Analysis of Effective Communication Tools for Disaster Management in the Educational Institutes

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Abstract

Disasters come across as a black day to any country or place within the country. It causes various destructions in the geographical and life of people. Analyze the uses of Information and Communication Technology (ICT) tools in the disaster period, explore the effective communication channel used in disaster management, and identify the best communication tools and channels in disaster periods in educational institutes' main objectives of this study and the Kathmandu, Lalitpur, Bhaktapur, and Dadeldhura districts of Nepal are the main study area. During the disaster period, the government brings different communication tools and awareness programs to minimize risk and destruction. However, due to a lack of proper implementation and unawareness, using those tools effectively has become a major challenge. There are challenges for integrating ICT tools for disaster management because of a lack of knowledge about the ICT tools, and how to use them inappropriately. Social media, smartphones, and short message service (SMS) ICT tools help to communicate immediately during the disaster period. ICT tools helped with disaster management in the research area's schools and they give priority to the wireless channel then the telephone channel for communication. In some of the schools, there are optical fibers also used for communication and no school used satellite communications channels for communication.

Introduction

Communication is simply the act of transferring information from one place to another place. The term **communication** is derived from the Latin word "**Communis**" which means to share. Among the first practical uses of electrical engineering, early communication devices included the telegraph, first conceived in the 1700s, and realized in 1837 (Morse, 1998). As per the Oxford dictionary, a disaster is "a sudden accident or a natural catastrophe that causes great damage or loss of life". Any event natural or manmade, which threatens human lives, damages private and public property and the infrastructure, and disrupts social and economic life. Disaster is also sometimes described as a "catastrophic situation in which the normal pattern of life or ecosystem has been disrupted and extraordinary emergency interventions are required to save and preserve lives and or the environment". Generally, the disaster was categorized in two-part one is

natural (NIoDM, 2016). Natural disasters have profoundly affected humanity in many ways. The United Nations International Strategy for Disaster Reduction (UN/ISDR) has calculated that there have been more than 5,210 disasters recorded in the world between 1991 and 2005 (UN/ISDR.2004). This has mainly been in the form of natural and human-made including earthquakes, fires famine, and floods. Africa especially has suffered from human-made disasters mainly in the form of genocides, wars, and other natural disasters ranging from floods to earthquakes.

Through the next century, advancements in the telephone, radio, television, and today's Internet, completely changed the way people communicate and interact with one another. Communication is a two-way process wherein the message in the form of ideas, thoughts, feelings, and opinions are transmitted between two or more persons with the intent of creating a shared understanding. Simply, an act of conveying intended information and understanding from one person to another is called communication. Effective communication is when the receiver understands the message conveyed by the sender in the same way as it was intended. Communications refer to the use of signals to transfer voice, data, image, and video information between locations, the main applications of which are in communications science, engineering, and technology. From bonfires and smoke signals to early modern optical telegraphs, humankind has attempted to move communication beyond the realm of earshot. In communication, there are a lot of tools and technologies used for the batter sending and receiving messages, voice, data, image, and video between the sender and receiver.

Disaster Information System indicates that Nepal is prone to a plethora of natural and human-induced calamities. The country's hazards include epidemics, floods, landslides and mudslides, urban and wildfires, glacier lake outbursts, windstorms, cold and heat waves, road accidents, drowning incidents, landmines, and earthquakes (DesInventpr, 2011).

The work of Lavell and Lavell (2009) and Wilches-Chaux (2007) on local disaster risk reduction in Latin America highlights the importance of past disaster incidents for current and future local development planning. Climate change appears set to exacerbate the situation, resulting in a higher incidence of droughts, floods, water-induced landslides, and glacier lake outburst floods (Aryal, 2012).

