An interactive travelling educational path on earthquakes and volcanoes

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SUMMARY:
A mobile earthquake interactive path is an action of disaster-risk reduction given by long-term activities based on an educational information system. The idea is to provide a realistic space and to design in it an interactive path, aimed at both children and adults, explaining. issues related to seismic hazard especially in urban sectors close to volcanic areas, such as Mt. Etna, Vesuvius and Campi Flegrei (Italy) and Azores Islands (Portugal). The educational path would ideally include a wall with basic information on natural hazards related to seismic and volcanic events, with hands on and interactive exhibits, a special "edutainment" corner focused on children, and a central platform for people who will experience the simulation of an earthquake, while being instructed on how to respond to the event. This educational information system represents a way of putting the results of the project UPStrat-MAFA (***U****rban disaster* ***P****revention* ***Strat****egies using* ***MA****croseismic Fields and* ***FA****ult Sources*) to the service of the entire community in order to strengthen people's awareness and preparedness related to seismic and volcanic hazards. The fundamental aspect of the risk level for people living near a volcano is also included in the educational experience.

Keywords: Science education, earthquakes, volcanoes, travelling exhibition

1. INTRODUCTION

Information and outreach activities on natural hazard and risks have a peculiar role in risk mitigation strategies, increasing people's risk awareness and their preparedness in coping with disastrous events, such as earthquakes and eruptions. However, in most European countries natural risk education is not included in school curricula. Therefore, to achieve a broad target audience, namely population groups that are prone to seismic and volcanic risk, remains a major challenge.
To achieve efficient public education training on seismic and volcanic risk, education initiatives should take advantage of different methods of communication, and should adapt to different contexts.
In this study we present the general outlines of Task H Action H.4 of the EC project UPStrat-MAFA "Urban disaster Prevention Strategies using MAcroseismic Fields and FAult Sources", which deal with the development of an educational system shared between the European project partners. In particular, this system is based on an interactive educational path especially designed to increase the population risk perception and promote mitigation measures in a consistent, accessible and simple language.

2. COMPONENTS OF PUBLIC EDUCATION

For a successful public education for hazards it is important to keep in mind that the components of a communication plan and the message presented to citizens should explain three critical issues:

i) Explain natural phenomena -– people will want to know the likelihood of an event (earthquake, volcano, other) in an uncomplicated way. Explain the behaviour of faults in a simple way, and the correlation between plates and earthquakes, and areas at risk;

ii) Explain the consequences of natural phenomena - describe the effects of the phenomena on nature, built environment and human; describe potential losses, specify who is at risk in a potential earthquake, clarifying people of what is at stake and their chances;

iii) How to mitigate – some simple and quick suggestions how to reduce the losses. People can be guided to mitigation in several ways: with a "how-to" video, flyers, urban interventions, exhibitions, and so on.

3. THE INTERACTIVE EDUCATIONAL PATH

The learning method is based on a "constructivist approach", which means that learners build or construct new ideas on top of their old ideas. In designing the educational interactive path, this approach has to take into account the knowledge of target visitor groups, particularly the knowledge of their distinctive learning styles and particular learning needs.
The first step is to identify topics and sub topics about seismic and volcanic phenomena, their impact on human society, and the most suitable measures to mitigate this impact also through appropriate behaviour preparedness (figure 1). Topics related to local seismic and volcanic history, local beliefs and myths, have to be included. It is indeed important to correct traditional misunderstandings, which could lead to inappropriate behaviour in case of seismic and/or volcanic events.

Figure 1. Examples of topics displayed

3.1 Interactive Experience

Our idea is to develop an innovative interactive path where the topics are presented in multimedia applications for tablet or touch-screen pc. The multimedia applications will be integrated and completed with traditional exhibits, such as roll-up panels and exhibitions of rocks and instruments. For example, an exhibit is planned to involve the visitors in an interactive virtual experience with earthquakes using a traditional shaking table.
Interactivity is a valuable tool to attract and retain the visitor attention. A multimedia exhibition, provided with videos, animated graphics in a touch screen environment and interactive equipment, enables multiple users to engage and learn through exploration and play. Multimedia applications can also offer dynamic solutions for all environments, and a flexible structure of their software will permit easy update and expansion of the educational path on earthquakes and volcanoes, also fitting it for a potentially wide range of public.
Advantages for this approach can be summed up as follows:

- high impact multimedia interaction with the users
- multi-level approach: educational material have virtually no limits to be developed, it is suitable for adults, students and kids
- easy to upgrade and expand

- all the educational path can be easily conveyed also through the project website and any hardware support
- learning process can be eventually valuated through a simple interactive procedure

The use of the web site will play an important role not only for helping communication among the partners of the project, but also as a tool in the education system proposed. http://upstrat-mafa.ov.ingv.it (2012) is the official URL of the UPStrat-MAFA project website which is realised using CMS (Content Management System) technology, highly flexible and customizable. The homepage (figure 2) will be enhanced with links to sections containing the online versions of multimedia applications used in the interactive exhibits. A "download section" will give also the opportunity to get hold of the digital educational material related to the project (e-books, multimedia applications, videos,...).

