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Earthquake and its Impacts on Education: Aftermath Nepal Quake 2015

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Abstract: Although earthquakes themselves do not kill people, they highlight the critical importance of physical infrastructure resilience, safety measures and preparedness for natural disasters. Earthquakes are one of several environmental crises that can be categorized as a natural hazard/disaster. This study uses the qualitative method of research. The semi-structured interview with follow up questions among the educational actors like students, head/teachers, officials from the district education office and the local NGO staff working in the field of education before and immediately after the earthquake. The content analyses of curriculum of secondary level and textbooks of grade IX and X as well as field visit/observation were carried out during the study. The result and the conclusion of this study show that following the 2015 earthquake, the preparation of emergency bags helped children and their families gather essential items in a ready-to-go bag specifically designed for disaster situations. Simulation activities in schools helped prepare students for future disasters, and there were also many initiatives to reduce student and teacher trauma following the 2015 quake, including the development of a credited 5-hour teacher professional development (TPD) counselling programme. The inclusion of school disaster risk reduction (DRR) education in the curriculum and textbooks containing information on earthquakes, their cause, effects and preventive measures have now been disseminated in many languages including Nepali and English.

Keywords: *Earthquake; Education;Impacts; Natural Disasters; Nepal*

Introduction

Nepal is a landlocked country between two giant countries - India and China (Ulak, 2015). Regarding the position of Nepal geographically, Shrestha (2000, p. 3 cited in Ulak, 2015), mentioned that "its shape is roughly rectangular with the length of 885 KM (kilometres) from east-west and its breadth 193 KM in north-south". Nepal is also the hub of the natural disasters because it has steep valley sides and elevation differences from the 65 metres from the sea level (Kechana – Jhapa) to up to several thousand metres i.e. 8,848 (Mt. Everest) metres (Hagen, 1969 cited in Kruhl et al., 2018) with breath-taking landscapes, snow-capped mountains, lakes and national parks. Natural disasters, earthquakes and other related information about the earthquake and its impacts on education: Aftermath Nepal quakes 2015 (Basnet, 2018) are introduced here. Moreover, the nation is located completely in a zone of high seismicity with at least ten larger earthquakes enlisted for historical times (Chitrakar and Pandey 1986 cited in Kruhl et al., 2018) and a similar number of earthquakes for pre-historic times (Sakai et al., 2015). The steep valleys and elevation differences as well as the earthquakes lead to other natural disasters, for an instance: earthquakes, floods, landslides, fires, epidemics, avalanches, windstorms, hailstorms, lightning, glacier lake outburst floods, droughts and dangerous weather events (Subedi & Chhetri, 2019 p.1). The annual monsoon rain partly increases these disasters (Kruhl et al., 2018).

Natural disasters occur suddenly and frequently in the global South, affecting millions of people every year - particularly in developing countries. Natural disasters

are an organic process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, and environmental damage (United Nations International Strategy for Disaster Reduction [UNISDR], 2009). Saluf (2007) divided disasters into three types: natural, man-made and hybrid. Earthquakes, volcanic eruptions and tsunamis are considered natural disasters, whilst chemical spills, industrial accidents, marine pollution, war etc. are man-made disasters caused by human actions. Hybrid disasters are a result of both human actions and natural causes (Evans, 2011 cited in Merchant, 2015).

The earthquake is one out of several different environmental crises or disasters, categorized as natural hazard/disaster. "An earthquake may be defined as a wave-like motion generated by forces in constant turmoil under the surface layer of the earth (the lithosphere), travelling through the earth's crust. (Duggal, 2013, p. 1).

A key question - according to Zakour& Gillespie, (2013, p. 40) is: "Who was where, when?" The devastating mega earthquake, with a magnitude of 7.8 (USGS 2015 cited in Bracken et al., 2018) first felt in the small town of Gorkha in central Nepal at 11:56 a.m. on Saturday, 25 April 2015 and many people who worked in the office were not at work and school children were also off. Most of other general people were not asleep at home and/or in buildings which subsequently collapsed. Fundamentally, these weak structures have been found as the major cause of huge damage and loss in earthquake (Subedi & Chhetri, 2019). So, the particular point of time, the earthquake struck actually saved lives. Otherwise, it would have been very difficult to contemplate the numbers of human casualties. But the loss of human was still huge. According to Subedi & Chhetri (2019), the 2015 earthquake and its many subsequent aftershocks killed 8,970 people; 198 people went missing; 22,303 people were seriously injured; 604,930 houses were completely destroyed; 288,856 houses were partially damaged and around 800,000 people were displaced. The total value of the damage was estimated at 706 billion Nepali rupees (around 7 billion US$).

Globally, children and youth are often vulnerable in disaster situations. In Nepal, children make up 40% of the country's total population. On the April 25, 2015 earthquake and the May 12, 2015 aftershock in Nepal hit 14 districts (as shown in figure 1) severely which has an estimated population of 2.8 million (Gautam, 2017). Among them 1.1 million (40%) are children (from a total of 9.1 million school-age children in the country) who were directly impacted after the earthquake and its aftershocks. The statistics showed that approximately 3,000 children were killed, and thousands were injured as well as 35,000 classrooms (Kruhl et al., 2018) were damaged or destroyed. At least 950,000 children in Nepal will not be able to return to school, unless urgent action is taken to provide temporary learning centres and repair damaged school buildings by retrofitting them or by other means following the 25 April earthquake (UNICEF, 2017).

The research will be guided by the following research questions:

1. What are the immediate experiences and the impacts of earthquake to head teachers, teachers and students?

2. To what extent are the post-earthquake measures reflected in:

i. Curriculum and textbooks of secondary level in governmental school and

ii. Infrastructural development in school constructions and other safety initiatives?

