

University Resilience to Natural Disasters: Assessment of Preparedness, Risk Perception and Response Capacity in European Countries

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Abstract

Universities in South-Eastern Europe are increasingly facing challenges generated by natural disasters such as earthquakes, floods and fires. In this context, assessing preparedness and response among the university population is essential to strengthening institutional and community resilience. Objectives: The study aims to conduct a comparative analysis of risk perception, response behaviours, and alerting infrastructure across universities in Bosnia and Herzegovina, Albania, Romania, Italy, and Greece, to identify factors that influence the capacity to react and adapt in emergencies. Methodology: A standardised questionnaire with quantitative and qualitative items was administered to students and teaching staff. The instrument assessed procedural literacy, the presence of institutional facilities, and the availability of communication systems. The analysis was carried out using descriptive methods and association tables of responses by country of residence. Results: Participants demonstrated a high level of familiarity with earthquake and evacuation procedures. However, differences between countries are evident in specific facilities (e.g., audible alarms, visible evacuation plans, alert apps), and local educational campaigns influence proactive behaviours. Conclusions: The results support the need for standardised interventions and the inclusion of emergency education in university curricula. Universities can become vectors of community resilience if they have functional infrastructures and coherent preparation strategies.

Keywords: institutional resilience; emergency communication; procedural literacy; natural disasters; university environment; risk perception; alerting infrastructure; transnational comparison.

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Introduction

In the context of the intensification and diversification of natural risks worldwide, higher education institutions are increasingly consciously developing an institutional culture of safety and resilience. Universities can no longer be viewed simply as academic spaces isolated from social and climatic realities, but as exposed entities, responsible for protecting a significant number of people – students, teaching staff, auxiliary staff – from potentially catastrophic events, such as earthquakes, floods or fires. These types of disasters have a significant impact on the physical and psychological integrity of individuals, as well as on institutional functioning, and require the development of coherent prevention, intervention, and recovery strategies.

Over the past two decades, the literature has devoted increasing interest to the concepts of institutional resilience and procedural literacy in the field of emergency management.

Recent studies highlight the importance of integrating the educational, organisational and behavioural dimensions in efforts to reduce collective vulnerability¹. In this sense, universities are not only beneficiaries but also vectors of security culture, with the role of forming informed, responsible citizens capable of reacting effectively in critical situations.

The present paper is part of this multidimensional paradigm, aiming to assess preparedness, risk perception, and response capacity in the academic environment, in relation to three of the most relevant types of natural disasters in South-Eastern Europe: earthquake, flood, and fire. The study is carried out in a comparative framework, including five countries with high exposure to such risks – Bosnia and Herzegovina, Albania, Romania, Italy and Greece – and aims to identify both strengths and discontinuities in institutional and individual protection policies and practices.

Through its comprehensive approach and the mixed-methodology applied, the study provides a relevant empirical framework for formulating concrete recommendations to strengthen security culture in the European academic environment, while supporting the need for integrated educational and institutional policies focused on prevention, solidarity, and resilience.

Literature review

Over the past two decades, the literature has increasingly emphasised the intersection of human vulnerability, climate change, and psychosocial resilience mechanisms. The intensification of natural disasters, such as forest fires, earthquakes, floods, and recent pandemics, has prompted a reassessment of how individuals, social groups, and public institutions respond to, adapt to, and rebuild after collective trauma. At the same time, the focus has shifted from post-disaster response to preventive planning and risk reduction through education, structural reforms, and community capacity building².

¹ N. Kapucu și S. Khosa, „Disaster Resiliency and Culture of Preparedness for University and College Campuses,” *Administration & Society* 45, nr. 1 (2013): 3–37, <https://doi.org/10.1177/0095399712471626>

² M. Wallengren-Lynch, *From Compassion to Action: School Social Workers at the Forefront of Emergency Response*, in *Nordic Social Work Research* 15, no. 2 (2025): 253–268, <https://doi.org/10.1080/2156857X.2024.2309187>

This paradigm shift is supported by recent literature that emphasises the importance of social capital, resilient institutional infrastructure, and multisystemic adaptation strategies, especially in the context of structural inequalities^{3,4}. Natural disasters do not affect populations equally; vulnerability to impacts and capacity to recover are profoundly influenced by factors such as inequitable distribution of resources, precarious legal status, or limited access to public services. The study by Dare et al.⁵ following the Australian bushfires shows that perceptions of economic inequality were associated with decreased trust in the community's ability to implement adaptive measures, reduced collective efficacy, and a pessimistic view of the future quality of life.

However, recent research also indicates the essential role of social cohesion as a moderating factor. Factors such as community identification, collective continuity and interpersonal support have demonstrated the ability to mitigate the adverse effects of inequalities and stimulate community functioning under conditions of severe stress⁶. In this context, the school becomes an essential institutional actor not only for formal education, but also for the cultivation of social capital in the dimensions of bonding (intra-community relations), bridging (connection between groups) and linking (relationship with formal institutions), according to the analysis proposed by Wallengren-Lynch⁷. School social workers play a decisive role in fostering community resilience through integrated psychosocial interventions.

On the psychological dimension, Liu et al.⁸ longitudinally investigated the effects of the floods in Henan on adolescent mental health, identifying differentiated trajectories of resilience, with protective factors such as family support, social network and personality traits. The study emphasises that resilience is not a static attribute but a dynamic construct influenced by individual and contextual variables. This approach is congruent with the multisystemic perspective formulated by Lomeli-Rodriguez et al.⁹, which shows that adolescent and parental resilience develop in interaction, being influenced by social representations, cultural and religious norms, but also by the developmental stage or the social roles assumed post-disaster.

³ S. Tiwari, Z. Ketola, C. Schelly, and E. Boyer-Cole, *Energy Service Security for Public Health Resilience: Perception and Concerns in Western Upper Peninsula of Michigan*, in *Rural Sociology* 89, no. 4 (2024): 932–953, <https://doi.org/10.1111/ruso.12571>

⁴ L. Nyahunda and E. M. Ncube, *Positioning Social Work Roles in Disaster and Climate Resilience Endeavours in South Africa*, in *Journal of Human Rights and Social Work* (2025), <https://doi.org/10.1007/s41134-025-00378-8>

⁵ M. Dare, J. Jetten, C. R. Crimston, and H. P. Selvanathan, *Wealth Inequality and Community Vitality in the Aftermath of the Australian "Black Summer" Bushfires*, in *Journal of Applied Social Psychology* 54, no. 12 (2024): 744–756, <https://doi.org/10.1111/jasp.13069>

⁶ D. G. Pilgreen, G. T. Kyle, and A. D. Ross, *Validation and Application of a Perception of Community Adaptive Capacity to Coastal Hazards Measure*, in *Environment and Behavior* 56, nos. 9–10 (2024): 682–711, <https://doi.org/10.1177/00139165241307533>

⁷ Wallengren-Lynch, *From Compassion to Action*, 253–268.

⁸ X. Liu, M. Bao, X. Wang, and G. Zhou, *A Longitudinal Investigation of Mental Health Outcomes after the Henan Floods in China: Examining Predictors of Resilience Trajectories*, in *Psych Journal* 13, no. 6 (2024): 993–1003, <https://doi.org/10.1002/pchj.781>

⁹ M. Lomeli-Rodriguez, E. Parrott, A. Bernardino, A. Rahman, Y. Direzkie, and H. Joffe, *Psychological Resilience Following Disasters: A Study of Adolescents and Their Caregivers*, in *Journal of Loss & Trauma* 30, no. 4 (2025): 483–514, <https://doi.org/10.1080/15325024.2024.2391903>

Focusing on the context of migration and multiple trauma, Im and Saleh's research¹⁰ among Somali youth in Nairobi reveals how repeated exposure to natural disasters and violence—a phenomenon conceptualised as “polytrauma”—deeply affects social functioning. Lack of legal documentation, substance use, and difficulties accessing support services were identified as negative predictors of social integration, while perceived support, community belonging, and the ability to seek help functioned as protective factors. The authors emphasise the need for holistic, culturally-contextualised interventions that recognise the interdependence between structural trauma and psychological vulnerability, while highlighting the destructive role of stigma and bureaucracy on recovery processes.