According to ITUs, communication is a dynamic process that begins with the conceptualizing of ideas by the sender who then transmits the message through a channel to the receiver, who in turn gives the feedback in the form of some message or signal within the given period. Information and Communication Technologies (ICTs) play a significant role in disaster prevention, mitigation response, and recovery. Timely, predictable, and effective information is much needed by government agencies and other humanitarian actors involved in rescue operations and decision-making processes. Telecommunications are critical at all stages of disaster management: mitigation, preparedness, response and relief, recovery, and rehabilitation The local community, the government, the private sector, disaster management agencies, meteorological organizations, civil society, humanitarian agencies, and international organizations should ensure access to ICTs to better coordinate disaster management activities. Partnerships are the best way to achieve this task. (ITU, 2013). Communication is not successful

without technology and communications tools. In communication, there are different tools like smartphones, laptops, tablets, VOIP/Internet telephony, intranet, social networks, forums, messenger apps, chatbots, email, blogs, tracking software, etc. The nation's development efforts and poverty alleviation programs are being negated by frequent disasters. Hence, increased focus on mainstreaming disaster risk reduction in development plans is needed to protect lives and property, as well as to sustain development benefits (Tuladhar, 2012).

Thus, the topic was selected "Analysis of Effective Communication Tools for Disaster Management in the Educational Institutes" as the research topic with specific objectives to analyze the uses of ICT tools in the disaster period in the educational institute, to explore the effective communication channel used in disaster management in an educational institute and, to identify the best communication tools and channel in disaster periods in educational institutes. The study was done with what type of communication channels are used for disaster management in the educational institute. How do ICT tools help in the disaster period for disaster management? Which type of communication channel and tools are effective for disaster management? What is the current situation of the internet in the educational institute? What is the current situation of an alert system for an upcoming disaster? Which are the best ICT tools and communication channels for disaster in the educational institute? As the Main, research question.

Review of Related Literature

The purpose of this form is to examine the corpus of theory that has accumulated about an issue, concept, theory, or phenomenon. The theoretical literature review helps to establish what theories already exist, the relationships between them, to what degree the existing theories have been investigated, and to develop new hypotheses to be tested. Often this form is used to help establish a lack of appropriate theories or reveal that current theories are inadequate for explaining new or emerging research problems. The unit of analysis can focus on a theoretical concept or a whole theory or framework. The process of communication is difficult in our ordinary and daily lives; it is far more so in times of disaster. The challenge remains to not only respond with accurate, understandable, and complete information as quickly as possible during a disaster but to communicate in a proactive way that involves members of communities to reduce the potential risk of a disaster (Nyondo, 2006).
The symbolic interaction perspective, also called symbolic interactionism, is a major framework of sociological theory. This perspective relies on the symbolic meaning that people develop and build upon in the process of social interaction. Although symbolic interactionism traces its origins to Max Weber's assertion that individuals act according to their interpretation of the meaning of their world, the American philosopher George Herbert Mead introduced this perspective to American sociology in the 1920s. Symbolic interaction theory analyzes society by addressing the subjective meanings that people impose on objects, events, and behaviors. Subjective meanings are given primacy because it is believed that people behave based on what they believe and not just on what is objectively true. Thus, society is thought to be socially constructed through human interpretation. People interpret one another's behavior, and it is these interpretations that

form the social bond. These interpretations are called the "definition of the situation" (Crossman, 2018).

Symbolic interaction theory, or symbolic interactionism, is one of the most important perspectives in the field of sociology, providing a key theoretical foundation for much of the research conducted by sociologists. The central principle of the interactionist perspective is that the meaning we derive from an attribute to the world around us is a social construction produced by everyday social interaction. This perspective is focused on how we use and interpret things as symbols to communicate with each other, how we create and maintain a self that we present to the world and a sense of self within us, and how we create and maintain the reality that we believe to be true (Cole, 2018).

The impacts are also expressed in different forms such as loss of life; health problems; the destruction, loss, or rendering useless of the totality or part of private or collective goods; and severe impacts on the environment.

Short Message Service (SMS)

SMS stands for Short Message Service. Technology enables the sending and receiving of messages between mobile phones. SMS first appeared in Europe in 1992. It was included in the GSM (Global System for Mobile Communications) standards right at the beginning. Later it was ported to wireless technologies like CDMA and TDMA. The GSM and SMS standards were originally developed by ETSI. ETSI is the abbreviation for European Telecommunications Standards Institute. Now the 3GPP (Third Generation Partnership Project) is responsible for the development and maintenance of the GSM and SMS standards. As suggested by the name "Short Message Service", the data that can be held by an SMS message is very limited.

