

## CHAPTER 7: PLANNING AND IMPROVISATION IN EMERGENCY MANAGEMENT

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### ABSTRACT

This chapter includes both a theoretical and practical examination of planning and improvisation in emergency management. The first portion of the chapter explores the concept of planning from a theoretical perspective and includes a critical assessment of its relation to community disaster preparedness. This section also restates important principles of sound disaster planning and underscores the need for improvisation due to limitations in human cognition and the uncertain and dynamic nature of disasters. A new concept of “spontaneous planning” is introduced and is defined as “a semi-formal process of evaluating existing and unfolding problems as well as determining potential solutions and required emergency management actions.” A research agenda pertaining to this concept is identified at the conclusion of this initial discussion of pre-disaster planning and post-disaster improvisations. The second part of the chapter reiterates, from a real-world perspective, the value of planning and improvisation alike. Although planning – the zenith of analytical decision-making – is clearly regarded to be a vital and indispensable foundation of emergency management, this section underscores the fact that policy is generally based on, and is almost completely biased toward, planning. For this reason, it is asserted that there is also a need to teach emergency managers about the significance of improvisation. Examples are provided to illustrate why improvisations are necessary in and beneficial for disaster response operations. The final portion of this practical exposition reveals how factors such as education and training may increase the probability of successful improvisations in the future. The final section of the chapter seeks to assimilate the theoretical and practical findings presented previously. Agreement was reached in regards to the benefit of planning, the primacy of planning in policy, the necessity of improvisations, the requirement for improved response operations, and the false dichotomy between planning and improvisations. Divergent thoughts about rationality, intuition, and training are also mentioned in this integrative section. The chapter concludes with recommendations to further examine the nature of planning during response improvisations, the extent of rationality in emergency management, the value of intuition in decision-making, and the need to identify who should receive training about improvisation. The major lesson to be drawn from this chapter is that researchers and practitioners share many common views about planning and improvisation, and agree that more discussion is required to resolve differences of opinion and advance the emergency management profession.

## AN ACADEMIC'S PERSPECTIVE

### Introduction

Whether justified or not, academic research is sometimes very critical of practical efforts to deal with disasters. For instance, scholars have written about the problems resulting from the creation of the Department of Homeland Security and the numerous failures evident in the response to Hurricane Katrina (see Aguirre, 2004; Waugh & Streib, 2006). Nonetheless, disaster literature closely parallels the real-world concerns of professional emergency managers in many ways. Academic studies provide thorough explanations of disaster behavior and thoughtful discussions of theoretical nuances, but they also reveal trends in catastrophic events and explore the implications of diverse emergency management policies (Bissell, 2013; Natural Hazards Center, 2006; McEntire, 2004; Quarantelli, 1993).

The interesting relationships between scholarship and practical application are especially visible in the primary responsibilities of emergency managers. For instance, those involved in civil defense have long been — or should be — concerned about strategic planning and tactical operations (Canton, 2007) and today's emergency managers are also interested in incident action planning for improved responses (see the recommendations of the Incident Command System [ICS] and National Incident Management System [NIMS]). Scholars have also focused research on the concepts and processes of planning, improvisation, and adaptive organizational responses. This chapter will discuss these theoretical topics and their ties to the profession of emergency management. While it would be impossible to include all of the relevant research, the chapter does attempt to cover some of the most important work on these subjects. In order to avoid repetition, the terms *practitioner* and *professional emergency manager* will be used interchangeably.

### Disaster Preparedness and Planning

According to the academic literature, a major duty of the emergency manager is to prepare for disasters. Preparedness is one of the fundamental phases or functional areas within comprehensive emergency management (McEntire, 2003). The concept and goal of preparedness implies a variety of efforts to get ready to cope with disaster situations that cannot be avoided (Lindell, Prater, & Perry, 2007). Developing an operational plan of action, training personnel in rescue techniques, the stockpiling of supplies, and the earmarking of funds for relief operations are examples of such preparedness activities (Perry & Lindell, 2007; Brown, 1979). Other components of preparedness may include hazard identification, grant application and administration, disaster exercises, public education, and the creation of Community Emergency Response Teams (CERTs) (Waugh & Tierney, 2007; McEntire & Myers, 2004).

