From Research to Praxis: The Relevance of Disaster Research for Emergency Management[1]

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The field of emergency management is "the discipline and profession of applying science, technology, planning, and management to deal with extreme events that can injure or kill large numbers of people, do extensive damage to property, and disrupt community life. When such events do occur and cause extensive harm, they are called disasters" (Hoetmer, 1991). This definition eloquently defines emergency management clearly explains what a disaster is, and exemplifies how academia and research provides conceptual and practical tools for emergency managers. Researchers tell us who we are; what we do; how and why we do the things we do; as well as provide guidance and advise as to where we should be going.

Emergency management, similar to the disciplines of fire fighting, medicine, political science, sociology, mental health, and others, relies on researchers to observe, evaluate, and provide referents and reports offering recommendations; reflect on how and what we have done; and to help us define, recognize, and understand the multitude of issues we face in the field of emergency management. This chapter describes the value of such research and provides examples of past and current topics that have significantly contributed to our understanding of emergency management. The chapter attempts to provide *some* answers regarding the relevance and benefit of disaster research to emergency management and planning and how we should conduct operations in events such as the hurricanes that impacted the United States in 2004 and 2005, the 2004 Indian Ocean tsunami, the massive power outage of 2003, and the terrorist attacks on the World Trade Center on September 11, 2001. Is research actually helping us in this process? Do we as emergency managers heed the findings and conclusions of such arduous work? How does this research impact emergency managers and other decision makers

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[1] *Editors' Note:* This chapter was written by Commissioner Rotanz, an emergency manager with extensive experience in the field. In his years as an emergency manager, Rotanz has used and values the cumulative body of knowledge generated by disaster researchers. Rotanz provides a general overview regarding the role and importance of disaster research for practitioners and makes a compelling case calling for increased communication, coordination, and integration of experiences and knowledge generated by practitioners, researchers, and scholars in the field of disaster research.

during crisis situations? How can one take advantage of this precious resource called disaster research?

PRESENT RESOURCES

Emergency managers need clearinghouse centers of definitive research regarding threat and consequence management from natural, technological, and terrorist agents. The study of planning constructs, communication, response operations, media relations, recovery, and mitigation activities are but a few research areas and resources that are currently available in these centers. Gaining access to such centers is a simple process and information can be obtained either by a direct visit, through mailings, by phone, or through the Internet. Internet access in some portals allows interactive access to some databases that allow for robust search capabilities for text versions of abstract or complete documents.

Two of the many large and prestigious centers that I have encountered when venturing out as a student of emergency management are the Disaster Research Center (DRC) at the University of Delaware and the Natural Hazards Research and Applications Information Center (NHRAIC), led by Havidán Rodríguez and Kathleen Tierney, respectively. These centers provide some of the most extensive collections of research and public policy documents relating to emergency management, disasters, and the social sciences. The library at the NHRAIC can be accessed through their online program HazLit, a database index providing access to the Center's full collection of papers. The Disaster Research Center has a similar computer interface allowing and extensive search of their database based on their 42 years of dedicated disaster research.

To complement these two entities, there are also a large number of centers (based in academic, state, federal, and international organizations and institutions) that conduct an array of research projects, studies, and conferences. A link found in the NHRAIC website, for example, provides an up-to-date listing of academic organizations in alphabetical order beginning with the Benfield Hazard Research Center up through to the World Institute for Disaster Risk Management, while other links provide listings of domestic organizations ranging from the American Society on Veterinary Disaster Medicine to the Western States Seismic Policy Council.