Methodology

In this article, a mixed-method was used, including both quantitative and qualitative approaches. As a rule, in such research, quantitative and qualitative approaches were taken into consideration when appropriate. Under the quantitative research design, the descriptive research method was applied the qualitative data was used for validation of qualitative results, there are several reasons for using a mixed-methods design to conduct a narrative inquiry. The researcher conducted a population for this research from five-five secondary-level government schools in Kathmandu, Lalitpur, Bhaktapur, Sindhupalchok, and Dadeldhura districts taking a teacher from each school using purposive sampling. The schools were also selected through using purposive sampling and the population was selected using a purposive sampling method.

There might be a large number of population related to our topic, which is not possible to include in the article. Therefore, among the various districts of Nepal researcher was select the Sindhupalchok, Kathmandu, Lalitpur, Bhaktapur, and Dadeldhura districts as the field for this topic using a purposive sampling method. Among the various schools of the Sindhupalchok, Kathmandu, Lalitpur, Bhaktapur, and Dadeldhura districts. The researcher was select 5/5 different schools using the purposive sampling method. Among those five school principals or ICT, the teacher was selected for this study as the respondent. A total of 5 District 5/5 schools 25 principal or ICT teacher was selected using the quota sampling method for the questionnaire. The primary and secondary tool

was used for data collection. The primary data was collected by making a questionnaire for the respondents and Similarly, the researcher conducted an open-ended interview with the teachers to find out the perception of the teachers towards the effective ICT tools, best communication channels in the disaster period in an educational institute in the Kathmandu, Lalitpur, Bhaktapur district. A secondary data collection tool was used in the Sindhupalchok and Dadeldhura districts through newspaper-recorded video audio, related article, thesis reports, documentary, and Google forms through their emails and phone call consequently in possible time. The field visit was done for primary data collection of the data and studying in this research. The researcher was select five-five schools from the research area and form them the questionnaire was given to the selected teachers for the primary data collection. In the secondary data collection, the data was collected through related newspaper recorded video audio, related articles, thesis reports, documentaries, and applied interviews, using Google Form through the respondent email addresses, and phone call activity applied for secondary data collections.

Result and Discussion

Result

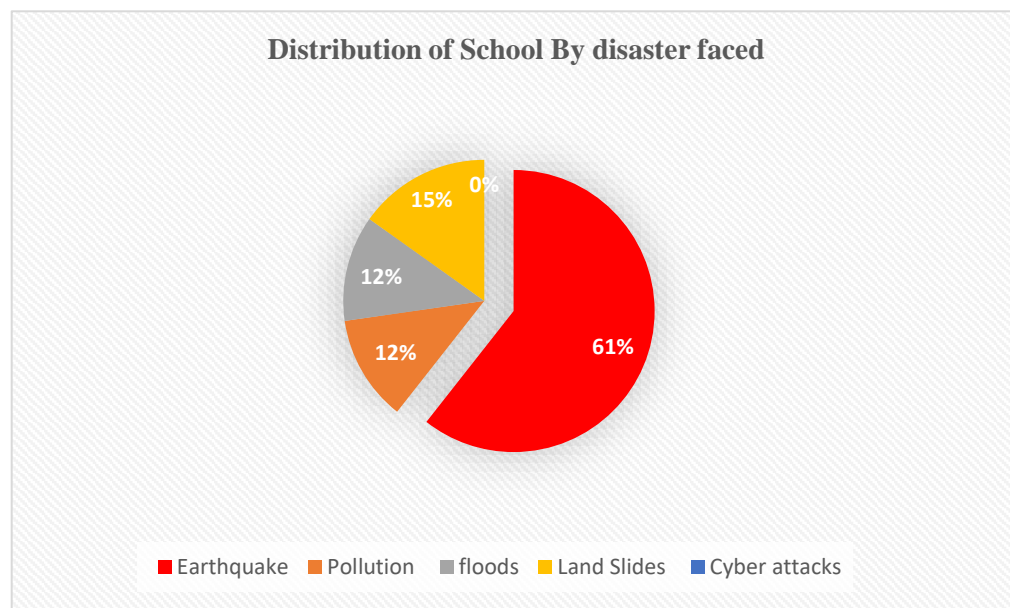In this article, the main section of the article according to our major findings,

