

INPUT PAPER

Prepared for the Global Assessment Report on Disaster Risk Reduction 2015

ACADEMIC NETWORK FOR DISASTER RESILIENCE TO OPTIMISE EDUCATIONAL DEVELOPMENT (ANDROID)

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October 2014

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Introduction

Increased intensity of disasters results in higher number of fatalities, economic and social losses. The continuous increase of disaster risks globally (IOM et al., 2013¹; UNISDR, 2005²; UN, 2005³) stresses the importance of disaster risk reduction.

According to United Nations Office for Disaster Risk Reduction (UNISDR, 2009⁴, pp10-11), Disaster Risk Reduction (DRR) is defined as:

«The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.»

Having observed the implementation of Hyogo Framework of Action (HFA), IOM et al., (2013¹) states that disaster risk reduction is a cross – cutting issue that requires a long term planning perspective, mainstream and integration across sectors, and a change in mind-set from response to prepare and prevent. The development of post-2015 framework for disaster risk reduction (HFA2) further confirms the obvious need for achieving DRR. Despite the various initiatives, achieving effective disaster risk reduction still poses a global challenge.

Various discussion and consultations were made in developing HFA2, which is a post-2015 framework for disaster risk reduction. Community participation in disaster risk reduction has been considered as an area where less progress seems to have been made in HFA (UNISDR, 2013⁵). Promoting local awareness, formalising community participation in DRR planning and implementation, empowering the local government, providing adequate resources, and getting the community involved are some of the measures identified to improve the community level-involvement. Without humans and their pertinent societal spheres, hazards are simply natural event, hence much attention should be paid to people and communities and their capacities to deal with disasters in order to reduce disaster risks and vulnerability (Haque and Etkin, 2012). Therefore, reducing disaster risks and impact is a shared responsibility across different stakeholders from different sectors. The shared responsibility

¹ IOM, ITU, OHCHR, UNESCO, UNEP, UNISDR, UNFPA, WMO, January 2013, Building resilience to disasters through partnerships: Lessons from the Hyogo Framework for Action, UN system task team on the post-2015 UN development agenda http://www.preventionweb.net/files/30374_thinkpieceondrmfinal.pdf [accessed 3 March 2013]

² UNISDR. 2005, Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters, http://www.unisdr.org/files/1037_hyogoframeworkforactionenglish.pdf [accessed 14 October 2013]

³ United Nations, 2005, Report of the World Conference on Disaster Reduction, Kobe, Hyogo, Japan, 18-22 January 2005 http://www.preventionweb.net/files/17671_finalreportconference1.pdf [accessed 16 October 2013]

⁴ UNISDR (2009) 'Terminology on disaster risk reduction'. http://www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf [accessed 18 February 2014].

⁵ UNISDR, 2013, Post-2015 Framework for Disaster Risk Reduction (HFA2): Report from 2013 Global Platform Consultations, http://www.unisdr.org/files/35070_hfa2consultationsgp2013report.pdf (accessed 26 January 2014)

that involves multi-stakeholder can be strengthened through a knowledge-sharing platform with strong partnership.

In this context, this input paper discusses one of such partnerships that were formed to increase societal resilience to disasters, through the development of innovative European education. The formation of the network, its aim, objectives and deliverables and the major achievements to increase societal resilience are all discussed in detail. As such this paper contributes to the core indicator 1 (CI1) of Priority for Action 3 (PFA3) that is 'Relevant information on disasters is available and accessible at all levels, to all stakeholders (through networks, development of information sharing system)' of the Thematic Research Area 2: Culture of resilience, rural and urban risk awareness, accessible information available to all stakeholders.

Disaster Risk Reduction and Resilience in Context

The number of disasters has risen sharply worldwide making the risk of disasters a global concern. It would be rather despairing to list the natural disasters that mankind has seen in the past, and those that we will deal with in the future. Disasters, either natural or man-made, pose significant challenges to the EU. In addition to the loss of lives, it greatly hampers the social-economic capacity of the member countries and also of the union as a whole. From year 2000- 2008, Europe accounts for 10.62% lives lost due to natural disasters (CRED, 2009⁶). Compared to the rest of the world, economic loss per capita is high in Europe partly because it is very densely populated. It further revealed that even countries previously considered not being at high risk need to re-evaluate and strengthen their disaster prevention strategies and capacities. Earthquakes in Italy and Greece, and extreme floods in UK, Czech Republic, France, Germany, and Poland, are recent examples. "Floods and storms explain part of the economic losses as weather related disasters have devastating effects on infrastructures which have on average, a higher value in Europe than in Asia or Africa" says CRED (2009⁷) also adding *"the trend will probably continue to rise as natural disasters are expected to become more frequent and severe in the future in Europe."*

The risks and vulnerabilities exposed by natural hazards and disasters are on the rise globally, and the impacts are severe and widespread: extensive loss of life, particularly among vulnerable members of a community; economic losses, hindering development goals; destruction of the built and natural environment, further increasing vulnerability; and, widespread disruption to local institutions and livelihoods, disempowering the local community. Rising population and infrastructures, particularly in urban areas, has significantly increased disaster risk, amplified the degree of uncertainty, challenged emergency arrangements and raised issues regarding their appropriateness (Haigh and Amaratunga, 2011).

⁶ Centre for Research on the Epidemiology of Disasters (CRED), (2009). Disasters in Numbers, http://www.unisdr.org/preventionweb/files/12470_2009disasterfigures.pdf [accessed 3 January 2014]

⁷ Centre for Research on the Epidemiology of Disasters (CRED), (2009). "Disaster Data: A Balanced Perspective, CRED CRUCH, Issue 17, www.cred.be/sites/default/files/CredCrunch17.pdf [accessed 3 January 2014]

What is becoming equally apparent, however, is the importance of resilience - not only in the structures that humans design and build, but in the way society perceives, copes with, and reshapes lives after the worst has happened: to use change to better cope with the unknown. In ancient times, cities like Pompeii were simply abandoned after disaster struck - a move that today seems unthinkable. But learning to bounce back is an emergent behaviour that must be both improvised and adaptive, and our creativity is vital.

In order to overcome the increasing hazard frequency, severity and exposure, the notion of building resilient communities has been adopted by many scientists and policy makers to describe the way in which they would like to reduce society's susceptibility to major incidents of all kinds, reducing their probability of occurring and their likely effects, and by building institutions and structures in such a way as to minimize any possible effects of disruption upon them. Disaster resilience has arisen from an amalgamation of historic developments in the disaster planning process, but the term resilience has been used freely across a range of academic disciplines, including material science (Tredgold, 1875), ecology (Holling, 1973), economics (Perrings, 1998) and sociology (Adger, 2000).