Finally, the Federal Emergency Management Agency (FEMA) Emergency Management Institute (EMI) located in Emmitsburg, Maryland serves as the federal government's center for the development of courses and curriculum in emergency management. As stated on its Web site, "Through its courses and programs, EMI serves as the national focal point for the development and delivery of emergency management training to enhance the capabilities of federal, state, local, and tribal government officials, volunteer organizations, and the public and private sectors to minimize the impact of disasters on the American public" (http://www.training.fema.gov/ emiweb/). During the past 10 years, EMI has developed numerous college programs and has provided assistance in the development of theses programs throughout the country. Today, more than 100 colleges and universities provide certificate and degree programs ranging from an associate's degree up through the Ph.D. level in emergency management and related areas. Some recent examples include the George Washington University (located in Washington, DC), with its newly developed doctoral degree program; North Dakota State University, with a doctoral program in emergency management; and Adelphi University (located in Long Island, New York), with a new graduate certificate program.

CURRENT APPLICATION

It would require a separate book to describe what has been accomplished in the field of disaster research, how it is being applied, and what is needed for further analysis. My personal experience as an emergency manager is that collaboration with academic institutions can serve to establish important and productive relationships between researchers and practitioners. The following sections provide a general overview of how past and present research has guided me in defining events; how I have come to conceptualize and perform *planning* functions; how we can recognize and interact with the various forms of *organizational behavior* that will be expected during a response to disasters; *communications;* types of *improvisation*; and the functions of an emergency operation center (EOC).

DEFINITIONS—REFERENTS

It is important for any discipline to have standardized terminology and jargon. For example, the term emergency should imply a specific, but familiar state of condition. Lagadec (1993) defines emergencies as classical incidents that are "well understood; are clearly defined; require a limited amount of "actors" or "emergency response providers"; participating organizations that are familiar with each other; roles and responsibilities are clear-cut; there is a present authoritative structure; the event is manageable; and the condition is brought under control quickly." Hoetmer (1991) defines emergencies as "routine" adverse events that do not have community-wide impact or do not require extraordinary use of resources or procedures to bring conditions back to normal." In other words, events are managed by local emergency response personnel. Hoetmer (1991) elaborates on his definition of disaster stressing the need to incorporate the term "catastrophic" in his definition. A catastrophic disaster is one that affects the entire nation and requires extraordinary resources and skills for recovery. E.L. Quarantelli (1981) expands on the definition of the term disaster by including various dimensions such as predictability, frequency, controllability, the speed of onset, the length of forewarning, and the duration of its impact. These characteristics allow emergency managers to conceptualize more effectively mitigation efforts, planning, preparation, and response to complex events.

These terms have allowed us to catalog events and to establish response patterns for emergency organizations. Most metropolitan areas in the United States have developed matrices based on the intensity of a hazard event matched with the required resources involving numerous agencies and disparate jurisdictions. Cities such as New York and Salt Lake City have established several levels of response (e.g., 1, 2, and 3), with level 3 involving the greatest deployment of resources as well as the active involvement of the media and political leaders and other public officials. In January of 2005, the Department of Homeland Security (DHS) issued the National Response Plan aligning all federal, state, and local agencies into an all-hazards approach for the management of domestic incidents. The plan includes a glossary with the intention of standardizing the way we define and think about our operations, functions, and situations. The term "catastrophic incident" is defined as any natural or manmade incident, including terrorism, that results in extraordinary levels of mass casualties, damage, or disruption, severely affecting the population, infrastructure, environment, economy, national morale, and/or government functions. A catastrophic event could result in sustained national impacts over a prolonged period of time and it exceeds the resources normally available to state, local, tribal, and private-sector authorities in the impacted area. Further, it significantly disrupts government operations and emergency services to such an extent that national security could be threatened.

Although the use of terms such as emergency, disaster, and catastrophe are slowly becoming standardized and understood, one concept that is widely abused is "crisis." Crisis, unlike the previous concepts, illustrates a lack of stability and the uneasiness of a situation and odes not necessarily focus on the degree of response that is required. Fink (1986) provides several stages of a crisis, beginning with the **prodomal** stage, the warning or symptomatic period; the **acute**, or "its' happening now" stage; the **chronic** stage, the point in the time-line that we recognize our successes or our failures; and the **resolution** stage, perceived as the time of restoration. Further, Rosenthal, Boin, and Comfort (2001) discuss various dimension of crisis, including discontinuity, threat, opportunity, change**,** uncertainty**,** disturbing regularity, isolation, the surprise, urgency**,** time pressure**,** and exhaustion. These factors help emergency managers better understand the circumstances that lead to a crisis situation, the dilemmas and coping mechanisms that emerge, and the strategies that allow us to mitigate the existing crisis.

