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DISASTER RISK MANAGEMENT: NEW CHALLENGES FOR THE EDUCATION SYSTEM AND RESEARCH IN ALBANIA AND THE BALKANS

Abstract: Disasters have a major impact on the living conditions, economic performance and environmental assets and services of affected countries or regions. These have been principally conditioned by the increases in population and assets exposed to adverse natural events, a trend likely to worsen with growing urbanization, environmental degradation and expected increase in the number and intensity of hydro-meteorological events resulting from climate change. It is recognized that disasters can have widespread impacts, causing not only harm and damage to lives, buildings and infrastructure, but also impairing economic activity, with potential cascading and global effects. Consequences may be long term and may even irreversibly affect economic and social structures and the environment. To cope with the pressuring issues of disaster consequences multi-stakeholder participation and collaboration is required. Exposure to disasters poses many challenges to our economic and social environment. Education system is one of the sectors much affected by these challenges.

This lecture will focus on challenges of higher education system in Albania and the Balkans and its response to the needs of building adaptive capacities to help cope with disaster challenges. It will offer a comparative overview of education provision in disaster risk management field in Europe and in the Region, arguing around the level of integration of disaster risk management topics in curricula of bachelor and master programs. It also will focus on research challenges of those involved in research in the field of disaster risk management. Finally, further recommendations in relation to the ability of the education system to respond to global challenges posed by disasters are offered.

Key words: disasters, higher education system, resilience, adaptive capacities

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1. INTRODUCTION

Disasters have a major impact on the living conditions, economic performance and environmental assets and services of affected countries or regions. These have been principally conditioned by the increases in population and assets exposed to adverse natural events, a trend likely to worsen with growing urbanization, environmental degradation and expected increase in the number and intensity of hydro-meteorological events resulting from climate change (Ghesquiere and Mahul, 2010). It is recognized that disasters can have widespread impacts, causing not only harm and damage to lives, buildings and infrastructure, but also impairing economic activity, with potential cascading and global effects. Consequences may be long term and may even irreversibly affect economic and social structures and the environment.

Education system is one of the sectors much affected by these challenges. Disasters affect both demand and supply side of education. This lecture will analyze both these aspects and focus on challenges of higher education system in Albania and the Balkans and its response to the needs of building adaptive capacities to help cope with disaster challenges.

The lecture is organized as follows. The first part will offer a brief overview of disasters and their economic impact. Later the relationship between disasters and education system will be analyzed and the way adaptive capacities can be built through education will be discussed. Finally, the research methods and methodology applied in the field of DRM are outlined, based on theoretical aspects of research methods and particular challenges related to the field. Recommendation and conclusions are offered in the last part.

2. DISASTER IMPACTS AND CONSEQUENCES AROUND THE WORLD

Disasters impact the economy in any country they occur and no apparent relation have been observed between economic development and exposure to natural hazards (Stromberg, 2007). Based on data from the Karlsruhe Institute of Technology in April 2016, it is evaluated that the economic damage caused worldwide as a result of natural disasters from 1900 to 2015 is over $7 trillion. Floods are the main cause for economic and human losses, according to the findings from the 35,000 natural disaster database in over 115 years, accounting for about 60% of the damage caused by disasters. Since 1960, storms and hurricanes have replaced the floods as the most devastating force that struck buildings and infrastructure. It cannot yet be determined whether this is due to climate change (The Karlsruhe Technological Entity 2016).

Climate change is considered one of the most pressing challenges of our generation with widespread impacts on disaster occurrence and severity. The Intergovernmental Panel on Climate Change (IPCC) has calculated that global average surface temperatures have increased by 0.13°C per decade since 1950 and that the global average surface temperatures might increase from 1.8°C to 4°C by the end of the 21st century due to the emissions of GHG expected to occur in the future (IPCC, 2007). Potential consequences of this heating vary from manageable to catastrophic. Several impacts will be felt on agricultural production (Howden et al, 2007), natural ecosystems (Hulme, 2005), biodiversity (Bates et al, 2008), water pollution (Haines, 2006), forests and living species, health, and sea level rise (IPCC, 2007). The variability of climate during this last century has been deteriorated by human activity, particularly in developed nations. Scientists have warned that without any action, the consequences will be disastrous for the future generations (Goodwin, 2008).