Despite longstanding usage of the term, there is little consensus regarding what resilience is, what it means to society, and how societies might achieve greater resilience in the face of increasing threats from natural and human induced hazards. There is however an underlying assumption that resilient communities are far less vulnerable to hazards and disasters than less resilient places. But for this assumption to be validated and useful, knowledge of how resilience is determined, measured, enhanced, maintained, and reduced is vital. Specifically, it is not obvious what leads to resilience within coupled human–environment systems or what variables should be utilised to measure it. If the concept of resilience is to be a useful framework of analysis for how society can cope with the threat of natural hazards, it is necessary to understand attributes that enable physical, socio-cultural, politico-economic and natural systems to adapt, by resistance or changing in order to reach and maintain an acceptable level of functioning.

There is also widespread agreement within the literature that addressing disaster risk is an endless or continuous process that cannot stop. Early examples such as comprehensive emergency management were criticised for their excessive focus on hazards at the expense of broader contextual factors and simplistic phases that do not include a sufficient breadth of activities and supporting expertise. There is now recognition of the need for multi-actor engagement that places greater emphasis on the development of resilience, and the link between risk reduction and sustainable development. The process of reducing society's susceptibility to disaster is thus commonly visualised as a two-phase cycle, with post-disaster recovery informing pre-disaster risk reduction, and vice versa. Although usually represented as discrete stages, there is now a strong view that these stages are inter-connected, overlapping and multidimensional. The significance of this concept is its ability to promote a holistic approach to increased resilience.

Using knowledge, innovation and education to build a culture of safety and resilience at all levels is one of the priorities for actions (PFA) identified to achieve substantial reduction of disaster losses, in lives and in the social, economic and environmental assets of communities and countries (UNISDR, 2005²). UNISDR (2005²) further insists that disasters can be

substantially reduced if people are well informed and motivated towards a culture of disaster prevention and resilience, which in turn requires the collection, compilation and dissemination of relevant knowledge and information on hazards, vulnerabilities and capacities.

Imparting sufficient disaster knowledge will help people to understand the process of mitigation and the process of recovery following a disaster. As such, making the disaster risk reduction (DRR) knowledge available to a wider community is vital to achieve societal resilience and sustainable development. Despite its importance, making the DRR knowledge available to all stakeholders is a challenging task. Lack of disaster knowledge among various stakeholders particularly among the vulnerable communities was considered as one of the possible reasons behind the least progress of effective community participation in DRR⁸. Views from the Front Line (VFL) revealed that the international and national scale knowledge and the practices based on that knowledge is not reaching enough to the local communities to achieve Hyogo Framework of Action goals (GNDR, 2009⁹). Global Assessment Report (GAR) further confirms that little progress was made in the use of knowledge, innovation and education (ISDR, 2009¹⁰). Therein lies the need for coordinated effort on disaster resilient practices capable of being adopted by the diverse population.

At a time when the global economy as a whole and the Eurozone in particular is under economic recession and when EU is in competition with the newly emerging economies, EU can ill afford the setbacks brought about by disasters. In terms of the governance aspects, EU's system of supranationalism and intergovernmentalism combined necessitates the need to take both the needs of individual member states, regions and also of the EU as a whole. It is important to highlight that the strongly knitted economic and people movement policies of the Union means that an effect on one country's economy through disaster related issues is likely to have consequences on the other countries too.

It has been specifically referred to the importance of EU Member States sharing knowledge on good practices for prevention of disasters. Therefore, the need to strengthen the EU capacity to manage disasters is of paramount importance. "Strengthening the EU capacity to respond to disasters: Identification of the gaps in the capacity of the Community Civil Protection Mechanism to provide assistance in major disasters and options to fill the gaps – A scenario-based approach, EU 2009" identifies the potential gaps in the overall EU civil protection response capacity including gaps hindering the degree of availability of existing resources and lack of information on specific categories of expertise (ECORYS¹¹). This emphasises a further in-depth analysis, including inventories, before being able to develop meaningful policy options. Such exercise of further information gathering and analysis will

⁸ From the discussion on the UK national dialogue on HFA2 held on 4 December 2013 in Manchester, UK

⁹ GNDR (Global Network of Civil Society Organisations for Disaster Reduction). 2009. Views from the Frontline: A local perspective of progress towards implementation of the Hyogo Framework for Action. http://www.preventionweb.net/files/9822_9822VFLfullreport06091.pdf [Accessed in 21 December 2013]

¹⁰ ISDR (2009), Review of progress in the implementation of the Hyogo Framework for Action. Chapter 5. In: *Risk and poverty in a changing climate: Invest today for a safer tomorrow*. Global Assessment Report on Disaster Risk Reduction, 2009, Geneva: United Nations: http://www.preventionweb.net/english/hyogo/gar/report/documents/GAR_Chapter_5_2009_eng.pdf [accessed 21 December 2013]

¹¹ ECORYS, 2009, http://ec.europa.eu/echo/civil_protection/civil/prote/pdfdocs/Final%20Report%20-%20scenario%20study.pdf [accessed 14 June 2014]

likely improve preparedness and may reveal further gaps. According to "Communication from the commission to the council and the European parliament - EU strategy for supporting disaster risk reduction in developing countries, 2009", current EU action is non-strategic as it mainly follows an ad hoc project/programme approach and is often uncoordinated and inadequate (European Commission¹²).

In this context, the next section discusses the educational aspects of disaster risk reduction and resilience. The importance of education in widely disseminating and sharing the DRR and resilience knowledge is justified.

Disaster Risk Reduction and Resilience Education

The importance of education in promoting and enabling Disaster Risk Reduction (DRR) has been widely recognised. Reducing risk and vulnerability to disasters requires people understanding how they can best protect themselves, their property and their livelihoods. As such the key to disaster risk reduction is about sharing and using information and knowledge in a productive way through awareness-raising and educational initiatives so that people make informed decisions and take action to ensure their resilience to disasters (UNISDR, 2014¹³).

As mentioned in the introduction, this input paper contributes to PFA3 / CI1 of Thematic Research Area 2, which is 'Relevant information on disasters is available and accessible at all levels, to all stakeholders (through networks, development of information sharing system)'. The following challenges¹⁴ have been identified under this core indicator, they are

- Information, education and communication initiatives have been framed to enhance public awareness, but there is little or no emphasis on how enhanced awareness can make governments more accountable for disaster risk reduction issues.
- Few research and analytical studies were conducted as a regular component of policy planning at the government level and made available to decision makers, focusing on the extent to which disaster risk reduction initiatives actually reduce damage and losses.
- HFA is not as well understood as a tool at the country-level as it is understood at the international level. This may be a function of the fact that the dissemination of HFA has been too targeted towards specific actors in countries.

In addressing such challenges, new technologies, especially social media, for capacity development and connecting people to the growing flow of risk information, knowledge for resilience has been suggested as one of the future considerations¹⁴. As such this input paper demonstrates an innovative way of educating the stakeholders through a dedicated network formed to increase societal resilience to disaster.

