13th World Conference on Earthquake Engineering
Vancouver, B.C., Canada
August 1-6, 2004
Paper No. 51

USING INTERNET COMMUNICATION IN INCREASING EARTHQUAKE DISASTER AWARENESS AND PREPAREDNESS

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SUMMARY

Communication of information is central to disaster management, awareness and preparedness. The aim of this paper is to propose new ways for communicating through presenting information by using the internet as a relatively new media and a suitable option for rapid and global dissemination of hazard information in both national and international levels. Both developed and developing countries are taken into consideration and some new ways are proposed for different groups of internet users, including the authorities and officials, the specialists, and finally the public. In the third group, the main attention is paid to the children and young adults. New forms of presenting information through network programmes, which are proposed in this paper, will definitely help in initiating another new step in disaster awareness and preparedness among the public which emphasises the famous sayings of "prevention begins with information".

INTRODUCTION

Public awareness as one of the non-structural ingredients of the disaster management cycle plays a crucial role in earthquake disaster mitigation. One way for mitigating disasters can be the availability of reliable information given to the public through using network programmes. Regarding this, the use of the internet is rapidly increasing in almost all of developed as well as many developing countries. It is believed that by using the user-specific designed websites, the awareness will increase in both disaster mitigation authorities and public levels. This helps in greater awareness not only in the public sector but also for various community sectors including officials and policy makers as well as specialists that ultimately results in a higher preparedness level of the whole society. It also ensures the increase in public awareness, sharing ideas and experience, and would develop and initiate the use of new and updated disaster programmes, especially in earthquake prone countries. Several countries have already

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implemented various programmes by using internet communication, but still there are many developing countries such as Iran, which should plan for more advancement in this regard. This issue is much more important for the countries with high percentage of children and young adults, as the awareness of the future generations of those countries can be regarded as a window of opportunity for the creation of a 'safety culture' against earthquakes.

Information communication technology

Stephenson in 1997 [1] stated that Information technology (IT) had an increasing application in mid 1990s to emergency planning and management. As he argues, the convergence of computers and communications, and the accelerating growth of global information networking had a profound impact on the organisation of disaster mitigation, planning and response, as well as on research and transfer of knowledge. In brief, the four main phases of IT application [1] can go back to:

1) An early period up to the end of 1970s, when the range of applications was limited by the availability of the equipment and limitations on access.

2) A phase of improvements in accessibility with experimentation during the first half of the 1980s, in which a new generation of microprocessors began. Many cheap desktops were then available for purchase by offices as well as individuals.

3) Time of application combined with communication grew in the late 1980s in which a range of more sophisticated software became available. Lots of changes were observed, such as equipment became portable, mainframe machines improved dramatically, databases of hazardous materials became available, etc….

4) Start of major revolution in networking during the 1990s. Major changes started in this decade. The changes in availability and accessibility to data improved. Also as will be discussed in this paper, the use of internet, intranet, GIS, and remote sensing as the tools of ITC increased more during the 1990s.

Nowadays, information and Communication Technology (ICT) is being used increasingly for disaster mitigation as means of disseminating information [2]. Communication technologies, skills and media are important tools in linking the scientists, disaster management authorities, and the public. They can also be useful in educating people on disaster preparedness, getting information about upcoming hazards and providing the officials with necessary information. There are different tools that can inform people about hazards, help in assessing the damage, collecting information, coordinate the activities and to motivate people, etc…. .

Yodmani in 2001 [3] states that 'communication technology can help establish preparedness networks that link emergency operation centers, emergency broadcasting systems and front-line emergency responders or communities. He further states that this network can be used to 'educate communities about disaster preparedness, track approaching hazards, alert authorities and warn people who are likely to be affected'.