The frequency of other natural disasters, especially earthquakes that make up 26 percent of the losses and volcanoes that caused a percent, remain quite constant over time. Meanwhile, in terms of human loss, according to the study, 8 million people have died throughout this time frame from disasters such as earthquakes, volcanoes, droughts, fires, etc.. Earthquakes are estimated to cause nearly 30% of the deaths, or, say, about 2.3 million human lives lost during the 115-year period. However, in comparison with the

population of the globe in general, which is on the rise, deaths from such catastrophes, with the exception of Africa, are declining. This is partially attributed to the geographical distribution of disasters.

In absolute monetary terms, over the last 20-year, the USA recorded the biggest losses (US$ 945 billion), reflecting high asset values as well as more frequent events. China, by comparison, suffered a significantly higher number of disasters than the USA (577 against 482), but lower total losses (US$ 492 billion) (CRED and UNISDR, 2018). Comparing continents, Asia, as the continent with the highest population and land mass, experiences the highest numbers of disasters, fatalities, and people affected. In relation to the population, the death rate is highest in Africa (Stromberg, 2007).

Between the 1950s and 1990s, the cost of natural disasters increased 15 times. Disasters in the 1990s caused an economic loss estimated at an average of $ 66 billion a year (in 2002 prices). In 1998-2017 disaster-hit countries also reported direct economic losses valued at US$ 2,908 billion, of which climate-related disasters caused US$ 2,245 billion or 77% of the total. This is up from 68% (US$ 895 billion) of losses (US$ 1,313 billion) reported between 1978 and 1997. Overall, reported losses from extreme weather events rose by 151% between these two 20-year periods. In 2017, according to the Natural Catastrophe loss data: NatCatService | Munich Re, total losses from world natural disasters accounted for $ 330 billion, compared to $ 184 billion in 2016. The year's losses resulted from 710 events, compared to 780 events in 2016.

While upper income and lower income countries have the same chance of being hit by a disaster event, in high income countries the means to cope with a disaster have improved over time, making a highly exposed area less vulnerable to disaster impacts. It is in fact demonstrated that, disaster impacts are much more serious in developing countries and emerging economies (Gurenko and Lester, 2004). This is due to many factors, including the infrastructure conditions, lower building standards, absent or poor incentives for mitigation, and underdevelopment of private markets which do not provide catastrophe insurance for homeowners and small businesses, and greater constraints on government resources available to cope with disasters. Moreover, developing countries face further constrains when trying to develop disaster risk management strategies which would alter disaster impacts. This is because of the mentality present in these countries. This includes the mentality of governments which often develop short run strategies corresponding to the election cycle, the mentality of the private sector which develop its activity focused on short term profit, without taking into account any damages imposed to the environment and infrastructure, and the mentality of the population which do not consider insurance as a risk protection technique (Lester, 2000; Gurenko and Lester, 2004; ECLAC, 2003). Although capital losses might be smaller in absolute terms when compared to those in developed countries, their relative weight and overall impact tend to be very significant, even affecting sustainability (Ghesquiere and Mahul, 2010).

In summary, all published data demonstrate that while absolute economic losses might be concentrated in high income countries, the human cost of disasters falls overwhelmingly on low and lower-middle income countries. This burden is expected to rise, especially under the conditions of a changing climate change, which, as shown before, is increasing the frequency and severity of extreme weather events.

In 2015, 193 world leaders of United Nations agreed on 17 Sustainable Development Goals, to initiate a worldwide integral action plan, embracing all dimensions of sustainability. Sustainability goals provide many opportunities for multi-stakeholder participation and collaboration in the field of disaster risk management, as well as new challenges for our economic and social environment.

3. EDUCATION AND DISASTER RISK MANAGEMENT

Education system is much affected by the challenges arising from the increase of intensity and frequency of disasters and consequences of climate change. Disasters and climate change affect both demand and supply side of education. The less developed communities are the ones who bear the costs of a damaged

environment, and this affects also the quality of education and jeopardies the security of students and teachers involved in the process of teaching and learning. Disasters induced by climate change can damage or destroy school facilities and educational systems, threatening the physical safety and psychological well-being of communities. Migration of population due to climate threats, also causes the interruption of education supply. Furthermore, the economic impacts of disasters reduce school enrolment, as children are kept out of school to help their families cope with disaster consequences (Kopnina, 2012; Anderson, 2012; Hamilton, 2011).