¹² European Commission, 2009, http://www.preventionweb.net/files/8653_COM200984ENACTEf.pdf [accessed 10 June 2014]

¹³ UNISDR, 2014, Education and DRR, <http://www.unisdr.org/we/advocate/education> [accessed 14 June 2014]

¹⁴ Research Area 2, PFA3 / CI1, <http://www.preventionweb.net/english/professional/networks/private/hfa-thematic-review/#ra2> [accessed 10 June 2014]

An educational contribution to a sustainable future must necessarily address disaster risk reduction and climate change (Kagawa and Selby, 2012). Thus education is one of the key activities that can contribute to promote the inclusion of DRR knowledge at all levels. In the context of DRR, education is to be understood broadly as the many forms of formal (through schools and universities) and non-formal transmission of knowledge, skills, experience and engagement of groups of people, including the use of media, awareness campaigns, special events, etc (DG ECHO, 2013¹⁵). The education sector not only offers opportunities to develop the disaster risk reduction approach but also act as a crucial means within communities to communicate, to motivate and to engage, as much as it is to teach (DG ECHO, 2013¹⁵).

Education can also be considered as a form of capacity building and development that can ultimately contribute to increase the level of resilience within the society.

According to UNISDR (2009⁴), capacity development is defined as:

«the process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals, including through improvement of knowledge, skills, systems, and institutions (p2) »

and the resilience is defined as :

«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 (p24) »

The definitions above clearly indicate the importance of knowledge improvement to the process of capacity building and in turn to increase resilience. Despite various efforts to increase the resilience through capacity development, capacity gaps are still in existence including the educational gaps such as lack of awareness, education and training in disaster management (Bosher et al., 2007). Such gaps need to be addressed through an innovative development of education to increase resilience to disasters. Education and training is an integral part of capacity building in the disaster management discipline as trained personnel respond much better to different disasters and will take proactive measures of mitigation and prevention (IDKN, 2009¹⁶).

Knowledge management and education was one of the five main areas where specific gaps and challenges were identified in the review of the Yokohama strategy¹⁷ and was

¹⁵ DG ECHO (The Directorate General for Humanitarian Aid and Civil Protection department of the European Commission), Disaster Risk Reduction: Increasing resilience by reducing disaster risk in humanitarian action: Thematic Policy Document n° 5 http://ec.europa.eu/echo/files/policies/prevention_preparedness/DRR_thematic_policy_doc.pdf [accessed on 3 March 2014]

¹⁶ IDKN. (2009), Planning for safer tomorrow. India Disaster Knowledge Network. http://www.sarc-sadkn.org/countries/india/major_safe.aspx [accessed 13 May 2011].

¹⁷ Review of the Yokohama Strategy and Plan of Action for a Safer World (2005), http://reliefweb.int/sites/reliefweb.int/files/resources/2529A0CADEC0EAA9C1256FA4003BB948-Review_Yokohama_Strategy_GA_A_CONF.206_L.1.pdf

consequently considered as one of the key priorities for actions in the development of HFA. Knowledge and education consists of the elements such as information management and exchange; formal education (curriculum); formal education (training of teachers and materials); community training and public awareness (GNDR, 2009⁹).

Thus the field of education contributes to increase the public awareness on disaster reduction and to create an impact on the culture of disaster reduction in the long run. However, there is gap exists between the growing recognition of the importance of teaching about disaster risks and actually doing it, mainly due to the slower rate of incorporation of such issues within the educational curricula². This affirms the importance of developing the field of education in such a way so that it contributes to increase disaster resilience.

As emphasised in the PFA², knowledge and education is a key to build a culture of resilience. The following key activities are particularly focused due to their direct relevance to this input paper (see HFA², page 9-10).

Key activities on information management and exchange:

- Strengthen networks among disaster experts, managers and planners across sectors and between regions, and create or strengthen procedures for using available expertise when agencies and other important actors develop local risk reduction plans
- Promote and improve dialogue and cooperation among scientific communities and practitioners working on disaster risk reduction, and encourage partnerships among stakeholders, including those working on the socioeconomic dimensions of disaster risk reduction¹.

Key activities on education and training:

- Promote the implementation of local risk assessment and disaster preparedness programmes in schools and institutions of higher education

The key activities extracted above indicate the importance of networks for knowledge exchange and sharing. Further, the incorporation of DRR knowledge within the education curricula has been widely discussed, mainly at the school level (see ActionAid¹⁸; UNESCO/UNISEF¹⁹; ADPC²⁰; riskRED²¹). However, the higher education can also play a vital role in promoting disaster risk reduction and resilience awareness. Accordingly this input paper endeavours to emphasise the importance of higher education development in improving societal resilience to disasters, and they ways to develop higher education through networks.

¹⁸ ActionAid International, (2011). Disaster Risk Reduction through Schools: Final Report, http://www.actionaid.org/sites/files/actionaid/drrs_final_report_to_dfid.pdf [accessed 8th May 2014]

¹⁹ Selby, D & Kagawa, F. (2012), Disaster Risk Reduction in School Curricula: Case Studies from Thirty Countries, Unesco/Unicef, <http://www.unicef.org/education/files/DRRinCurricula-Mapping30countriesFINAL.pdf> [accessed 10 April 2014]

²⁰ Asian Disaster Preparedness Centre, 2007, Mainstreaming Disaster Risk Reduction into Education Sector, http://www.preventionweb.net/files/3928_ADPCnewsletterSeptember2020.pdf [accessed 10 April 2014]

²¹ RiskRED, Risk reduction education for disasters, <http://www.riskred.org/> [accessed 10 April 2014]

Among various levels of education, higher education is considered as a social structure for the control of advanced knowledge and technique with teaching in its system predominantly (Clark, 1986). Clark (1986, pp 12-13) reviews the different perceptions of higher education by different groups of people as

« psychologists may see it as is a place where people undergo personality development; sociologists as a central institution for status attainment or denial; political scientists as a locus of political recruitment; economists as a developer of human capital »

In every instance knowledge creation, sharing, management and exploitation act as the core functions of any higher education systems. Higher education programmes that prepare students for careers in disaster resilience have an important contribution to make in terms of the contents of the curriculum, educational methods and study materials (Amaratunga et. al., 2011). However, the complex and multidisciplinary nature of disaster management education pose a challenge to the higher education institutions (HEIs) to achieve this goal purely through the delivery of formal curriculum. The higher education programme should be more innovative providing opportunities to work in close collaboration with industry, communities, humanitarian agencies, private sectors and other higher education institutions. As such, facilitating cooperation and communication among university programs devoted to aspects of humanitarian studies and research are some of the suggestions that could enhance the effectiveness and efficiency of disaster management learning (Amaratunga et. al., 2011).

The concept of learning has gone through a process of redefinition in recent years. On one hand learning is seen as an active individual process with learners constructing their own knowledge base (Niemi, 2009). On the other hand it is also a process based on sharing and participation with different partners in a community, and is viewed as a holistic constructing process, which is inter-connected with learners' social and cultural premises. As argued by Niemi (2009), in order to meet new challenges of learning, HEIs need high quality multidisciplinary teaching to support different learners in their life situations. This approach will be effective in the context of disaster risk reduction learning and education.