Although preparedness includes a very broad array of actions that take place prior to the occurrence of a disaster, the majority of an emergency manager's time is spent on

disaster planning. *Planning* is sometimes equated in the research with overall *community disaster preparedness efforts*, and the use of these terms may often lead to confusion. For instance, Perry and Lindell (2007, p. 8) have argued that planning is “preparing before the event” while others have pointed out that planning is one specific type of activity within the preparedness phase of comprehensive emergency management (McEntire & Myers, 2004). Therefore, preparedness and planning have a complex association. They are undoubtedly related, but still have unique activities that are performed by the professional emergency manager.

However, it should be underscored that planning is a unique activity within all aspects of emergency management, and it is related to many functions including mitigation, preparedness, response, and recovery. Regardless, planning often conjures up the development of official documents (i.e., plans or emergency operations plans) that describe “strategies and procedures covering a range of disaster events” (Phillips, Neal, & Webb, 2012, p. 484). Before disasters occur, emergency managers identify possible hazards (whether natural, technological, or anthropogenic man-made) and determine what must be done to react to them effectively. For instance, emergency managers also write annexes dealing with specific hazards (e.g., hurricanes, hazardous materials, terrorism, etc.). Anticipatory measures for a disaster may include planning for various functions such as warning, evacuation, sheltering, and other post-disaster operations. In this sense, planning “provides an opportunity to explore how organizations [will deal with] . . . uncertainties about the future” (Kartez & Lindell, 1987, p. 487).

While the exact relationship between planning and other phases is at times debated, the literature is clear about the relevance and benefits of planning. Planning is regarded to be an essential part of life, but it is especially vital in the context of disasters (Clarke, 1999). Many assert that emergency operations plans are a crucial component of emergency management (Lee, Woests, & Heath, 2007). Planning is believed to increase disaster preparedness (Lee, Woests, & Heath, 2007). Scholars also declare that planning promotes efficiency and lessens the impact of crises (Wang & Ritchie, 2010; Penrose, 2000). In short, planning is believed to help design and manage a future crisis in an effective manner (Pollard & Hotho, 2006; Quarantelli, 1984).

While planning is regarded to be vital, not all plans are the same. The literature illustrates that disaster plans may be informal or formal in nature (Perry & Lindell, 2003). An example of an informal plan is the verbal agreement a business or family might have about how the organization or parents and children will respond to an emergency (e.g., where to meet after a fire). An example of a formal plan is the Comprehensive Emergency Operations Plans created by the local emergency manager to anticipate possible or impending disaster situations and be eligible for Emergency Management Performance Grants (EMPGs). It is this document and the process of creating it that are commonly referred to in the literature

about emergency management. However, emergency managers are also responsible for Hazard Mitigation Action Plans and others related to recovery.

Regardless of the type of plan being discussed, researchers agree on many important principles that should guide the planning process (Quarantelli, 1997). Some of these principles and others are discussed below.

1. Disaster plans must be comprehensive and inclusive. An important principle of planning is that emergency managers should consider all types of hazards, vulnerabilities, disaster impacts, and functions to be performed and potential actors to be involved (Blanchard et al., 2008). If an emergency manager does not strive to anticipate the big picture, it is likely that anticipatory planning will be limited, ineffective, or inefficient.

2. Plans must be based on actual behavior. Another principle of disaster planning is that plans should be based on accurate assumptions about human behavior. Planning is considered to be unrealistic if it is based on erroneous views about human activity in disasters (e.g., the prevalence of panic and looting, the breakdown of society, the helplessness of victims, the need for donations, etc.). Alternatively, some plans are regarded to provide more correct policy recommendations because they are based on behavioral expectations (e.g., evacuation planning under the Federal Emergency Management Agency's [FEMA] National Hurricane Program). Thus, planning will serve as an effective guide for certain situations to the extent that it is based on valid perceptions about human behavior (Drabek, 1985).

3. Plans must assign responsibilities. Plans should also identify important activities to be performed in a disaster and who will be responsible for those functions. Laws, executive orders, command and control structures, and plans like the National Response Framework have this goal in mind. Along these lines, Dynes (1994) suggests that emergency authority will not be ensured through the creation of an artificial authority structure. Instead, it is advisable that the "pre-emergency authority" carries over and serves as the basis for activity in a disaster situation.

4. Planning must facilitate coordination. A major purpose of planning is to identify important priorities and needed resources, and find ways to enhance coordination so major considerations do not fall through the cracks. Planning, such as the development of Concept of Operations (CONOPS), should provide information so that the parties involved know what the others are doing and can take this knowledge into account in disasters (Perry & Lindell, 2007; UNA-USA, 1977). Planning requires cooperation in all levels of government (McEntire, 2003; Brown, 1979) and across the public, private, and nonprofit sectors.