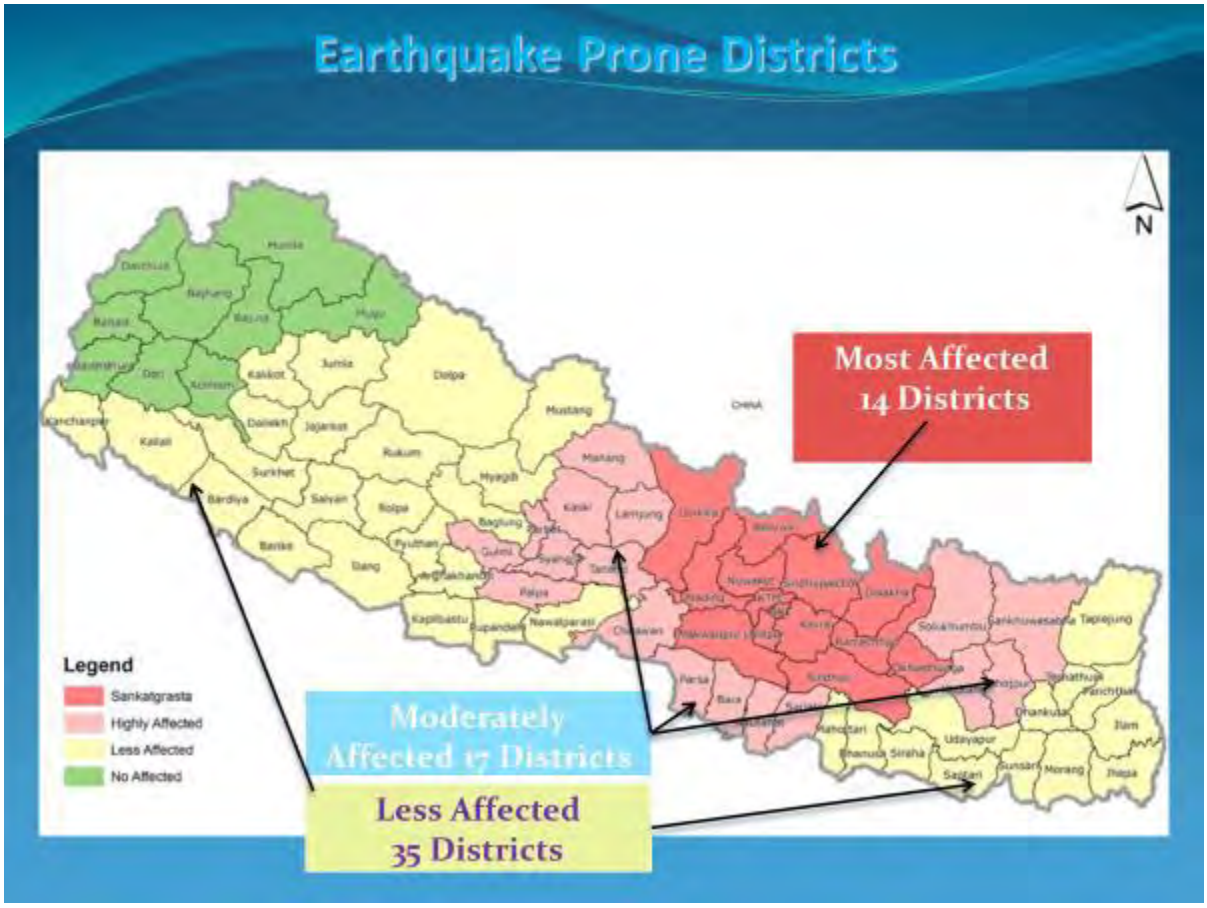

Figure 1: The earthquake affected districts of Nepal by the mega earthquake of 2015 (Basnet, 2018)

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Literature Review

Although there are several concepts introduced and applied throughout this paper, the most central are accounted here. For the purpose of this study, the disaster vulnerability and disaster resilient theory will be used to explain how likely a person is to experience harm from the losses in a disaster and what measures does s/he adopt to exacerbate the consequences which is explained in detail by M.J. Zakour and D.F Gillespie (2013) in their book Community Disaster Vulnerability: Theory, Research and Practice. More specifically, the immediate earthquake impacts will be analyzed through disaster vulnerability theory and post-earthquake via the lens of disaster resilience theory. The vulnerability theory specifically explains the vulnerable conditions before the disaster and the resilience after the disaster. There is, however, a gap between pre-disaster and post disaster phase which the theory lacks. The people will be more vulnerable after disaster and when there are many subsequent seismic tremors, the condition around them is more vulnerable than the pre-disaster phase. This is particularly relevant to this study since the people in Nepal in general, and in the research sites in particular, were more vulnerable after the devastating earthquake of

spring 2015. I will also focus in the concepts related to earthquake impacts such as disaster, vulnerability and resilience simultaneously. Additionally, the pressure and release model, push and pull factors of theory of migration will also be discussed in detail to support the findings.

As vulnerability theory acknowledges that "there are things that can be done during each phase of disaster, from mitigation to reconstruction to reduce vulnerability (Zakour and Gillespie, 2013; 19), it is a good fit for examining vulnerabilities during the humanitarian response, recovery and rebuilding process. Vulnerability is determined through the social processes that unfold over time through layers of root causes, dynamic pressures or structural constraints, and unsafe conditions" (Zakour and Gillespie, 2013). Multifold factors influence the vulnerabilities of people after a disaster. At Risk (2005): Natural Hazards, People's Vulnerability, and Disasters (A book written by Piers Blaikie, Terry Cannon, Ian Davis, and Ben Wisner) focuses on what makes people vulnerable by providing two analytical models understand vulnerability. One model (The disaster pressure and release model also known as PAR model) links remote and distant 'root causes' to 'unsafe conditions' in a 'progression of vulnerability'. The other (the Access model) uses the concepts of 'access' and 'livelihood' to understand why some households are more vulnerable than others.