Having realised the essential role higher education plays in increasing knowledge and awareness about DRR across all sectors and stakeholders and in turn increasing the disaster resilience, it is vital that the education sector to be developed and promoted to achieve resilience.

In this context a network, namely ANDROID, was formed for disaster resilience mainly to optimise educational development by influencing the higher education policy in Europe. Universities are key players in shaping the future of Europe. Strategies such as Lisbon²² and EU2020²³ were set in order to address the challenges such as globalisation, climate change and ageing population faced by Europe and to make Europe more dynamic and competitive, in a sustainable way while enhancing social inclusion. The EU2020 strategy, the successor to the Lisbon strategy, highlights education as a key policy area where collaboration between

²² http://ec.europa.eu/archives/growthandjobs_2009/

²³ http://ec.europa.eu/europe2020/index_en.htm

the EU and Member States can deliver positive results for jobs and growth. Thus the ANDROID disaster resilience network will increase inter-disciplinary and inter-sectoral cooperation to develop innovative European education that can increase societal resilience, and thereby reduce the threat posed by natural and human hazards, a challenge of critical European and global importance.

ANDROID Disaster Resilience Network

Networks can act as useful platforms for knowledge sharing and management. Research networks in science and technology that connects universities and business firms are often being regarded as crucial for the performance of knowledge-based economies and societies (Campbell, 2006). As such the network for disaster resilience will be effective in sharing the disaster knowledge among the stakeholders concerned.

An overview of the ANDROID network

ANDROID²⁴ (Academic Network for Disaster Resilience to Optimise educational Development) is an Erasmus academic network that includes 67 member organisations from 31 countries. Though the consortium is represented largely by European universities, it also includes major international organisations as partners, including the UNISDR. In recognition of the global impact of disasters and the complex nature of their causes, which frequently require international action to address them, the consortium also includes three partners from third countries (Australia, Canada and Sri Lanka), who will contribute specific scientific expertise. It has a Stakeholder Advisory Board, which consists of local and international organisations including UNISDR, the United Nations Human Settlements Programme (UN-HABITAT), Asian Disaster Preparedness Centre (ADPC) and Federation of Sri Lankan Local Government Authorities (FSLGA), to review emerging outputs and to influence the direction of the network to create impacts. In addition, the network includes more than hundred associate member organisations globally. The network officially commenced its activities in October 2011 and will receive financial assistance from the European Commission until early 2015.

Aim and objectives of the ANDROID network

ANDROID disaster resilience network was formed to promote co-operation and innovation among European Higher Education to increase society's resilience to disasters of human and natural origin. The network also aims at gathering a wide and most advanced set of competencies in the field of Disaster Resilience in sharing knowledge, discussing methodologies, disseminating good practices and producing and promoting innovation, by bringing together a good mix of stakeholders addressing topics of direct relevance for the EU higher education policy. Higher education institutions among all educational structures are vested with significant responsibility and should ensure that they incorporate this concept in a transverse and structured way. The existence of a network dedicated to the development and dissemination of progress on this issue therefore seems essential.

The network's teaching and research is concerned with what resilience is, what it means to society, and how societies might achieve greater resilience in the face of increasing threats

²⁴ Project website: <http://www.disaster-resilience.net/>

from natural and human induced hazards. The network will create a European approach that will help us understand the attributes that enable physical, socio-cultural, politico-economic and natural systems to adapt, by resistance or changing in order to reach and maintain an acceptable level of functioning.

ANDROID network will also raise awareness and promote a common understanding among stakeholders of the importance of disaster resilience education and the essential role of European higher education institutions in improving society's ability to increase disaster resilience.

The network's deliverables and methodology

ANDROID is based on an inter-disciplinary consortium of European partners that comprises scientists from applied, human, social and natural disciplines. These partners from across higher education have complementary skills, expertise and competences to identify and understand the varied attributes of resilience that underpin the capability and capacity of a community to cope with the threat posed by natural and human hazards. These partners therefore offer strong inter-sectoral linkages and will assist the network in becoming a reliable partner as stakeholders seek to reduce society's vulnerability to hazards.

ANDROID produces data from cross-national studies in Europe. It promotes discourse among European applied, human, social and natural scientists, supported by international organisations and a stakeholder board, in order to achieve the following objectives.

- Map the field in disaster resilience education, pool their results and findings, develop interdisciplinary explanations
- Describe, analyse, and compare the capacity of European cities and higher education to address disaster risk, and thereby reinforce the link between education and society;
- Build the capacity of higher education to address emerging challenges in disaster resilience, strengthen the link between research and teaching, and inform policy development.

In achieving the aforementioned objectives, the network has developed several work packages (WP), and the activities the WPs are delivered by active working groups representing several partner institutions who are allocated to the WPs. In addition to the secondary data through critical literature review, primary data mainly in the forms of surveys were also conducted to capture and share innovative approaches to inter-disciplinary working in disaster resilience (WP4 - Box 1); to develop a European inventory for disaster resilience education (WP5 - Box 2); and to analyse the capacity of European public administrators to address disaster risk (WP6 - Box 3).

In addition, the network has promoted interdisciplinary learning through the development of the ANDROID Doctoral School initiative (WP3). This initiative aims to develop HEI capacity for research and teaching into the development of societal resilience to disasters. It draws on the wide disciplinary base of the network's partners to promote inter-disciplinary working for doctoral students in order to develop the capacity of disaster related education in the long run.

The network also aimed to explore aspects of European and global relevance to developing societal resilience to disasters (WP7). It examines emerging inter-disciplinary research directions across the applied, human, social and natural sciences and consider their implications for education. In order to achieve this, three Special Interest Groups (SIGs), which represent the particular research and teaching concerns of groups of members, have been established.

The ANDROID Network also has developed an Open Educational Resources (OER) platform which will host digitised materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research (WP8).

The network has also organised conferences where all the partners gather and share knowledge and information (WP10) and these conferences and other national and international events are used to publicise and disseminate the network's objectives to a wider audience (WP11).

The network will eventually launch²⁵ a Roadmap for European Education in Developing Societal Resilience to Disasters (WP9). The roadmap will collate the major findings that arise from the network's survey and analysis projects in order to set an agenda for educational policy in the field.

A network board has been formed at the beginning to manage all the above activities by taking leads on different work packages. In addition the Board is also responsible for overall network management (WP1) and quality assurance (WP2) of the deliverable.

Key achievements to date of the Network

The ANDROID disaster resilience network has achieved several of its objectives through various initiatives. The key achievements of the networks are discussed in detail below.