5. Planning must avoid common pitfalls. Planning should not be based on the "paper plan syndrome" or promote the creation of "fantasy documents" as an end unto itself. In some cases, practitioners might regard plans to be a physical document that is

developed solely to comply with legislation or to satisfy public demands (i.e., the paper plan syndrome). Research reveals that some community leaders falsely assume that they are prepared for a disaster by simply having a plan (Auf der Heide, 1989). When asked if they are ready for possible contingencies, they frequently reply that they “have a plan” (but ironically seem to forget to undertake the many other preparedness activities that are needed to build response and recovery capabilities) (McEntire, 2006). For instance, New Orleans had a very detailed plan prior to Hurricane Katrina (covering hurricane impacts and evacuation and sheltering functions), but the city was not able to implement the plan when this disaster occurred. In this sense, organizations sometimes use plans as a form of rhetoric to convince audiences that they ought to believe what an organization says. Instead of identifying realistic actions to be taken, some plans have so little instrumental utility in them that they warrant the label “a plan without means” or a “fantasy document” (Clarke, 1999). Therefore, planning must avoid the fantasy documents mentality and reject the paper plan syndrome.

6. Planning must be an ongoing process. The development of a disaster plan should not be a one-time occurrence (McEntire, 2003). Plans should be viewed as an interim product based on information and understanding at one particular moment, and subject to revision. In other words, the plan itself represents a snapshot of that process at a specific point in time (Perry & Lindell, 2003) and plans are out of date almost as soon as they are published (Canton, 2006). Planning must thus be a recurring process, to be revised and changed as risk changes over time (Perry & Lindell, 2003). In addition, plans should be tested, exercised, validated, and then updated again with sufficient input from all relevant parties. That is why plans are best described as “living documents.”

The literature discussed above is – or should be – closely related to the practice of emergency management. However, this is not to suggest that planning will resolve all types of disaster problems. For instance, research reveals that there can be a big gap between what was planned for and what actually happens in a disaster crisis (Quarantelli, 1997). There are at least three reasons for this. First, planning itself may be inadequate. Humans are not omniscient so plans may not fully anticipate what could happen or identify the best ways to react to emergencies. Second, there is often a failure to recognize that the principles of disaster planning are not the same as the principles of crisis management (Quarantelli, 1988). The differences between disaster planning and crisis management are significant because traditional emergency planning occurs before a disaster, while the management of a crisis takes place in the heat of the incident, emergency, or disaster. Along these lines, planning is intended to be a rational process with no serious time constraints, while the management of crises requires difficult decision making due to incomplete, incorrect, or changing information as well as the rapid implementation of policies resulting from a pressure to act as soon as possible. Third, politics may impact planning. Political leaders may not fully understand emergency management, and they even

might try to shape planning to downplay risk. For these reasons, good planning (or strategy) does not automatically translate to good managing (or tactics) (Quarantelli, 1993).

Perhaps some of the weaknesses of planning result from the fact that there is still surprisingly insufficient research about the topic itself (Tierney, Lindell, & Perry, 2001). Most studies are based on interviews of individual emergency managers or anecdotal evidence of what works and what does not. In addition, there are a variety of topics related to planning that are not adequately addressed by current research. For example, how much commitment do emergency managers devote to planning on a daily basis and is that the most effective use of their time? What else do emergency managers need to do to make sure that disaster plans are effective in practice? How are Threat, Hazard Identification, and Risk Analysis Assessment (THIRA) and Hazard Mitigation Action Plans (HAZMAPHMP) related to, or different than, emergency operations plans? Should more emphasis be given to recovery planning? If so, why? To what extent does planning ensure success in response and recovery operations? Is more planning required to address non-Stafford Act events, National Contingency Planning events, or public health events? These and many other questions about planning deserve further investigation by current researchers.