A set of key technologies is widely used in disaster management, planning and research. The most common tools as stated by Stephenson in Joyce as shown in Figure 1, include [4]:

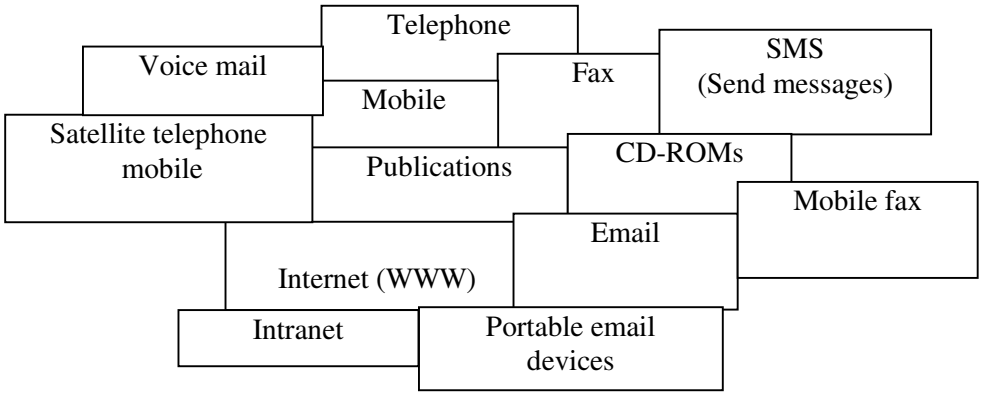

Figure 1. Various modern communication tools

Among the various communication tools mentioned in Figure 1, few ICT tools that are related to internet communication is discussed in this paper.

Application of the internet

The internet has become the standard information dissemination platform in many areas of the world [5]. The establishment of many preparedness networks can help in increasing the awareness and disaster education. The network can be used for educating communities on disaster preparedness, get information about upcoming hazards, and to warn the public and authorities about the consequences of a disaster. Twigg [6] stated that the 'internet has brought an information revolution in risk reduction'. It has been proved that a website including information on disaster plans definitely assists in managing the consequences of a disaster. Internet communication is therefore improved rapidly among the experts, professionals, academia and the public about risk and risk mitigation [6]. There are various lists managed by groups or organisations on risk reduction introducing their activities, some of them, however, only have the role of information sharing. Great amounts of information can be gathered in a user-friendly format at a low cost rate for using in information management.

The use of the internet through the World Wide Web (WWW) has grown increasingly, especially in the last decade. In many countries where there is access to the internet, it has become a primary source of information for people working on risk reduction issues. This has been used for many purposes. Some organisations provide guidelines, reports and studies for a target group, some publicise issues for the use of everyone. Many organisations have their own websites. The USA has the highest proportion of internet users. There are a lot of channels also for providing guidelines and recommendations on risk mitigation and preparedness. There are sites for any levels of society starting from small children and continues to the elderly. There are even special sites for disabled people [6]. For example, in the United States, FEMA [7] has a website that provides a lot of information about various disasters to the public. The information contains:

1) Information on each hazard,
2) Guidelines on how to face a hazard,
3) Guidelines for families on hazard preparedness,

4) Guidance for local officials on aspects of mitigation, preparedness and response,
5) A site especially for children on disasters,
6) An online library,
7) Information on training courses, seminars and conferences,
8) Educational resources for teachers.

Internet for policy-makers

A great amount of guidelines and recommendations for the public can be put on the websites. Policy-makers can provide new comments and publicise it through the special websites. There can be a chain of communication between the authorities and the public. The latter can announce their suggestions and comments about disaster issues through a website and authorities can basically plan according to the need assessment with regard to their budget and limitations.

Internet for experts

There is a growing emphasis nowadays on the exchange of information between the specialists and the communities. Specialists would like to provide ideas that attract more interested public. Their ideas can be spread through websites informing the public on disasters and preparedness issues. Most of the time, people feel much more confident in considering safety measures, if they receive the information through credible sources such as disaster experts.

