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The Geohazard Safety Classification: how resilience could play a role in the geo-hydrological hazards assessment of school buildings.

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The impacts of adverse events related to geological hazards are unevenly distributed among communities and groups of individuals concentrated in restricted workplaces. Their consequent safety level is the result of differential exposures to these events and of diversified levels of preparation to them. Nowadays, the exposure and coping ability as co-determinants of people's safety are of particular interest for institutions managing the schools systems. According to the disaster risk reduction experts, the geo-hydrological processes can be mitigated with knowledge and planning, physical and environmental protection measures, and response preparedness. UNISDR is promoting a global culture of safety and resilience through the integration of disaster risk reduction in school curricula. The Comprehensive School Safety (CSS) framework is intended to advance the goals of the Worldwide Initiative for Safe Schools and the Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector, and to promote school safety as a priority area of post-2015 frameworks for sustainable development, risk reduction and resilience. In Italy, according the latest ministerial survey (June 2010), there are 41,902 school buildings. Their alarming condition in terms of safety for their daily occupants is reflected by 39 fatalities ascribable to structural failures in the last 21 years. In 95% of these cases victims are a sad tribute due to natural phenomena.
A rigorous evaluation of the total risk of a school building, as defined by the well known risk equation (R=HxVxE), would require a complete probability density function describing the exposure to specific types of events of all the pupils and personnel in the school. In addition, the probability that the inhabitants are present in the school during an event should be estimated depending on the time of day, day of week, or month of the year, as well as on local holiday schedules. The inclusion of resilience as a component of risk allows us to refine the risk awareness, focusing attention on the cultural and social meaning of risk as a shared practice among communities that are potentially at risk.
This project developed a method for assessing school hazard exposure (landslide, seismic, flood) and structural fragility/safe learning facilities (seismic response, dampness, plan configuration) which is non-invasive, fairly quick and objective. This tool, which is based on the GSC (Geohazard Safety Classification) definition, was tested in central Italy and optimized for a very wide variety of situations, so that it may be exported in schools (or in similar working places) of other geographical areas. The GSC was obtained as the complementary to one of the Index of Geohazard Impact (IGI), calculated modifying the equation of the specific risk, taking into account also the resilience as a damper, amplifier or invariant of the specific risk itself (IGI=max(HixVi)/rho). The variables of this new equation (hazard, vulnerability and resilience) can be quantified on the basis of ancillary data (thematic maps), results of the data processing of field surveys (seismic noise measure according to the H/V technique, thermographic images, GPS surveys) and the answers to an online questionnaire implemented on purpose.