### Improvisation

Although planning is regarded to be an important responsibility of the emergency manager in the preparedness phase, both researchers and practitioners acknowledge that this activity may be confronted with potential limitations. For instance, scholarship illustrates that it is impossible to plan for all disasters (McConnell & Drennan, 2006). There are simply too many variables to consider, and the nature of disasters is usually synonymous with unpredictability. A historical examination of planning reveals that plans rarely work as anticipated. Planning is hindered by the lack of knowledge about future events; no one is able to predict the future precisely. Such improbable, unanticipated, and consequential events have been described by Mendonça, Cunha, Kaivo-Oja, and Ruff as “wild cards” (2004). They are characterized by rarity, uncertainty, significant and broad consequences, complexity, and urgency (Mendonça, 2005, p. 957). These wild cards thus “unfold in a unique way” so plans need “to be complemented with action based on . . . knowledge acquired and processed on the spot” (Mendonça et al., 2004, p. 210).

Research has indicated that practitioners have, at times, relied too heavily on plans that constrain initiative and effectiveness during response operations. Dynes (1994) argues that disaster plans are often based on a military model that stresses adherence to standard operating procedures (SOPs) and the centralization of authority. This perspective views disasters as episodes of social chaos that can only be rectified by following SOPs and implementing command and control over organizations (Webb & Chevreau, 2006; Dynes, 1994). However, sometimes adhering to plans and following routine orders has devastating consequences, as Weick illustrates in his study of the Mann Gulch fire (1993). Thus, plans

may at times have a limiting effect on response (Canton, 2006). Disaster scholars have argued that effective emergency response therefore requires organizational flexibility (Blanchard et al., 2008; Quarantelli, 1997; Neal & Phillips, 1995). In other words, evidence suggests that plans are more of a general road map than a script that should be followed verbatim (Quarantelli, 1993). Plans are meant to be scalable and flexible based on the type of event, magnitude, duration, impact, etc.

While planning and plans have become less rigid and restrictive over time (compare FEMA's Local Planning Guide 101 in 1994 to its Comprehensive Preparedness Guide 101, version 2 in 2012), research suggests that improvisation is an essential response activity (Kendra & Wachtendorf, 2006; Mendonça, Giampiero, & Wallace, 2001; Kreps, 1991). Improvisation has been defined as an "adaptation to the unique circumstances of an unfolding situation" (McEntire, 2007, p. 431). Improvisation allows for a departure from existing plans and suggests tolerance of, or even appreciation for, flexibility and creativity. Webb and Chevreau articulately state that "successful responses to crises occur not in spite of but because of various unscripted activities, improvised behaviors, and emergent organizational structures" (2006, p. 67).

The 2010 Deepwater Horizon oil spill is a good example of the need for improvisation in practice at the tactical level. Prior to this ecological disaster, British Petroleum planned to use skimmers to clean up oil if a spill were to occur on the ocean. However, the company did not anticipate that the drilling mechanism would suffer a catastrophic failure far below the ocean surface and spew over 100 million gallons of crude oil into the Caribbean Sea Gulf of Mexico. For this reason, engineers had to devise a way to cap the source of the oil with cement and other mechanisms at a depth of 3,600 feet. This solution was not based on a prior plan but was, in essence, a departure from the existing operating procedure (e.g., the use of skimmers). The improvised reaction eventually contained the amount of oil spilled in what could have been an even worse environmental catastrophe.

There is also the possibility of improvisations emanating within or from emergency operations centers (EOCs). After the Deepwater Horizon oil spill, public officials created a "Forward Emergency Operations Center" and implemented their own version of community relations and claims assistance. Because FEMA was not involved in this event, there was a need to obtain resources for those who were affected by the spill. EOC personnel therefore worked closely with British Petroleum to meet the needs of those affected and assist the state in recovery efforts.

Another example comes from New York City after the terrorist attacks of September 11, 2001. Operational decision makers had no way of overseeing the response to the 9/11 attacks after the EOC in World Trade Center #7 was gutted by fire. Emergency management officials therefore set up a temporary makeshift EOC in a police training facility and later moved operations to a pier on the Hudson River. This ad-hoc re-establishment of the EOC

clearly facilitated resilience in New York City on 9/11 (Kendra & Wachtendorf, 2003). In other disasters, those in the EOC may make decisions in order to meet the unique challenges at hand. For instance, emergency managers in Texas and Louisiana had no plans to respond to the disintegration of the Space Shuttle Columbia upon its re-entry into the atmosphere. They either adapted or departed from existing plans or created new methods altogether for dealing with scattered debris, recovery of remains, public information, and other needed functions after this tragedy in 2003.