Figure 1: Disaster faced by School

The maximum number (20/25) of the school faced the earthquake as a disaster. Sometimes they also faced floods, landslides, and pollution, but all of the educational institutions have not faced cyber-attack disasters because, in the context of Nepal, most people are not familiar with the cyber-attack, so The researcher thinks that they faced cyber-attacks the disaster but they don't know about that. In the article, the researcher finds out that most of the schools, which is nearby with the Kathmandu valley, so they faced the Nepal earthquake in 2015, and the Dadeldhura district is far from the Kathmandu valley and the central point of the earthquake in 2015 so the educational institute in Dadeldhura district cannot face that earthquake.
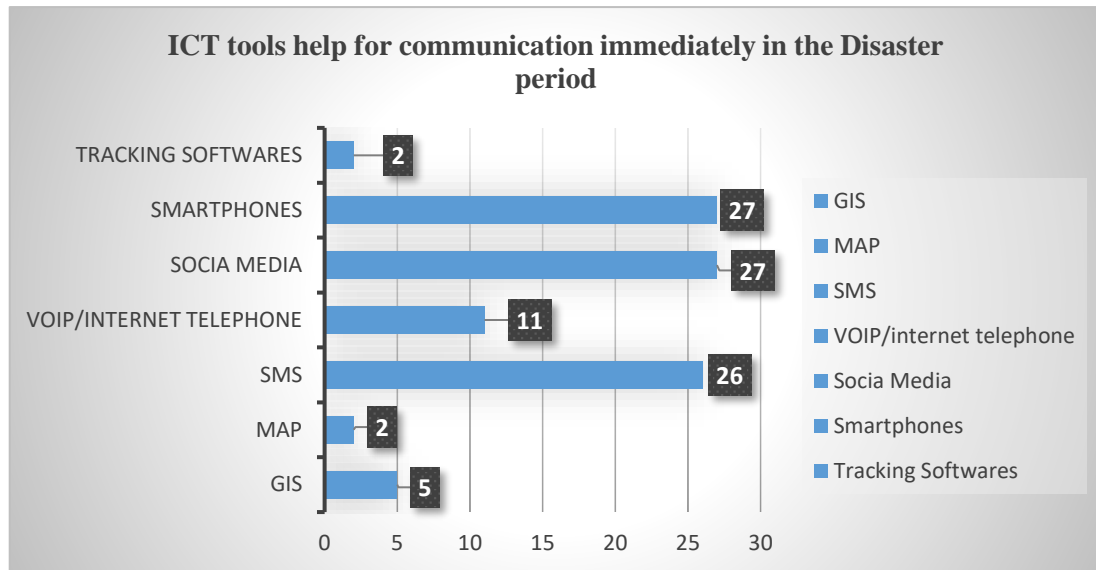
ICT tools help for communication immediately in the Disaster period

TRACKING SOFTWARES — 2
SMARTPHONES — 27
SOCIA MEDIA — 27
VOIP/INTERNET TELEPHONE — 11
SMS — 26
MAP — 2
GIS — 5

Legend: GIS, MAP, SMS, VOIP/internet telephone, Socia Media, Smartphones, Tracking Softwares

Figure 2: Immediately helpful ICT tools.