Lagadec (1993) provides emergency managers with a most practical definition of crisis indicating that it is "a situation in which a range of organizations, struggling with critical problems and subjected to strong external pressure and bitter internal tension, find themselves thrust into the limelight, abruptly and for an extended period; they are also brought into conflict with one another... this occurs in the context of a mass media society (i.e. "live") and the event is sure to make headlines on the radio and television and in the written press for a long time." These definitions are but a few of the multitude of terms that emergency managers, governments, and businesses must recognize. It is important to note that each state in the United States had previously developed definitions for the above terms. As a case in point, the term disaster relates not only to the size of the event, but also to the requirements for federal funding and material assistance along with a laundry list of probable causes.

PLANNING PRINCIPLES

One of the most important functions of emergency management is planning. Research has taught us that for effective response and recovery operations, all members of any emergency response organizational network (ERON) need realistic, flexible, and uncomplicated planning documents to provide knowledge, guidance, and reference points during times of disaster. Dynes, Quarantelli, and Kreps (1981) provide several emergency planning principles that I have found very useful as the Deputy Director in the New York City (NYC) Office of Emergency Management (OEM), and presently as Commissioner of Emergency Management in Long Island. Briefly, the eight planning principles demonstrate that planning is a continuous process; it attempts to reduce the unknowns; it should evoke appropriate action; the planning document should be based on what is likely to happen; the process is based on knowledge; it must focus on principles; it should be partly an educational activity; and it must overcome resistance and encourage participation and cooperation. These principles should keep emergency managers focused on the planning document as well as prepare them for a variety of issues and complexities that arise during the process.

I have also discovered, through a number of research documents, that disaster demands are divided into agent- and response-generated demands. Agent-generated demands are those that are specific to the agent and directly affect planning and response strategies regarding which types of *warnings* are appropriate; specific *pre-impact preparations*; what skills and equipment will be needed for *search and rescue;* how to care for the *injured and deceased*; identify anticipated *welfare demands* when differentiating, for example, between those impacted by a disease outbreak relative to the needs of those evacuated and sheltered; *restoration of essential*

community services, such as the restoration of electrical power from utility disruptions or the rebuilding of a bridge destroyed from a flash flood; *protection against continuing threats;* and *community order.* These agent-generated demands can be used as guiding principles in anticipating how each disaster agent will challenge us.

Response-generated demands are more general and basic involving communications, continuing assessment of emergency situations, mobilization and utilization of human and material resources, coordination (the most important of all agent and response-generated demands), and control and authority. This typology of demands has led to successful development of planning documents for response strategies throughout the emergency management field. For example, during my tenure with the NYC OEM we worked on the development of a biological hazard annex. An elaborate "warning" system was put in place in the form of a robust syndromic surveillance system produced through OEM and the NYC Department of Health; pre-impact preparations were established in the form of identified points of dispensing emergency pharmaceuticals; and all other agent and response-generated demands were incorporated into planning efforts. It is noteworthy that one common error planning personnel often commit is an assumption that during the writing of plans, everyone understands each others' jargon or definitions. To plan for the multitudes of missions that are anticipated during disasters, and during incident action planning for emerging conditions, all responding agencies and nongovernment organizations must "be on the same page" and in agreement; thus, communication and coordination are essential.

Previous research has linked the response-generated demands to four basic and important concepts: domain, tasks, activities, and human and material resources. *Domain* refers to which organization has responsibility for which disaster-generated demands. *Tasks* define how the domain of the organization is to be performed while *activities* refer to the actual implementation of these tasks. Finally, *human and material resources* are the workers and tools that are required to perform the "activities" in order to accomplish the "tasks" relating to the organization's domain.