The research on vulnerability has drawn on traditional methods also known as comprehensive disaster management. They are disaster mitigation (prevention), preparedness, response, and recovery (reconstruction). Mitigation, which is also known as prevention or risk reduction is often regarded as the capstone for disaster management (Coppola, 2015). It is a simple answer to the hazard problem and it tries to reduce the consequences of a hazard risk before a disaster ever occurs unlike the other components viz. preparedness, response, and recovery. These are performed either in reaction to disasters or in anticipation of such a disaster in the days to come. According to Wisner et al. (2004), the vulnerability to hazards and risk not only affect one's ability to cope with a disaster, but also affect a person's means for mitigation (pre-disaster event) and recovery (post-disaster event). Even though mitigation measures are highly effective at reducing disaster risk, they cannot exacerbate every threat to a society at large. When a disaster strikes, there may be little or no time to make any additional arrangements, to learn any new skills, or to acquire needed supplies simultaneously. According to Coppola (2015), "disaster preparedness is defined as actions taken in advance of a disaster to ensure adequate response to its impacts, and the relief and recovery from its consequences (p. 275)". This action is shown to eliminate the need for any ultimate actions to be taken. Many different organizations and individuals, including emergency response agencies, government officials, businesses, and citizens and people who work in international non-governmental and humanitarian organizations conduct disaster preparedness activities. Through the processes of preparedness and mitigation, mirrored and elaborated earlier, individuals, communities, and countries work to decrease their vulnerability and increase their resilience to disasters. Unfortunately, despite preparedness (having the best emergency plans, the most comprehensive preparedness programmes, and the most effective risk reduction plans in hand), disasters still strike throughout the world on a regular basis and it struck in Nepal in 2015 too. And when they

do, individuals, communities, and countries must initiate disaster response, working within their limited funding, resources, abilities, and time to prevent the onset of a catastrophe. Response is the action taken to reduce the impact of the disaster to prevent more suffering and/or financial loss to the people and their periphery. Within this, relief materials such as food, clothes, temporary shelters and other basic needs in general are provided. Thereafter, the recovery phase begins. By "recovery, we mean psychological and physical recovery of the victims, and the replacement of physical resources and the social relations required to use them" (Wisner et al., 2004, p. 59). This can take months or years (Coppola, 2015) and it is not surprising that this process is taking time in Nepal too. Social, economic and political factors and processes influence how the earthquake, or hazards, affected people´s lives in different ways.

"The disaster resilience can be observed only after a disaster occurs" (Norris & Elrod, 2006 cited in Zakour and Gillespie, 2013 p. 73), but the likelihood of resilient recovery is increased by decreasing vulnerability. Like vulnerability, the prospect of resilient recovery is not evenly distributed among systems. Many social systems are highly stratified, especially in terms of socio-economic status and resources as well as social capital. The resources facilitating resilient recoveries from disaster are stratified in most regions around the world (Oliver-Smith, 2004). People in less-developed countries like Nepal tend to suffer slow and ineffective recoveries from disaster (Bankoff, 2004).

Research Methodology

This research adopts the qualitative research methodology as discussed and described below.

The research was conducted in the months of September to November in 2018 in two different districts and schools. The schools in Sindhupalchok and Kathmandu (as shown in the figure 2 below) were purposefully selected on the basis of physical destruction of the school buildings as well as death tolls. These districts were also selected based on facilities i.e. rural versus urban to explore the experiences and the impacts to the participants. The selected school in Sindhupalchok district was completely destroyed whereas the school in Kathmandu is retrofitted.

The participants selected from non-probability sampling and/or purposive sampling which was very open, flexible and willing to facilitate the interview process. The participants were very positive and cooperative during the time of data collection as well. The study collected data from 22 participants; 3 head/teachers, 16 students from both the grades (IX and X) and from both the schools, two government officials from both the districts and an NGO staff from Sindhupalchok district. The sample was carefully selected to be inclusive in gender, age and educational background. The students were selected randomly so that they will not feel traumatized and they are made anonymous whilst the head/teachers, government officials and the NGO staff are chosen purposefully. Many of the participants were still traumatized and did not like to talk about the earthquake. Therefore, the numbers of participants were less than numbers most researches do.

As the literature review suggested, teachers and students have impacts of the earthquake and therefore, it is crucial to view their experiences as the primary

sources of data. Therefore, the semi-structured interview with follow up questions were carried out. The interview instructions were clearly explained to the participants, and the questions followed the same specific order with all interviewees as they are in the interview guides.

