

ARE EDUCATIONAL INITIATIVES IN SCHOOLS EFFECTIVELY CONTRIBUTING TO PREVENTION IN ITALY ?

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The social and economic consequences of the recent earthquake in Abruzzo dramatically recalled the fragility of a land where the many ancient monuments and the unscrupulous construction concur to a catastrophe scenario. And of course they recalled the question of what can be done to avoid the losses, making the terms prevention, mitigation, and preparedness prevailing again.

In fact, despite the very poor attention towards safe construction in seismic areas, in Italy several education programs have taken place in the last two decades with the aim to make people conscious of natural hazards and raise their sensibility on the behaviour to adopt during an emergency.

The aim of this article is to discuss the role of education in terms of prevention under the light of the main past experiences in education programs. The first part of the article is thus a short description of the projects held in Italy and of their current heir.

The main initiatives in education, namely the EDURISK (still active) and EDUSEIS projects, had similar targets and goals, but were somewhat different in their means and activities. In fact while they were both aiming at:

- 1) instructing and informing about what an earthquake is and how one can prepare for it
 - 2) raising awareness of the fact that most of the Italian population lives in seismic areas
 - 3) orienting towards problems related to earthquake preparedness, and the role of prediction and prevention,
- they were based on different levels of intervention of the people involved.

The activities included within the EDURISK project are the natural continuation of the early works by *Stucchi et al., 1978*: the primitive education group continued its activity in the context of the **Gruppo Nazionale per la difesa dai Terremoti (National Group for Protection Against Earthquakes, GNDT hereinafter)**. The EDURISK project continued after GNDT had been subsumed into the **Istituto Nazionale di Geofisica e Vulcanologia (INGV hereinafter)**.

The activity of EDURISK (www.edurisk.it) is designed for the whole range of schools: students and teachers are offered a wide variety of educational tools and

learning courses specifically designed to foster, nurture and enhance knowledge. During its enterprise, EDURISK drafted forth educational tools for the infant, primary and lower secondary school, which are printed in the form of short books and freely distributed to the schools participating in the activities. The teachers undertake to fit the EDURISK prototypes within their curricular activities for at least one academic year, at the end of which they assess their effectiveness, suggest alterations/improvements, and provide additional feedback.

In its subsumption to INGV, EDURISK was associated to an existing group of researchers already devoted to education. The merging of the two research units resulted in a series of initiatives, again mainly devoted to schools but not only. The offer spans from production of printed and multimedia editorial items, to exhibitions, lessons in schools and visits to the seismic centre of the National Earthquake Centre in Rome, with the opportunity to see seismologists attending their everyday work. As INGV is organized into agencies spread all over the Italian territory, these kinds of initiatives regard most of the Italian regions and are organized by the Roma, Rocca di Papa, Arezzo, Bologna, Genova, Napoli, Catania, Grottaminarda branches (<http://portale.ingv.it/servizi-e-risorse/attivita-scuole>, in Italian).

EduSeis (*Educational Seismological Project, Cantore et al., 2003*), was a scientific/educational project which involved high schools, scientific museums and research institutes in different European countries. It covered the fields of environmental and earth sciences using seismology as a tool of scientific learning. The main objective was to create a direct and permanent link between scientists on one hand, teachers and students on the other one. The project was based on the implementation at schools of an earthquake recording station with a network data management. The seismic data recorded by the EduSeis network were analyzed and interpreted in school laboratories by the teachers and their students with the assistance of science museums and the supervision of research institutes. The project in Italy was originally funded by the GNDT. In the early years of 2000, 10 stations were installed in schools of Southern Italy, but after 2002, due to financial problems, many Italian schools retired from the project. Only a few seismic instruments were kept

in operation, under the supervision of the Università della Calabria, Università di Napoli and Città della Scienza.

The latter station was then included in the Sismo a l'Ecole network, contributing to enlarge the area of young seismologists in Europe.

The **O3E (European Observatory for Education and Environment, Berenguer et al., 2009)** borrows the experiences from 10 years of regional and national educational programs, including the initiatives up to now described. It is an innovative program born from the cooperation between France, Italy and Switzerland to promote responsible behaviour of citizens towards environmental emergencies (earthquakes, storms, floods) by installing sensors of educational vocation in selected schools. Data are recorded in the schools and processed by the students on dedicated servers and then made available through the internet to the entire educational community.

The schools participating in the project are offered a rich series of meetings, classes and technical briefings (<http://o3e.geoazur.eu>)

Therefore the past and present experiences have schools as main targets. Although based on small amounts of students, an estimate of the impact of this educational initiatives on prevention can be done and turns out to be very positive. In principle the idea of involving schools in education is meaningful. Students are open-minded, do not have pre-concepts; they do like very much being protagonists and having a duty like running a seismic station or processing data helps them to become more responsible. Going into the nature of seismic data helps them to understand the physics behind and, more important, they get the feeling about the limitations that data may introduce when their quality is not high enough or their number and distribution is not sufficient. The availability of data make students more eager to go into the nature of the processes, and learn to estimate what information can be taken out from the single datum. Teachers also benefit from the projects because the availability of instruments and the cooperation with researchers may improve their knowledge on specific topics.

There are of course also advantages for the researchers. The world of scientific research is often considered by the citizens as unreachable, while education projects establish a direct relationship between scientists on one side, teachers and school students on the other one.

This relationship is profitable for each one of the actors, because in the current society scientists must be able to communicate in order to convince people (and financiers) of the importance of their work. Nevertheless, even if the involvement of teachers, students and their families is taken into account, the number of persons hit by the initiatives, and possibly educated, is too small. In order to ensure a significant result, education should involve more schools (better all) and last for longer times.

The themes of prevention and mitigation should become topics treated in school books, and not left to

the initiatives of a bunch of researchers. By the way, this would cost almost nothing to society.

One can argue: provided that the time devoted to earth sciences in Italian schools is very limited (even in those colleges supposed to specifically form students for further earth science applications at the University), should we insist on the physical aspects of the phenomena, favouring those that will continue in the field of earth sciences, or should we form citizens more conscious about the natural hazards by introducing more information on how to face emergencies? The answer should be easy: although in Europe and, in particular in the Mediterranean area, the risk of strong earthquakes exists, the politics of information and awakening to the seismic prevention are still insufficient in comparison with analogous initiatives undertaken in other seismic regions in the world (such as for example Japan, Western United States).

In this context, the role of media has to be underlined. The educational messages should appear every now and then on newspapers and be the theme of television broadcasts, but most of the time this does not happen until a catastrophe occurs.

Media have an impressive power that they seldom use for scientific divulgation, although a great improvement for the wrapping of the news would result from the cooperation between journalists (bad science, efficient communication) and researchers (good science, inefficient communication).

Unfortunately, media are used to think in terms of economical advantages: from this point of view the impact of prevention is apparently zero. Instead, it has a paramount importance on society because educating people may save human lives and huge amount of money.

Can we assign such a heavy duty only to our students?

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