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## The current landscape of disaster resilience education in Europe

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### Abstract

Natural disaster events are continuously increasing in number and severity in recent years. In 2010, 263 million people were affected by disasters – 110 million more than in 2004, the year of the Asian tsunami. There is a need for citizens as well as public administrators to be educated in disaster resilience issues for better prevention, mitigation, preparedness and recovery from such events. Education in disaster resilience is of great importance for administrators forming policies and planning disaster response, managing post disaster actions and performing risk and vulnerability assessments. This paper presents the results from a study aimed to explore, analyse, compare and describe disaster resilience related higher education programmes in Europe in order to establish the existing capacity among European Higher Educational Institutions (HEIs) to address the threats posed by hazards of natural and human origin. Results showed that there has been growth in disaster resilience higher education programmes in recent years, particularly at masters level, but there remains great potential for many more.

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## 1. Introduction

There has been a continuous increase in the number and severity of natural and man-induced disaster events over the years. Hurricane intensity has increased by 70% in the last 50 years (Anderson and Bausch, 2005). The average amount of menacing precipitation is rising, as are the incidences of heavy rainfall but at an even higher rate; high-intensity rainfall events have become more common in Europe since 1950 (Klein Tank and Können, 2003). In addition, natural disasters such as earthquakes, tsunamis, landslides, etc. can result in major loss of life, damage to properties and huge economic impact. Recent natural disasters have showed how vulnerable humans are, even in wealthy nations. In 2011 two significant earthquakes in Christchurch New Zealand and in Tohoku, Japan, tested two of the world's most seismically resilient communities with high-quality seismic building codes. The continuous and rapid change of vulnerability to earthquakes in countries that are becoming industrial and urban centric is causing great concern (Crowley and Elliott, 2012).

To improve disaster resilience of citizens as well as public administrations forming policies and planning disaster response, managing post-disaster actions and performing risk and vulnerability assessments, higher education is of primary importance. The lack of adequate continuing education and training for administrators was also reported by Perkins *et al.* (2002) in their study on the two massive earthquakes that struck Turkey in 1999. Bründl *et al.*, 2004 also reported the crucial importance of educational level of those responsible for safety.

There is therefore a need to explore the current teaching and research capacity among European Higher Educational Institutions (HEIs) at addressing the threat posed by hazards of natural and human origin. This paper presents the findings of an inventory designed for this purpose, which is part of the Lifelong Learning Project Academic Network for Disaster Resilience to optimise educational Development (ANDROID) that aims at promoting co-operation and innovation among European Higher Educational Institutions (HEIs) to increase society's resilience to disasters of human and natural origin.

## 2. Methodology

To fulfil the aim of this work, an online survey was developed using the Limesurvey web-based survey tool and was available for completion for one year from November 2012 to November 2013.

### 2.1. Survey participation

The developed inventory referred to teaching and research programmes covering the full scope of disaster resilience education from applied, human, social and natural sciences at European HEIs.

All 67 Android partners from 28 European countries were invited to participate in the online survey, forming a significant proportion of experts in the field of disaster resilience representing HEIs across Europe. To avoid misleading and biased results, outside Android, only programmes directly related to disaster resilience could participate. This excluded programmes with emphasis and learning outcomes in different subjects offering a very small proportion of programmes on disaster resilience related issues. Whether a course was directly related to disaster resilience or not was decided by the programme coordinator and depended on the core course learning outcomes of the programme, based on the Disaster Resilience definition by United Nations International Strategy for Disaster Reduction (UNISDR): “resilience is the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions” (UNISDR, 2014).

In addition to the Android partners, participation in the survey was also sought from outside the partnership. Android project partners provided lists of HEIs in their countries offering disaster resilience programmes, and these were contacted to invite them to participate in the survey. Also, information provided on the PreventionWeb, an initiative of UNISDR, was used to contact and invite programme coordinators from as many European countries as possible to participate in the survey. Other sources included lists of participants in other similar surveys, conference delegates and the world wide web.

## 2.2. Structure of the survey

For the survey, it was decided to use simple and short questions in order to encourage completion of the survey, yet seeking information about a wide range of attributes of educational programmes on disaster resilience. The survey was designed to take only 10 minutes to complete.

For the selection of questions and the structure of the survey, previous, similar questionnaires were studied. In addition, before launching the survey online, a sample survey was distributed among the ANDROID partners during the 1<sup>st</sup> ANDROID Conference in Tallinn, Estonia in October 2012 for comments and suggestions. Following this, the online survey was finalised and launched in November 2012.

