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# MAINSTREAMING DISASTER RISK MANAGEMENT IN HIGHER EDUCATION

INCORPORACIÓN DE LA GESTIÓN DEL RIESGO DE DESASTRES A LA EDUCACIÓN SUPERIOR

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## ABSTRACT

Universities should actively participate in disseminating and fostering a culture for disaster risk management (DRM) among students and the community. Particularly in countries with high levels of risk, education plays a key role in raising awareness on the importance of preventing and implementing conscious risk management. Though the incorporation of DRM into the curricula, education programs become a mechanism to prepare students from a perspective of strengthening of values, citizenship, and social sensibility towards how disaster represents a disruption of the functioning of a community and impairs business activity. This paper presents the proposal for the integration of DRM of a private university in Mexico, one of the countries particularly susceptible to extreme hydrometeorological and geological events. The proposal includes a concentration area for undergraduate business students, a mandatory introductory course for all business majors, and for the business community an executive education program for SMEs.

## KEYWORDS

Disaster risk management; higher education; Mexico.

## RESUMEN

Las universidades deben participar de manera activa en la diseminación y promoción de una cultura hacia la gestión del riesgo de desastres (GRD) entre los estudiantes y la comunidad. Particularmente en países con altos niveles de riesgo, la educación desempeña un papel importante en la creación de conciencia sobre la importancia de prevenir e implementar una gestión consciente de los desastres. A través de la incorporación de la GRD en los currículos, los programas educativos pueden convertirse en un mecanismo para preparar a los estudiantes desde una perspectiva de fortalecimiento de valores, ciudadanía y sensibilidad social acerca de cómo los desastres representan una disrupción al funcionamiento de las comunidades y un perjuicio a la actividad de las empresas. Este artículo presenta una propuesta para la integración de la GRD en una universidad privada en México, uno de los países particularmente susceptibles a eventos hidrometeorológicos y geológicos extremos. La propuesta incluye un área de concentración para alumnos de pregrado en negocios, un curso obligatorio para todos los programas de negocios y, para la comunidad empresarial, un programa ejecutivo para PYME.

## PALABRAS CLAVE

Gestión del riesgo de desastres; educación superior; México.

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## INTRODUCTION

The catastrophic events in Japan and Thailand in 2011, and in the United States in 2012 highlighted the challenges and uncertainty raised for businesses derived from their negative impacts (UNISDR, 2013a). These emergency situations are understood as exceptional events of nonmilitary nature that threaten the lives and health of the population, environment, materials and cultural values, and which call for urgent action (UNISDR, 2013b). These exceptional events, such as natural disasters or collective public health threats, significantly threaten the normal course of business operations (Smith, 2009; WHO, 2007). This disruption not only needs to be at a local scale; globalized businesses can also be affected if their markets, suppliers, or partners in other parts of the world are hit by exceptional events (United Nations, 2013).

In such situations, vulnerability to a threatening event is not limited to the potential physical damage, but also acquires a social character (Cardona, 2004). Vulnerability makes reference to the capacity to respond and recover from the impact of an exceptional situation (Cardona, 2004; IFRC, n.d.), representing the susceptibility to damage in case a destabilizing phenomenon occurs (Cardona, 2003). Small and medium-sized enterprises (SMEs) are often the most vulnerable in disasters (Liu, Xu and Han, 2013; United Nations, 2013), when all or most of their capital could disappear (United Nations, 2013a).

A situation of hazard such as the exceptional situations above mentioned, can lead to risk, understood as the potential for the materialization of unwanted, negative consequences of an event (Conrow, 2003). Since risk can only exist in the future and represents a probability, the inability to manage risks can jeopardize not only lives, but the country or region's economic growth, leading to substantial economic costs and large-scale loss of property, infrastructure and belongings (World Bank, 2014).

Risks may be created over years before a disaster manifests (UNISDR, 2015a). According to the Global Assessment Report (GAR), a disaster is a disruption of the functioning of a community or society involving the loss of life, disease, and negative effects on economic or environmental conditions (United Nations, 2013). The "combination of the probability of an event and its negative consequences" is known as a disaster risk (UNISDR, 2015a, Disaster Risk section, para. 1), which makes evident two main facts: that a geographical area where a community is settled is exposed to a hazard; and that the infrastructure, assets, and other processes and services are vulnerable (UNISDR, 2015a).

According to the World Disasters Report (2015), for the period of 2005 - 2014 there were a total of 3,809 natural disasters around the world, mainly floods, with a toll of 764,204 deaths primarily from earthquakes. The far-reaching ramifications of disaster risk for businesses in this complex and unpredictable reality in which disaster risk is becoming, if slowly, part of the business landscape (UNISDR, 2013b), call for a shift from unplanned responses to a more proactive, systematic and integrated way of managing risk (World Bank, 2014). Disaster risk management (DRM) is "a

systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies, and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster” (United Nations, 2009, p. 10).