Internet for public, especially the children

Based on what was discussed in the previous section, the reliability of the sites provided by experts in disaster areas ensures people that these sites are created by people with great knowledge on the field. These sites can be provided in areas from pre-disaster to post-disaster phases in order to increase the public awareness and to be accessible at anytime for the groups mentioned. In addition, there are many sites that have been particularly designed for children on the internet. One of the sites that provides various information for children about hazards is FEMA for kids [8]. The children websites around the world have been very effective in teaching about disasters. The International Institute of Earthquake Engineering and Seismology (IIEES) Education Dept. has recently constructed a disaster related website for the use by children [9]. However, still in many developing countries, an overall access to the internet communication for all levels of society has not been possible due to various reasons such as existing poverty and lack of updated technology.

Email

Using emails among organisations and people is growing quickly, but as was mentioned, still there are a few developing countries that may not have enough access to the internet. Many cities in African countries still have problems in internet access except for the capitals or big cities. However, it has also been proved that emails ease of use and the 'relaxed' style of communication have increased the quality of the correspondence and relationship between the individuals and the organizations, [6, 10].

There are discussion groups such as ISDR dialogue [11] which are examples of effective ways to share the information or to create links between the professionals and academics in various developing as well as developed countries. Some of the dialogues only focus on a very specific topic, however, those moderated by the UN such as IDNDR and ISDR dialogues, focus on much broader subjects. The ISDR dialogue on risk reduction [11] provided an opportunity for the individuals and organisations to get involved in a series of discussions on risk mitigation and reduction. Therefore, there is a chance for the academics and the practitioners to attend and debate on a particular issue. During this time they can read the contributions from the participants and submit their comments and ideas or to provide answers to any

questions given by the participants. The mentioned ISDR dialogue was well advertised in advance. It was free to subscribe for participation. Around 380 individuals, including academics, NGOs, practitioners, representatives of different organisations and institutions joined the dialogue. However, in these dialogues, there is always the probability of non-active participation, even in the case of a high registration rate. Some become almost inactive just at the beginning and only few attend, therefore other participants will be left excluded [6]. There should always be a moderator to check the messages that are sent so as to prevent the unnecessary messages being passed around. In addition, most of the time, email conferences are linked to websites in order to distribute the relevant information and bring about an environment of communication. For example, on the Radix (Radical Interpretations of Disaster) website, the ideas can be discussed and continue to stimulate lively debate [12].

Intranet

Many organisations have their own website which is only for the use of their own personnel. For example, the intranet site of Cranfield University, Royal Military College of Science, is only accessible to the staff and students on the campus. Another example is the IFRC which is developing a Disaster Information System (DMIS) to keep all the documents of the Red Cross/Red Crescent movement at its different levels, 'such as the practical guidelines, project proposals, reports and other relevant documents' [6].

Satellite remote control

An improved reliability of disaster information from satellite image due to the recent advanced image processing technology enables us to obtain various disaster information via remote sensing at anytime and anyplace, improving an environment to utilize it for disaster mitigation. Satellite technology can be useful in collecting and the dissemination of disaster mitigation information. However, in developing countries, due to the strict governments' control, the topographic access is somehow limited. That is why Geographical Information System (GIS) is a very effective tool for planning, especially in risk mitigation activities [2].

Information sharing

One of the most important means of using the internet is the information sharing aspect. Most of the agencies are now even publishing books, reports, their guidelines, journals and newsletters electronically and many are accessible to everyone [6]. As an example, one of these centers, the Disaster Research Centre (DRC) at University of Delaware in the USA [14] has put all its research reports on the website. Also many journals are now available through the website such as 'Journal of Disaster Prevention and Management' and many other journals that in some cases the articles are free of charge for the use of everyone. Stephenson in 1997 [1] states that the integration of computer systems is increasing continually particularly in larger cities in developed nations to the point where the 'matrix of communications and computing power' will have the resources to assess and to respond to disasters. He also argues on other possible improvements which include public information and warning systems and also response scheduling.