This perspective is also reinforced by Lomeli-Rodriguez et al.¹¹, who show that the forms of resilience exhibited by adolescents and their caregivers in Indonesia are closely linked to collectivist, religious values and norms of mutual support, highlighting cultural variation in ways of coping with adversity. Thus, psychological adaptation after disaster is an expression of a complex ecology of personal, family and community factors, which must be understood in the context of local social representations.

In conclusion, contemporary literature highlights the convergence of structural vulnerability, social capital and multisystemic mechanisms of adaptation in the face of natural disasters. Resilience is not a fixed individual attribute but an emergent social construct influenced by inclusive public policies, functional institutional infrastructure, community support, and integrated psychosocial interventions. Recent studies offer an integrative vision in which psychological, social, cultural, and institutional dimensions are articulated in a complex yet necessary process of sustainable and equitable reconstruction.

Methodology

Objectives

Assessment of the level of preparedness, risk perception and resilience capacity of university staff and students from five European countries (Bosnia-Herzegovina, Albania, Romania, Italy, Greece) in the face of natural disasters: earthquakes, floods and fires.

Specific objectives:

1. Identifying respondents' previous experiences with natural disasters in their areas of residence.
2. Assessing the existence of institutional emergency response procedures in the university environment.
3. Determining the level of information provided by teaching staff and students regarding these procedures.
4. Analysing the existence and functionality of protective equipment and institutional communication systems.
5. Assessing knowledge and applicability of correct procedures in case of earthquake, flood or fire.
6. Identifying significant differences between countries regarding all the aforementioned aspects.

¹⁰ H. Im and M. Saleh, *Exposure to Natural Disaster and Polytrauma Among Somali Youth in Urban Kenya*, in *Global Social Welfare* (2025), <https://doi.org/10.1007/s40609-025-00382-w>

¹¹ Lomeli-Rodriguez et al., *Psychological Resilience Following Disasters*, 483–514.

Study participants

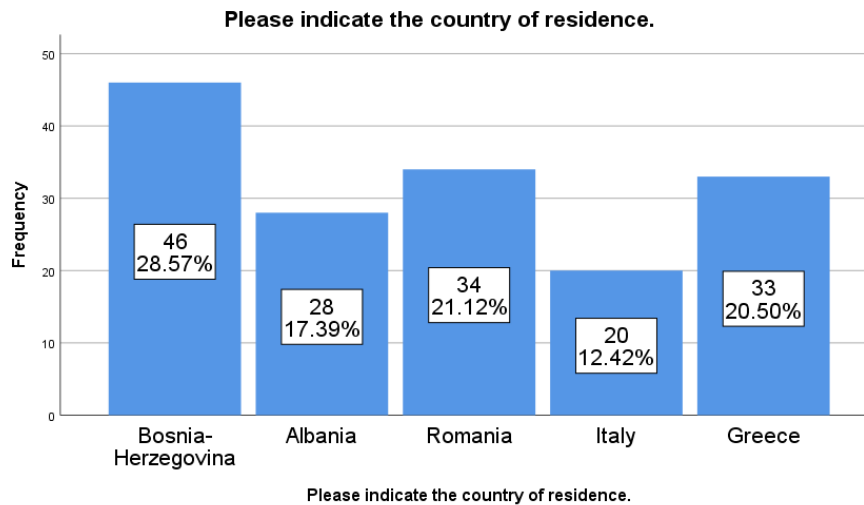


Figure 1. Distribution of respondents by country of residence

The graph illustrates the percentage and numerical distribution of respondents from the five countries included in the research: Bosnia and Herzegovina, Albania, Romania, Italy and Greece. The following can be observed:

- The highest percentage of respondents comes from Bosnia and Herzegovina (28.57%), with a total of 46 people.
- Romania (21.12%) and Greece (20.50%) are in the following positions, with 34 and 33 respondents, respectively.
- Albania contributes with 28 respondents (17.39%), while Italy has the lowest share, only 12.42% of the total (20 respondents).

This relatively balanced distribution allows for meaningful transnational comparisons, but it should be borne in mind that different shares can influence the interpretation of aggregate results, which is why, in comparative analyses, it is advisable to use percentages rather than absolute values.

Research instrument

The instrument used in this research is a questionnaire developed in English, entitled "Resilience to natural disasters", designed to assess perceptions, level of preparation and individual and institutional resilience capacity in the face of natural disasters (earthquakes, floods, fires), in the university environment.

The questionnaire is structured in three major sections, each corresponding to a type of natural disaster: earthquake, flood and fire. Each of these sections includes, in turn, two subscales:

- perception of risk associated with the disaster analysed;
- individual resilience capacity, structured on five dimensions: psychological resilience (PR), cognitive (CR), adaptive (RA), social (SR) and institutional (IR).

The instrument contains both closed factual "YES/NO" questions regarding respondents' previous experiences and the existence of institutional emergency procedures, as well as 5-point Likert self-assessment items (from 1 - "never" to 5 - "always") to measure perceptions and attitudes.

Topics covered include:

- existence of evacuation plans and protective equipment;
- level of information and training of staff and students;
- familiarity with emergency intervention procedures;
- level of emotional and logistical preparedness;
- involvement in community activities and collaboration with authorities.

The questionnaire has both diagnostic and predictive value for institutional and individual emergency preparedness, providing relevant data for evaluating risk management policies and practices in the academic environment.

Data analysis and processing

1. Direct experience with natural disasters

The section on direct experience with natural disasters aims to highlight respondents' subjective perceptions of risk, based on the concrete contact they have had with such events. Analysis of answers to questions about experiencing earthquakes, floods, or fires in the area of residence reveals the level of personal familiarity with different types of natural risks. This dimension plays an essential role in understanding subsequent attitudes related to prevention, response, and the perceived degree of vulnerability. The more frequent or severe the direct experience, the more likely respondents are to demonstrate greater awareness of the risks and, in some cases, increased concern about protection measures and institutional preparedness.

Regarding experience with earthquakes, the highest exposure is reported in Bosnia and Herzegovina (89.1%), Greece (93.9%) and Romania (88.2%). In contrast, Italy has a significantly lower percentage of respondents who report having experienced an earthquake (50%), which may affect levels of awareness and preparedness. Only 22 respondents from the entire sample (13.7%) report never experiencing an earthquake.

In the case of floods, Bosnia and Herzegovina stands out for a high rate of direct exposure (78.3%), followed by Albania (46.4%). The lowest percentages are recorded in Italy (15%) and Romania (32.3%), suggesting a lower perception of hydrological risk in these areas.

Regarding fires, the situation is more balanced. The highest percentage is recorded in Italy (100% of respondents declare having experienced a fire), followed by Greece (45.5%) and Bosnia and Herzegovina (41.3%). Romania (26.4%) and Albania (32.1%) have lower values.

Across the entire sample, earthquakes are most frequently experienced (86.3% of respondents answered yes), compared to floods and fires (each with 44.7%). This significant difference suggests that the majority of respondents perceive seismic risk as more present and real.

Bosnia and Herzegovina stands out for its high exposure to all three types of disasters. Romania and Greece confirm seismic risk through very high rates of direct earthquake experience, but have lower exposure to floods and fires. In Italy, on the other hand, experience with fires is dominant, which may reflect recent climatic realities, such as heat waves and wildfires. Albania presents a moderate and balanced exposure to all three risks, suggesting a potentially versatile risk profile.

The results highlight regional differences in experience with natural disasters. This may directly influence attitudes towards prevention and institutional measures. In particular, the earthquake seems to be a common experience for most respondents. In contrast, floods

and fires are experienced more unevenly, which justifies differences in risk perception and in the level of involvement in personal and institutional protection measures.