ORGANIZATIONAL BEHAVIOR

What I have found to be an important construct of planning is the awareness of organizational behavior during disasters. A typology, developed by researchers at the Disaster Research Center, has allowed me to conceptually categorize each government and nongovernment organization into one of four possible forms of organizational structures and disaster-related tasks. The first category, Type I or *established,* are organizations that perform routine tasks and maintain their basic organizational structure during disasters. Examples of Type I organizations include fire departments, law enforcement, Emergency Medical Services (EMS), and hospitals; these organizations routinely respond to a variety of emergencies and disasters. Type II or *expanding* organizations engage in routine tasks during a disaster but are required to expand their "everyday" but limited staff and activate volunteers. Examples of Type II organizations may include the Salvation Army, the American Red Cross, Community Emergency Response Teams (CERT), and state militia, such as the National Guard. *Extending* organizations (Type III) are those who do not generally perform routine tasks in response to emergencies or disasters but have been part of established planning and preparedness initiatives; however, they maintain their organizational structure while performing tasks and activities during an emergency or disaster type of environment. Construction companies and government agencies that perform debris removal or assist in recovery efforts given their specialized equipment and related skills

are common examples of Type III organizations. Finally, Type IV, *emergent groups,* are those with no formal disaster-related tasks or structure but they emerge as small groups or en masse and respond to the areas that have been impacted. These groups will fulfill tasks during disasters that municipalities are not able to accomplish or are simply not available to do so, especially when they are overwhelmed or have been destroyed by the hazard agent. Such tasks and activities can take the form of ad hoc search and rescuers or feeding or caring for the victims. These groups can be useful to responding organizations given their manpower and talent, but if not managed and supervised properly, their efforts and desire to "just do something" can impede the response or they could be placed in harms way. During the few weeks following the attacks on the World Trade Center (September 11, 2001), thousands of civilians converged on the site with the intent to help, while thousands more came to seek family members or watch the rescue events unfold. This compelled NYC's OEM to rapidly credential thousands of essential responders, a form of improvisation briefly described in the following sections.

COMMUNICATION

Communication is the most important function during the planning and preparation phases in order to generate effective response and recovery efforts during and following disasters. It is not only which technology we use to communicate but the form or methods used to communicate. How do we communicate preparedness and planning strategies? What critical assets do we transport and to where do we transport them? What is the status of our fuel, power, and water supplies? What is our situation with human service issues, casualties, and fatalities? Communication is essential to provide accurate and reliable answers to these questions. Quarantelli (1988a) provides us with five forms of communication: (1) intraorganizational; (2) interorganizational; (3) information flow from organizations to the general public; (4) information flows from the public to different organizations; and (5) information flows from within different systems of organizations. These forms of communication help emergency managers understand and improve the communication process.

COOPERATIVE EFFORTS AND
SAMPLED RESULTS

One of the most important outcomes in establishing robust relationships with academic institutions is the collaboration and cooperative efforts that emerge before, during, and after a disaster. As mentioned earlier, I have reached out to the Disaster Research Center and to the Emergency Management Institute in Maryland. This outreach has resulted in face-to-face meetings and interactions on an array of topics as well as the sharing of research material and my experiences as a practitioner.

During the attacks on the World Trade Center (2001), DRC researchers responded to a makeshift office on Manhattan's West Side to initiate credentialing and to gather real-time data and information. Tricia Wachtendorf and James Kendra were the first, among others, who gathered vital information during the response phase, resulting in excellent reports not only for social scientists but for emergency managers as well. A report that I found very enlightening, and has helped in our emergency planning, was written by Wachtendorf (2004) and pertains to improvisation. She presents an analysis of three forms of improvisation—*reproductive, adaptive,* and *creative*—identified during the response to the 2001 WTC event. The first form

of improvisation presented, *reproductive*, depicts the re-creation of New York City's EOC at Pier 92, 3 miles north of Ground Zero. The NYC OEM was formerly housed on the 23rd floor of WTC 7, the last building to collapse during that fateful Tuesday, resulting in the loss of the City's EOC.