Four categories of question were used in the survey as follows:

- Participant information including name, affiliation, area of specialization and role of participant.
- Programme Information: these included data and information related to the specific programme, some of which were the title, European Qualifications Network (EQF) level, HEI name, city and country programme is offered, HEI department, discipline, duration of programme, type of programme (full time, distance learning, etc.), frequency the programme is offered, areas / subjects dealt with in the programme, cohort size.
- Information on Lecturers: these aimed to capture information on the involvement of academics and/or professionals in teaching, the number of lecturers involved, links with the industry integrated into the programme such as internship, practical training, mentorship and involvement of local/national authorities. Information on connections of the surveyed programmes with existing research centres, groups or institutions in disaster resilience field was also sought.
- Comments: the survey participants could add any other comments about their relevant programmes which were not covered in the survey.

## 3. Results

Based on the structure of the survey and its division into four categories, the results are separated into those concerning the programmes and the teaching staff.

### 3.1. Programmes

A total of 96 completed surveys from HEIs across Europe were reported. Incomplete surveys were not included in the results.

Nearly 60% of the HEIs participating in the survey (58 programmes) stated that they offer disaster resilience related programmes. Since all the HEIs responding to the survey are ostensibly involved in the disaster resilience field (members of ANDROID network, listed on PreventionWeb, etc.), this still leaves a significant proportion (40%) who do not offer degree programmes in this field and suggests that there is high potential to increase the number of programmes in this field.

Regarding the geographical distribution of the 58 programmes identified, a good distribution was reported with the 58 programmes being offered in 18 different countries (Figs. 1 and 2). The highest number of programmes are offered by the UK HEIs, but there are a high number of UK-based partners in the ANDROID. Remarkably, 5 programmes – even though they are short duration programmes – are offered in Iceland, a country with a population of only around 300,000. This demonstrates the potential to increase the number of programmes offered in more populous countries. It is a good example showing that high occurrence of (in this case) natural hazards evokes establishment of new education programmes connected with disasters and hazards.

There was also a question on the EQF levels which are discriminated as follows:

Participants were asked to select the EQF level most appropriate for each programme, whether level 5, level 6 (e.g. Bachelor/first degree); level 7 (e.g. Master/ postgraduate) or level 8 (e.g. Doctorate). The survey results demonstrate that a significant majority of the programmes (79%) were at EQF level 7, as shown in Fig. 3. This is reflective of the multi-disciplinary nature of disaster resilience, where entrants on such programmes may have graduated from bachelor degree programmes in more fundamental fields as diverse as engineering, natural science and sociology.

As far as the length of time that each programme has been offered is concerned, the results show that the majority of the programmes have only been operating for 5 years or less or are new/planned. Less than 20% of the programmes are over 10 years old. This shows that recent years have seen a rapid increase in the number of programmes offered in disaster resilience and demonstrates the momentum that the concept of disaster resilience has gained.