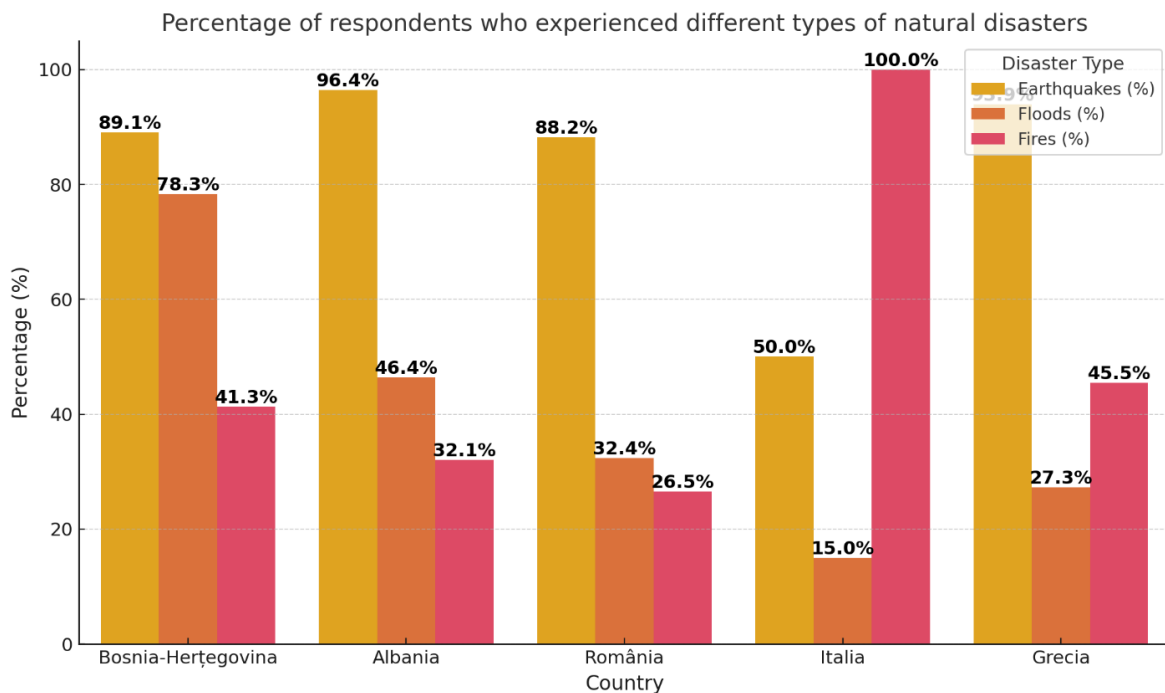


Figure 2. Percentage of surveyed participants from each country who reported having experienced earthquakes, floods, or fires in their area of residence. Data are based on self-reported experiences.

Figure 2 illustrates the percentage of respondents from the five countries participating in the study who reported personally experiencing earthquakes, floods, and fires in their area of residence. It is clear that, overall, earthquakes are the most frequently encountered type of disaster in all the countries analysed, with percentages ranging from 50% (Italy) to 96.4% (Albania). Romania, Greece and Bosnia and Herzegovina also have a high seismic profile, suggesting a consolidated perception of the risk associated with these events. In the case of floods, Bosnia and Herzegovina (78.3%) and Albania (46.4%) have the highest percentages, indicating a greater frequency of hydrological exposure or a more recent collective memory of such events. In contrast, Italy and Greece have low values (15% and 27.3%), and Romania is at an intermediate level (32.3%).

Regarding fires, Italy stands out, with all respondents reporting having experienced one (100%). This result is consistent with recent climatic realities in the region, which are frequently affected by wildfires and heat waves. Bosnia and Herzegovina (41.3%) and Greece (45.5%) have moderate exposure to this type of risk, while Romania (26.4%) and Albania (32.1%) have lower exposure.

This graphic distribution provides a clear comparative picture of the risk profile in each country and contributes to a better understanding of regional differences in perceptions of danger and the need for institutional and personal adaptation to these contexts. High values may reflect not only objective realities, but also a greater degree of social and institutional awareness of the phenomenon in question.

II. Institutional infrastructure and preventive organisation

The section dedicated to institutional infrastructure and preventive organisation aims to analyse universities' level of involvement in emergency preparedness. It aims to highlight the extent to which higher education institutions have structures, procedures, and resources dedicated to the effective management of natural disasters, and how they are implemented in practice.

The data collected reflects the existence or absence of key elements such as evacuation plans, information maps, periodic simulations for various emergency scenarios (earthquakes, floods, fires), protective equipment (fire extinguishers, alarms), campus communication systems and lists of responsible contact persons. In addition, the degree to which teaching staff and students are informed about these procedures and whether there are specialised departments to coordinate information and training activities is assessed.

By analysing these dimensions, one can assess the level of preventive organisation at the institutional level, the capacity of universities to respond effectively in emergencies, and the coherence of internal security and protection policies with the risk realities specific to each region.

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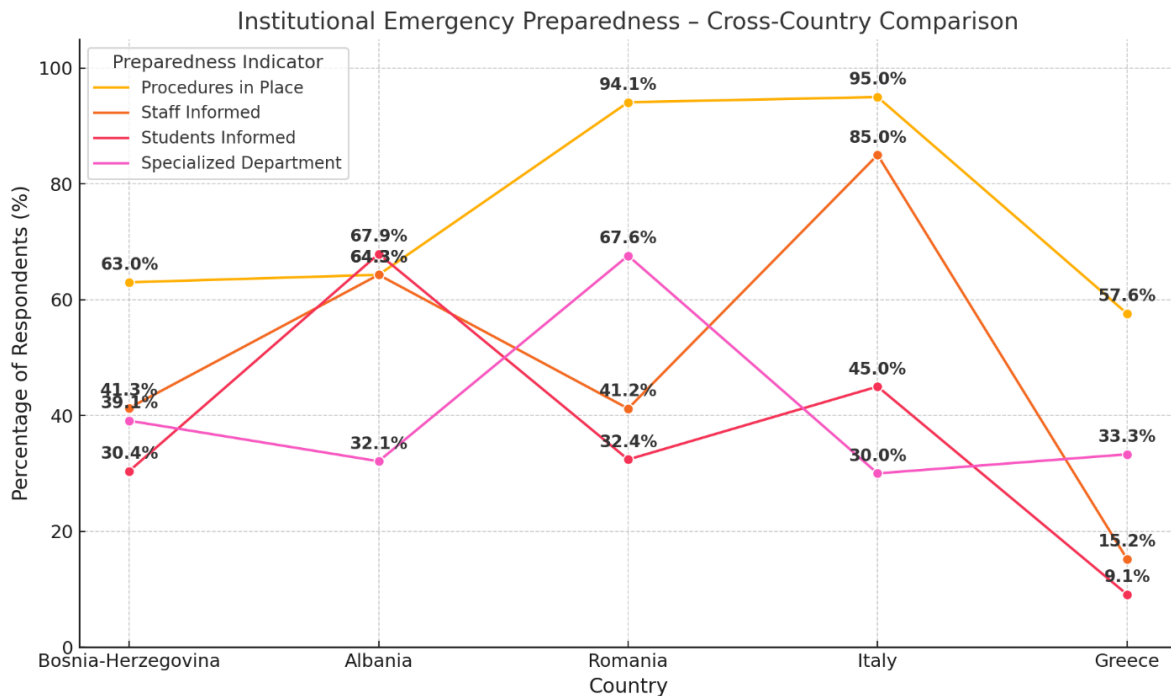


Figure 3. Institutional Emergency Preparedness – Percentage Comparison Across Countries

Figure 3 graphically summarises these four fundamental institutional dimensions – the existence of emergency procedures, complete information of staff, information of students and the existence of a specialised department – in comparison for each of the five countries analysed. It is observed that Romania and Italy register the highest percentages in terms of formalisation of procedures, while Albania stands out for its superior information on students. Greece and Bosnia and Herzegovina, although they recognise the existence of procedures, present significantly lower values in terms of their communication and the visibility of training structures. The percentage representation in the graph clearly highlights these discrepancies and supports the interpretative conclusions detailed in the following paragraphs.

Regarding academic staff information, the situation is heterogeneous. Only 73 respondents (45.3%) report being fully informed about all procedures, with the highest scores in Albania (64.3%), Italy (85%) and Bosnia and Herzegovina (41.3%). In Greece and Romania, these percentages are significantly lower, which raises questions about the efficiency of institutional communication channels. Also, a significant number of respondents – especially from Greece (17) and Bosnia and Herzegovina (15) – declare that they are not informed at all, indicating a possible gap between the existence of procedures and the institutional capacity to systematically transmit them to employees. Intermediate answers (information only for fires or only for earthquakes) suggest a fragmented approach to training, lacking an integrated, unitary strategy.