Adaptive improvisation was exemplified during the mass credentialing of essential personnel at the impact site of the WTC as well as the development of special three-man teams from the New York Fire Department (NYFD) and the New York Police Department (NYPD) to respond to the hundreds of alarms regarding the anthrax attacks that took place between September and December 2001. Finally, *creative improvisation* is reflected in the recovery of human remains and the complexities surrounding the ensuing criminal investigations and debris removal operations.

REACHING OUT: FROM PRAXIS TO RESEARCH

As a practitioner, my interest in the field of disaster research emerged as questions continued to be generated regarding the strategies needed in order to maintain stability and continuity of our society during and after a catastrophic event. My interests focused on how the functionality of emergency operations centers could provide an adequate response in a cooperative environment.

My personal experiences in managing an EOC show that, when properly managed and staffed, it can be a facility that can provide an adequate environment for the coordination of response functions during major complex events, such as disasters; it can also serve to maintain the continuity of critical services.

My involvement with disaster researchers has led me to write and elaborate on articles and reports that affect our field. For example, I recently stepped up to the plate and presented an article which elaborated on Quarantelli's (1979) six functions of the EOCs by modifying and adding new components to his list. I argued that, in order for EOCs to operate properly, they must perform the following functions: (1) coordination; (2) surveillance management; (3) establish levels of activations; (4) information management; (5) planning; (6) operations and missions management; (7) policy making and legal issues; (8) public information; (9) facility environment; and (10) host visitors.

WHAT NOW?

Collaboration is critical to foster interactions between researchers and practitioners. We can learn from each other and can contribute to the enhancement of this partnership while incorporating the public and private and nonprofit sectors. We must learn from each other what are the functions that we perform, the questions that need to be asked and answered, how we can aid each other in finding these answers, and how we can learn and take advantage of our mistakes and best practices.

Those of us who are responsible for educating and preparing our social networks on how to properly mitigate, respond, and recover from disasters, need to better understand how to communicate risk to the public, businesses, and our governments. For example, is there a better "warning" system than color coding terrorist threats (e.g., Homeland Security Threat Advisory Level) or should this scheme be applied to all hazards? Can legal researchers with legislators

formulate standardized sets of law and rights, allowing doctors, medics, and many regulated practices to function across political boundaries during disasters?

Industries in the technology arena must establish a relationship with first responders and emergency management agencies to provide a platform where, for example, a fire fighter can express their technological needs instead of being provided with items that simply do not work or do not apply to their field. What educational courses should be taught in elementary through high school levels to achieve a needed paradigm shift in how our society perceives, prepares, and responds to the inevitable impact of disasters? As a young boy growing up in the 1950s, I was instructed to hide under my school desk when the warning of a potential attack occurred. Smokey the Bear warned me not to play with fire while Donald Duck showed me how to stop, drop, and roll if one's clothes caught fire. What are our children being taught today regarding hurricanes, disease outbreaks, or terrorism? Are we too afraid to teach them about such horrors?

We have seen so many disastrous events since the great flood and the epic of Noah's preparation as well as the fateful results of complacency. The cliché of "those who ignore the past are condemned to repeat it" remains valid today, but there is no excuse for such arrogance and ignorance. How can researchers in motivational theory solve such dilemmas with today's technology and massive forms of communication to bring us all "onto the same page?"

But let's start here, in our university offices and from our emergency operation centers, and "pick up the phone." A simple introduction of each other will lead to a long-term relationship that will enhance our emergency planning and preparedness initiatives that will result in the protection and survival of our communities during disaster or catastrophic situations. There are a multitude of examples regarding how the findings of research are being applied through technology in history. Just in weaponry, medicine, transportation, and communication, we have seen massive leaps in the past 50 years. We should become part of this trend more so than we currently are. Let's raise the raise bar and move forward in closing the gap between research and praxis, for we have so much to lose if we choose not to act, but so much to gain if we choose to collaborate.