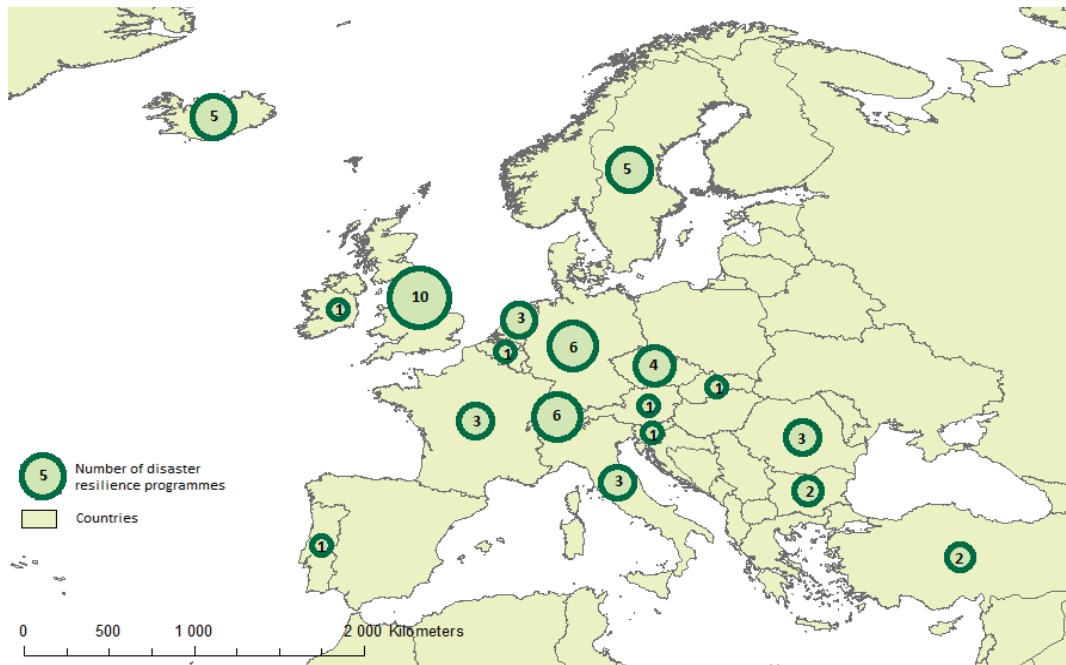


Fig. 1. Number of disaster resilience programmes in European countries

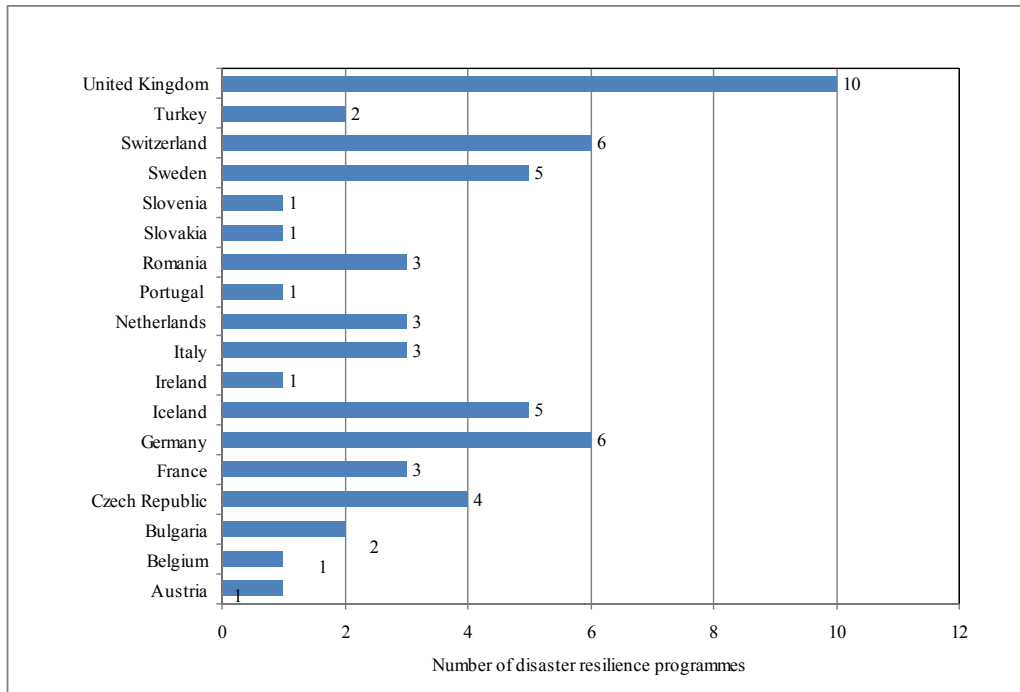


Fig. 2. European countries offering disaster resilience programmes

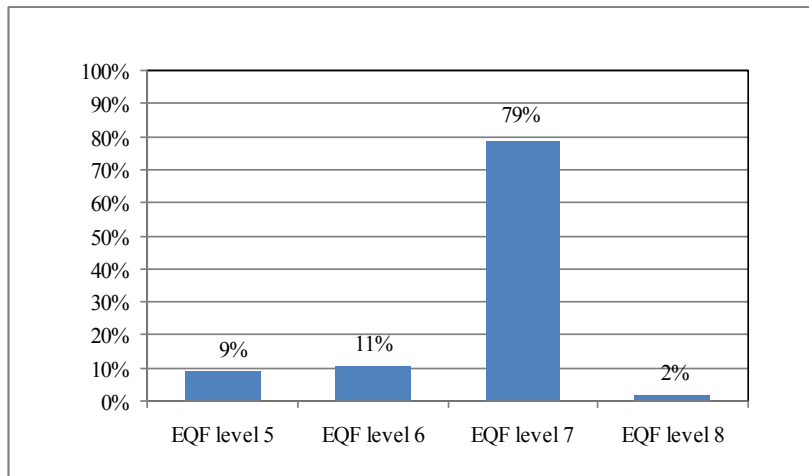


Fig. 3. EQF level of programmes offered in disaster resilience

The disciplines in which the disaster resilience programmes are offered are shown in Fig. 4. Sixteen different disciplines were reported with engineering being the discipline with the most programmes (30%), reflecting the fact that technological knowledge is very relevant in improving disaster resilience. The contribution from all the other disciplines demonstrates the multi-disciplinary nature of disaster resilience. A significant proportion (7%) of programmes was identified as multidisciplinary.