Despite being threatened by climate change, the education sector involve many adaptive capacities. Higher Education Institutions are the place where tomorrow's leaders are trained. Therefore, they have the chance to guide the action toward sustainability and climate change adaptation. Education has already been proven to have an impact on key issues of global importance, therefore it is important that its role is not overlooked.

There are many ways how sustainable development and climate change adaptation issues can be mainstreamed into education system. Education for Sustainable Development is a comprehensive and multidisciplinary tool that includes not only relevant content knowledge on disasters, climate change and other sustainability topics, but also focuses on the capacity of schools and education systems to become climate-proofed and resilient as well as sustainable and green. Sustainability education offers many opportunities, but in the same time poses many challenges.

Education is a critical component of adaptive capacity. The way that people are educated and the content of education can provide the knowledge and skills needed for making informed decisions about how to adapt our lifestyle and choices to a changing environment. Teaching sustainability involves the interdisciplinary nature of the problems at stake. Moreover, teaching sustainability implies not only focusing on course content, but also to new ways of teaching that content. Pedagogy in sustainability field is therefore a complex issue. Usually, instructors involved in sustainability teaching are required to work outside their own areas of expertise. They need to bring new content and methodologies to the process of teaching, in order to promote critical thinking and a problem solving approach to students. Moreover, in order to contribute to coping with the challenges of climate change, disaster risk management and sustainable development it is indispensable to establish interfaculty and interdisciplinary collaboration (Makrakis & Kostoulas-Makrakis, 2016) which will also enable the modernization of Higher Education. This kind of cooperation is indispensable in reaching the goals of sustainability education, and, moreover, leads to facilitation of appropriate policies for effective ecological and social outcomes.

New research and knowledge is also produced within higher education institutions and research institutes. New theories, explanatory relationships and innovative solutions are products of this research. Therefore, contributions to the advancement of the field is achieved through development of substantial and relevant studies, projects and research focusing on all aspects of DRM cycle.

Finally, schools and education institutions should be made sustainable through green policies that promote sustainability through building and site design and maintenance, reducing this way their own ecological footprint. In summary, education system can affect climate change action by improving climate change literacy, addressing teaching and learning methodologies that foster a problem solving and critical thinking approach, and by making university services more sustainable and greener (Kopnina, 2012; Anderson, 2012; Hamilton, 2011.

Although the role of education in addressing the challenges of climate change is being increasingly recognized, the capacity of education to contribute to adaptation and mitigation measures has yet to penetrate mainstream development thinking.

4. CHALLENGES OF SUSTAINABILITY EDUCATION IN THE WESTERN BALKANS

Western Balkan countries share a communist past which, to various extents, continues to affect their higher education systems. However, in post-communist era (1990 to the present) higher education curricula have been heavily revised to incorporate the principles set forth in the Bologna Process. Also, entirely new courses have been devised. The European Union has supported the higher education sector in the region through a broad range of projects and financing schemes, and most countries have reciprocated by willing to embrace western education practices, such as multidisciplinary or interdisciplinary approaches. By engaging the academics in numerous perspectives and solutions the multi and interdisciplinary approaches are indispensable for sustainable development (Azeiteiro, 2015).

However, while bachelor programs in WB tend to be more traditional in terms of content and focus, postgraduate programs are making a concerted effort to diversify their content. The creation of master programs that straddle across faculties is evidence of that. This shift reflects the needs of the increasingly challenging future described above. Through the interdisciplinary and interfaculty approach it is intended to enhance the skills of new graduates in order to meet new community, government, and industry needs.

In the Balkan region, it has been identified a lack of action in the field of sustainability within Higher Education Systems. Few efforts to implement modernized sustainability education in the region were observed, as well as few attempts to make university services more efficient, and more sustainable. While Sustainable Development Education is becoming increasingly popular in the EU, in Balkan countries there is still a way to go. As per a study conducted in the framework of K-Force project[3] the content of the Master's programs in Risk Management in the EU and the UK is diverse, with more than 107 risk education programs. It should be noted that in many cases these programs are of an interdisciplinary nature, where at the same time with the technical elements of the field, the programs include issues related to economics, risk assessment, financing, insurance, etc. in their curricula. Meanwhile in Western Balkan, with the exception of Greece, few countries have operationalized the concept of interdisciplinarity in higher education, and the inclusion of topics related to disaster risk management, climate change adaptation, energy markets, sustainability governance, etc. Cultural inflexibility, a traditional education system, and a generally restricted labour market are barriers for implementing such requirements in higher education. Countries in the region offer a few programs in the field of disaster risk management at both the bachelor and master level. Meanwhile, it should be stated that most of these programs are offered by polytechnic universities while an interfaculty collaboration is necessary. A summary of the programs offered in the countries of the region is summarized in table 1.