Another example of the information sharing through an email discussion group as mentioned by Twigg [10] is the natural-hazards-disasters established in 1994. It is a multidisciplinary email discussion group/network which covers socio-economic, psychological, organisational, scientific and technical aspects of all kinds of disasters triggered by natural and technological hazards which is open to anyone who is interested [13]. Some examples of electronic conferences are also to advertise the reports or papers in advance in order to stimulate debate before they are published. This is also a good and effective way of sharing information about disasters through emails. Several journals are now placing the disaster

management papers on special websites. The web pages contain all the information required regarding that journal.

Limitations and problems in using internet

As mentioned, the main limitation is the lack of regular access to the internet in many developing countries. There are also problems facing people who use the websites. One of them is that for a single item, there might be many websites. For example, one day after the Bam earthquake, there were thousands of sites available about the earthquake which might not be really that useful and efficient. Other problems relate to lack of control. It is really hard to say which sites are most reliable. There is not much guidance and assessment available in the disaster sites. Also most of the time, the sites only stay for a short period, and are either changed or shut down [6]. According to Twigg [6], directories of disaster websites usually provide ever-growing lists, therefore most of the time they are of not much help. Sometimes people also feel that the internet is not always the best distribution channel. They think that the specialists in the field should use CD-ROMs for storing the data. They argue that the low-tech tools are preferable to high-tech ones especially in developing countries, due to their limited resources and higher illiteracy rates [2].

Suggestions for the better use of internet

As discussed in this paper, there are presently several ways of using the internet for information dissemination, and there are also some limitations or shortcomings which decrease the efficiency of this application. Obviously the information dissemination should be done in such a way that the right information be given to the right people, so they can exclude the unnecessary issues. Therefore, the required materials are explained to various sectors of the community and then some methods are proposed by which the internet search can be improved.

What to do for authorities and officials?

Decision makers and people responsible for emergency response management are among the most important sectors of the community who should be more aware about the level of the risk which threatens their society. They should be informed about every new issue which can affect their capability for facing the hazards. This is more crucial in developing countries as in these countries there are many other prior problems which keep authorities diverted from allocating priorities to earthquake hazard and its consequences. So, it is very crucial to keep them updated and remind them about it every now and then in order for them to maintain their consciousness or sensitivity. This can be done through designing a programme in order to send automatic emails or messages to them on specific dates as reminders. It can also happen whenever any important natural phenomenon occurs. It does not need to be just when an earthquake happens.

What to do for specialists?

It may seem that earthquake engineers and seismologists as the main specialists who work on earthquake issues do not need awareness as their jobs relates directly to earthquakes. However, it should be noted that even they should be reminded about the actual hazards which threaten them and their community. Unfortunately, sometimes they do not pay attention to these facts as they are very busy with their research, teaching, and study works. Specialists of other branches of science and technology, other than earthquake engineering and seismology, regardless of what their specialty is, also need some higher level of awareness comparing to the public. There are two reasons for the need of this higher level of awareness. First is the fact that many of the specialties are directly or indirectly involved in earthquake emergencies, for example, physicians, particularly orthopaedics and those who work on mass casualties. The other reason is that the awareness of these people can lead to awareness of larger groups of people who are in direct contact with them in their daily jobs, such as students and patients.

What to do for children and young adults?

As mentioned before, awareness of children and young adults is very important as it secures the safety of the future community. This is more important in developing countries as they are populated with higher percentages of children and young adults. The higher potential of learning in this level of society is another point which encourages the employment of more teaching materials for their awareness. Depending to the age level, the materials which can be used for this sector can be different. For example, in the case of preschoolers, who can use the internet by the help of their parents, songs look more attractive and effective, but for students of 5th grade, drills are more popular. These findings were found in two recent studies of the authors on Iranian preschoolers and young students, [15, 16]. Considering these facts, the information provided for dissemination to this group can be categorized to help them in getting the more desirable information. Cartoons, puzzle clips, playing games, paintings and previously performed drills, games and so on can be mentioned as examples of useful materials for children that can be displayed through the internet.

Who should do the job?