Regarding student information, the data reveal even lower coverage. Only 56 respondents (34.8%) say they have been fully informed about all emergency procedures, with the best results in Albania (67.9%), Italy (45%) and Bosnia and Herzegovina (30.4%). In contrast, 70 respondents (43.5%) say they have not been informed at all, an alarming situation especially in Greece and Bosnia and Herzegovina. Similarly to staff, the fragmented responses indicate a lack of clear risk communication policies among the student population.

Another dimension analysed was the existence of a specialised department responsible for organising periodic training on emergencies. Only 67 respondents (41.6%) confirm the existence of such a structure, which reveals a significant institutional deficit. Romania stands out positively again, with 23 respondents indicating the existence of such a department, followed by Bosnia and Herzegovina (18) and Greece (11). In contrast, a large number of participants (74, representing 45.9% of the total) state that they do not know whether such a structure exists at their university. This fact, in itself, reflects a lack of institutional visibility and a possible problem of functionality or internal recognition of those responsible for safety. In conclusion, the data suggest that although many universities have formal emergency procedures in place, transparency, communication and institutional coherence in their implementation remain significant challenges. Incomplete or non-existent information for staff and students, as well as uncertainty regarding the existence of training structures, indicate an acute need to strengthen institutional strategies for preparing for and protecting against natural disasters.

IV. Behaviours and knowledge in emergencies (procedural)

a) Earthquake

The section on procedural behaviours and knowledge in emergencies aims to analyse how responders know and are prepared to apply correct protective measures during an earthquake. Behaviours such as taking shelter under a solid table or desk, avoiding elevators, checking evacuation routes, providing first aid to injured persons, maintaining calm, and following safe building exit procedures are essential elements of an effective response in such contexts. The level of knowledge and assumption of these behaviours is a direct indicator of procedural literacy and the effectiveness of training provided in the academic environment. The analysis of this type of behaviour allows the assessment of the individual and collective response capacity in a critical situation. It highlights differences across countries in risk exposure, security culture, and institutional preparedness strategies.

Behaviours and procedural knowledge in the event of an earthquake are an essential indicator of literacy in terms of personal and collective security. The data obtained indicate a high level of familiarity with the main protective measures, suggesting a good internalisation of the behavioural norms associated with such an event.

One of the most important reactions, taking shelter under a table or near a retaining wall to protect the head and torso, is recognised by 153 of the 161 respondents, corresponding to an impressive 95%. The same trend is observed in the case of other critical behaviours immediately after an earthquake: 144 people (89.4%) know that they must quickly assess the environment to identify possible victims or dangers before evacuating, and 134 (83.2%) say that they would apply first aid procedures in case of identifying injured people.

The responses also indicate a well-established culture of collective support: 134 respondents (83.2%) say they would stay with others during an evacuation, and 142 (88.2%) know and follow the official evacuation routes. Similarly, 132 people (82%) would check the safety of evacuation routes and look for alternatives if they are blocked. One of the most ingrained rules – not to use the elevator during an earthquake – is known and accepted by 147 respondents, representing 91.3% of the total, which reflects the effectiveness of information campaigns and previous training. Regarding post-event reactions, 127 respondents (78.9%) say they would check the status of electricity and telephone networks, and 134 (83.2%) say they know how to use and distribute emergency resources (water, food,

temporary shelter). Finally, 137 people (85.1%) declared that they would contact the competent authorities after the disaster, which shows a mature understanding of the institutional role and post-earthquake protocol.

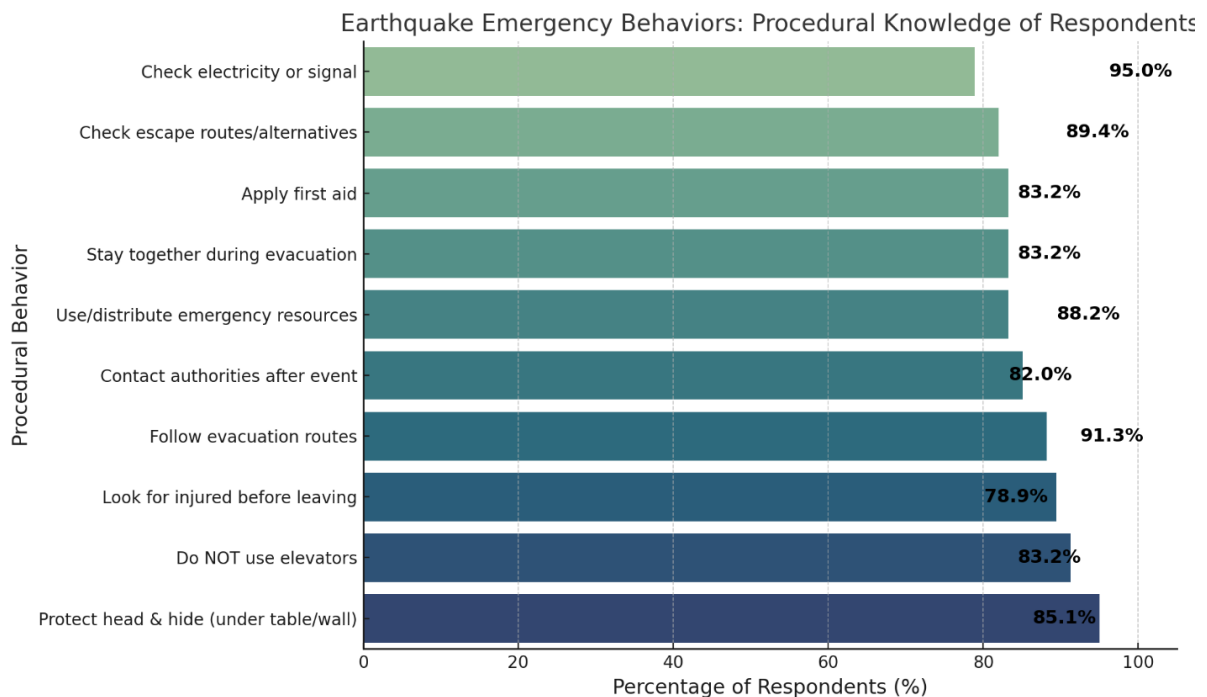


Figure 4. Procedural Earthquake Response Knowledge – Percentage of Respondents Aware of Recommended Behaviours

Figure 4 illustrates the percentages of respondents who would apply different essential behaviours in the event of an earthquake. It is noted that most of the measures analysed are well known and internalised, which confirms the conclusions presented above regarding the high level of procedural literacy. The high percentages reflect not only the effectiveness of prior training but also possible cultural familiarity with seismic risk among respondents.

The distribution of responses by country indicates a relatively uniform level of procedural awareness, with only slight variations. Romania, Greece, and Bosnia and Herzegovina stand out with consistently high positive responses. At the same time, Italy and Albania show some differences, especially in post-event reactions (e.g., checking the phone and contacting the authorities).

Overall, the data reflect a solid preventive culture regarding earthquakes, both at the individual and collective levels, which can be correlated with the frequency of this type of risk in the analysed areas and with the degree of institutional integration of safety measures.

b) Floods

This section aims to analyse the level of knowledge and application of appropriate behaviours in the event of a flood. Among the measures considered essential in such situations are disconnecting electrical equipment to prevent accidents, avoiding areas already flooded or at high risk, using only safe drinking water for consumption and hygiene, and disinfecting objects that have come into contact with contaminated water. The ability to adopt these behaviours reflects both the level of procedural literacy and the effectiveness

of training programs in the university environment. The assessment of these behaviours provides relevant insights into how young adults respond to an imminent danger and into the level of institutional preparedness across different countries.

This section aims to assess the level of knowledge and the assumption of correct behaviours in the event of floods, behaviours that directly contribute to protecting life, health and personal property. The data obtained indicate a generally high level of procedural literacy among respondents, with some variation across countries.

One of the fundamental measures—disconnecting electrical equipment before the flood—is known to and declared applicable by 122 respondents (75.8%). Bosnia and Herzegovina (31 affirmative answers) and Greece (27) recorded the most positive mentions, while Italy had the lowest compliance rate (14 affirmative answers out of 20).