As can be seen, emergency managers and others responding to disasters must therefore plan to improvise (Webb & Chevreau, 2006). While research has certainly identified the need for flexibility and creativity, as in the case of the water-borne evacuation of Manhattan on 9/11 (Kendra & Wachtendorf, 2003), it is possible that scholarship has not fully investigated if improvisation is always beneficial. Is it possible that first responder free-lancing, citizen emergent behavior, and improvised responses (e.g., showing up without being summoned, beginning work without informing incident commanders, and exploring creative ways to fight high-rise fires resulting from terrorist attacks) had deadly consequences in the World Trade Center complex? Therefore, the advantages and disadvantages of improvisation (based on studies of real-life examples) need to be addressed further in disaster scholarship.

### Spontaneous Planning

As indicated, the literature on planning and improvisation is extremely important in emergency management. However, it is possible that the existing research is too simplistic. For instance, the concepts of planning and improvisation are sometimes discussed in a dichotomous manner. “A significant hypothesis from this research states that managers respond to crisis challenges either rapidly by relying upon familiar norms and templates or with creative and flexible improvisation” (Roux-, Duffort , & Vidaillet, 2003; see also Weick, 1993; Staw, Sandelands, & Dutton, 1981). That is to say, pre-disaster planning and post-disaster improvisation are believed by some scholars to be alternative or opposite activities. However, Kreps admits that “without improvisation, emergency management loses flexibility in the face of changing conditions. Without preparedness, emergency management loses clarity and efficiency in meeting essential disaster-related demands. . . . Improvisation and preparedness go hand in hand” (Kreps, 1991, p. 33). Harrald agrees and asserts that agility and discipline are critical factors for the success of response operations (2006).

For this reason, scholars are now recognizing that the relationship between planning and crisis management is more complex than is often assumed (Eriksson & McConnell, 2011). Studies of organizational responses to disasters now show that there is a unique relationship between improvisation in a disaster and prior planning activities. For instance, Mendonça and Wallace’s work (2007) examines distinct types of activities that emerge



based on plans and improvisations. Wachtendorf (2004), and Wachtendorf and Kendra (2005), also found three ways in which improvisation is related to disaster plans:

- **Reproductive Improvisation:** Although a system for response is in place, the disruption of a disaster impels the organization to improvise to achieve the desired result. In this case, the emergency managers replicate existing plans through improvised efforts.
- **Adaptive Improvisation:** While a response system may have been identified in advance, the organization adapts the plan to unfolding conditions or opts for a novel approach altogether. In this situation, emergency managers improvise because the existing plan is not totally appropriate for the situation.
- **Creative Improvisation:** If no plan exists to deal with environmental demands, organizations may establish new courses of action that are emergent in nature. Under these circumstances, emergency managers improvise because no plan captures the essence of the unfolding disaster.

While research is currently exploring different ways that improvisation may be based on — or depart from — existing plans, “the processes that actually constitute improvisation have been comparatively underexplored” (Mendonça & Wallace, 2007, p. 547). In particular, it is possible that scholarship has not fully recognized that planning itself occurs within improvised response operations. For instance, Alterman declares that planning may occur before a disaster, but he is also careful to acknowledge that planning will occur during and after a disaster as well (1995; see also Kreps, 1991, p. 34).

Sense making is in some ways an example of this blended activity (Weick, 1995). Sense making is the construction of reality in one’s mind based on environmental clues and a person’s prior experience and frame of reference. In terms of disasters, sense making is a context gathering and analysis process that informs and shapes ongoing decision-making and subsequent response operations. While sense making may occur automatically based on the necessity of any given situation, it is not necessarily a process that excludes the attempt to pursue rational decision making and logical implementation strategies.

In addition to Weick’s work on sense making, the research of Mendonça and others implies that the improvisation process is complex and may include its own planning activities. “Unplanned-for contingencies . . . create the need for the responding organization to develop and deploy new procedures in real-time” (Mendonça, 2005, p. 954). In many disasters, emergency managers must recognize that “no planned-for procedure applies to the current situation” and that organizations must seek the “real-time development and deployment of new procedures” (Mendonça, 2005, p. 955). The resulting “organizational improvisation refers to the convergence of conception and execution” (Mendonça et al., 2004, p. 210). It is a “problem solving” effort (Mendonça & Wallace, 2007, 549) that may include the gathering and assessment of environmental cues,

situational awareness, a reflection on prior experience, learning on the job, hunches about the future, the development of “mental models,” identification of goals, competition and negotiation of options, and strategies on how to accomplish new priorities (Hamra et al., 2012; Mendonça, 2005; Ford & Schmidt, 2000).