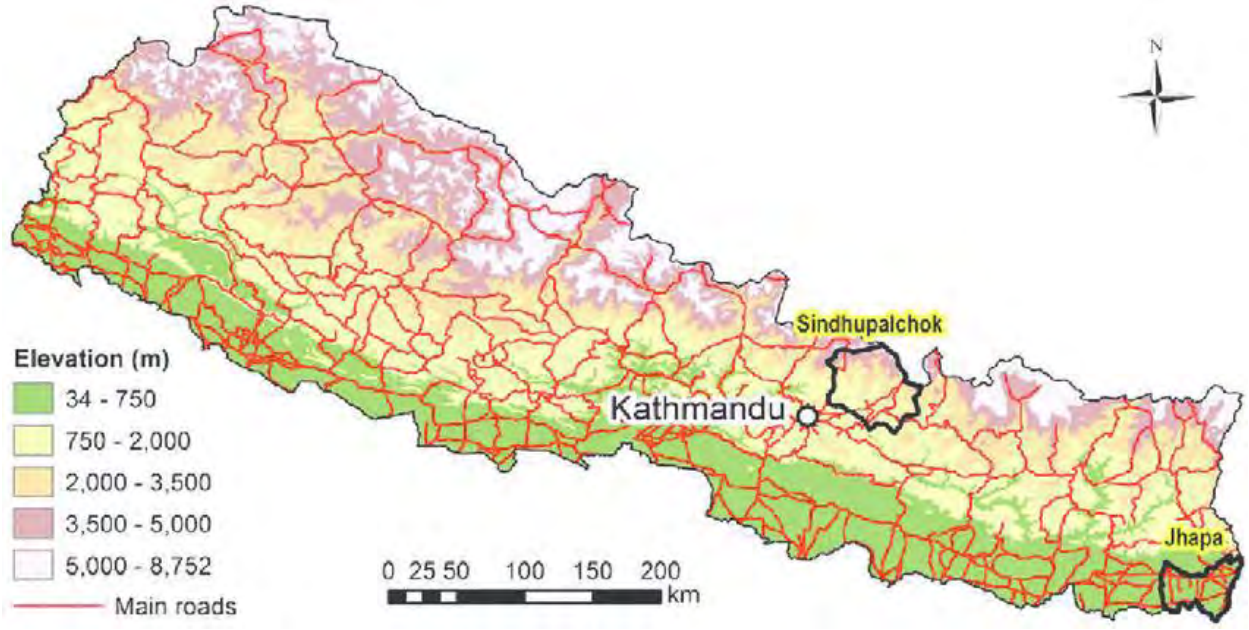

Figure 2: Map of Sindhupalchok and Kathmandu, the data collected sites. Sindhupalchok is marked with its shape on the map of Nepal whereas Kathmandu is pointed

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To find out how the earthquake is reflected/included in curriculum and textbook after the mega earthquake of 2015 as a post-earthquake impact, the document analysis is carried out. For this purpose, the curriculums as well as the textbook of secondary level of government school are analyzed. The textbook of English of grade IX and Social Studies of grade X are selected for the analysis. This level of governmental schools was selected purposefully because of the uniformity in implementation of curriculum by Curriculum Development Centre (CDC) and textbooks published by Janak Education Material Centre (JEMC) throughout the country.

To compliment the semi-structured interviews as well as document analysis, the unstructured observation of the construction sites of the buildings were conducted to have a critical, realistic opinion of the daily interaction with the students and teachers in the schools and their peripheries. It aims to see how destructive the earthquake is and how the construction of the newly built buildings is going on in general and particularly the school buildings. It is also carried out to see whether the on-going building construction (both school buildings and the private houses) are earthquake resistant or not.

Findings

The empirical data from the field in the earthquake and its impacts on education: aftermath Nepal quake 2015 is discussed in two main themes, namely: 1) experiences and immediate impacts of earthquake, and 2) the earthquake and its impacts later on i.e. post-earthquake impacts based on the research questions. The first theme discusses the earthquake and its

immediate impacts, known as "trans-impact" (Rodriguez et al., 2018, p. 395) experienced by educational actors such as students, teachers and head teachers. The second part describes the post-earthquake impacts, specifically the preparedness and preventive actions related to a) curriculum, syllabus and teaching/training and b) infrastructure improvements toward earthquake resistance and other safety initiatives. The identities of all participants i.e. the students involved in the data collection for this study have been withheld for privacy reasons.

On the basis of the data, the two major themes can be categorised into a series of sub-themes:

Theme 1: Immediate Earthquake Impacts

Sub-themes:

- Immediate Experiences
- Impacts on Attendance
    - Female students, human trafficking and domestic violence
    - Low socio-economic backgrounds
    - Disability
    - Migration
- Psychological Impacts
- Physical Impacts
    - School buildings and Temporary Learning Centres (TLCs)
    - Go-bags
    - Simulation
    - Trauma Reduction Initiatives and Actions

Theme 2: Post-Earthquake Initiatives and Impacts

Sub-themes:

- Earthquake Information in Curriculum and Textbooks
- School Infrastructure Strategies and Student's Participation
- Future Preparedness

The key finding of this study is that the devastating 2015 earthquake and its aftershocks had a significant impact on education: particularly on students, teachers and other educational actors.

Regarding the impacts on female students, human trafficking and domestic violence, the female students from Sindhupalchok:

> Girls are definitely more impacted as we have more work at home. So, when school reopened, I did not go at first. I had to help with clearing up our demolished home. I had to go to school and do my school work as well as helping my mom at home. We were building a new house too and I had to help there during my free time. (D1F5).

She further added, "we now know how domestic violence takes place and how traffickers offer sweet words to traffic us to Kathmandu and out of the country".

When this issue was put to students, governmental officials and even NGO staff, the same view was expressed for the students whol belong to low socio-economic backgraound. The resource person (RP) from Sindhupalchok district said:

> In terms of caste, the lower caste people suffered more than other castes because people except lower caste are less fortunate

> financially. If we also look at their social status, their "untouchability" makes things more difficult too. These types of students experienced more difficulty than regular students in every school so far.

Hearing from another participant from Sindhupalchok district, it is easier to pin point how devastating the earthquake was:

> There were a lot of human casualties. My younger brother, younger sister and grandfather were under the debris of the house, but we rescued them. There were at least 8 people killed in my neighborhood. Another grandfather in my neighbourhood was also killed. My brother-in-law's daughter was also killed and a relative also lost 6 out of 9 family members in this earthquake (D1F6).

Students faced many psychological challenges following the quake, including fear, anxiety and sleeplessness, meaning that schools were not able to conduct regular teaching routines once they reopened.