Table 1: Programs of study in the field of disaster risk management in Western Balkans

Country	Program	Aim	HEI
Serbia	Master programme "Disaster Risk Management and Fire safety"	The purpose of the study programme is the education of students of the profession of Master in Disaster Risk Management and Fire Safety in accordance with the needs of society.	Faculty of Technical Sciences, University of Novi Sad
	Master programme "Emergency Management"	The primary aim of the study programme is to enable students to apply scientific and professional achievements in solving the problems of safety of humans and natural and	Faculty of Occupational Safety, University of Niš

[3] The Knowldege of a Resilient Society Project is a project financed by the EU throught the Erasmus + program. Its aim is to improve regional resilience to hazards and capability for regional cooperation in risk prevention and response and to ensure national professional resources and regional capacities in order to build regional-based disaster preparedness and a culture of safety and resilience at all levels according to EU Integration Strategies and National relevant strategies.

		material wealth, and in developing emergency management systems.	
North Macedonia	Master in Earthquake Engineering	The Earthquake Engineering major enables education of candidates in the domain of modern earthquake engineering. The candidates are trained in application of new, most recent methods of design and construction of seismically safe structures.	University Ss. Cyril & Methodius, Skopje Institute of Earthquake Engineering and Engineering Seismology
Bosnia and Herzegovina	Master in Disaster Risk Management and Fire Safety	The program's goals are to further train professionals in Disaster Risk Management and Fire Safety in Civil Engineering.	University of Tuzla
Albania	Master of Science in Risk Management	This Master Program aims at combining three approaches to risk management: enterprise risk management; Financial risk management; and disaster risk management.	Faculty of Economy, University of Tirana
	Professional Master Disaster Risk Management and Fire Safety in Civil Engineering	The program's goals are to further train professionals in Disaster Risk Management and Fire Safety in Civil Engineering who are able to work effectively in teams across a large range of scales and with a well-developed knowledge.	Epoka University

Source: The Authors

5. EDUCATION DEVELOPMENTS IN THE FIELD OF DISASTER RISK MANAGEMENT IN ALBANIA

5.1. Disasters and DRM in Albania

Albania has a high exposure to natural disasters. The causes of natural disasters are different: Natural causes (geological, hydrological, atmospheric, biophysical); 2) Anthropogenic causes (floods caused by dams break, intentional fires, 3) Ecological causes (Ministry of Local Government and Decentralization and UNDP, 2003). Moreover, as the risk of climate change emerges, it is expected that the frequency of extreme weather events will significantly rise in the upcoming years. Available data shows that the disaster risk level is comparatively higher in Albania than in neighboring countries. The four main dangers affecting Albania are earthquakes, floods, forest fires and snowstorms (UNDP, 2009).

The Albanian population has experienced many consequences from disasters in the past. Their effect has been really devastating to the population, the Albanian economy and the country's development even as a result of the lack of disaster insurance (WB, 2014). Most disaster events have been related to flooding. However, recent events have posed new challenges to Albanian society and government, as well as have increased the need for new action in the field of disaster risk management.

On 26th November 2019 at 03:54, a devastating earthquake, with a magnitude of 6.3 on the Richter scale at a depth of 38 km, hit Albania. As a result of the disaster, a total of 202,291 people were affected in the country, 47,263 directly, and 155,029 indirectly. The earthquake caused 51 fatalities and injured at least 913 people. Moreover, up to 17,000 people were displaced due to the loss of their homes. Overall, first responders rescued 48 people from collapsed houses. The earthquake has been described by the national

authorities as the strongest to hit Albania in 30 years. It caused extensive damage in 11 municipalities, including the two most populous, urbanized and developed municipalities (Tirana and Durres) (The Albanian Institute of Geophysics, Water and Energy, 2020).