Regarding avoiding contact with electrical equipment in water—an essential rule for preventing electric shock—the level of awareness is almost unanimous, with 151 respondents (93.8%) indicating they would adopt this behaviour. All countries recorded high values, indicating strong internalisation of this significant risk.

The behaviour of retreating to upper floors as a self-protection measure is also well understood by the participants, with 134 (83.2%) stating they would do so. Bosnia and Herzegovina and Greece again lead in the frequency of affirmative responses. At the same time, Italy and Romania recorded a higher proportion of adverse reactions, suggesting a need to strengthen preparation in this regard.

One hundred twenty-seven respondents (78.9%) recognise media announcements and warnings as necessary in the context of emergency management. However, Romania and Italy register the most negative responses (9 and 7, respectively), which may indicate low trust in official sources or a deficient institutional culture regarding risk communication.

An essential behaviour, such as avoiding buildings affected by flooding, is widely recognised, being indicated by 151 respondents (93.8%). The level of affirmative responses is high across all countries, with the highest in Albania (100%).

Similarly, moving cautiously on stairs in flooded areas is a behaviour reported by 146 people (90.7%), indicating a high level of awareness of secondary risks, such as slipping or falling.

Exclusive use of safe drinking water sources during floods is a behaviour supported by 148 participants (91.9%). Bosnia and Herzegovina (45) and Greece (32) again stand out with a very high level of favourable responses, while Albania and Romania record some adverse reactions that may reflect gaps in preventive education.

Finally, disinfecting objects that have come into contact with flood water before reuse is a behaviour declared by 132 respondents (82%). Although Bosnia and Herzegovina and Albania indicate a good internalisation of this aspect, Italy and Romania report a higher number of negative responses (9 and 7, respectively), which may signal an information deficit or a minimisation of the post-flood biological risk.

Overall, the data suggest a high level of knowledge of essential flood behaviours, but also reveal significant differences between countries, possibly related to the frequency of exposure to such risks, the effectiveness of training programmes, the national preventive culture and the degree of trust in public authorities. These conclusions can guide the development of differentiated educational policies adapted to the local context.

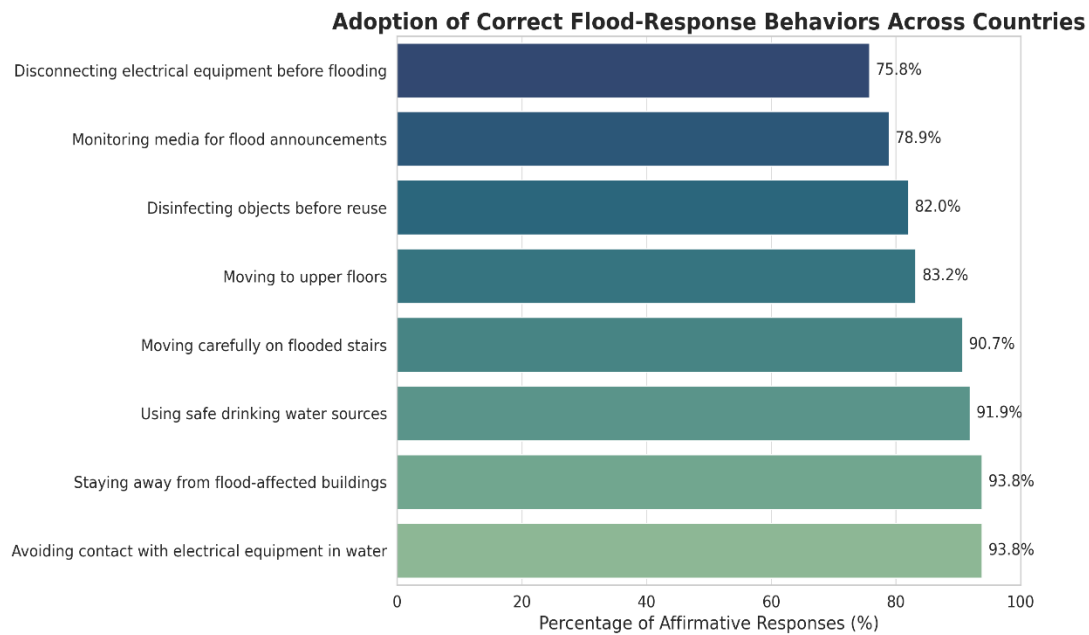


Figure 5. Level of assumption of correct behaviours in case of floods

This is also supported by the graphic representation above (Figure 5), which highlights the percentage differences in the behaviours reported by participants in the face of flood risk. It is observed that the most widely adopted behaviours are reactive ones – such as avoiding electrical equipment in water and in affected buildings –, each with an assumption level of 93.8%. At the same time, using safe water sources and moving carefully on stairs are behaviours adopted by over 90% of respondents, which reflects a good awareness of indirect risks. In contrast, preventive measures such as disconnecting electrical equipment before flooding or disinfecting objects after exposure are less frequently practised, indicating a possible need to strengthen education in proactive prevention, not only in emergency response.

c) Fires:

This section analyses respondents' procedural literacy in the context of fire situations, highlighting how they know and are prepared to adopt appropriate behaviours to protect their own lives and those around them. The responses collected reflect the extent to which students understand the importance of maintaining calm and order in critical moments, the need to activate the alarm system immediately, and the need to respect properly signalled evacuation routes. In addition, the degree of assuming responsibility towards colleagues in vulnerable situations, especially towards students with disabilities, as an integral part of a solidary and well-coordinated response to risk, is noted. The level of these behaviours allows a relevant assessment of the capacity for an organised response in the face of a fire. It can indicate both the effectiveness of preventive training in the university environment and the overall institutional safety culture.

The aim is to assess the behaviours reported by respondents in fire situations to identify the level of procedural literacy and the capacity for coordinated response in such high-risk contexts. The data highlight, overall, a good internalisation of essential safety measures, with moderate variations between countries.

The overwhelming majority of respondents (153 out of 161, i.e. 95%) declare that they would follow the signs to the nearest exit in an orderly manner, demonstrating a good understanding of the evacuation logic and the importance of staying calm. Similar responses

were also recorded regarding the recommendation to others to remain calm, follow instructions, and avoid panic: 153 people (95%) stated that they would promote these behaviours, reflecting a collective assumption of responsibility and discipline in risk management.

A slightly smaller number of participants (148, i.e. 91.9%) stated that they would not return to the building to retrieve personal belongings, a behaviour essential in preventing secondary accidents. Another 148 respondents (91.9%) indicated they would not use elevators during a fire, demonstrating a solid understanding of the dangers associated with this behaviour.

A key aspect of emergency evacuations is supporting vulnerable people. In this regard, 150 participants (93.2%) stated they would pay attention to students with disabilities who require special support measures, indicating a strong orientation towards inclusion and solidarity in critical situations.

Immediately activating the fire alarm upon discovering a fire is a behaviour affirmed by 137 respondents (85.1%). Although this percentage is high, compared to the other behaviours analysed, a certain reluctance or uncertainty is still observed, reflected in the 24 negative responses, especially in Albania (5) and Greece (5). This difference may indicate either a lack of specific training on individual duties or an erroneous perception of the responsibility to signal the danger.

The assessment of the presence and complete evacuation of all students is recognised as necessary by 146 respondents (90.7%). Italy (19) and Bosnia and Herzegovina (42) recorded the most affirmative responses, while Romania (5 negative responses) may indicate a greater need for institutional training on this collective component.

A behaviour involving institutional communication — calling the person responsible for emergencies at the university level — is declared by only 132 respondents (82%). Although Albania stands out positively with full compliance (28 out of 28), other countries register a considerable number of denials, which may reflect a lack of knowledge of formal procedures or a lack of clarity regarding institutional roles in the event of a fire.

Immediately reporting the absence of some people is considered essential by 153 participants (95%), signalling a culture of vigilance and responsibility towards others. This behaviour, closely linked to verifying complete evacuation, is well assimilated across all five countries.