The above may be even more imperative for a country like Mexico, where micro, small and medium-sized enterprises (MSMEs) represent the backbone of the economy, accounting for 98.5% of all business units in the country (INEGI, 2014). Over 45% of these businesses are in the service sector, 35% in commercialization, and 17% in manufacturing, generating approximately 73% of formal employment (Banco de México, 2015; INEGI, 2014).

Due to its geographical location, Mexico is particularly susceptible to extreme hydrometeorological and geological events (CENAPRED, 2014). For 2014, hydrometeorological events alone accounted for 84.9% of total losses and damages in the country; and for this same year the impact of natural disasters surpassed that of the previous 15 years, which was 2,147 million USD for 2000-2014 (CENAPRED, 2015). In this context, business disaster preparedness acquires greater relevance considering that approximately 65% of MSMEs in Mexico are family businesses (ProMéxico, 2014).

It must be kept in mind that the adverse impacts of an event caused by climate change or climate extremes depend not only on these events themselves, but on the conditions of exposure and vulnerability (IPCC, 2012; UNISDR, 2015a). According to the INFORM Risk Index, Mexico is ranked with a medium risk level, but is ranked high for the hazards (events that can occur) and medium for the lack of coping capacity (lack of resources to alleviate the impact) dimensions (INFORM, 2016). And while it must be acknowledged that the Mexican government has created institutions for the prevention of disaster risk, such as the National Center for Disaster Prevention (CENAPRED) and the Operative Center for Attention of Contingencies (COPAC), as well as the implementation of initiatives such as the National Risk Atlas and the Early Warning System for Tropical Cyclones (SIAT-CT), there exists a lack of a culture of prevention for disasters or for disaster risk management in the country (Indesol, 2015).

Therefore, it is a matter of urgency that the capacities of MSMEs are developed to manage disaster risk. Higher education institutions can play a key role in the task of embedding in business-owners an awareness on how to prevent, cope and recover from disasters, and their role within their communities to identify potential hazards and to engage in emergency management.

## NEW ROLES OF THE UNIVERSITY

The engagement of universities in their local communities has transitioned from providers of basic research and teaching to active participants in the process of creation, diffusion and transfer of knowledge (Boyles, 2012). This is particularly the situation for a large and growing number of universities that have acquired a unique role in public strategies concerned with promoting economic and social development.

This scenario poses challenges for universities as they must engage in activities outside of the traditional realm of teaching and research.

This structural change in the university's traditional mission of teaching and research expands to a third task to embrace the third mission, in which the university produces knowledge with social and economic perspectives in mind (Laredo, 2007). In this context, the concept of university social responsibility (USR) evolves from the concept of corporate social responsibility, incorporating new issues about the university's relationship with society, such as the revision of the curricula in light of socioeconomic and environmental challenges that we face today (Vallaey, 2014).

The objective of USR is to build a better society through transforming and strengthening community potential, through strengthening civic commitment and promote local and global sustainable development (Abdel-Hameid and Badri, 2016; Vasilescu *et al.*, 2010). One of the threats for sustainable development (SD) are the risk and vulnerability issues related to disasters. The link between (SD) and disasters are in terms of loss of human lives and loss of environmental services, but also both in terms of direct and indirect economic losses (GDRC, 2003). Vulnerability to disasters appears as a function of human action or inaction, as well as behavior (GDRC, 2003).

Disaster education is a key element in formulating appropriate disaster reduction risk strategies, in order to enable societies to become engaged in the adoption of suitable and conscious risk management and reduction of vulnerability (GDRC, 2003; Shaw, Mallick, and Takeuchi, 2011). In this sense, and as Clarke (2003) expressed, universities are critical actors for effective mobilization of the imagination, creativity, skills and talents of people, by using the knowledge and understanding on how to build economic strength and social harmony.

To effectively integrate sustainable development (SD) into teaching and learning practices at universities, Shaw *et al.* (2011) suggest a full integration of SD into the curriculum; student-centered activities and assessments; trans-disciplinary teaching; and teaching that emphasizes SD as an ongoing process. Thus, education programs become a mechanism to prepare students from a perspective of strengthening of values, citizenship, and social sensibility (Gaete, 2011).

## DRM IN THE AGENDA OF MEXICAN UNIVERSITIES

In Mexico, particularly after the devastating earthquakes of 1985, the Federal Government created the National Commission for Reconstruction and the National System of Civil Protection; the latter emerging as an "organized group of structures, functional relations, methods, and procedures involving all levels of government and engaging the private sector and non-governmental and civil society organizations" (World Bank, 2012). Since then, efforts have been made to strengthen the linkages between disaster prevention and the education sector in Mexico, however most focusing at the elementary school level (Dettmer, 2002).