The social-media, smartphones, and short message service (SMS) ICT tools help to communication immediately in the disaster period, because in the current situation, all school has their social media user account and their own page for communication. There is 100 percent of the respondent think that ICT tools helped with disaster management because they know about the benefit of ICT.
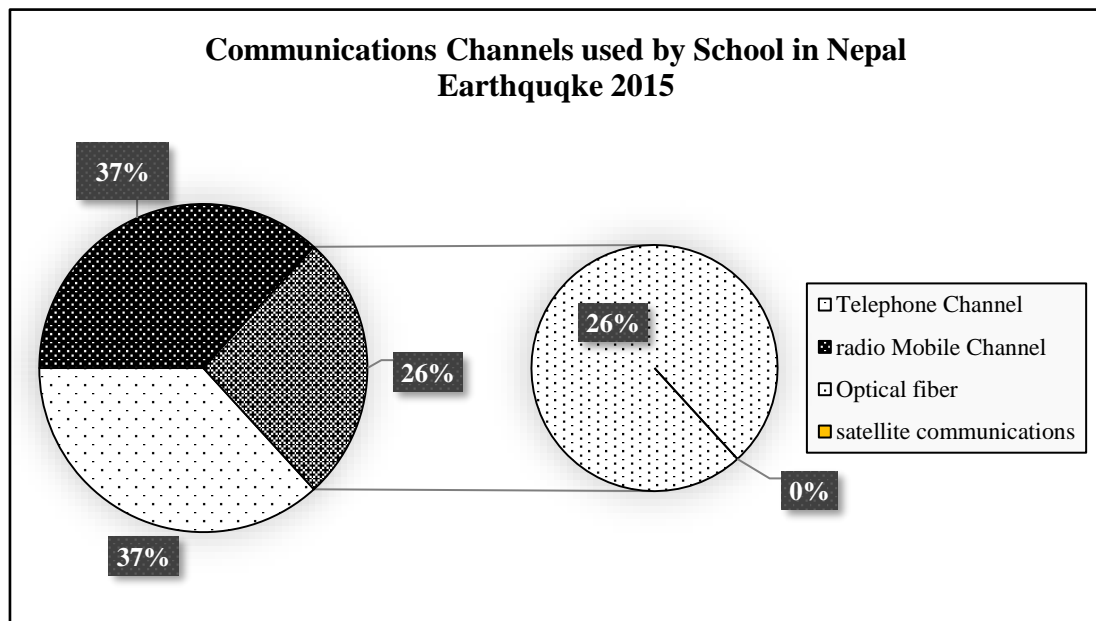
Communications Channels used by School in Nepal Earthquqke 2015

37%
26%
26%
37%
0%

Legend: Telephone Channel, radio Mobile Channel, Optical fiber, satellite communications

Figure 3: Communication Channel used by School

In the research area's schools, they give priority to the Mobile Radio channel and then the telephone channel for communication, In some of the schools there are optical fibers also used for communication and no school used the satellite communications channel for the communication.
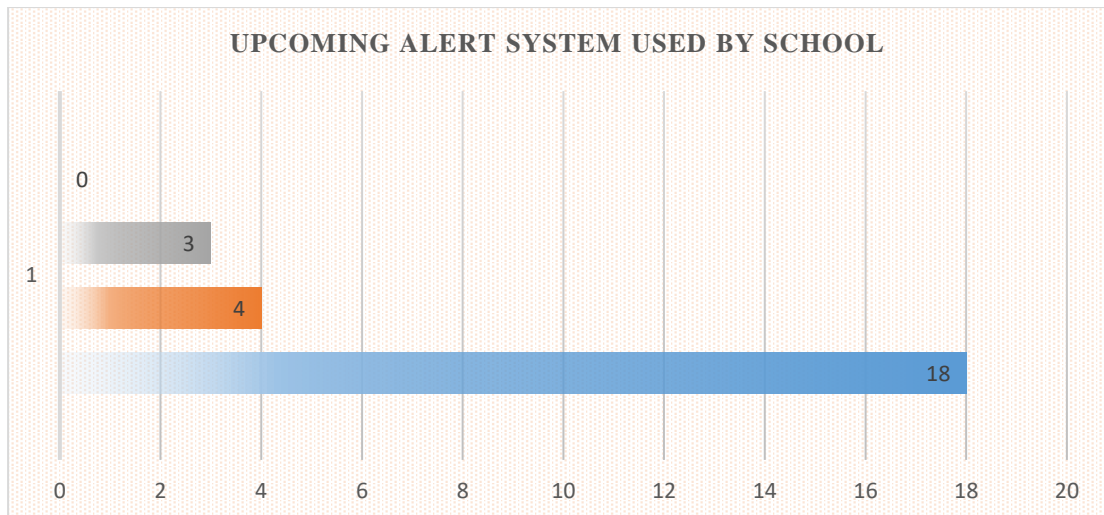
Figure 4: Alert system used by the school