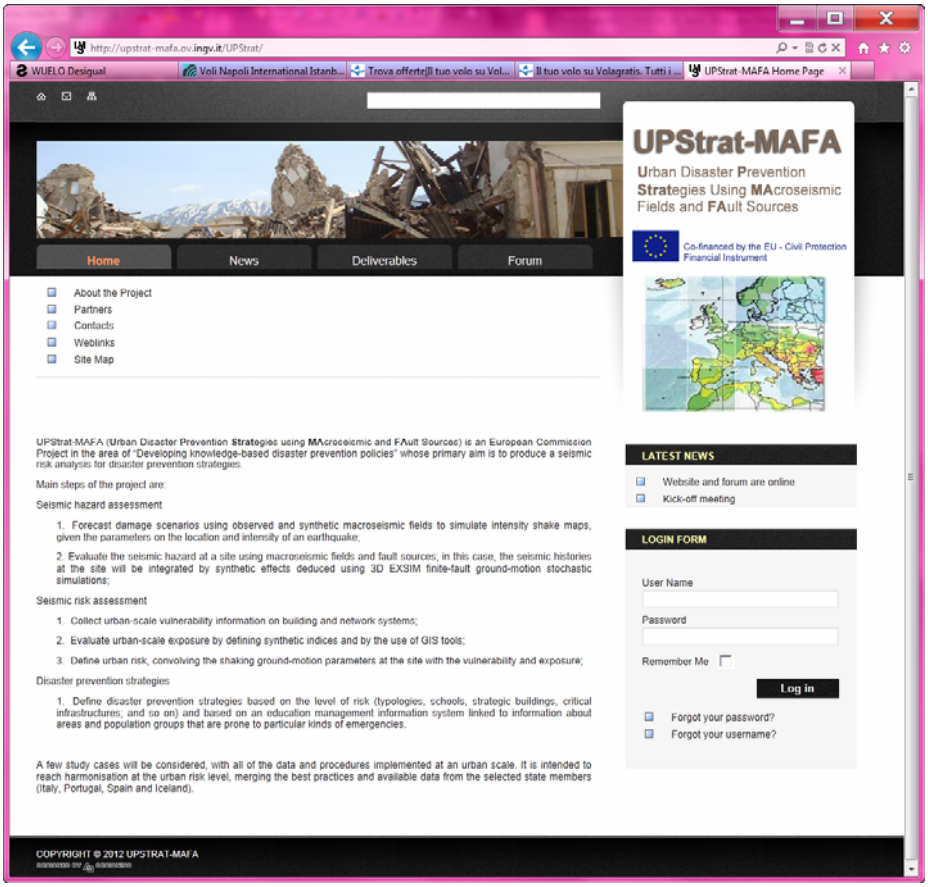

Figure 2. Home page of UPStrat-MAFA website.

4. MEETING THE HAZARD: URBAN INTERVENTION

To reach random public, a urban context intervention should be prepared. In elected urban places such as monumental areas, squares, touristic spots, a structure should be designed to appeal and to drew people attention. The information should deal with seismic and volcanic famous recent events sometimes unknown by general public. This would be useful to get their attention on these topics and, then provide visitors with complementary and more detailed information also on risk mitigation actions. This kind of information is important to raise the citizen's awareness of the risk, and is helpful in the way that we could create public education initiatives on earthquakes and other natural hazards events. By this way, the aim of increasing people awareness on seismic and volcanic risk would be achieved and main information would be passed on.

5. PUBLIC EDUCATION USING VIDEO REALIZATION

One suitable tool for public education can be through videos. This tool is intended to reach the broader audience and hopingly the ones that are not aware of the risk at all, making use of internet opportunities.
Often it is not easy for general public to get correct information on natural hazards and risk mitigation actions, and people have little preparedness of what to do in case of an earthquake or other natural event.
The rate of general public preparedness could be tested by street-interviews, carried out asking people how they would react during an earthquake and volcanic event (figure 3).