These arguments bring up the recently introduced concept of “spontaneous planning.” McEntire, Kelly, Kendra, and Long define this phenomenon as “a semi-formal process of evaluating existing and unfolding problems as well as determining potential solutions and required emergency management actions” (2013, p. 3). In other words, this concept conjures up “a decision making endeavor undertaken during or after disasters to identify available options and specify additional or novel tactical guidelines based on situational awareness and the acquisition of context-specific knowledge” (McEntire et al., 2013, p. 3). McEntire and his colleagues are careful to note the differences between planning, spontaneous planning, and improvisation.

*Spontaneous planning is not equivalent to routine planning or emergent improvisation. Spontaneous planning is distinct from normal emergency planning because it does not take place before an emergency or disaster occurs. While spontaneous planning is indeed an anticipatory activity (like the development of emergency operations plans), it is only witnessed [immediately before or] after an incident occurs and takes into account actual hazards and unfolding disaster consequences. Spontaneous planning is, at times, based on or expands from existing planning documents, but it may also depart from agreed-upon procedures and result in completely unanticipated post-disaster activities. (McEntire et al., 2013, p. 2)*

The concept of spontaneous planning was identified while studying the 2010 San Bruno gas pipeline explosion (NSF Award CMMI-1103819). This research project sought to advance the literature on organizational resiliency during disasters. The preliminary findings of this research illustrate that spontaneous planning was utilized by virtually every organization during initial response operations and such planning continued through ongoing recovery activities. For instance, after the pipeline explosion, CalFire had to spontaneously plan air drops in a residential neighborhood to avoid injuring firefighters on the ground. Later on, city officials held multiple meetings to spontaneously plan victim re-entry into the affected neighborhood so it could be completed in a coordinated fashion. Most functions, in fact, were regarded to include aspects of spontaneous planning.

Moreover, the preliminary research on the San Bruno incident reveals that spontaneous planning appears to have contributed to the success of mass care, public relations, damage assessment, site security, debris removal, environmental remediation, and long-term recovery activities. The comments from one city official about this type of planning are particularly instructive:

*I mean, literally, we had thought [and worked] through every possible contingency [as the problems unfolded] and had addressed [them]. . . . The operation was so smooth that people didn't even believe it themselves – that they had been able to pull it off. (City official as cited by McEntire et al., 2013, p. 20)*

The implications of spontaneous planning may be significant. Even though spontaneous planning occurs during and after disasters, it may facilitate successful improvisation in unfolding response and recovery operations. The idea that ad-hoc planning improves response operations should come as no surprise to practitioners. First responders and emergency management personnel have taken more interest in the ICS, which mandates the development of incident action plans (IAPs) to better manage a particular emergency or disaster (see Mendonça et al., 2004, p. 211, for similar comments on this subject).

However, the preliminary work on the spontaneous planning concept is clearly incomplete. Does spontaneous planning really occur in some, most, or all disasters? Is spontaneous planning a valid descriptor of the decision-making and implementation process that occurs during disaster improvisations? If so, what individual or contextual characteristics increase the probability that spontaneous planning will be effective? How does spontaneous planning relate to sense making and improvisation? Does spontaneous planning require a “safe” climate for improvisation, diversity of perspectives, an attitude of nonconformity, improved information processing skills, the ability to rapidly reconsider previous knowledge, and reorganize new structures to be successful (Mendonça et al., 2004)? What is the role of feedback and communication in spontaneous planning (Hamra et al., 2012, p. 589)? Is spontaneous planning more common in response operations than in recovery operations? When does spontaneous planning end after a disaster? Finally, what additional education and training would be required to improve spontaneous planning skills for future emergency managers? There are currently few answers to these important questions.

### Conclusion

This section illustrates that disaster research closely parallels the practice of emergency management. Disaster researchers have discussed at length the concepts of preparedness and planning. They have illustrated that emergency managers spend a great deal of time on preparedness activities, including the process of planning and the development of formal emergency operations plans. Those in academia underscore the value of planning and also differentiate it from crisis management activities.

However, scholars also question a sole reliance on planning. They assert that no one is able to anticipate all types of disasters and their unique consequences. For this reason, scholars also study improvisation and underscore the importance of flexibility in order to

discover ways to improve disaster response operations. Yet, in many ways, improvisation is regarded as being divorced from disaster planning activities.