In higher education, different Mexican institutions include disaster management as part of their program offerings, either as undergraduate degrees or as certificate

courses focusing on different aspects of disaster risk management and prevention. As of date, the following are available as shown in Table 1 below:

**Table 1.** Disaster Management Academic Offerings in Mexican higher education institutions

Higher education institution	Level	Focus	Website
Colegio Latinoamericano de Educación Avanzada	Undergraduate degree	Resilience + vulnerability + DRM	<a href="http://www.cleaedu.com/pdf/carreras/papc.pdf">http://www.cleaedu.com/pdf/carreras/papc.pdf</a>
Escuela de Administración Pública	Specialization	Vulnerability + DRM	<a href="http://www.eap.df.gob.mx/gird2014">www.eap.df.gob.mx/gird2014</a>
Instituto Nacional de Salud Publica	Certificate course, graduate level	Vulnerability + DRM	<a href="http://www.inspvirtual.mx">http://www.inspvirtual.mx</a>
Instituto Mora	Certificate course, graduate level	DRM	<a href="http://goo.gl/efJg8E">http://goo.gl/efJg8E</a>
Universidad Nacional Autónoma de México	Certificate course, graduate level	DRM	<a href="http://www.pctierra.unam.mx">http://www.pctierra.unam.mx</a>
Universidad de Colima	Undergraduate degree	Resilience + vulnerability + DRM	<a href="http://www.ucof.mx/docencia/facultades/fciencias/ambienteyriesgo">www.ucof.mx/docencia/facultades/fciencias/ambienteyriesgo</a>
Universidad de Guadalajara	Undergraduate degree	DRM	<a href="http://goo.gl/Bq9yBs">http://goo.gl/Bq9yBs</a>
Universidad Hernán Cortés	Certificate course, graduate level		<a href="http://uhc.edu.mx">http://uhc.edu.mx</a>

Source: UNISDR, 2015b.

Universities also take part in disaster risk prevention and management initiatives. In 1997, the states of Oaxaca and Guerrero were affected by hurricane Pauline, in which over 1,278 communities were devastated and damages were estimated at almost 300 million Mexican Pesos (Foro Ambiental, 2016). The Universidad de Loyola called upon the people of Guerrero to aid after this disaster, a call to which a large part of the population responded (UNIREN, 2016). From this initiative, in 1999 the Mexican Philantropy Center (CEMEFI, for its acronym in Spanish) gathered different Mexican universities to create an organization for disaster relief assistance, known as UNIREN - University Network for Disaster Prevention and Attention (UNIREN, 2016).

UNIRED currently is integrated by 15 universities throughout the country, which promote volunteering and educate students in disaster prevention and management. Particularly for students directly involved in UNIRED, workshops are held on different aspects of disaster risk management and relief. Also, UNIRED organizes together with other organizations seminars and training sessions open to academics, public officials, the private sector, and society in general (UNIRED, 2016).

### A PROPOSAL FOR INCORPORATING DRM IN HIGHER EDUCATION IN MEXICO

Tecnológico de Monterrey is an independent, privately supported, non-profit institution of higher education in Mexico, founded in 1943 by a group of visionary Mexican businessmen. It has grown into a multi-campus university, with presence in most states in the country. Taking advantage of its national presence, Tecnológico de Monterrey has been part of UNIRED for the last 19 years, with 19 of its campus participating in this network.

At Campus Monterrey, in particular, the School of Business, Social Sciences and Humanities (ENCSH) has established its mission to: *“educate business leaders to have an entrepreneurial spirit, a humanistic outlook and who are internationally competitive, distinguished by their global vision, innovation and adaptability.”* (ENCSH, 2011). Alongside its mission and adopting even more active USR initiatives, the School of Business aims at incorporating DRM as part of its education and training programs.

The School’s intention is to mainstream these DRM content themes into the following:

- a. The design of an elective introductory course for students of all programs to engage new students to this knowledge area;
- b. the design of a concentration area of study available for students of different undergraduate business programs in Accounting, Finance; Business administration, Economics; International business; and Marketing;
- c. a multidisciplinary case contest for students of business programs and students of other universities participating in Stream 4; and
- d. the design of an executive learning program for local SME’s.

These proposed initiatives are explained below.

#### Introductory elective course to DRM

The objective would be focused on the student being able to develop a conceptual understanding about risk, vulnerability and disaster management. Content would include:

- Key concepts for disaster risk management and vulnerability
- Political, social and economic perspectives of risk and vulnerability
- Disaster management and resilience

- Disaster response
- Post-disaster recovery

### **Concentration area for undergraduate business students**

The objective is to offer a minor in disaster risk management specialization, providing the student the multidisciplinary knowledge and skills required to approach and address the management of disasters in complex environments.