Remaining in a safe area until permission to leave the perimeter is granted is a behaviour reported by 151 respondents (93.8%). This percentage reflects a good understanding of post-fire risks and the importance of respecting official communications to avoid further accidents.

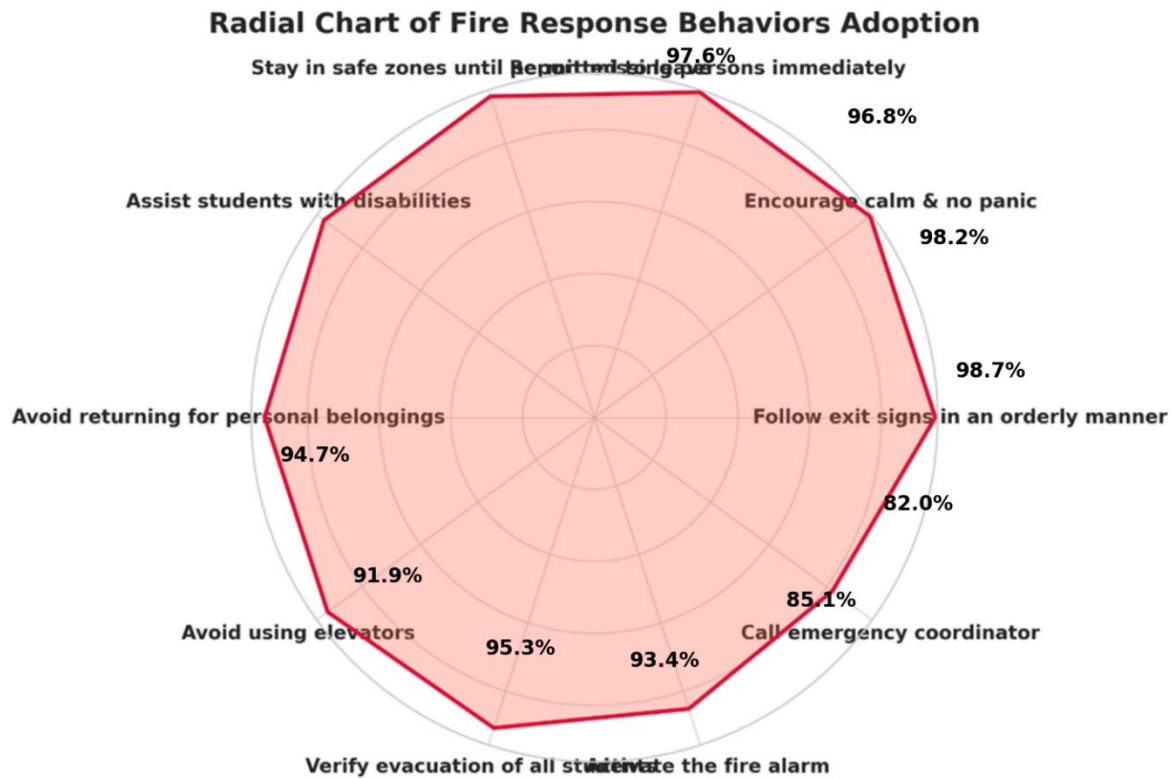


Figure 6. Level of assumption of correct behaviours in case of fire

Figure 6 provides a radial representation of the percentage distribution of fire response behaviours among respondents. A high overall level of procedural literacy is observed, with most behaviours being assumed by over 90% of participants. The most frequently adopted actions are: following evacuation signs (98.7%), staying calm and avoiding panic (98.2%), and staying in safe areas until official instructions (97.6%). Also, avoiding using the elevator (95.3%) and supporting colleagues with disabilities (94.7%) are internalised behaviours. Behaviours such as checking that all colleagues have evacuated (93.4%) or avoiding returning for personal belongings (91.9%) indicate a good understanding of priorities in case of an emergency. However, two essential actions in coordinated crisis management register the lowest values: activating the alarm (85.1%) and contacting the emergency coordinator (82%). These results suggest that, although individual reactions are well internalised, the institutional dimension — which involves the formal initiation of the protocol and communication with internal authorities — remains insufficiently clarified and applied.

Overall, these results highlight strong procedural literacy in fire situations, with a clear understanding of self-protection measures, the logic of orderly evacuation, and collective solidarity. However, some aspects — such as activating the alarm or contacting the emergency responder — require strengthening training, clarifying protocols, and promoting an institutional climate that actively encourages individual responsibility.

V. Human intervention capacity and training

This section analyses the actual level of preparedness of teaching staff and students in the face of emergencies, with a focus on immediate intervention skills and the infrastructure available in the university environment. It first considers the extent to which members of the academic community are trained in first aid, an essential aspect in the efficient management of incidents until the arrival of specialised teams. At the same time, the existence and functionality of fire alarms in campus spaces and administrative buildings are evaluated as an indicator of the institutional capacity for rapid and coordinated response. Together, these dimensions provide a clear picture of the level of practical training in the face of possible critical situations and allow the identification of strengths or potential vulnerabilities in the university security system.

This section explores the level of practical training for students and teachers in emergency intervention, with a focus on first aid, as well as the preventive infrastructure installed in institutional spaces. The results reveal a mixed picture, with some positive aspects in safety infrastructure but also essential gaps in human training for critical situations.

Regarding the preparation of students for first aid following a disaster, only 48 respondents (29.8%) report being trained in this regard. In contrast, 50 people (31.1%) state that they have not received such training, and a considerable number – 63 respondents (39.1%) – do not know whether they have been trained. This high degree of uncertainty indicates both the lack of visibility of training programs and their possible informal or non-institutionalised nature. Albania and Romania stand out positively, with 14 and 12 students, respectively, reporting first-aid skills, while Bosnia and Herzegovina records the lowest training rate (only 4 out of 46 respondents).

As for teachers, the situation is slightly more favourable. Half of the respondents (50 out of 147, i.e. 34%) believe that teachers are trained to provide first aid. However, 40 people (27.2%) say the opposite, and 57 (38.8%) do not know how to answer. Therefore, although the level of confidence in teacher training is slightly higher than that of students, the lack of certainty remains a common problem. Italy stands out for a relatively high level of affirmative responses (10 out of 20). At the same time, Greece shows low confidence in the training of teaching staff (only one affirmative response out of 26).

On an institutional level, the situation is more positive. The majority of respondents (138 out of 161, i.e., 85.7%) confirm the presence of fire alarms on university campuses, with the highest level of coverage in Italy (100%) and also high levels in Albania (96.4%) and Romania (91.2%). However, Bosnia and Herzegovina records a significant proportion of negative responses (11 out of 46), which may reflect incomplete infrastructure or a lack of information among students about the available facilities.

In administrative buildings, the coverage level is slightly lower. 117 respondents (79%) confirm the installation of fire alarms, while 31 (21%) indicate their absence. Bosnia and Herzegovina and Greece stand out again with a higher number of negative responses (16 and 10, respectively), while Italy and Albania record complete or almost complete coverage (20 and 27 affirmative responses, respectively).

In conclusion, although preventive infrastructure (fire alarms) is generally well represented in campuses and administrative buildings, human preparedness for immediate interventions – especially among students – remains limited and fragmented. The lack of institutionalised programs and clear communication regarding first aid training creates insecurity at both the individual and collective levels, which can negatively affect the efficiency of the response in real emergencies.