1. Online and residential doctoral schools

The network aimed to develop HEI capacity for research and teaching into the development of societal resilience to disasters through online and residential doctoral schools. The ODS/RDS draw on the wide disciplinary base of the network's partners to promote inter-disciplinary working for doctoral students; recruit candidates from the network and beyond and intend to develop long term capacity. The work package 3 of the working group consists of Northumbria University, UK (Lead); University of Copenhagen, Denmark; Geological Survey of Denmark and Greenland, Denmark and National University of Ireland, Ireland. The doctoral schools clearly indicates an interdisciplinary work representing various disciplines such as agriculture & geo-information science, social science, civil engineering, architecture, building construction, physical and earth science, sociology, construction management, geography management, public management, built environment, forest engineering and sociology. The network has successfully conducted two online and one residential doctoral

²⁵ The Roadmap for European Education in Developing Societal Resilience to Disasters will be launched at the 4th International Conference on Building Resilience, incorporating the 3rd Annual Meeting of the ANDROID Network, 8-11 September, MediaCityUK, Salford Quays, UK

schools, with one more residential school scheduled in September 2014 alongside the ANDROID 3rd annual conference.

Online Doctoral Schools (ODS)

ODS has used Blackboard collaborate platform to connect all the presenters and doctoral students virtually to deliver short presentations, keynote presentations and conduct discussions. The ODS has delivered two compulsory modules and two elective modules as detailed below.

Compulsory modules

1. **Society and Disaster Resilience:** This module provides the contextual basis of the course. The theme of disaster is discussed as both an outcome of natural occurring events and as the result of social, economic and political processes. Within this context issues such as living with the risk of disaster, communication strategies and decision-making mechanisms are discussed by way of emphasizing the importance of inter-disciplinary understanding and cooperation.
2. **Society-environmental relations: social and physical factors in resilience:** The complex nature of disasters, their origins, causes and consequences, has led to widespread recognition that risk reduction through increased resilience will require a multi-disciplinary approach. The Hyogo Framework for Action 2005-2015 makes calls to, 'promote and improve dialogue and cooperation among scientific communities and practitioners working on disaster risk reduction, and encourage partnerships among stakeholders'. This final module looks at the complex inter-play of social and environmental factors and explores how these complex relationships influence societal resilience to disasters. We will discuss the nature of multi-disciplinary research and identify points of connection between researchers and practitioners.

Elective modules

1. **Disaster Management Policy in Europe:** This module introduces the idea of disaster management as a policy issue. In this context we explore existing knowledge frameworks, decision making processes and structures. The policy process is explored in terms of assessing the ways in which policy is formulated, implemented and evaluated.
2. **System overall resilience:** This module considers a range of questions around quantification of the overall resilience of the built/human environment. The following questions will be addressed with particular attention: How can the data and knowledge acquired be stored, superimposed and elaborated in order to define the system's resilience in an univocal and unambiguous way? How can the system's resilience be defined and modelled, including weaknesses and strengths, for different scenario-based analyses in conformity with a multi-hazard approach?

The network has conducted 2 ODSs one in March 2013 attended by 22, and the other in March 2014 attended by 38. Doctoral students from all over the world has attended these sessions.

Residential Doctoral Schools (RDS)

The residential doctoral school is a two days intensive residential workshop organised in parallel with ANDROID annual conference. The doctoral students presents their interdisciplinary disaster resilience work to a panel and receive constructive feedback to further improve their work. The RDS also includes keynote presentations and site visits. The first residential doctoral school, which was attended by 16, was conducted at the second annual conference in Limassol, Cyprus in October 2013. The second residential school has been scheduled at the 3rd annual conference in Salford, UK in September 2014. More than 30 doctoral students will be presenting their work at the second RDS in September. The main outcome of this RDS is the double-blinded peer reviewed proceeding where the papers presented by the doctoral candidates are published. The proceedings of the first residential school is available to download from the website of ANDROID disaster resilience network http://www.disaster-resilience.net/images/Docs/ds1_proceedings.pdf.

2. Interdisciplinary work in the field of disaster resilience

This interdisciplinary work aims to identify and promote innovative inter-disciplinary working and co-operation among scientific communities tackling the challenges associated with natural and human induced hazards. The term interdisciplinary indicates an interaction among two or more different disciplines and an exchange of information or methods between the two, often with the aim of solving a common complex problem (Apostel, 1972). The complex nature of disasters, their origins, causes and consequences, has led to widespread recognition that risk reduction through increased resilience will require a multi-sectoral approach. Au such this section provides the key findings from the survey on interdisciplinary work in the filed of disaster resilience (Source: WP4 working group – refer Box 1) in terms of the benefits and barriers of interdisciplinary working and the occurrences of various disciplines across the projects.

Box.1. Survey on interdisciplinary work in the field of disaster resilience (Work Package - WP4)

Aim: to highlight the current status of research and education programs and promoting best practices and innovative approaches in the field.

Date collection: 57 projects from more than 20 European countries and few extra European countries (United States, New Zealand and Sri Lanka).

Outcome: Good practice review of inter-disciplinary working in disaster resilience education

Working group: Technical University of Denmark, DK (Lead); National University of Ireland, IE; University of Coimbra, PT; University of Moratuwa, LK; Mid Sweden University, SE; Tampere University of Technology, FI; Deltares, NL.

Better understanding of complex systems; multidisciplinary nature; access to resources; new technologies and methodologies; promoting inclusive practices; and improved ability to cooperate across the border during emergency situations were identified as benefits of interdisciplinary work by the projects surveyed.

The outcomes of the survey have highlighted that a major barrier in interdisciplinary work on resilience is the lack of a common framework and common language. In addition, lack of resources; different working practices; administrative obstacles, problem of contrasting techniques; conflicting objectives; lack of interest interdisciplinary work, limited access to data, and limited time were also identified as some of the barriers to the interdisciplinary work.

However, more than 70% of the projects have taken countermeasures to overcome some of the barriers encountered during the interdisciplinary work. Improving understanding, promoting and advertising the information, solving budget problems, and solving problems related to lack of data were the actions taken to overcome the barriers.

The survey on interdisciplinary projects on disaster resilience revealed the disciplines that register the highest occurrences (technology, geography, earth and space, and sociology), moderate occurrences (political science, life science and economics), and low occurrences (law and juridical science, ethics, philosophy, and history). It may give a good indication of disciplines that should be included in educational programs on resilient design of buildings and urban systems. Political, economic, and cultural aspects, which all affect the process of decision-making and the establishment of rules and regulations, are not much represented in the disaster resilience projects. Also there is low involvement of citizens and opinion groups involved in the projects. The predominant involvement of academics with lower involvement of industries and with limited application of resilient design in the practice was evident across the projects. This outcome suggests the need of a more effective action of regulators and politicians in facilitating resilience-based design, as well as a closer feedback from people, in the form of parliamentary discussion or direct consultation of the citizens.

All in all the findings of the interdisciplinary survey suggest that there is an on-going body of work that attempts to reconcile the complexity of most disaster based research by developing and producing knowledge which goes beyond disciplinary boundaries. One of the strongest indications from the survey is that discussion and reinterpretation of established concepts and practices has been a key necessity in advancing interdisciplinary collaborations.