The RP from Sindhupalchok shared his view about the trauma right after earthquake:

> The stress was massive at that time. People were so traumatized that when they felt an earthquake, even sitting on the ground in an open space, they started to stand and run even though they were in the safest place possible.

The earthquake caused a huge loss of life and property in Nepal and school buildings were not an exception: many completely collapsed and it was impossible to run classes even if buildings were only partially damaged.

The head/ social studies teacher from Sindhupalchok confirmed that TLCs (temporary learining centres) were in place before the school re-opened after the holidays announced by the government:

> All the school buildings were completely destroyed and the government issued a notice to re-open schools from 17th of Jestha i.e. 35 days after the earthquake of April 25, 2015. We also wanted to bring the children in to share their momentous experiences. After that we had a school teacher's team meeting. With the help of grade IX and X students as well as from the teachers, we were able to clean 6 classrooms within 3 days. Then, we asked for help from the local community forest committee and Nepalese army to help to build the 15-roomed TLCs.

The fact that the earthquake was on a Saturday was fortunate and probably saved many students' lives. All participants I interviewed cofirmed that TLCs were set up to run classes once schools re-opened.

Although the earthquake created significant physical and psychological damage, it also taught many lessons for the future and people are now better equipped and prepared to deal with earthquakes.

A student from Sindhupalchok, a rural area (D1M7) said:

> We will be safer now. The houses are safe now. Single-storied buildings with only a few rooms. We did not know anything about earthquakes before, but now we know many things about earthquake safety and so do our parents. We have a clear plan on where to go, what to do and how to be safe, despite a lot of human casualties and other losses. This information and the construction of safer houses definitely mitigate the loss.

Students prepared "go-bags" with essential items which include basic items and supplies such as medicines, noodles, water, a torch light, radio and other basic needs to use in times of emergency, both during and immediately after a natural disaster. They were kept near the door ready to be taken during emergency situations such as earthquakes.

A teacher in Kathmandu described an exercise where students practised making emergency bags:

> We rehearsed how to prepare an emergency bag and what to keep in it. I told students to bring the materials from their home and we prepared the emergency bag in class. It was a great lesson for them from a practical perspective.

Simulation, a method that has previously proved impactful in achieving seismic safety (Uprety & Poudel, 2012) was also introduced and practiced at school so that students were prepared for a disaster to strike at any time. Regarding the simulation at the school when it is reopened, one student from Sindhpalchok said:

> Our Population and Environmental Studies teacher created earthquake simulation classes, although not all of us were present on that day. We lined up to exit the classroom and get to a safe place, keeping something on our heads to protect them and we moved to an open space without running. Then, we confirmed whether all our friends were there or not and if not, we helped find and rescue them (D1F8).

There were many trauma reduction initiatives and activities to increase psychological resilience amongst students and teachers, including a credited 5-hour teacher professional development (TPD) counselling programme.

The document analysis shows inclusion of a DRR objective in the school curriculum, as well as earthquake education topics in textbooks. All participants who were interviewed confirmed that there were earthquake topics included in English (grade IX) and Social Studies (grade X) classes within government secondary schools. However, both the document analysis and participant interviews revealed that this information is not yet comprehensive enough. One of the students from Kathmandu confirmed that earthquake information was included in textbooks but questioned its validity:

> We read this information in Social Studies and English. There is not much advanced information, but our teachers shared more than what was in the textbook. But I think the information about staying under a table or bed during an earthquake is quite misleading. In Nepal, the buildings are not earthquake

> resistant. When the buildings are not safe in themselves, how can a person under a table or bed be safe? (D2M4).

Given that the earthquake only occurred in 2015, it is perhaps too early to expect extensive change. According to Nanda & Raina (2019, p. 496), "countries like Bangladesh, Cambodia, Indonesia, Iran, Maldives, Lao PDR, Nepal, Pakistan, Malaysia, Philippines, Sri Lanka etc. are already in this process" (the process of integrating DRR in school curriculum).

Findings from the field visits/observations and participant interviews also explored the development of earthquake-resistant school buildings and private houses: the constructions of both types of buildings were financially aided by the government, and therefore regulations were followed comprehensively. The government supported the entire construction of school buildings and offered 300,000.00 Nepali rupees (around $3,000 USD) per family for the construction of private houses. Rigorous supervision and monitoring of the construction sites were conducted by technicians from the national reconstruction authority (Nepal), with financial aid being provided only after certain aspects of the construction had been approved. The benefit of this system is that schools had their own monitoring team including the construction; students took part as active members and shared information with their peers, which was also useful in construction of their own houses. Preparedness for any future disaster is highly important: students and their parents can prepare themselves by making "go-kit", practicing earthquake simulations and accessing information on coping strategies. Interviewees revealed that they know the importance of disaster emergency kits having already experienced the earthquake of 2015: people with earthquake experience tend to have a better level of preparedness (Uprety & Poudel, 2012). The findings also highlighted the importance of earthquake simulations. Although many people believe that simulations add insult to injury and remind people of traumatic experiences that they would rather forget, in reality simulations have a significant role to play.

Discussions and Analysis

The findings on the basis of conceptual and theoretical frameworks that is framework of theories are briefly discussed here which were discussed in detail in literature review section of this article. It is divided in two sections. The first part of this section summarises some immediate impacts of the earthquake through the lens of disaster vulnerability theory, including both physical and psychological impacts and the effect of the quake on students' attendance at school. The second part of the analysis focuses mainly on post-earthquake impacts relating to the inclusion of earthquake preparation and protective measures within the school curriculum and textbooks through the lens of disaster resilience theory.

