainable for the long-term in these communities?

Interview questions

1. Please could you identify yourself, state where you are from, and briefly describe your experience with the Community Emergency Response Team programme?

2. As you know, the standard CERT basic training course consist of nine different units. I'd now like to mention each of these units and ask if you have any comments about that unit in general or specific topics or activities thereof, and if you have any suggestion about possible changes.

- Unit 1: Disaster Preparedness
- Unit 2: Fire Safety and Utility Control
- Unit 3: Disaster Medical Operations - part 1

- Unit 4: Disaster Medical Operations - part 2
- Unit 5: Light Search and Rescue Operations
- Unit 6: CERT Organisation
- Unit 7: Disaster Psychology
- Unit 8: Terrorism and CERT
- Unit 9: Course review, post-test and final simulation

3. In your experience, do you believe that the CERT programme is a good model for community-based disaster response teams? Why or why not? What do you think could be changed to increase the relevance or usefulness of the programme?

4. Finally, based on your experience with CERT, do you have any suggestions about implementing or maintain a community-based disaster response team programme?

Appendix 3: Questionnaire Likert-scale scores

Survey Question	Summated Likert-Scale Score	Approval %
Q4: The CERT training program could be useful for this country or territory	260	94.55%
Q5: The CERT training course contains the appropriate amount of practical activities	246	89.45%
Q6: The CERT training course contains the appropriate amount of theory and teaching	257	93.45%
Q7: Unit 1 complete lesson	261	94.91%
Q8: Topics: Community Preparedness and Hazards and their Potential Impact	258	93.82%
Q9: Topics: Home and Workplace Preparedness and Mitigation of Hazards	254	92.36%
Q10: Topics: CERT Disaster Response, Protection for Disaster Workers and Additional Training for CERTs	264	96.00%
Q11: Unit 2: Fire Safety and Utility Controls complete lesson	263	95.64%
Q12: Topics: Fire Chemistry, Fire and Utility Hazards and Sizeup	263	95.64%
Q13: Topics: Firefighting Resources, Fire Extinguisher Operation and Fire Suppression Safety	260	94.55%
Q14: Topic: Hazardous Materials	250	90.91%
Q15: Suppressing small fires using a fire extinguisher practical activity	269	97.82%
Q16: Unit 3: Disaster Medical Operations - Part 1 complete lesson	266	96.73%
Q17: Topic: Treating Life-Threatening Conditions	268	97.45%
Q18: Airway Management, Bleeding Control, Removing Gloves practical activities	271	98.55%
Q19: Topic: START Triage	272	98.91%
Q20: Triage practical activity	272	98.91%
Q21: Unit 4: Disaster Medical Operations - Part 2 complete lesson	269	97.82%
Q22: Topics: Public Health Considerations, Establishing Medical Treatment Areas and Functions of Disaster Medical Operations	267	97.09%
Q23: Topic: Conducting Head-to-Toe Assessments	268	97.45%
Q24: Head-to-Toe Assessment practical activity	266	96.73%
Q25: Topics: Treating Burns, Wound Care and Treating Fractures, Dislocations, Sprains, and Strains	270	98.18%
Q26: Splinting practical activity	268	97.45%
Q27: Topics: Nasal Injuries, Treating Cold-Related Injuries, Treating Heat-Related Injuries and Bites and Stings	262	95.27%