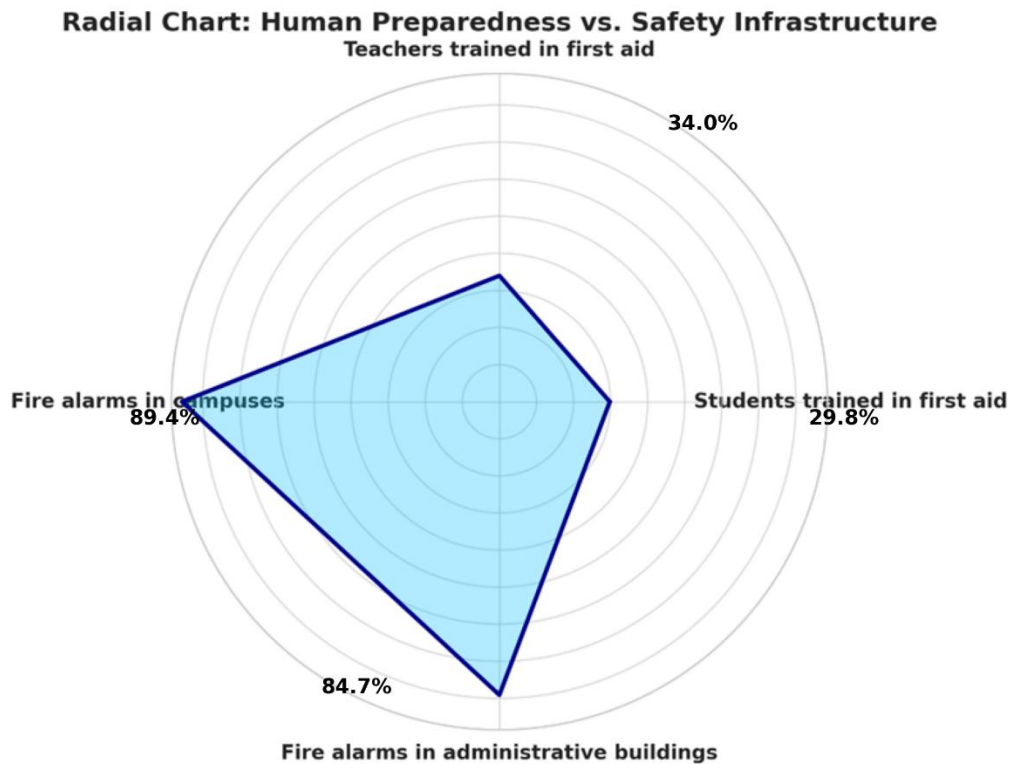


Figure 7. Radial representation: human training vs. safety infrastructure

Figure 7 provides a visual comparison between the perceived level of human training and the existence of safety infrastructure in universities. There is a strong contrast between the frequency of technical equipment – such as fire alarms (reported by over 85% of respondents) – and the relatively low level of first aid training, both among students (29.8%) and teaching staff (34%). Through its circular shape, the graph highlights the imbalance between the material and human components, underlining the need for an integrated approach that combines infrastructure with practical training and continuous education of all members of the academic community.

VI. Institutional infrastructure and equipment for emergencies

This section aims to assess the degree of logistical and organisational preparedness of universities in the face of emergencies by analysing the presence, accessibility, and functionality of safety infrastructure. Aspects such as the existence of evacuation plans and related maps, the provision of protective and intervention equipment, the installation and use of alarm systems, the functioning of internal communication channels for transmitting alerts, and the updating of lists of people responsible for crisis management are analysed. At the same time, periodic simulation exercises to test the institutional response are considered. These components provide an overview of operational capacity and internal coordination in the face of high-potential risks.

Regarding emergency contact lists, only 78 respondents (48.4%) reported that they are available at the institutional level. In contrast, 16 (9.9%) report their absence, and a significant percentage – 41.6% – lack clear information in this regard. Bosnia and Herzegovina and Greece register the most “don’t know” responses, indicating either a lack

of information or poor institutional communication about the structures responsible for coordinating emergencies.

Regarding evacuation plans and maps, the situation is more encouraging: 120 respondents (74.5%) confirm their existence. Italy, Romania and Bosnia and Herzegovina register the highest percentages of affirmative answers. However, in Greece and Albania, a significant proportion of people report the absence of these essential tools (16% and 9%, respectively).

A critical aspect of institutional preparedness is the organisation of periodic simulations for emergency scenarios. Only 51 respondents (31.7%) state that such exercises are carried out, while 87 (54%) respond negatively. Another 23 responses are specific, indicating simulations for only certain types of risk: fires (15), floods (3), or earthquakes (5). These data suggest that, although there may be specific initiatives, they are limited in frequency, coverage and coherence, lacking a systemic framework for operational preparedness.

Regarding the communication systems available on campuses, only 71 respondents (44.1%) confirm their existence, while 36 (22.4%) indicate their absence, and 54 (33.5%) do not know the situation. This high degree of uncertainty suggests a lack of visibility of the communication channels or their poor promotion. Romania stands out positively, with 23 affirmative answers, while Italy and Greece register a high proportion of uncertainty.

Among respondents who reported the presence of communication systems on campus, they were also asked to specify their type. The most frequent mentions include audible warning systems (21.1% of the total), informative posters (8.7%), alert applications (2.5%) and video or text warning messages (9.3%). A significant category provided various answers classified as "other" (19.9%), indicating a variety of local ad-hoc solutions. These data complete the picture of the communication infrastructure in emergencies, but also highlight the need to standardise and streamline alerting channels in the university environment. The "doughnut" graph provides a more distinctive and elegant visual representation of the percentage distribution of communication systems mentioned on campus (Figure 8).

Distribution of Communication Systems Mentioned in University Campuses

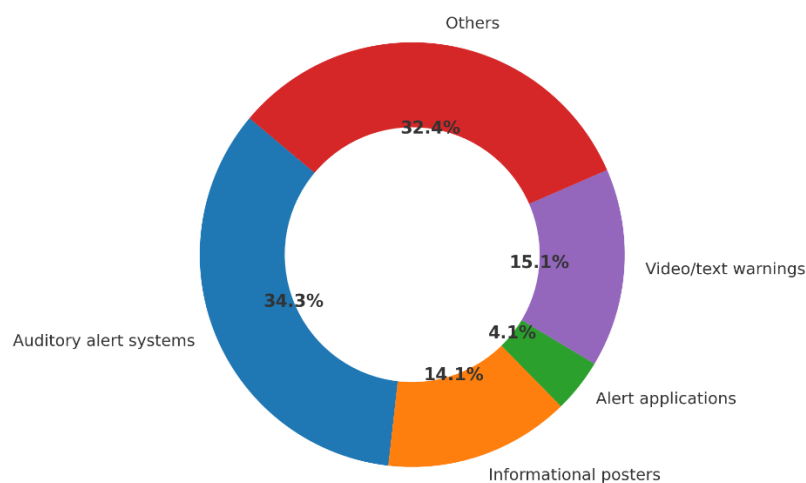


Figure 8. Types of communication systems reported by students on university campuses.

When asked about the types of warning systems in place, respondents frequently mention sound systems (34 mentions), warning messages (15), posters (14), and alert applications or informative videos, but in much lower proportions. This suggests a preponderance of traditional communication channels, to the detriment of digital, interactive and modern ones.

Regarding protective equipment, the situation is significantly more positive: 147 respondents (91.3%) confirm the existence of specific equipment, such as fire extinguishers or intervention kits. Italy and Bosnia and Herzegovina report full coverage, while only a few institutions in Greece, Albania and Romania indicate their absence.

Another indicator of awareness of danger is vigilance regarding objects that could become dangerous in the event of a collapse. In this regard, 149 respondents (92.5%) state that they are attentive to these aspects, which shows a good internalisation of collateral risks in the context of natural disasters, especially earthquakes.

In conclusion, the institutional infrastructure for emergencies is generally well represented from a technical point of view – especially in terms of equipment and evacuation plans – but serious deficiencies persist in the areas of regular training, formal communication, and the visibility of accountability structures. Universities appear to have invested in infrastructure, but a significant part of the academic community remains insufficiently informed, untrained or uninvolved in the collective preparation process. This imbalance undermines the coherence of the institutional response and underscores the need for an integrated intervention plan and ongoing education.