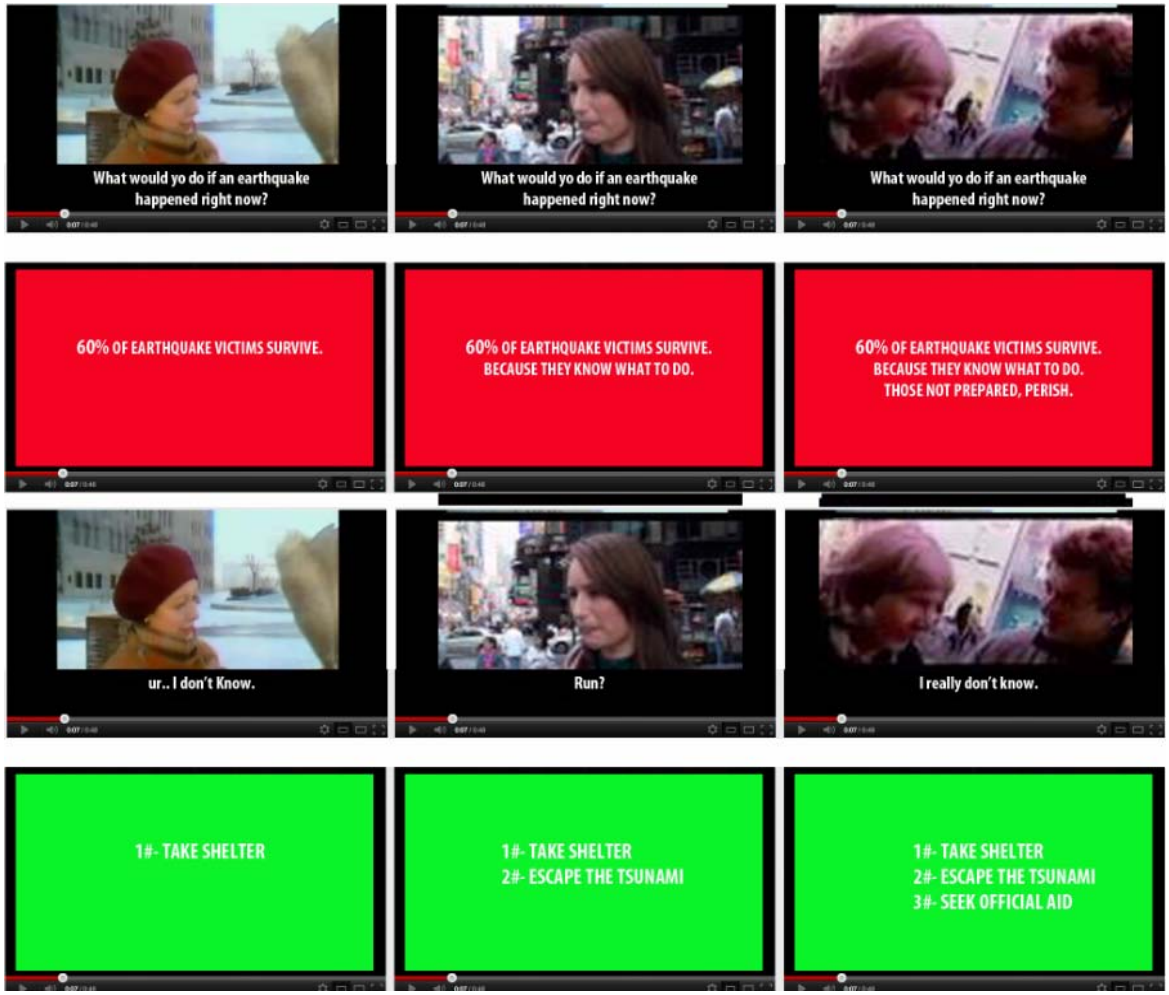

Figure 3. Example of street interviews.

The interviews will be supported by video material and images of natural disasters, in order to show the real impact that such these events could have on human life. The following step will be to assess people's ideas of how safe they feel in their own home in case of earthquake.
At the end of the interview, correct information on the natural phenomena, their possible impact and the correct behaviour to follow during the event will provided together with some insights on local seismic and volcanic risk.
Local municipality's officials will be involved in this action in order to create a stronger link between residents and their local Government also in informing people on their building vulnerability to a natural event.
At the end interviewed are invited to get further information, visiting the project's website.

6. CONCLUSIONS

We, as outreach scientist community can make substantial steps towards the reduction of seismic and volcanic hazard with:

- strengthening our presence in the territory with traditional and multimedia tools
- communication aimed at a broad (not specialized) audience, starting from children
- simple rules about how to behave correctly in case of earthquakes and volcanic eruptions
- let people get in touch with experts (researchers and technicians), and look at how instruments for seismic and volcanic monitoring work

We believe that the interactive educational path on earthquakes and volcanoes presented here can be useful in European countries involved in the UPStrat-MAFA project, as well as in other regions with high seismic and volcanic risk.

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