In recent years, scholarship has argued that the relationship between planning and improvisation is actually much more complicated than previously thought. The work of McEntire and his colleagues has attempted to draw out the relationship between planning and improvisation during response operations. They illustrate that planning is not only evident in response operations, but argue that it will logically improve improvised activities after disasters occur.

Nevertheless, there are certainly numerous questions that deserve exploration in future scholarship. Many opportunities exist to determine if and how spontaneous planning occurs and benefits post-disaster emergency management activities. In short, there is a continued need to ensure that the theories developed by scholars are transferrable and beneficial to practitioners in the important profession of emergency management. For this reason, further constructive dialogue among scholars and practitioners will be required and is to be encouraged.

## A PRACTITIONER'S PERSPECTIVE

### Introduction

While there are many kinds of people in the world, this paper will focus on just two: one type that sees the need for planning and plans to guide our actions, and the other that believes in improvisation and flexibility as the key to thriving and surviving. Planners seek order and improvisers work well in chaos. We often see these two kinds of people in emergency management, even in the same EOC working under stressful conditions saving lives and property. We might well ask ourselves, given the two different – but not necessarily opposite – approaches, is one approach better or more effective than the other in dealing with disasters and emergencies? Or, is some sort of hybrid approach more valuable?

Both approaches have merit and neither is inherently better or worse than the other. The two extremes are reconcilable in the sense that both contribute to emergency management and both grow and gain from the other. This position comports with that of Kendra & Wachtendorf (2006, p. 8), who wrote that “planning and improvisation are important aspects of any effective disaster response and are best considered as complimentary.”

The purpose of this section is to identify, from a practitioner's viewpoint, the differences between approaches dominated by planning and by innovation, and to ask why our profession still seems to favor one (planning) over the other (improvisation). This portion of the chapter will conclude by proposing how improved training of improvisation in emergency managers could be achieved.

### Planning

Planning may be the zenith of analytical decision-making. Emergency management planners collect and analyze large volumes of relevant information regarding a particular threat or hazard, and the potential impacts, and provide guidance on how best to act. Through the planning process, a plan is developed that encourages us to focus on and implement actions that repeat optimized patterns of activity (Weick & Sutcliffe, 2001). Written plans and procedures have been shown to serve valuable purposes in training new organizations, individuals, and public officials for responding to emergencies and disasters. It has been demonstrated repeatedly that when emergency operations are conducted in accordance with existing plans, reaction time is reduced and coordination improved with fewer casualties and reduced economic and property damage as results (Mendonça et al., 2006).

Plans have significant strengths (Klein, 2003). For instance, they allow us to solve problems in the absence of specific expertise. Consideration of important issues, opportunities, and constraints before an event happens can allow individuals without

complete knowledge of what they need to do to implement an effective response. An example of this might be an emergency manager being able to lead aspects of a response to a hurricane without being a meteorologist or an engineer. Plans allow us to perform adequately in areas where we lack specific expertise.

Plans also allow us to coordinate a team so that everyone knows what they are supposed to do and where they fit in to the overall response. Through the development and study of a plan, we can see the interactions required to pull a complex mission together. Plans shape our thinking by allowing the team to get smarter. Through the analytic processes, planners and plan users can learn more about hazards, vulnerabilities, what has worked in the past, and what might work in the future. Plans allow us to generate expectations, such as what and how many resources should be available so we can spot shortfalls in time to do something about it. By “war-gaming” the response process planners can identify important decision points and critical roadblocks to effective response. Most importantly, however, plans can serve as platforms for improvisation.

### Improvisation and Plans

Improvisation has been described (Leyborne & Sadler-Smith, 2006) as a combination of intuition, creativity, and bricolage. Intuition is characterized by decisions and actions that are reached with little apparent effort and typically without conscious awareness and with little or no conscious deliberation (Hogarth, 2001); creativity is expressed by originality, expressiveness, and imagination (*American Heritage Dictionary*, 1982); and bricolage used in this context refers to solving problems with the resources one has available at the time (Leyborne & Sadler-Smith, 2006). Successful intuition has been described both as a rapid, creative, and effortless solution to a problem or problems and as a slower-building realization established over time (Hogarth, 2001).

As emergency managers acquire experience, they can combine improvisation with plans and use the written plan as a basis for action rather than as a prescription. It is this improvisation that leads to innovation and new ways of responding to familiar problems. It is through a strong planning base that practitioners can discover new and better approaches.