3. Inventory of European disaster resilience education

The network aims to establish the current teaching and research capacity among European HEIs in the field. In order to achieve this, it attempted to develop an inventory of disaster resilience related education programmes currently being undertaken within Europe. The inventory aimed at capturing teaching and research programmes covering the full scope of disaster resilience education from applied, human, social and natural sciences at European HEIs. Accordingly, this section provides the key findings from the survey on European education to map teaching and research programmes in disaster resilience (Source: WP5 working group – refer Box 2).

Box.2. Survey on European education to map teaching and research programmes in disaster resilience (Work Package – WP5)

Aim: to establish the current teaching and research capacity among European Higher Educational Institutions (HEIs) in the disaster resilience field.

Date collection: 96 completed surveys from higher education institutions across Europe

Outcome: Inventory of European disaster resilience education.

Working group: Frederick University, CY (Lead); Czech Technical University, CZ; VSB-Technical University of Ostrava, CZ; Mining and Geology University, BG; Heriot Watt University, UK; Catholic University of Sacred Heart Milan, IT

Among the 96 completed surveys from HEIs across Europe, 60% of the HEIs offer disaster resilience related programmes whereas 40% do not offer programmes in this field. This suggests that there is high potential to increase the number of programmes in the field of disaster resilience across Europe.

Nearly 80% of the programmes are at European Qualification Framework (EQF) level 7 which are largely classified Masters or postgraduate. Only few were found to be at bachelor degree level. The nature of these programmes are a combination of theoretical, practical and applied basis.

The geographical distribution of the HEIs that offer disaster resilience education are given in Figure 1.

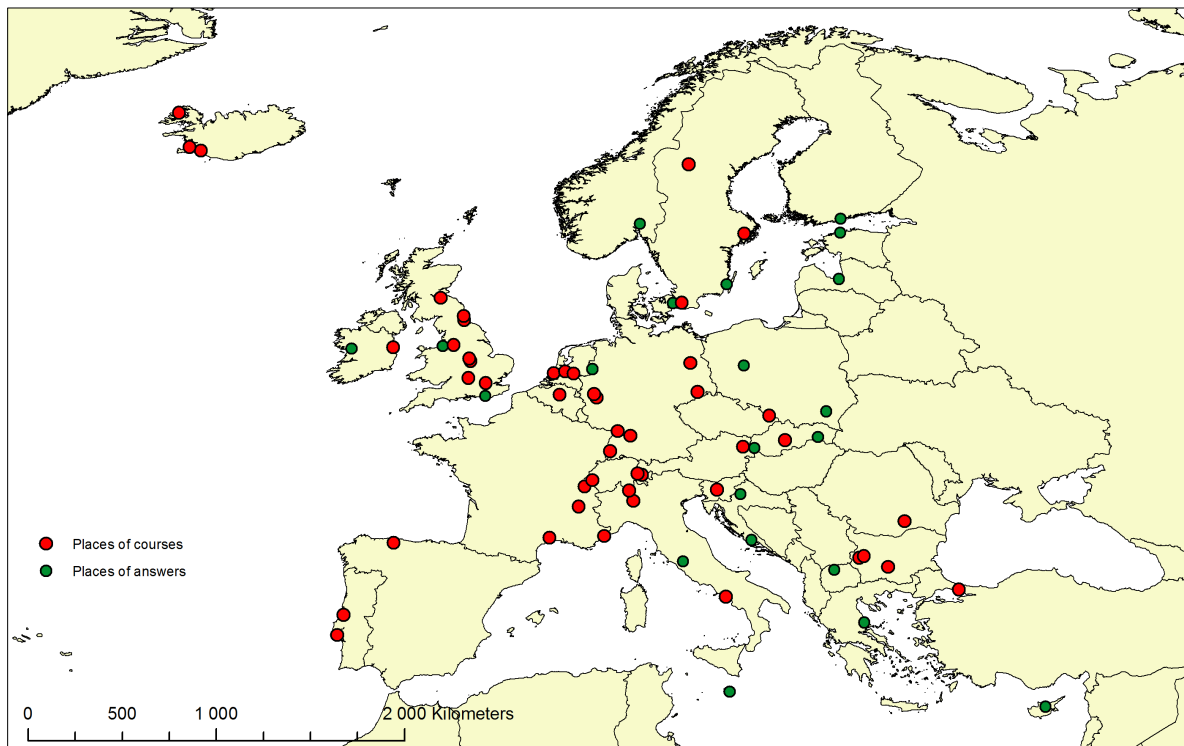


Figure 1: European countries offering disaster resilience programme (in red)

A majority of the programmes surveyed have some form of link with industry in a form of mentoring, practical training and internship. In a majority of programmes nearly 60% of teaching is performed by both academics and professionals. On the contrary the survey results on interdisciplinary work pointed out lower level of industries' involvement in the projects. This indicates that there is the more involvement of industry in academic programmes compared to research projects undertaken by the universities.

The great majority of programmes have been running wither for five years or less or are in the process of still developing. Only less than 20% of programmes are over 10 years old, confirming that disaster resilience is a relatively new field of academic study.

The survey results also demonstrates very clearly the multidisciplinary nature of this field as well as the involvement of academia, professionals, governmental organisations, research institutions etc in this effort to promote disaster resilience. There were sixteen different disciplines were identified of which 30% of the programme belonged to Engineering.

All in all, this work demonstrates the lack of disaster resilience related programmes offered by HEIs across Europe, the multidisciplinary nature of field of disaster resilience education and the clear potential for such programmes.

4. Capacity analysis of European public administrators

The network aims to establish the capacity of local and national government's public administrators in European urban areas to address disaster risk. The United Nations Office for Disaster Reduction (UNISDR) has highlighted the need for cities and local governments to get ready, reduce the risks and become resilient to disasters. Their 2010-2015 World Disaster Reduction Campaign "Making Cities Resilient" addresses issues of local governance and urban risk while drawing upon previous ISDR Campaigns on safer schools and hospitals. Their overall target is to get as many local governments ready as possible, to span a global network of fully engaged cities of different sizes, characteristics, risk profiles and locations. The campaign is focusing on raising political commitment to disaster risk reduction among local governments and mayors and to develop capacity development opportunities. If European HEIs are to be able to support European local administrators in achieving this goal, it is important that priority areas for capacity development can be identified so that European HEI's education programmes can be developed to meet their requirements. As the UNISDR Campaign is global, it will also afford European HEIs an opportunity to develop capacity in a field of global relevance. In order to achieve this, the network conducted a survey on capacity analysis of public administrators in European urban areas. Accordingly, this section provides the key findings from the survey on capacity analysis of European public administrators (Source: WP6 working group – refer Box 3).

Box.3. Survey on Capacity Analysis of European Public Administrators (Work Package – WP6)

Aim: to describe the capacity of public administration organisations in European urban areas to address disaster risk and highlight priority areas for capacity development (through education).