This section will be analysed through the lens of disaster vulnerability theory. The second section deals with longer-term post-earthquake impacts.

The vulnerable populations

The earthquake's aftershocks not only made people vulnerable physically but also psychologically. Houses which were yet to be demolished were in a dangerous condition: there was little healthy food, lack of fresh water and sanitation, and living and studying under a tarpaulin roof made people especially the students feel insecure since they were vulnerable to the

attacks of thieves at night. There was also a lot of uncertainty about the future which affected peoples' mental health.

Vulnerabilities within the population include commonly recognized social factors such as class, race/caste, ethnicity, gender, age, poverty, disability and immigration status (Cutter, Boruff & Shirley, 2003; Wisner et al., 2004 cited in Rodríguez et al., 2018). Vulnerable groups such as women, children (Fothergill & Squier, 2018)), disabled people (Tierney et al.,1988), the elderly, ethnic minorities and low caste students (Amnesty International, Nepal Report 2013; Human Rights Watch World Report 2015; Amnesty International 2014-15 report cited in Kruhl et al., 2018) have higher chances of risks during earthquakes (ICIMOD, 2015; Ulak, 2015, Paudel, 2018). Bhavnani (2006) writes "sudden changes brought on by natural disasters exacerbate problems that people face on a daily basis," explaining the physical, psychological and sociological impacts natural disasters have on people's lives.

Trauma, Anxiety and Casualty

The devastating 2015 earthquake destroyed "physical property, lives and highly affected the psychological aspect" of people (Kruhl et al., 2018, p. 275). There is much research showing the relationship between natural disasters and their psychological impacts on human beings. One study by GoldineGleser, Bonnie Green, and colleagues complemented Erikson's (1976) study which described trauma as an event and examined the disruption associated with this event. They examined long-term psychological impacts of the Buffalo Creek disaster (Gleser, Green, & Winget, 1981; Green et al., 1990 cited in Rodríguez et al., 2018). This work contributed to the understanding of distinctions between the impacts of natural disasters in relation to human psychological stress. For example, 14 years after the event they found persistent post-traumatic stress disorder (PTSD), major depression and anxiety disorders amongst survivors (Green et al., 1990).

In terms of the psychological impacts resulting from the devastating earthquake of 2015, there were many traumas and emotional health issues which needed to be taken care of at both personal and group levels. Paudel (2018) suggested that the methods to overcome these issues were psychological counselling, peace way workshops (empowering people to lead non-violent lives through affirmation, cooperation and trust) and applied improvisation (providing opportunities for collaboration and expression) etc.

Physical loss and Damage

Much research exists around the physical impacts of disasters and how they could be measured in relation to human casualties, damage to the built environment, economic loss and other indicators. Based on this research and its findings, many changes in warning systems and evacuation processes have been implemented in order to reduce casualties. Similarly, mitigation efforts such as changes to land use policies, construction codes etc. were aimed at reducing physical damage and its associated financial costs.

The 2015 Nepal earthquake caused widespread destruction of housing and human settlements. Over half a million houses were completely destroyed and more than 250,000 houses were partially damaged" (Joshi & Joshi 2018), the main cause of seismic vulnerability was the poor-quality masonry houses constructed throughout the nation. If we consider the

damage and loss to physical infrastructures, it was not only mud buildings which collapsed: cement-mortared buildings were also significantly damaged due to a deficiency in construction materials, engineering and a detailed understanding of the local geology.

Preparedness

Schools play a vital role in the communities of developing countries like Nepal in raising awareness and preparedness for natural disasters, since any type of message can reach parents, relatives, and the entire community through the pupils and the teachers (Dixit et al., 2013). Formal education and previous experience of earthquakes can play a key role in cultivating preparedness. Preparing for natural disasters forms part of a national government's responsibility; it is also the duty of every person within a community, including the children. The preparedness of different educational actors such as head/teachers, students, non-teaching staff and the school as the whole are also essential, as is the inclusion of information in the curriculum and textbooks. During trans-earthquake impacts and even post-earthquake impact periods, people may have limited access to essential resources and functions. Under these circumstances, the capacity to cope depends upon the level of preparedness (e.g. knowledge of disaster impacts, protective measures, awareness etc.) and a capacity for self-reliance (Paton & Johnston, 2017). Protective measures include securing fixtures and furniture such as "installing latches on cupboards and strapping water heaters to the wall before an earthquake occurs" (Lindell, & Whitney, 2000, p. 13). Safety initiatives include storing food and water and other essential basic items for emergency use termed as a disaster go-kit (Merchant, 2015). Household emergency plans for both public and private buildings i.e. school buildings (Paton, & Johnston, 2017) also need preparing for natural disasters such as earthquakes. In this sense the preparation from any actors including education system as a whole had much role to play to confront the consequences of earthquake.

The findings of global research relating to disaster preparedness and the level of education is consistent with studies conducted in Asia. For example, research found that communities in Nepal with maximum levels of education suffer minimum human and non-human casualties because of floods and landslides (K.C. 2013). Similarly, in Indonesia it is reported that the higher an individual's level of education, the better they cope with the post-disaster phase of the tsunami (Frankenberg et al., 2013). These findings show that education is an essential resource in reducing vulnerability to environmental hazards in Asia.