Survey Question	Summated Likert-Scale Score	Approval %
Q28: Unit 5: Light Search and Rescue Operations complete lesson	265	96.36%
Q29: Topic: Safety During Search and Rescue Operations	268	97.45%
Q30: Topic: Conducting Interior and Exterior Search Operations	264	96.00%
Q31: Topic: Conducting Rescue Operations	260	94.55%
Q32: Cribbing practical activity	260	94.55%
Q33: Patient Carries practical activity	265	96.36%
Q34: Unit 6: CERT Organization complete lesson	260	94.55%
Q35: Topics: CERT Organization and CERT Mobilization	259	94.18%
Q36: Topic: Documentation	257	93.45%
Q37: ICS Functions practical activity	266	96.73%
Q38: Tabletop Exercise practical activity	255	92.73%
Q39: Unit 7: Disaster Psychology complete lesson	269	97.82%
Q40: Disaster Trauma	267	97.09%
Q41: Topic: Team Well-Being	269	97.82%
Q42: Topic: Working with Survivors' Trauma	270	98.18%
Q43: Unit 8: Terrorism and CERT complete lesson	248	90.18%
Q44: Topic: What Is Terrorism?	254	92.36%
Q45: Topics: Terrorist Targets, Terrorist Weapons and CBRNE Indicators	248	90.18%
Q46: Topic: Preparing at Home, Work, and in Your Neighbourhood	251	91.27%
Q47: Topics: CERTs and Terrorist Incidents, and Hazardous Materials	251	91.27%
Q48: Applying CERT Principles to a Suspected Terrorist Incident practical activity	250	90.91%
Q49: Unit 9: Course Review, Final Exam, and Disaster Simulation complete lesson	268	97.45%
Q50: Topic: Course Review	263	95.64%
Q51: Final Exam (post-test)	248	90.18%
Q52: Disaster Simulation practical activity	268	97.45%
Q53: Exercise Critique and Summary	258	93.82%
Questionnaire average	237.91	86.51%

Appendix 4: Interview themes and codes

Code	Count	% Codes	Cases	% Cases
T1: How did the informant get involved with CERT?				
Participated since young	3	1.00%	3	42.90%
Participated in CERT team	1	0.30%	1	14.30%
Participated as victims when young	1	0.30%	1	14.30%
Taught CERT as instructor	2	0.70%	2	28.60%
Seen CERT teams developed over the years	2	0.70%	2	28.60%
Wanted to know about community preparedness before CERT	1	0.30%	1	14.30%
T2: Evaluation of the CERT course and individual components				
Unit 1 Preparedness	8	2.60%	6	85.70%
Unit 2 Fire safety	7	2.30%	6	85.70%
Unit 3 DMO 1	8	2.60%	6	85.70%
Unit 4 DMO 2	6	2.00%	6	85.70%
Unit 5 SAR	6	2.00%	6	85.70%
Unit 6 Team Organisation	6	2.00%	6	85.70%
Unit 7 Disaster Psychology	8	2.60%	7	100.00%
Unit 8 Terrorism	8	2.60%	5	71.40%
Unit 9 Simulation	7	2.30%	7	100.00%
Whole course	8	2.60%	7	100.00%
Useful/Good	17	5.60%	5	71.40%
Very useful/good/excellent	8	2.60%	5	71.40%
Important / very important	8	2.60%	4	57.10%
No criticism/nothing lacking/Wouldn't change anything	7	2.30%	3	42.90%
Best/One of the best units	6	2.00%	4	57.10%
Not relevant to this country	4	1.30%	3	42.90%
More important/better for another country	4	1.30%	3	42.90%
Is not easily adaptable	1	0.30%	1	14.30%
CERT is a good model/program	5	1.70%	4	57.10%

Code	Count	% Codes	Cases	% Cases
T3: Informants' impressions of the CERT training				
Liked the practical activities	8	2.60%	5	71.40%
Shows how CERT works in practice	5	1.70%	5	71.40%
Important life skill	4	1.30%	3	42.90%
Relevant and practical	4	1.30%	3	42.90%
Enjoyed the training	3	1.00%	1	14.30%
We had never worked with that before	3	1.00%	2	28.60%
Worried about the material being learned/Unsure	2	0.70%	2	28.60%
Comfortable with material	4	1.30%	2	28.60%
Unsure if able to help in real-world	2	0.70%	2	28.60%
Simulation felt real/very real	3	1.00%	2	28.60%
Simulation didn't feel real	1	0.30%	1	14.30%
Final test difficult	1	0.30%	1	14.30%
T4: Suggested changes to the CERT course				
Content sub-theme				
Needs more frequent updates	5	1.70%	2	28.60%
Needs to be adapted to context	10	3.30%	5	71.40%
We have other types of disasters	1	0.30%	1	14.30%
Needs additional material	16	5.30%	4	57.10%
Be culturally relevant	9	3.00%	4	57.10%
Delivery sub-theme				
Add more simulations	2	0.70%	1	14.30%
Not dependent on PowerPoint (technology)	1	0.30%	1	14.30%
Needs to be visual for non-readers	2	0.70%	1	14.30%
Specialist instructors	2	0.70%	2	28.60%
Use more practical activities	3	1.00%	2	28.60%
Make simulations more real	1	0.30%	1	14.30%
Prevent traumatisation	2	0.70%	2	28.60%