Obviously the preparation of the above mentioned materials and disseminating them through the internet in an appropriate way is a great job that should be done with great care. This can only be achieved successfully by the cooperation of various bodies such as seismologists, earthquake engineering experts, education specialists in all levels, psychologists, mass media authorities, communication experts and the government officials or related authorities. Obviously, each group should be assigned for a specific task, and the whole job is to be directed and coordinated by an experienced authority. For example, preparing appropriate and informative materials about earthquakes is the duty of seismologists and making the materials understandable to the public, particularly children, is the duty of education experts who should have the base knowledge of earthquakes. Therefore, there is a need for a scheduled and continued cooperation between the different sectors. It is worth mentioning that this cooperation is not only required between the experts and authorities in each country, but also between all related specialists worldwide. In fact, without the help of developed countries, making effective use of the internet for the purposes discussed in this paper seems very difficult or even impossible for developing countries.

Key points for improving the internet search efficiency

There are several search engines which download millions of sites in just a few seconds and provide the user with thousands of web addresses which include the key word(s) provided for the search. However, obviously only a trivial per cent of the websites found are useful in any specific case. The main cause of this deficiency is the uncategorised websites which have got the entered word(s) for some reasons, in spite of the fact that not all of what is downloaded is related to the search case. Therefore, it will be very useful to have all the existing websites categorized based on some rules and arranged classification. Also there is a need to design the search engines in such a way to be downloaded on a selective basis in order to be desirable and acceptable to the user. In addition and as was mentioned in earlier parts of the paper, sometimes the sites are displayed for a short period of time, therefore it might be useful if the information be cited with the date of their appearance on the website and the duration of their display. Also, the key words should become even more specific in order to prevent the long lists.

Key points for better access to internet in developing countries

In some developing countries, the access to internet is not available to all different social classes and various areas. Therefore, the use of Information Access Points (IAP) is much like cyber cafés or internet cafés for all levels of society. In the 13th World Conference on Disaster Management which was held in Toronto in 2003, a cyber café was organised for the use of all participants in the conference. Also these

IAPs can be useful for the dissemination of disaster mitigation information. Telecentres are also another example of community-based access to ICT in low-income and rural areas which can provide a broad range of communication and information services to people at a cheap rate. There are a great number of 'Internet cafés' and 'Information kiosks' as they are called in Iran as well as many other developing countries, which provide access to the internet for many people who do not have these facilities available at home or at work. However, it seems that these cafes can be only found in the capital city and big cities. They should get expanded to smaller cities as well, therefore, creating availability for access to them by everyone.

CONCLUSIONS

Information and Communication Technology (ICT) has been identified as an integral part of disaster management. At the same time, the development of the information management systems continues to increase. The impact is still yet to be observed. Communication with mobile instruments continues to improve with many tools, a few are mentioned in this paper. It can be argued that one of the most popular ICT tools is the internet as the main tool discussed. The use of the internet for dissemination of disaster mitigation information is not very well developed in many countries. Although, many developed countries are making benefit from using different networks and systems for getting information about disasters, it can be said that it still may be a while yet before the real implications of it become completely clear. Also still in many developing countries in the world, there is no regular and systematic access to internet for the public. However, nowadays there is an increasing number of internet users even in developing countries due to the rapid growth of new technology.

To conclude, a few recommendations can be made as follows:

- Cooperation between various experts for preparing information and designing the websites
- Preparing the web materials for various groups of people based on their level of knowledge
- The help of developed countries to developing ones in IC technology
- Resolving the shortcomings of the internet search capabilities
- Expanding the internet café and information kiosks to smaller cities and rural areas.

There are social as well as technical aspects of ICT in disaster management and mitigation. A great amount of information about disasters, preventive safety measures, preparedness on disasters, response and recovery techniques, as well as the structural advice and guidelines can be found for the public to use. It is hoped that using information technology communication and the proposed strategies through using the internet can contribute towards increasing earthquake disaster awareness and preparedness in upcoming years worldwide especially in developing countries.

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