In Albania, disaster risk reduction and disaster management need to be treated as a matter of priority, particularly in the light of the severe earthquake of 2019. This earthquake testified the lack of safety culture in society in general and in particular that there was a need; for professionals, experts, competent to operate in prevention, reaction and recovery phases of the catastrophic events and solve interdisciplinary problems in the field of DRM.

5.2. Disasters and education sector in Albania

Education sector have continuously suffered the effects of disasters in Albania. School interruption, destruction of school facilities, damage to students and teachers, as well as declining rates of school enrollment have been observed following past disaster events in Albania. Some data about the consequences of the last earthquake to education sector report damages to 321 educational institutions in the 11 affected municipalities, representing 24% of all educational establishments. The municipalities of Tirana and Durres have the highest share of damage, with 55% and 21%, respectively. In addition, losses are estimated at 8.76 million EUR (1.08 billion ALL).

The response of education sector to such challenges have been scarce. Until 2018, there were no university programs (neither master's nor bachelor's degree) focused on disaster risk management in Albania. Programs related to the field of Environmental Engineering and Earthquake Engineering can be mentioned to emphasize their content and their partial relevance to the field of disaster risk management.

Meanwhile in 2016, the University of Tirana, in cooperation with a number of other Universities, applied and were approved a project under the European Community funded Erasmus + program in the field of DRM. The project, entitled Knowledge for a resilient Society (K-Force), contributed to building a sustainable educational foundation in the field of Disaster Risk Management and Fire Safety Engineering in the Western Balkans. In 2018 five new programs of studies in the field of DRM were implemented at Partner Universities in the Balkan countries partnering with the project (Serbia, Bosnia and Herzegovina and Albania).

Albania was one of the countries that developed two programs of studies in the field of DRM. Their relevance and importance was especially recognized after the disaster events of Autumn 2019. However, the need for these kind of programs was identified since the development phase of curricula of both programs. For the purposes of market research, during the period March-April 2017 several interviews were conducted with experts of the area, professionals working in DRM, and representatives of government institutions in charge of civil protection. The outcome of this process has been a thorough understanding of the problems Albania faces in the institutional and legal framework of civil emergencies and education needs in the DRM field. The opinions gathered from the interviews were divided into two groups. The first were those who embraced the idea of creating a master's program in the field of DRM. This group mainly consisted of those working in research institutions or involved in academic research in this field. On the other hand, there was more skepticism by representatives of government institutions who consider the consolidation of the legal and institutional framework in the field of DRM as a priority. They emphasized that the creation and consolidation of the institutional framework and legislation is a prerequisite for the future employment of students enrolled in such programs. This market study showed that while professionals express a need for a more diversified workforce (in terms of education), they doubted the ability of the labour market to absorb graduates of “modern,” and “innovative” programs of study. This is partially one of the reasons why mostly classic education programs are offered in Albania.

In addition to the market survey, a *Youth Safety Culture survey* was conducted by the K-FORCE Project Consortium with the aim to gain an understanding how safe and prepared for natural and manmade disasters the young generations of Western Balkan countries feel. The primary target group of the survey was set as High School and University students from Albania, Bosnia and Herzegovina and Serbia. The survey was drafted by the European Youth Parliament Serbia (EYP Serbia) and contained three sections: previous experience in the field of DRM&FSE; safety culture and personal stances and future education aspirations. The survey was completed by 1364 participants. Most of the surveyed participants were from Albania - 486, followed by Bosnia and Herzegovina - 469 and Serbia - 396 participants. This survey has discovered the willingness among most of the respondents to engage in courses related to DRM and FSE while a significant number, around one fifth expressed interest in doing a master's degree in the field. Such results indicate a potential to create and leverage the human capital and improve the safety culture in the future years in order to provide an adequate answer to the challenges that the region would face in this area.

The Market research and the *Youth Safety Culture survey* gathered information which was used to better develop and implement curricula in the field of DRM&FSE at partner Universities in Albania, Bosnia and Herzegovina and Serbia and to create adaptive capacities through the education system in these countries.