Code	Count	% Codes	Cases	% Cases
T5: Suggestions for maintaining CERT programmes				
Leadership sub-theme				
Important to have leaders	1	0.30%	1	14.30%
Needs to raise up leaders	3	1.00%	2	28.60%
Teach as leadership class	1	0.30%	1	14.30%
Organisation sub-theme				
Needs to find funding/resources	1	0.30%	1	14.30%
Needs to create networks	3	1.00%	2	28.60%
Ongoing training	3	1.00%	3	42.90%
CERT teams need to be promoted more	2	0.70%	1	14.30%
Partnerships sub-theme				
Need to work with public authorities	7	2.30%	4	57.10%
Need to hold CERT in schools/for young people	7	2.30%	3	42.90%
T6: Benefits of the CERT programme				
Empowering sub-theme				
CERT empowered me	2	0.70%	1	14.30%
CERT empowers people to be agents of change	2	0.70%	1	14.30%
We can help people	4	1.30%	4	57.10%
Used CERT training following course	3	1.00%	2	28.60%
Community sub-theme				
People aren't prepared for disasters	2	0.70%	2	28.60%
People needed CERT training following disaster	3	1.00%	2	28.60%
Helps to think differently about disasters	6	2.00%	2	28.60%
CERT is needed in my community / country	3	1.00%	2	28.60%
Useful sub-theme				
Important for the responders themselves	1	0.30%	1	14.30%
Useful for young people	2	0.70%	2	28.60%
Helps with healing	2	0.70%	2	28.60%
Importance of safety training	3	1.00%	3	42.90%
Importance of standard structures and protocols/ICS	3	1.00%	3	42.90%
Teamwork sub-theme				
Teaches teamwork	1	0.30%	1	14.30%
CERT more than a team, a community	2	0.70%	2	28.60%

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Appendix 5: Survey comment field codes by theme

Code	Count	% Codes	Cases	% Cases
T1: How did the informant get involved with CERT?				
Taught CERT as instructor	1	1.70%	1	3.60%
T2: Evaluation of the CERT course and individual components				
Unit 2 Fire safety	1	1.70%	1	3.60%
Unit 3 DMO 1	3	5.10%	3	10.70%
Unit 4 DMO 2	2	3.40%	2	7.10%
Unit 7 Disaster Psychology	2	3.40%	2	7.10%
Unit 8 Terrorism	1	1.70%	1	3.60%
Whole course	4	6.80%	4	14.30%
Useful/Good	4	6.80%	3	10.70%
Very useful/good/excellent	3	5.10%	3	10.70%
No criticism/nothing lacking/Wouldn't change anything	2	3.40%	2	7.10%
Not relevant to this country	1	1.70%	1	3.60%
T3: Informants' impressions of the CERT training				
Liked the practical activities	3	5.10%	2	7.10%
Enjoyed the training	1	1.70%	1	3.60%
T4: Suggested changes to the CERT course				
Needs more frequent updates	1	1.70%	1	3.60%
Needs additional material	6	10.20%	5	17.90%
Add more simulations	1	1.70%	1	3.60%
Needs to be visual for non-readers	1	1.70%	1	3.60%
Use more practical activities	4	6.80%	4	14.30%
More time for course/unit	5	8.50%	5	17.90%
T5: Suggestions for maintaining CERT programmes				
Needs to create networks	3	5.10%	3	10.70%
Ongoing training	3	5.10%	3	10.70%
Need to hold CERT in schools/for young people	2	3.40%	2	7.10%
CERT teams need to be promoted more	2	3.40%	2	7.10%
T6: Benefits of the CERT programme				
We can help people	1	1.70%	1	3.60%
CERT is needed in my community / country	2	3.40%	2	7.10%