There was 72 percent (18 Schools) of the school; they have used an earthquake early warning system alert for the upcoming disaster, which is in Kathmandu, Lalitpur, Bhaktapur, and Sindhupalchok. 16 percent (4 schools) of the school used the shake alarm alert system and three schools used both earthquake early warning and shake alarm systems in their school and there were no schools have used the Ocean Network Canada alert system for the upcoming disaster.
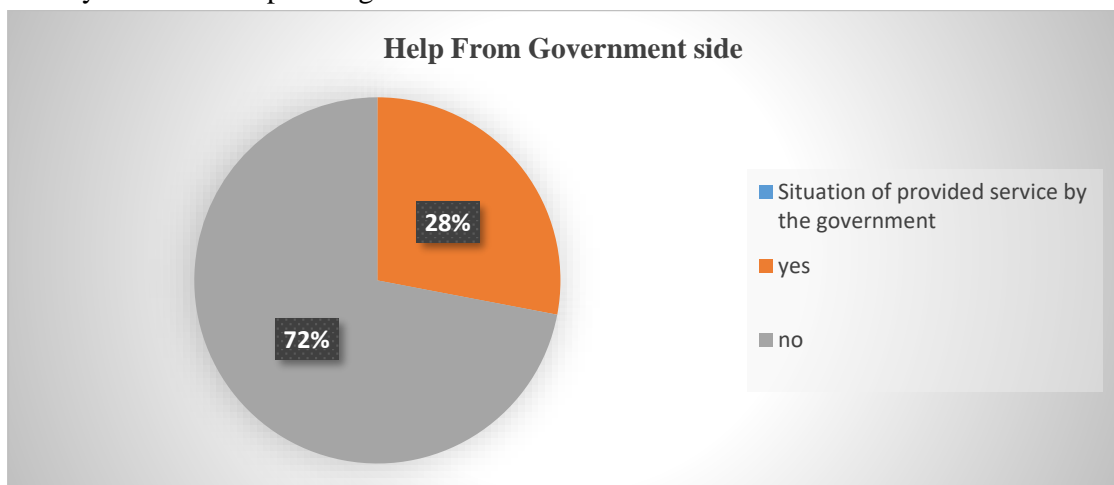
There were different-different policies made by the government for disaster management. However, 72 percent of the school said that the government of Nepal has not helped in the use of ICT tools for disaster management only 28 percent of the school said some time government of Nepal helps to use ICT tools that were only in the Kathmandu and Lalitpur district. In all schools, there was a lake of skill to operate ICT tools, power disruption, a lack of training, economically week for buying the situational ICT tool, which does not have sufficient ICT tools for communication. There were almost schools have SMS services, social media, the Internet, the telephone is the current communication tools. All schools have that information; there were government and non-government sectors like the Nepal Police force, Nepal Armed Police Force, the Military of Nepal, NGOs, and INGOs. Individuals, Health Organizations, and Red Cross society. Help in a disaster period for disaster management. All the educational institutes smartphones, laptops, tablets, VOIP/Internet telephony, intranet, social networks, forums, messenger

apps, Chatbots, email, blogs, and tracking software tools were effective ICT tools in the future for disaster management.