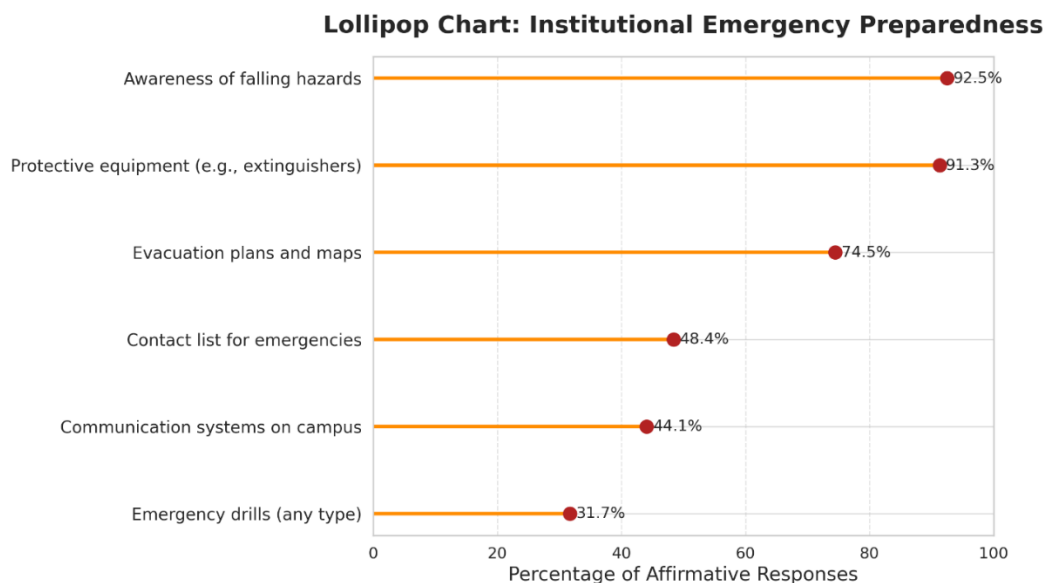


Figure 9. Perceived level of implementation of institutional infrastructure for emergencies

Figure 9 provides a concise and clear visual representation of the perceived level of implementation of institutional emergency infrastructure. Through its minimalist format, this type of graph easily highlights the components that are best represented (such as protective equipment and physical risk awareness) and those that require priority interventions (such as organising simulations and ensuring official contact lists). The values displayed allow for a quick comparison of essential institutional dimensions, visually reflecting asymmetries in university crisis management readiness.

Qualitative analysis of declared institutional facilities in the context of emergencies

In the section on institutional infrastructure, participants were invited to openly mention the types of emergency equipment available at their university. The answers provided reveal a variety of expressions, but also an obvious focus on a core of essential facilities, especially those dedicated to fire prevention and management.

The most frequently mentioned element is the fire extinguisher, found in numerous linguistic variants and technical combinations. Formulations such as “fire extinguishers”, “fire extinguishers and fire doors”, “fire extinguishers, hydrants” or “fire extinguishers, fire alarms” reflect both the presence of basic equipment and their association with other specific components of fire protection systems.

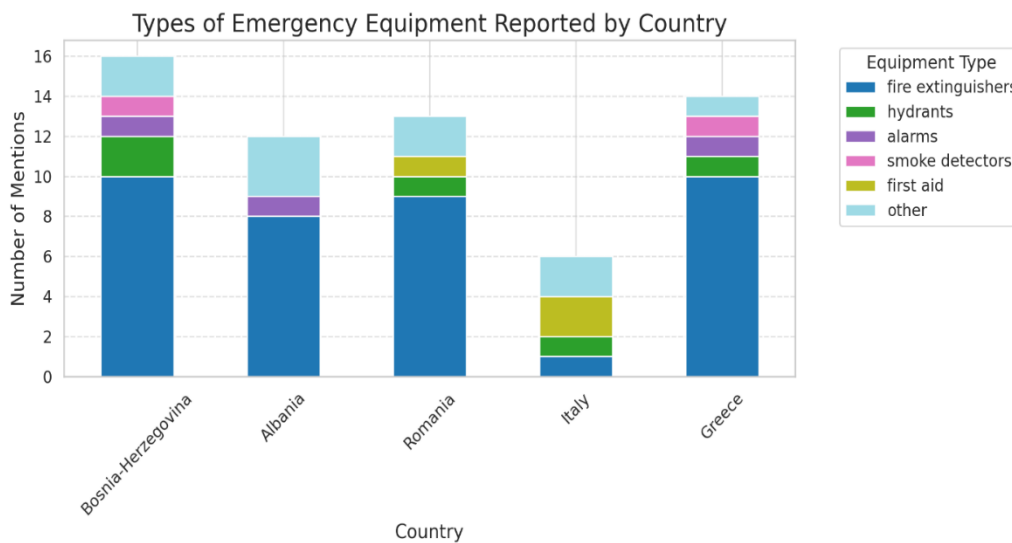


Figure 10. Distribution of emergency equipment mentioned by students, by country.

Some answers are formulated in a detailed, technical way, suggesting either a higher level of knowledge or direct familiarity with the university's infrastructure. Thus, expressions such as '*fire extinguishers, fire sensors, fire alarms*', '*fire extinguishers, flexible tube conveying water*' or '*hydrants, fire detection, signalling and alarm systems, extinguishers, escape doors with light indicators*' indicate a clear perception of the complexity of the existing infrastructure.

In addition to fire-fighting equipment, there are references to complementary equipment, such as "first aid kit", "smoke detectors", "sprinklers", "fire doors", "warning messages", or "*gloves, gowns, glasses*". Although in smaller numbers, these mentions broaden students' perception of a more comprehensive infrastructure that involves not only fire prevention but also intervention in cases of injuries or collateral accidents.

In some cases, the answers are formulated in colloquial, local or informal language, such as '*Aparati za gašenje požara*', '*Fikse*', '*Fikse zjarri*', '*Me shkume*', '*svasta*', or '*Služba za zaštitu na radu (mislim)*'. These expressions reflect the cultural and linguistic diversity of the sample, as well as the possible general or approximate character of the perception of the available facilities.

It is also important to note the presence of uncertain, vague or hostile answers. Formulations such as "*I don't know*", "*No*", "*Nothing*", and "*N/A*" suggest either an absolute lack of infrastructure or a problem with institutional communication regarding the existing

facilities. The existence of such responses in almost all the countries analysed indicates that students are not sufficiently informed about the resources made available.

Equipment associated with risks other than fires is rarely mentioned. Only a few answers, such as "I", indicate a broader concern for different emergency scenarios. This observation confirms that, in the majority perception, institutional preparedness is focused almost exclusively on fires, to the detriment of other types of disasters, such as floods or earthquakes.

In conclusion, the qualitative analysis of free responses highlights a predominantly fire-oriented perception, with a focus on fire extinguishers and related systems. However, the degree of detail, certainty, and technicality of the answers varies significantly among participants, suggesting differences in both the actual infrastructure and the level of information and involvement of members of the university community. This underlines the need for more effective institutional communication about available resources, as well as for expanding infrastructure preparedness to include multiple emergency scenarios.

Conclusions

The Erasmus study revealed a complex but coherent picture of preparedness and resilience to natural disasters across universities in five European countries: Bosnia and Herzegovina, Albania, Romania, Italy, and Greece. Overall, the data suggest a high level of risk awareness, especially regarding earthquakes, the most common type of disaster directly experienced by respondents. This familiarity is reflected in a high degree of procedural literacy, with most participants stating that they would follow essential behaviours in the event of an earthquake.

Regarding institutional preparedness, notable differences were found between countries. Romania and Italy stand out for better formalisation of procedures and a more visible safety infrastructure. In contrast, in Greece and Bosnia and Herzegovina, there are problems with informing the university community and with the clear functioning of coordination structures in the event of an emergency. Albania also stood out positively in terms of student information and the level of involvement in practical training.

A key aspect highlighted by the study is the discrepancy between institutional facilities and the level of human training. Although most universities are well equipped with warning systems, fire extinguishers and evacuation plans, concrete training for intervention — such as first aid training — is often insufficient. Many respondents are unsure whether they have been trained or whether teaching staff are prepared for such situations, indicating a lack of a coherent, visible institutional training strategy. The analysis of declared behaviours in emergencies confirms that most respondents are familiar with immediate reactions and self-protection measures. Reactive behaviours, such as avoiding contact with contaminated water or orderly evacuation in case of fire, are assumed by over 90% of participants. However, proactive measures — such as activating the alarm or contacting responsible persons — are less frequently mentioned, suggesting a need to clarify protocols and strengthen individual responsibility.

In conclusion, the research reveals a promising level of awareness and procedural literacy among students and academic staff, but highlights imbalances in infrastructure and practical training. To strengthen the real capacity for intervention in emergencies, an integrated approach is needed, combining technical equipment with continuous training for the academic community and promoting an institutional climate oriented towards prevention, solidarity, and coordinated response.

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