Suggested course requirements are:

- Course 1: Introduction to Disaster Risk Management
- Course 2: Disaster Management and Resilience
- Course 3: Disaster Risk Reduction and Development Planning
- Course 4: Disaster Response and Post-Disaster Recovery
- Course 5: Project on Disaster Risk Management I
- Course 6: Project on Disaster Risk Management II

### **DRM case competition**

The objective of the contest would be to provide a tool for undergraduate business students from different countries to present alternatives of solutions related to disaster risks management; rewarding to those who present better alternative of solutions, under the following criteria:

Call for participation: Students from third year enrolled in business management undergraduate programs will be invited to register teams comprised of students and one faculty member (it could be one or more teams from the same higher education institution, as long as all members of the team fulfill all participation requirements).

Process: The case presentation process will consist of the following:

- An initial virtual component (phase one) and one final face-to-face component (phase two) held at Campus Monterrey.
- First phase: On Tuesday, October 25<sup>th</sup> of 2016 a call for cases will be published, and teams should send the electronic format of solution proposal, according to the delivery format, by Friday December 2<sup>th</sup> of 2016. The list of teams to reach the final phase will be published on the contest webpage on Monday, December 5<sup>th</sup> of 2016.
- Second phase: On January 6<sup>th</sup>, 2017, details on the final event to be held in Monterrey, Nuevo Leon, will be published. Finalist teams must attend the final event at Campus Monterrey, to be held February 10<sup>th</sup> and 11<sup>th</sup>, 2017.

Evaluation: A jury will be integrated by professors from ENCSH and business representatives in the area of risk management. The jury will study the solution proposals of the cases and will select those which they consider stand out in quality according to the admissibility criteria guidelines and evaluation criteria established on the call for cases.



It is worth noting that as of date there are no case competitions in Mexico that address natural risk management, therefore, our interest in launching this initiative is to generate knowledge, and at the same time, create consciousness among participants on how to formulate viable alternatives as solutions in case of a disaster. Indeed, some events that address DRM are organized by the National Center for Disaster Prevention (CENAPRED), which works hand in hand with the Universidad Autónoma de México (UNAM) (CENAPRED, n.d.).

In addition, other initiatives have taken place around DRM by different organizations. In October 2015, Tecnológico de Monterrey, Campus Querétaro, in collaboration with CENAPRED and the Jewish community in Mexico launched a contest for the creation of a videogame to explain how to proceed in case a natural disaster occurred (CONACYT, 2015). In 2014, in the competition Startup Bus, the team Bridgefy, integrated by five Mexicans, won second place by developing an application that helps people in case of connectivity problems when a natural disaster strikes (FORBES, 2016). Also, the Mexican Association of Insurance Institutions (AMIS) holds a contest among undergraduate students to design messages focused on the acknowledgement of the relevance of risk prevention (AMIS, n.d.).

### Executive education program for SMEs

The objective of the executive program on DRM would be for participants to understand and evaluate principles and practices of disaster risk management and reduction, and to understand disaster resilience, risk mitigations and recovery policies.

Content of the program are suggested as follows:

- Module 1: Foundations and Key Concepts for Disaster Risk Management
- Module 2: Disaster Management and Resilience
- Module 3: Infrastructure Asset Management
- Module 4: Governance of Sustainability
- Module 5: Management Law (natural resources, human rights, international law...)
- Module 6: Disaster Response and Post Disaster Recovery
- Module 7: Project on Disaster Risk Management

### CONCLUSION

Due to the country's high susceptibility to natural hazards, and particularly to hydrometeorological and geological events, a crucial step for Mexican higher education institutions is to take more preactive and proactive participation in generating a culture for disaster risk prevention and management. Raising public awareness for disaster prevention is even more important in countries such as Mexico, where SMEs represent an important part of the economy. Universities in particular have the opportunity to reach out to businesses and contribute with training services, alongside their mission of educating students and generating research for expanding DRM knowledge transfer to the communities they are embedded in.

Universities need to share experiences with other higher education institutions on the implementation of DRM curricula to enrich the knowledge base and identify better ways to design programs. Universities are one of the parties responsible for educating and developing future entrepreneurs of the country, therefore, the importance of introducing this subject in the curriculum is essential as it is to create and develop awareness of the future workers.

Something interesting, and at the same time can become a limiting factor, is to observe and measure how these types of initiatives in the university are accepted by the students or participants. And, whether in reality, they created an awareness in such a way that in a near future they will be able to implement more initiatives and to have a preactive and proactive participation around DRM. Future research should focus on how to measure the impacts of DRM programs.

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Mainstreaming disaster risk management in higher education

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