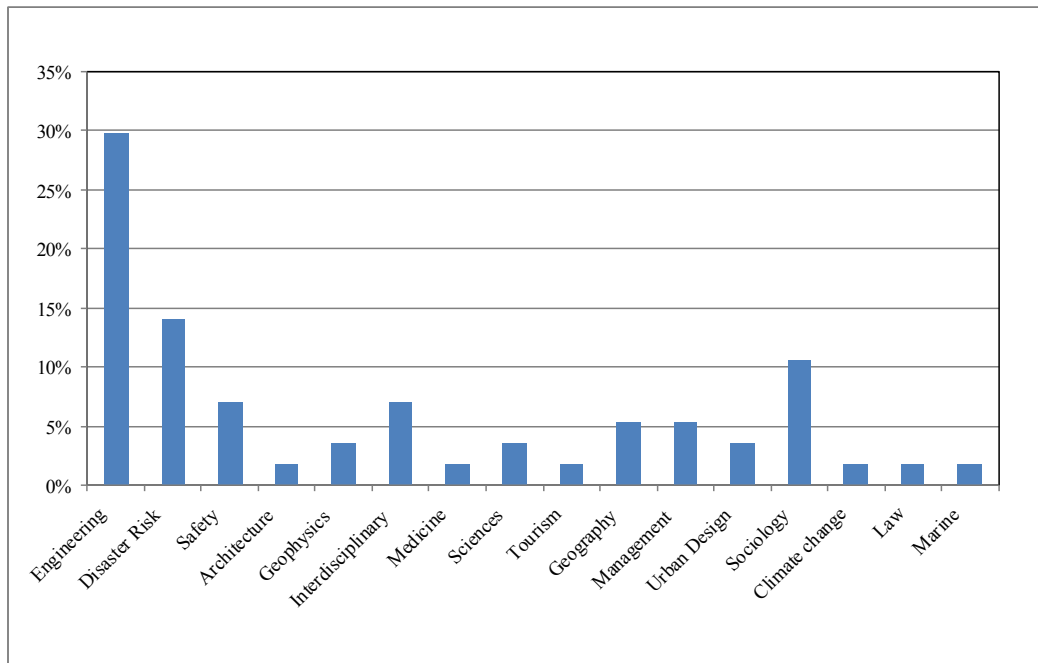


Fig. 4. Disciplines in which programmes are offered

In a question regarding the type of programme, a majority of programmes (86%) reported that they are classroom based, while 68% of the programmes are full-time and 18% part-time. Only a small proportion (7%) of the programmes are delivered on distance learning basis, which suggests that in response to the recent developments in the number of programmes offered, there is significant scope to increase the number of programmes offered via distance learning modes.

The subject areas covered in the programmes were also investigated in the survey. A rather even distribution of subject areas was reported in the disaster resilience programmes, reflecting the multidisciplinary nature of these programmes (Fig. 5). Natural sciences, management, engineering and social sciences were the four subject areas covered in at least 10% of the programmes. This demonstrates that developers of such programmes require teaching support in a disparate range of subject areas, requiring either academic staff with a wide cross-section of areas of expertise and/or support from a range of disciplines at each HEI.

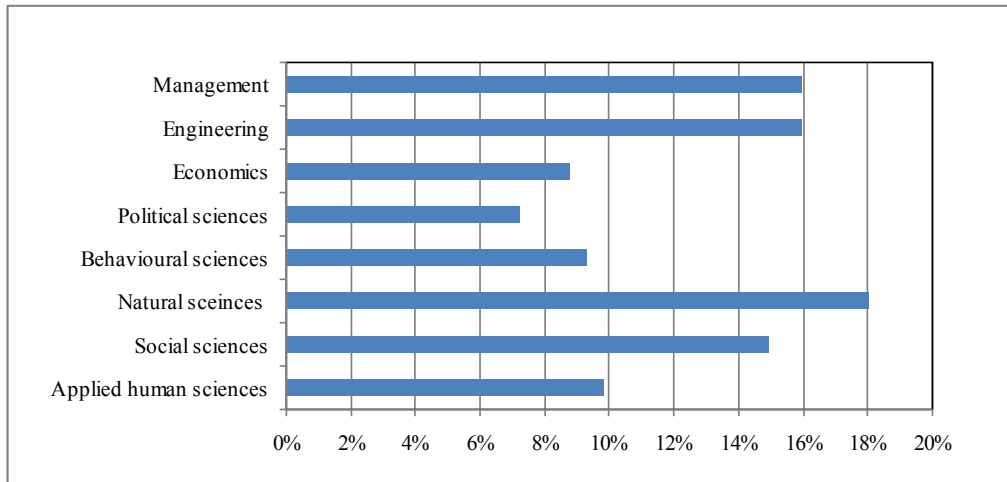


Fig. 5. Areas/subjects covered in programmes

In order to assess the nature of programmes, respondents were asked to state whether their programmes have a practical, theoretical or applied nature. 43% of respondents stated that their programmes were theoretical while 29% reported them as practical and 28% as applied.