Date collection: 127 responses from 21 countries representing 19,000 disaster resilience personnel. 71 local government departments or agencies, 33 national government departments or agencies, and 23 'other' (NGOs, universities, national platforms, etc.)

Outcome: Capacity Analysis of European Public Administrators

Working group: Tallinn University of Technology, EE (Lead); Frederick University, CY; United Nations University, DE; Firat University, TR; Heriot Watt University, UK

To overcome the problems associated with the numerous (geographical, population, risk, etc.) differences between European countries, the fulfilment of the Hyogo Framework for Action (HFA) priority actions was adopted as a common baseline from which to measure capacity since all of the survey countries have signed up to them. However, since these actions apply specifically to the national level, a corresponding set of local level actions, which follow from the HFA priority actions, was derived for the survey. For each of the identified actions, it was first determined if the action had already been successfully completed. If it had, then there was clearly no capacity constraint. If the action had not been achieved and it was ascertained that this was a result of constrained capacity rather than something else (such as it merely not being a current priority), then respondents were asked to rate each of the capacity dimensions in terms of both their importance and the degree to which they were constrained. A gap analysis was then carried out to determine which dimensions of capacity presented the most pressing challenges to HFA implementation and to identify the priority areas for capacity development through education.

A multidimensional conception of capacity was adopted with the following capacity dimensions identified as relevant:

- Human resources (availability)
- Human resources (knowledge and skills)
- Financial resources
- Management
- Leadership and direction
- Systems and infrastructure
- Linkages / relationships with external organizations / communities / society.

In terms of progress in implementing the HFA priority actions, the majority of respondents reported that moderate progress having been made. With regard to all 5 of the national actions and all 7 of the local level actions, a majority of respondents indicated that the necessary capacity to fulfil the actions existed so that the non-completion of the actions was due to other factors (e.g. time, other priorities, etc.) rather than being a consequence of capacity constraints.

Those respondents who did report the existence of capacity constraints indicated that the *financial resources* dimension of capacity presented the greatest challenge to their

organisations (at both local and national levels). Further, *staff knowledge and skills and staff availability* were another major constraints both at local and national levels. A majority of the organisations (68%) were reported to be interested in their staff obtaining disaster resilience-related academic qualifications. *Systems and infrastructure* and *legal framework* were other capacity dimensions considered by national level public administrators.

The survey has thus given insight into the relative demand for academic qualifications within European public administrations and the degree to which staff knowledge and skills have affected the implementation of disaster resilience initiatives.

5. Special Interest Groups

The network also established three Special Interest Groups (SIGs), which represent the particular research and teaching concerns of groups of members as described below;

- SIG1: *Multi-hazard Scenario* - to find common languages/tools to identify, profile, quantify and combine different natural hazards that might affect the community or the territory
- SIG2: *System Overall Resilience* - to define the criteria to quantify the overall resilience of a built/human environment. How to store/ overlay/ elaborate knowledge to extract the system's resilience in an univocal way, including weakness/strength points, for different scenario-based analyses.
- SIG3: *Integrated Mitigation and Governance, Lessons from the past to the future, Impact on society* - to define integrated multi-risk analysis methodologies, mitigation options and governance strategies, focusing on stakeholders' advice and guidance, to learn from mistakes examples of best current practices, training modules, and to suggest guidelines, recommendations, etc. as inputs for stakeholders
- SIGs promote inter-disciplinary working, encourage emergent and innovative resilience research, formulate research agendas, and strengthen the link between research and teaching. Each SIG will contribute to a report on future research directions in disaster resilience research, and the implications for education.

These SIGs are developed and managed by network partners for network partners. Each SIG is different and has its own defined scope and work plan. SIGs promote inter-disciplinary working, encourage emergent and innovative resilience research, formulate research agendas, and strengthen the link between research and teaching. Each SIG will contribute to a report on future research directions in disaster resilience research, and the implications for education.

6. Open Education Resources (OER)

The ANDROID network has developed innovative educational resources in order to support capacity building for improving societal resilience to disasters. The network has developed an Open Educational Resources (OER) platform to host digitised materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research.

OER are teaching, learning and research materials in any medium that reside in the public domain and have been released under an open licence that permits access, use,

repurposing, reuse and redistribution by others with no or limited restrictions (Atkins, Brown & Hammond, 2007).

OER has emerged as a concept with great potential to support educational transformation. While its educational value lies in the idea of using resources as an integral method of communication of curriculum in educational courses (i.e. resource-based learning), its transformative power lies in the ease with which such resources, when digitized, can be shared via the Internet. The use of open technical standards improves access and reuse potential, supporting the development and dissemination of disaster risk information to relevant stakeholders.

The concept of OERs describes any educational resources that are openly available for use by educators and students, without an accompanying need to pay royalties or licence fees.

OER can include full courses/programmes, course materials, modules, student guides, teaching notes, textbooks, research articles, videos, assessment tools and instruments, interactive materials such as simulations, role plays, databases, software, apps (including mobile apps) and any other educationally useful materials. The term 'OER' is not synonymous with online learning, eLearning or mobile learning. Many OER — while shareable in a digital format — are also printable.

There is only one key differentiator between an OER and any other educational resource: its licence. Thus, an OER is simply an educational resource that incorporates a licence that facilitates reuse, and potentially adaptation, without first requesting permission from the copyright holder. An open licence is a standardised way to grant permission and to state restrictions to accessing, using, repurposing, reusing or redistributing creative work (whether sound, text, image, multimedia, etc.).

A number of important benefits can accrue from sharing content under an open license (Butcher, 2011). As digitized content can so easily be shared between students and institutions, sharing it publicly under an open licence is the safest way to protect the author's IPR and copyright; the licence can ensure that, when content is shared, it remains attributed to the original author. Open sharing of content can more rapidly expose plagiarism, by making the original materials easy to access. In addition, releasing materials under an open licence also reduces the incentive for others to lie about the source of materials because they have permission to use them.

Sharing of materials also provides institutions opportunities to market their services. Educational institutions that succeed economically in an environment where content has been digitized and is increasingly easy to access online are likely to do so because they understand that their real potential educational value lies not in content itself, but in offering related services valued by their students. These might include: guiding students effectively through educational resources (via well-designed teaching and learning pathways); offering effective student support (such as practical sessions, tutorials, individual counselling sessions or online); and providing intelligent assessment and critical feedback to students on their performance (ultimately leading to some form of accreditation). Within this environment, the more other institutions make use of their materials, the more this will serve to market the originating institution's services and thereby attract new students.

The ANDROID Network developed a set of standards (Haigh, 2013) that form the basis for the ANDROID Open Education Resource (OER) platform and its content. These standards set out the technical specifications of the platform, accessibility and inclusion, rights management, and approaches for ANDROID network members to describe, manage, and share learning resources online.

The standards include a clear operational policy for the ANDROID OER platform: a takedown policy; content policy for types of learning resources held; submission policy concerning depositors, quality & copyright; preservation policy.