According to Brooks (2012), participation is required "from the federal level all the way down to Joe Q. Citizen (grassroot level)" when it comes to preparing for and responding to disasters (p. 28). Nepal is a critically and continuously earthquake prone country; the culture of disaster preparedness should therefore be fostered at all levels of society including school, home, work, and public spaces such as libraries, grocery stores, holiday destinations etc. Educational drills or simulations to increase preparedness should be as natural as having a meal or getting dressed in the morning so that we may foster a "disaster-aware generation" (Tuladhar et al., 2015). Therefore, preparedness by the education or the school, curriculum and textbooks as well as teachers are crucial at point of time both pre-disaster and post disaster period. A study was conducted by Farahat et

al. (2010) to evaluate the role of school-based interventions on disaster preparedness. The study found that the proportion of students with satisfactory knowledge increased from 43% before the intervention to 68% afterwards. The proportion of students with good practice rose from 57% to 65% (Nanda & Raina, 2019). Similar improvements were observed in studies conducted across different parts of the world (Bradley et al., 2016).

Build Back Better (BBB)

The 2004 Indian Ocean tsunami resulted in a new concept in reconstruction and recovery theory: "build back better" (Cosgrave, 2007 cited in Mannakkara & Wilkinson, 2013). Kennedy et al. (2008) explain the term "build back better" as "the need to link humanitarian relief and post-disaster reconstruction with longer-term disaster mitigation and vulnerability reduction efforts in order to ensure that reconstruction would not lead to conditions which could result in a similar disaster recurring". During the unstructured observations and participant interviews, I witnessed the risk reduction principle being fully implemented by school management committees and private home owners once they had received financial aid from the government of Nepal (after having fulfilled certain conditions or requirements). The conclusions of the aforementioned researchers are therefore in line with the findings of this study in terms of the build back better concept.

Psychological Resilience and Coping Strategies

Psychological resilience refers to the ability of individuals to positively adapt and respond to stress and adversity. It is important for mental health and well-being (Shi et al., 2019). In the aftermath of a disaster, many physical impacts such as the destruction of infrastructure and human casualties are easily noticeable. Yet there are often many invisible psychological impacts present too, including symptoms of post-traumatic stress disorder (PTSD) such as shock, anxiety, guilt, numbness, sleeplessness, changes in appetite, issues concerning the future etc. (Merchant, 2015).

In the same vein, spiritual beliefs defined as "deep personal beliefs and practices that transcend the regular activities of this world" (Madsen & Abell, 2010, p. 225) and religious beliefs known as "the use of behaviours to facilitate problem-solving to prevent or alleviate the negative emotional consequences of stressful life circumstance" (Koenig, Pargament & Nielsen, 1998, p. 513 cited in Merchant, 2015) may help to alleviate trauma and anxiety. The trauma resilience model was also very useful in Nepal amongst students and teachers in terms of uplifting their psychological states.

According to Lazarus and Folkman (1984 cited in Smith et al., 2014), coping refers to a person's efforts—both cognitively and behaviourally—to manage taxing or stressful events. During the aftermath of natural disasters like earthquakes, individuals may use various coping strategies, such as talking with friends and family and/or engaging religious support or other community resources. Meditation, yoga, praying, hobbies, crafts and keeping oneself busy are some coping strategies associated with disaster-related distress which were also practiced during the aftermath of the earthquake in Nepal.

Conclusion and Recommendation

This research examines the 2015 earthquake and its impacts on education. The devastating earthquake brought many impacts to the lives of people and their day-to-day activities, including students and teachers. The findings obtained in the qualitative phase of this study discussed various impacts relating to both immediate and post-earthquake phases.

The key finding of this study is that the devastating 2015 earthquake and its aftershocks had a significant impact on education: particularly on students, teachers, and other educational actors. The earthquake created many catastrophic impacts. One immediate impact of the earthquake was that female students and those from low socio-economic background became more vulnerable. The earthquake also affected differently-able students: some migrated from one school to another, whilst others changed location completely. Students faced many psychological challenges following the quake, including fear, anxiety and sleeplessness, meaning that schools were not able to conduct regular teaching routines once they reopened. The earthquake caused a huge loss of life and property in Nepal and school buildings were not an exception: many completely collapsed, and it was impossible to run classes even if buildings were only partially damaged. The fact that the earthquake was on a Saturday was fortunate and probably saved many students' lives. All participants I interviewed confirmed that temporary learning centres were set up to run classes once schools re-opened.

The ministry of education added one more objective in the school level curriculm and chapters in textbooks so that the students will be aware of the disaster and get prepared themselves. When I did the content analysis, I found the discrepancies which still exist within the textbooks: in the Social Studies (grade X) textbook, earthquakes are introduced with tsunamis, despite Nepal being a land-locked country with no possibility of a tsunami occurring. I hope and recommend that comprehensive safety initiatives and full preparedness policy will be included in the school curriculum and textbooks to prepare both students and teachers for future disasters.

The inclusion of a DRR objective in the school curriculum, as well as earthquake education topics in textbooks is very crucial. The countries like Bangladesh, Maldives, Pakistan, Malaysia, Philippines, Sri Lanka including Nepal are already in the process of integrating DRR in school curriculum. Thus, it can be expected that the topics will be fully convered in the days to come.

I will strongly recommend to follow Japan's example, which simulated the 1995 Kobe disaster for educational purposes, giving people the chance to physically experience and prepare for an earthquake. Research shows that personal experience affects responses to disasters/earthquakes; simulations of the 2015 earthquake could therefore be introduced using specialist simulation vehicles as was done in Japan, to increase awareness and preparedness.

During the interviews, participants said that the safest place to be during an earthquake is under a desk, chair or bed – information which is misleading in the context of Nepal, since most buildings are built with brick or mud mortar, rather than prefabricated materials such as in Japan or Chile, and are unsafe. Some children ran into their classrooms upon

experiencing the 2015 Nepal quake and were hurt or killed as a result. When a building itself is not safe, it is almost impossible for people to be safe inside it. Therefore, earthquake awareness education should always be specific to context.