6. RESEARCH IN THE FIELD OF DISASTER RISK MANAGEMENT

6.1. Definition of scientific research and its nature

Scientific research is a very systematic, but at the same time, creative process. Often the word "research" is overused and misused in the world around us, whether in academic conversations or not, in politicians' speeches, in advertisements and in promotional campaigns, in various television programs, or elsewhere in the media. Therefore it is important to define what research means. There are three keywords that link the definition of research. They are: facts, purpose, and systematic. The research process is fact-based. The facts are fragments of the reality that surrounds us. For this reason, an essential part of scientific research involves data collection. The research should necessarily be done for a specific purpose. The purpose of the research should be clearly stated by the researcher. Often, researchers can use different tools to define the research purpose, such as designing research hypotheses, formulating a research question, defining research variables, and so on. These are the bases for expressing what the researcher has in mind and then breaking down into the various elements of research. It is important to note that the research process is performed with a specific purpose, to discover something new. The researcher's intent is expressed through keywords that determine the expected outcomes of the research, either description, explanation, meaning, critique, comparison, analysis, etc.

Last but not least, the systematic element is of critical importance to the definition of research. Systematic is every element of scientific research, every part of the research process, every method of data collection and analysis, and every form of research reporting. Data are collected systematically. The data are interpreted systematically. Research is a planned, non-random, process that strictly follows the methodology chosen by the researcher.

Combining the three aspects described above, research is defined as systematic process for a specific purpose, involving different processes and activities, rather than a simple application of isolated and unrelated concepts and ideas. It involves a systematic process of collecting, recording, and analyzing data to help make decisions. The purpose of scientific research is to draw facts and reach new conclusions. It is a process of intellectual discovery, during which knowledge is developed, expanded or transformed, and then communicated. In fact, the publication of research is as important a stage in the research process as the research itself (Saunders et al, 2009).

6.2. Philosophy, approaches and choices of scientific research

It is very important to understand the term philosophy and its application in the field of scientific research. Philosophy is the study of the essential and general questions about existence, knowledge, values, reason, mind and language. These questions are often posed as problems that require solutions. This definition works best when it comes to scientific research. Ultimately the reason for doing research is to improve, revise, expand the knowledge base, to have a fuller picture of the reality and the truth. Therefore, research is a dynamic process, researchers are always on the move to discover the reasons and truths of the world around us.

When talking about search philosophies we usually have to ask 3 questions (Saunders et al, 2009):

What is the source of our knowledge?

How do we determine what is truth?

How do we justify our faith?

The answers to these questions determine the philosophical path that the researcher will follow. Practically, before starting a research process and making research choices, the researcher must ask himself what he calls the fact (the origin of knowledge), how he will proceed in discovering new facts (the research process), and why he thinks so (the role of his/her values). Virtually every research process is initiated (originated) by the researcher, who uses its knowledge and beliefs, and filter them through the process of reasoning, perception and observation to produce new results. Let us first discuss what our knowledge are, and where they come from.

Practically the sources of knowledge can be divided into two major groups: inductive knowledge and stated knowledge (Ryan et al, 2002). Inductive knowledge is about what we believe in ourselves. The stated knowledge is about what others tell us and we believe it. These knowledge is shaped by the individual's perception of the outside world, by the process of introspection (the analysis of the events he / she sees / perceives), by the process of judgment that relates to how individuals value what happens to them, and by memories.

On the basis of these beliefs and in defense of the way research is conducted, the philosophies of research can be divided into two main categories: positivism and interpretivism (Saunders et al, 2009). The differences between the two philosophical approaches affect all of the issues associated with the research process. Positivists choose to do research that is "value free". This means that the researcher disconnects himself / herself from the research process in order to carry out a process as objective as possible “unaffected” by his / her own thoughts and beliefs. The basis for this decision is the fact that he views the world as unchanging and values statistical analysis and structured methodologies of data collection and analysis. In this w ay he is focused on finding, recording and structuring facts, and quantitative analysis of the high amount of data collected. Interpretivists, on the other hand, assume a constantly changing reality, shaped by the interaction of social actors. They assume that to discover the truth, just observation and recording of facts is not enough. Research means the discovery of the reasons behind what we see. They value contact with research subjects as indispensable for discovering the truth. Their research methodology is generally less structured and less formal, and research is guided by the researcher's feelings and beliefs. Thus, the epicenter of the research in the case of the positivists are the facts, while in the case of the interpretivists are the individuals.