The OER platform²⁶ developed to host the educational resources uses the free and open-source content management system Joomla, which was chosen due to its ease-of-use and extensibility. The platform supports the searching and organisation of content, and on-line learning communities.

It is essential that content released through the platform can be found, used, analysed, aggregated and tagged. In order to facilitate this, content is accompanied by metadata. In this instance metadata doesn't necessarily mean de jure standards, application profiles, formal structured records, cataloging rules, subject classifications, controlled vocabularies and web forms. Metadata can also take the form of tags added to resources, time and date information, and author name, affiliation and other details added from user profiles when resources are uploaded.

OERs for hosting on the platform have initially been developed through the activities and outputs of the network's other work packages, such as the events and materials from the Doctoral School (WP3), and reports and seminars organised as part of the Inter-Disciplinary Methodologies (WP4), and the three survey and analysis projects (WP5, WP6 and WP7). However, ANDROID partners are also being invited to upload other educational resources that they wish to disseminate and make available to educators, students and self-learners.

8. ANDROID Roadmap

A major output of the first ANDROID workplan, due for completion in late 2014, is the development of a roadmap for European education in developing societal resilience to disasters. The roadmap will collate the major findings that arise from the network's survey and analysis projects (WP5, 6&7) in order to set an agenda for educational policy in the field.

This report will not be about predicting the future. Instead, its starting point will be simply to consider some of the greatest challenges and opportunities for education in the 21st century in helping society address the threat posed by hazards of natural and human origin. The report will consider society's requirements in terms of skills (WP6) and scientific advances (WP7). It will also consider the existing capacity of European HEIs to meet these requirements (WP5). Finally, the report will consider what needs to happen in education policy to help address this key European and global challenge. The report will be a major output for the network that can be disseminated to key stakeholders, and also form the basis of the network's future activities. The report will be published in four languages.

²⁶ <http://www.disaster-resilience.net/index.php/component/oer/>

7. Further networking opportunities via international conferences

ANDROID was further structured in aiming to bring together network members, lecturers and researchers in universities and other higher education institutions with an interest in our core themes, as well as those in NGOs and policy fields. It has achieved this through a series of annual conferences across Europe. Conferences include a varied programme of themed paper presentations, workshops, round tables, working group meetings, and plenary addresses.

The first annual ANDROID conference²⁷ was held in Tallinn, Estonia between 17th and 19th October 2012. The conference was hosted by the Tallinn University of Technology and chaired by Professor Irene Lill. The event was held at the historic Teachers' House (Õpetajate Maja), which stands on Town Hall Square, right in the centre of the city's Old Town. The conference was the first gathering of the entire network. Over 60 partners from across Europe and Australia attended.

The second annual ANDROID conference²⁸ was held in Limassol, Cyprus from 23rd to 25th October 2013. The conference was hosted by the Frederick University and chaired by Dr Skevi Perdikou. The venue of the conference was Amathus Beach Hotel in Limassol, Cyprus. Conference proceedings will give a flavor of the activities that took place.

The programme during the 1st and the 2nd years resulted in an annual report on the state of innovation in disaster resilience education²⁹.

3rd ANDROID conference³⁰ will be held from 8th – 11th September 2014, Salford Quays, United Kingdom and this incorporates the 4th International conference on Building Resilience. Despite resilience having been widely adopted in research, policy and practice to describe the way in which they would like to reduce our society's susceptibility to the threat posed by hazards, there is little consensus regarding what resilience is, what it means to society, and perhaps most importantly, how society might achieve greater resilience in the face of increasing threats from natural and human induced hazards. This International Conference will explore the concept of resilience as a useful framework of analysis for how society can cope with the threat of hazards, helping to understand attributes that enable physical, socio-cultural, politico-economic and natural systems to adapt, by resistance or changing in order to reach and maintain an acceptable level of functioning.

Submission of abstracts and full papers that address the conference themes were particularly encouraged: Resilience; Education; Built environment; Communication; Health facilities, infrastructure and system resilience planning; Social resilience.

Special features of the conference include: Inter-disciplinary themes - papers subject to double blind peer review by international scientific committee; Awards for best papers; Hosting of the UN Making cities resilient campaign steering committee meeting; Hyogo

²⁷ <http://www.disaster-resilience.net/index.php/news/conferences/28-2012-android-conference-tallinn-estonia>

²⁸ <http://www.disaster-resilience.net/index.php/news/conferences/54-android-second-annual-conference-23-25-oct-2013-limassol-cyprus>

²⁹ <http://www.disaster-resilience.net/androidconference/>

³⁰ www.buildresilience.org/2014.

Framework for Action Phase 2 briefing activity; ANDROID residential doctoral school; and launch of the ANDROID Research Roadmap.

Accepted papers will be published in a dedicated online issue of Elsevier's *Economics & Finance Procedia*, to be made available with open access on www.ScienceDirect.com and in perpetuity (without restriction in time). All partners will be expected to attend the annual conference, but the conferences will also be open to other interested stakeholders in the region.

Further, ANDROID had formal links with the 2013 International Conference on Building Resilience³¹: Individual, institutional and societal coping strategies to address the challenges associated with disaster risk. The conference encouraged debate on individual, institutional and societal coping strategies to address the challenges associated with disaster risk. As a country subject to several large-scale disasters in recent years, including the 2004 Tsunami and a civil war spanning several decades, Sri Lanka provided an ideal setting to explore the challenge of creating resilient communities and cities. The conference programme incorporated keynote addresses by respected government officials, leading industrialists and implementers, and distinguished local and international academics. The conference included the publication and presentation of 87 research articles and practice notes that had been subject to double blind peer review by a distinguished international scientific committee. All accepted papers were published in the conference proceedings. Selected papers will also be published in a special issue of the *International Journal of Disaster Resilience in the Built Environment*, by Emerald Publishing. Further details on the conference can be found at www.buildresilience.org/2013. You can also view the conference proceedings and the post-conference press release.

Conclusions

This paper discussed the role of education in disaster risk reduction knowledge, and how network can act as useful platforms for knowledge sharing and management. A case study of the ANDROID disaster resilience network was presented. In this regard, the ANDROID network will raise awareness and promote a common understanding among stakeholders of the importance of disaster resilience education and the essential role of European higher education institutions (HEIs) in improving society's ability increase disaster resilience.

The major achievements of the network were presented, including the findings of various surveys. The survey results revealed the multidisciplinary nature of disaster resilience education and research. Lack of disaster resilience related programmes offered by HEIs across Europe and the capacity constrains of public administration both at local and national levels, demand innovative higher education policy in developing resilience to disasters. All the survey results and analyses undertaken by the ANDROID Network, together with other initiatives such as doctoral schools, Open education resources (OER) and Special Interest Groups (SIGs) and conferences will inform the network's Roadmap for European Education in Developing Societal Resilience to Disasters.

³¹ www.buildresilience.org/2013

Acknowledgements

ANDROID project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

The authors also acknowledge the partner institutions that conducted and analysed the three surveys the results of which are summarised in this report.

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