Smartphones, social media, SMS, and Telephone are the used ICT tools in the disaster period for disaster management. Mobile Radio channels, telephone channels, and optical fibers are effective communications channels for communication for disaster management during disaster management. According to other researchers finding and our finding Geographic Information Systems (GIS), MAP, Short Messaging Service (SMS), Social media, VOIP/IP telephony, Smartphones, tracking software, and Alert system apps are the best ICT tools for disaster management and Mobile radio channels, telephone channels, optical fibers, and satellite communication is the best communication channels for disaster management during the disaster period. In the context of Nepal. According to collected data and respondents view the maximum number of the school's respondent says that there were lout's challenges in the implementation of the ICT tools like do not have sufficient situational ICT tool, the lake of skill for operating the tools in the correct time, power disruption, lake of training to the strike holder in disaster management, lake of the open place for the ICT tools, economically weak schools are under problem to buy much and situational tools for disaster management, lake of information about the importance of ICT tools for communication, there was not any special informative training provided by the related organizations and government of Nepal.

Discussion

The findings, along with other reports, articles, thesis, and The researcher suggest that the results are almost identical because those of ICT around the world are the same, as well as the nature of different tools, communication channels, and communication processes. The results from the study of different articles, reports, research, and reports and the results The researcher have seen articles The researcher have seen are a little bit different. The researcher concluded that lack of knowledge of how to use different tools, lack of ICT infrastructure in Nepal like in many other developed countries, lack of qualified human resource to operate ICT tools in the correct situation, lack of knowledge about the benefit of the ICT tools for communication, lack of awareness of ICT tools and technology on disaster management, lack of identification of using the right tools in the right time to the nature of the disaster, lack of coordination among related agencies for use of ICT tools, communication media, like lack of knowledge of using ICT tools and technology for disaster management and not having the same geography are somewhat different results.

Conclusion

Communication is fundamental to the existence and survival of humans as well as to the organization of any nation. It is a process of creating and sharing ideas, information, views, facts, feelings, etc. among people to reach a common understanding. A disaster is a sudden, dreadful event that seriously disrupts the functioning of a community or society and causes human, material, economic, or environmental losses that exceed the community's or society's ability to cope using its resources. Though often caused by nature, disasters can have human origins. Information and Communication Technologies (ICTs) play an important role in disaster prevention, mitigation response, and recovery. Timely, predictable, and effective information is much needed by government agencies

and other humanitarian actors involved in rescue operations and decision-making processes. In this research, the researcher tries his best for the analysis of best communication tools, and identify the best communication channel in the disaster period for disaster management.

The maximum number of school has faced earthquake as a disaster and sometimes they also faced floods, landslides, and pollution, there are no schools that have faced cyber-attack as a disaster. In Kathmandu, Lalitpur, Bhaktapur, and Sindhupalchok most of the respondents said that there is only an earthquake and the Dadeldhura district's educational institute they were not facing an earthquake as a disaster. A maximum number of the respondent said that the social-media, smartphones, and short message service (SMS) ICT tools help to communicate immediately during the disaster period. Most of the respondents think that ICT tools helped with disaster management. in the research area's schools, they give priority to the Mobile Radio channel and then the telephone channel for communication, In some of the schools there are optical fibers also used for communication, and no school used the satellite communications channel for communication. Most of the schools have used earthquake early warning system alerts for the upcoming disaster. The minimum number of the school used the shake alarm alert system and 3 schools used both earthquake early warning and shake alarm systems in their school and there were no schools have used the Ocean Network Canada alert system for the upcoming disaster. There were different-different policies made by the government for disaster management but the government of Nepal has not helped in the use of ICT tools for disaster management for all districts the government of Nepal focused only on the Kathmandu and Lalitpur districts' educational institutes. In all schools, there was a lake of skill to operate ICT tools, power disruption, a lack of training, economically week for buying the situational ICT tool, which does not have sufficient ICT tools for communication. There were almost schools have SMS services, and social media, the Internet, the telephone was the current communication tools. All schools have that information; there were government and non-government sectors like the Nepal Police force, Nepal Armed Police Force, the Military of Nepal, NGOs, and INGOs. Individuals, Health Organizations, and Red Cross society. Help in a disaster period for disaster management. In all educational institutes smartphones, laptops, tablets, VOIP/Internet telephony, intranet, social networks, forums, messenger apps, Chatbots, email, blogs, and tracking software tools were the effective ICT tools in the future for disaster management.

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