This discussion and these differences may look insignificant. One could argue that the divine purpose of research is to discover the truth and it does not matter what means are used to achieve it. If one were to initiate this discussion then most likely it would belong to the pragmatist philosophical approach. Pragmatists argue that the best determinant of the philosophy of research is the research question itself, and that it is unrealistic to choose one attitude instead of another as long as the research has different objectives. It is totally possible for them to exchange different aspects of research philosophies within a study as long as it serves to reach the intended conclusions (Saunders et al, 2009).

Theory plays a very important role in our discussion of research philosophies. There are two ways the theory relates to the research process. Theory can guide the research process, and in this case we would do more deductive research. This kind of research has its origin in the existing theory, which leads the process of data collection, which usually undergoes a statistical testing process to produce new results and knowledge. On the other hand, if the data collected by the researcher is subjected to a process of interpretation and perception to develop, create, shape, complement the theory, then we are dealing with inductive research. This distinction is important because it once again testifies to how the researcher wants to do research and supports the research choices that the researcher will make (Saunders et al, 2009; Glinner et al, 2009).

The discussion about research choices is a discussion about the type of data the researcher will collect and the type of analysis he will use to produce new knowledge. Basically it refers to the use of qualitative or quantitative data. In this regards, the researcher can chose to use mono-methods, which imply that he will collect and use only qualitative data and qualitative analysis, or only quantitative data and quantitative analysis. Or, he can involve in multi method and mixed methods research, which imply the use or both quantitative and qualitative data and analysis, either separately or combined in the same research. The advocates of mixed methods choice are the researchers embracing the pragmatist philosophy (Saunders et al, 2009).

6.3. Types of search

Regardless of the research question the researcher will ask, his research will be qualified by reference to one or more of the following types of research (Glinner et al, 2009). Descriptive research is defined as the type of research which systematically performs a profile description of a person, event, situation, problem, phenomenon, service or program. Descriptive research usually has to justify itself, as long as such research can be considered very basic. Therefore, the researcher should provide a wide range of information, consult many references and explain the importance and requirement for a research of this nature. However, even if a thoroughly descriptive research is not undertaken, descriptive research is usually part of exploratory and explanatory work.

Classification / correlational studies reveal the existence of a relationship / dependence between two or more aspects of a phenomenon, or as we will mainly refer to later, research variables. Such studies usually lay out so-called research hypotheses that are subject to econometric analyzes and models to discover whether or not the relationship between variables is present.

Explanatory research reveals whether there is a causal relationship between research variables. It is important to note that this type of research differs from correlational research, although often the researchers may mistakenly express the discovery of causal relationships while analyzing the parameters of an econometric model. The causal relationship between the variables is revealed only by virtue of performing so-called experiments, which are specific in different fields of research.

Exploratory research explores an area where there is little knowledge or explores the possibilities of conducting a particular study. Usually the basis of exploratory research is to discover what is happening, to create new knowledge, or to evaluate a phenomenon in a new light. Since exploratory research seeks to shed light on a previously unexplored phenomenon, often research techniques involve work and analysis with qualitative data, such as expert interviews and focus group interviews. Search in the literature also helps researchers to identify gaps in the literature, which are the origin of exploratory research.

It is, of course, possible that research is included into two groups at the same time, implying that the types of research are not exclusive. Thus a researcher can conduct a descriptive and explanatory search, which is simultaneously intended to describe a phenomenon and to discover the causal links between the variables included in the research.

6.4. Research design and strategies

Research strategies that can be used in a research process are: experiment; survey; case study; grounded theory; ethnography; archival research (Glinner et al, 2009; Saunders et al, 2009).

The experiment is a classical form of research that owes much to the natural sciences, although it features strongly in much social science research, particularly psychology. The purpose of an experiment is to study causal links; whether a change in one independent variable produces a change in another dependent variable. The simplest experiments are concerned with whether there is a link between two variables. More complex experiments also consider the size of the change and the relative importance of two or more independent variables. Experiments therefore tend to be used in exploratory and explanatory research to answer 'how' and 'why' questions.

The survey strategy is usually associated with the deductive approach. It tends to be used for exploratory and descriptive research. Surveys allow the collection of a large amount of data from a sizeable population in a highly economical way. Often obtained by using a questionnaire administered to a sample, these data are standardised, allowing easy comparison. In addition, the survey strategy is perceived as authoritative by people in general and is both comparatively easy to explain and to understand.