Yet there is always the possibility to turn disasters into opportunities, and many countries improve their infrastructure and education following a disaster. Nepal can learn lessons from these countries and become more resilient. I would therefore like to recommend that authorities make a viable plan for the development of global villages and smart cities that are earthquake-resilient and contain a lot of open space.

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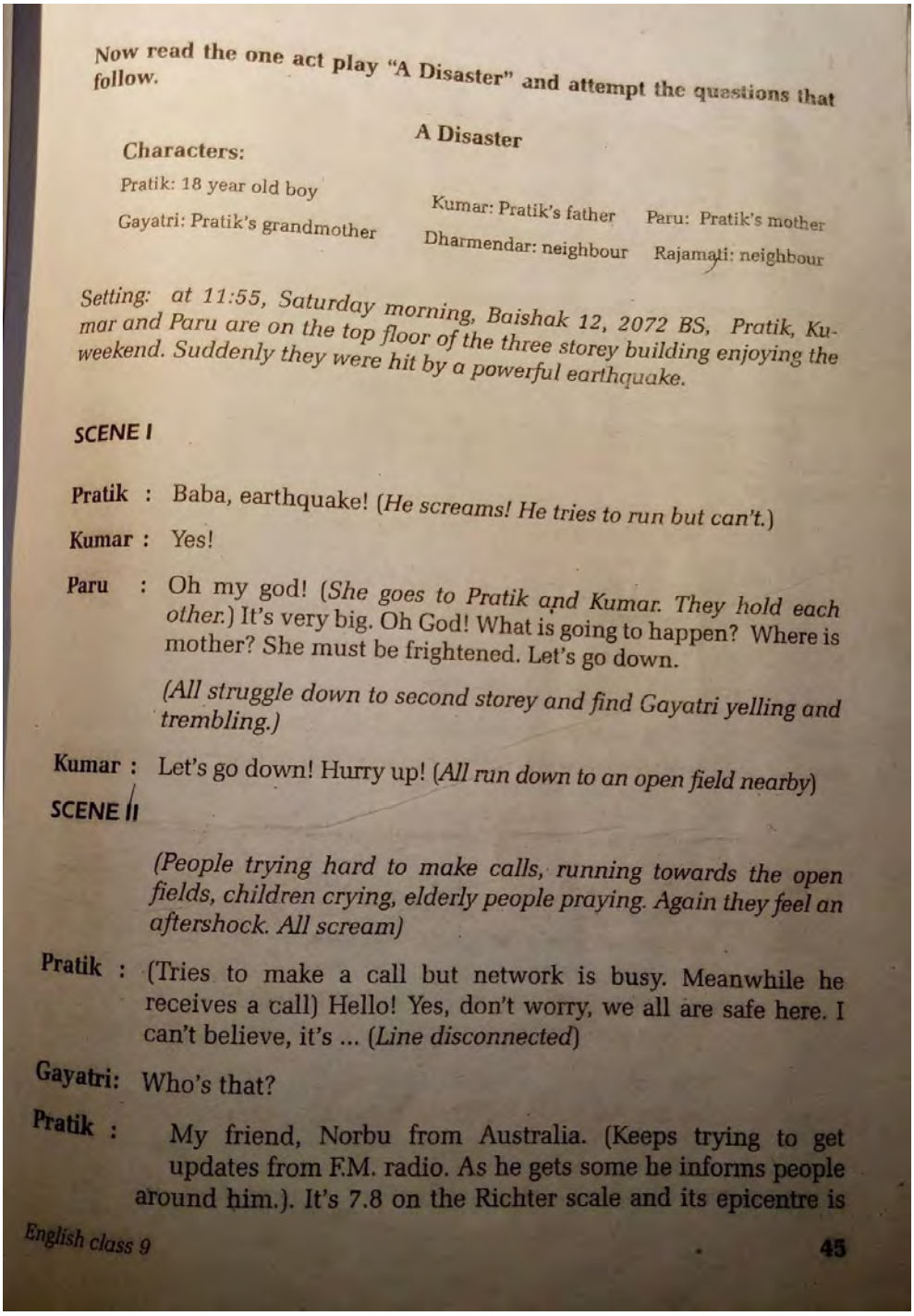
Appendix



Now read the one act play "A Disaster" and attempt the questions that follow.

A Disaster

Characters:

Pratik: 18 year old boy
Kumar: Pratik's father
Paru: Pratik's mother
Gayatri: Pratik's grandmother
Dharmendar: neighbour
Rajamati: neighbour

Setting: at 11:55, Saturday morning, Baishak 12, 2072 BS, Pratik, Kumar and Paru are on the top floor of the three storey building enjoying the weekend. Suddenly they were hit by a powerful earthquake.

SCENE I

Pratik : Baba, earthquake! (*He screams! He tries to run but can't.*)

Kumar : Yes!

Paru : Oh my god! (*She goes to Pratik and Kumar. They hold each other.*) It's very big. Oh God! What is going to happen? Where is mother? She must be frightened. Let's go down.

(All struggle down to second storey and find Gayatri yelling and trembling.)

Kumar : Let's go down! Hurry up! (*All run down to an open field nearby*)

SCENE II

(People trying hard to make calls, running towards the open fields, children crying, elderly people praying. Again they feel an aftershock. All scream)

Pratik : (Tries to make a call but network is busy. Meanwhile he receives a call) Hello! Yes, don't worry, we all are safe here. I can't believe, it's ... (*Line disconnected*)

Gayatri: Who's that?

Pratik : My friend, Norbu from Australia. (Keeps trying to get updates from F.M. radio. As he gets some he informs people around him.). It's 7.8 on the Richter scale and its epicentre is

English class 9 45

Figure 3: Book chapter included about the earthquake in the textbook of English in grade IX after the mega earthquake of 2015.