Despite the relatively young age of the programmes, the cohort size of these programs shows that they are in good health indicating high demand for such programmes. Specifically, the majority of cohort sizes lie 11 and 50 , while 21 to 30 was the mode size (39%), followed by 11 to 20, which is the typical size for EQF level 7 programmes. Notably, a significant proportion of 11% of HEIs reported a quite high cohort size of 31 to 40 and 14% of respondents indicated a cohort size of 41 to 50.

### 3.2. Teaching staff

Analysis of the results related to teaching staff showed that in 58% of the programmes, teaching is performed by both academics and professionals. A significant proportion (38%) do not involve any professionals in the teaching of their programmes. Regarding the number of lecturers involved in the programmes, almost 70% of them operate with 10 or fewer lecturers. Specifically, 40% of them reported that they had 6-10 lecturers while nearly 30% had 1-5 lecturers. This shows that most programmes have a relatively low number of teaching staff, particularly considering the high number of subject areas that need to be covered as discussed in section 3.1. This may be due to a high proportion of the programmes being relatively young and teaching staff numbers may grow as programmes mature. This was the case for some of the older programmes such as the bachelor degree programme in emergency planning and crisis management offered by the VSB Technical University of Ostrava in Czech Republic which has been running for 10-20 years and has more than 20 lecturers.

As far as the collaboration of programmes with industry is concerned, 72% of the programmes surveyed reported links with industry in the form of mentorship, practical training and internship. However, over a quarter of programmes had no link with industry. On the question regarding collaboration with national/local authorities, over 40% of the respondents stated there is collaboration with either national or local authorities. 19% of respondents selected the “others” category, including United Nations and international agencies and organisations (e.g. IRFC) , experts from related fields, or specialised NGOs (e.g. URD), consultants and the Council of Europe.

Respondents were also asked whether connections exist between their programmes and existing research centres, groups or institutions studying disaster resilience of related areas. Nearly 70% of programmes stated that they have established such connections and it was encouraging to learn that a high level of collaboration exists among organisations involved in disaster resilience.

#### 4. Conclusions

This paper presented the results from a study of the disaster resilience related educational programmes currently being undertaken within Europe. In the survey, 96 participants directly related to disaster resilience education have responded. The findings suggest that disaster resilience related educational programmes across Europe are enjoying rapid growth and there is still potential for further growth. The field is also multidisciplinary in nature and involves a variety of organisations, including academia, professionals, governmental organisations and research institutions. Specifically, the findings can be summarised as follows:

- In spite of all the Android partners being directly related to disaster resilience in some way, 40% of them represent HEIs that do not offer degree programmes in disaster resilience, demonstrating that such courses are not offered widely across European HEIs.
- A good geographical distribution of responses was recorded with 58 programmes identified across 18 countries. However, in some countries there were many more such programmes than in others, especially in per capita terms.
- The multidisciplinary nature of the disaster resilience field was demonstrated with 16 different disciplines being identified. The engineering discipline had the most programmes (30%). A significant proportion (7%) of programmes was identified as multidisciplinary.
- Less than 20% of programmes are over 10 years old, confirming that disaster resilience is a relatively new field of academic study. The great majority of programmes have been running for 5 years or less or are new/planned.
- A majority (72%) of the programmes surveyed have some form of link with industry in the form of mentorship, practical training and internship. Over 40% collaborate with local/national authorities. In a majority of programmes teaching is performed by both academics and professionals.

Due to the dynamic evolution of the disaster resilience field and movements from single oriented to multidisciplinary programmes, it is recommended to repeat the survey periodically and update the current situation. The results of the survey may be utilized in designing national and European educational activities, including establishing joint educational programmes utilizing the established network of HEIs. The network of HEIs disaster resilience programmes represents an essential contribution to the development of disaster resilience educational infrastructure.

The multidisciplinary nature of these programmes will prepare specialists for organizational positions with a good, broad knowledge. However, the knowledge will not be deep enough for many detailed spheres. Therefore the specialists must also be able and ready to cooperate with many other branches/organizations and specialisations.

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