Case study strategy is defined as a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence. The case study strategy is most often used in explanatory and exploratory research. The data collection techniques employed may be various and are likely to be used in combination. They may include, for example, interviews, observation, documentary analysis and questionnaires.

Grounded theory is often thought of as the best example of the inductive approach, although this conclusion would be too simplistic. It can be considered as 'theory building' through a combination of induction and deduction. A grounded theory strategy is particularly helpful for research to predict and explain behaviour, the emphasis being upon developing and building theory.

Ethnography is rooted firmly in the inductive approach. It emanates from the field of anthropology. The purpose is to describe and explain the social world the research subjects inhabit in the way in which they would describe and explain it. This is obviously a research strategy that is very time consuming and takes place over an extended time period as the researcher needs to immerse herself or himself in the social world being researched as completely as possible. The research process needs to be flexible and responsive to change since the researcher will constantly be developing new patterns of thought about what is being observed.

6.5. Research challenges in DRM field

Discussing research process within disaster risk management field is an important topic as it helps students and researchers to think about the choices, decisions, and action they need to foresee and undertake if they intend to engage in research in the field of DRM

Two of the few publications reviewing research methodology in disaster research has been Methods of Disaster Research edited by Robert Stallings (2002) and Methodologies of contemporary disaster resilience research article by Emly Witt and Irene Lill (2018). Within these studies it is noted that very little has been written specifically on the subject of research methods in the field of disasters.

These studies identified several characteristics of research in the field of DRM. Different categorization of research have been used to identify the main features of research in DRM field. This way key words defining research approaches, choices, strategies, and techniques have been used, such as: Quantitative; Qualitative; Mixed Methods; Literature; Interviews; Questionnaires; Case study; Geographic Information Systems; Numerical modelling; Grounded Theory; Participatory Action Research.

Several characteristics were identified. It was found that qualitative approaches dominate over quantitative approaches with relatively few mixed methods studies in evidence. However, research

materials shows a preference for positivist as opposed to interpretivist philosophy, which favours quantitative research. Data collection is primarily from literature (academic, policy and technical documentation) and from interviews. Questionnaires and field observations are also commonly utilised. Case study research is particularly common and the derivation of theoretical and conceptual frameworks is somewhat more prevalent than the development of practical toolkits and guidelines. The volume of data was found to be insufficient to allow trends to be analysed either in terms of changes in research methodology use over time or by specific authors and research groups. Few of the research articles made use of recently emerging possibilities for research such as open data, satellite imagery and social network analysis suggesting opportunities for innovation and improvement in applying the latest technologies and developments to DRM research. Although an investigation of the research methodologies used in DRM research is of some interest for the DRM research community, it seems that a more comprehensive study of this nature would be of questionable utility.

Following the findings from the two studies, and overall experience in research and DRM field of the author, these aspects of choices and decisions in relation to involvement in DRM research must be taken into account:

- Research Choice
    - Qualitative vs Quantitative
    - Multi and Mixed Methods
- Research Strategy
    - Survey
    - Case study research
- Data collection
    - Questionnaires
    - Interviews
    - Secondary data
    - Observation
- Topics:
    - Multidisciplinary
    - Technical impact
    - Economic impact
    - Behavior
    - Local/Regional/International
- Research Objectives
    - Research around objects
    - Research around people
    - Comparative research
- Research Output
    - Recommendations
    - Public policies
    - Risk communication
- Research tools
    - Comparative research
    - Cost Benefit analysis
    - Technical analysis
    - Financial analysis
    - Decision making

7. SUMMARY

This lecture focused on the impacs of disaters in education system and the ability of the ater to create adaptive capacities for DRM and Cimate change adaptation. If also offered a region perspective of the above mentioned issues. Theoretical aspects and practical examples were offered and explained.

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REVIEW QUESTIONS

1. What ate the supply side conseuences of disasters to the education system?
2. What education programs do you know that target DRM in their curricula?
3. What are the caracteristics of reseach in the field of DRM?
4. What kind of research have you engaged on in the field of DRM?
5. Please define the strategies you intend to use in your research ang give arguemnts for your choice.