Plans do have important shortcomings (Klein, 2003), however, and the shortcomings must be understood by emergency managers. Plans are always based upon assumptions, and if the assumptions are violated, the prescription in the plan may be less appropriate. Indeed, Waugh and Streib (2006, p. 132) argue that “emergency managers have to innovate, adapt, and improvise because plans, regardless of how well done, seldom fit circumstances.” Plans are developed out of context and may overlook information that an expert responder will see and recognize as important. Reliance on plans encourages a search for attributes that are consistent with the plan. They encourage not searching for attributes that are inconsistent with the plan. They can make you immune to important cues

that things are not quite right and may delay the implementation of corrective actions at the earliest possible time when the problem can be more easily solved.

There are indications that, especially under high stress and emergency conditions, humans do not analyze their options rationally and then choose the best solution (Simon, 1955; Vermeule, 2004). Humans are able to satisfice, intuit, and improvise. Individuals in high-reliability organizations cope with unexpected events by adapting to circumstances rather than depending on plans (Weick & Sutcliffe, 2001). It may be, therefore, that human nature is biased toward improvised solutions over plans in crisis situations.

This paper is not the only place where one may find criticism of the primacy of the operational use of plans over improvisation. Mintzberg (1994) warns us that planning, taken to its extreme, can stem from an obsession to control. Over-planning may inhibit spontaneity. Mintzberg focuses specifically on strategic planning rather than emergency planning. However, his cautions are relevant to emergency management plans and planning. Planners may believe in the absolute need to prepare for all contingencies and minimize surprise since, to Mintzberg's extreme planners, surprise is an unsatisfactory state of affairs. He warns that an obsession with control can lead to several undesirable behaviors: aversion to risk, conflict with others who do not appreciate planners' concerns about their loss of control, and a belief that control must be provided by the plan. If we apply these behaviors to the field of emergency management, we will see several possible dysfunctions: the making of poor or delayed decisions, obsession with a more complete and perfect plan, and a knee-jerk reaction toward "improving" the plan when there is evidence of suboptimal performance. Mintzberg also points out that the obsession for control may come from the failure to recognize or appreciate the value of spontaneity. Hence, any conflict with planners could possibly result from the planner's lack of appreciation of the power and importance of improvisation.

### Planning, Improvisation, and Emergency Management

Despite some shortcomings and because of the strengths of plans and planning, emergency management has adopted the analytical planning process as the model to address natural and human-caused disasters. Planning continues to reign supreme in our preparedness activities. Part of this may be linked to our natural instinct to consider things whenever we have the time to do so. How often are we advised to "sleep on it" or "take your time" in our decisions? In important matters we feel more comfortable with decisions developed through analytical processes. Planning is not, however, the only way forward. There is also room for improvisation.

Improvisation allows for agility in our response. When we are confronted with time-critical decisions and when the plan does not cover the situation, we must rely on improvisation or else we do not act. We see improvisation in a sporting context all the time: a player comes up with a novel solution in the heat of the game, sometimes with spectacular

effect. We appreciate the effect in improvisational comedy where entertainers come up with novel and viable solutions to unrehearsed situations. We also view it in emergency management where, for instance, a firefighter decides to alter the response based upon a sense of how a situation is evolving. Even though they cannot explain how they are doing it, individuals in these examples are experts in improvising successfully in the absence of specific guidance contained in a plan.

Similarly, improvisation can provide valuable insight to planners. Improvisation brings novel solutions to the challenges the plans are designed to address. Without some improvisation added to the planning process, plans do not change. They continue to solve the old problems in the same old way. Planners use innovation to develop new solutions to old problems as well as new solutions to novel problems.

Intuition may be essential and at its best extraordinarily powerful, but it is not infallible (Officer, 2005). As a result, our improvisations may not be successful. Successful improvisation requires a base of expertise upon which it works (Mendonça & Wallace, 2007). There is a need for a degree of prerequisite expertise to develop in an individual before improvisation would be expected to produce positive outcomes. Simon and Chase (1973) have suggested – and this has been confirmed by subsequent investigators (see Ericsson and Lehmann, 1996, for some discussion) – that it takes approximately 10 years of intensive study and experience to develop true expertise in any domain or subject area. Novices do not have the prerequisite knowledge and ability to improvise with frequent success.

There are at least two distinct steps in the process of improvisation as applied to emergency management (Mendonça & Fiedrich, 2004). The first step is to recognize that no existing plan or plan element applies to the current situation or that an applicable plan cannot or should not be executed. The second step involves the real-time development and deployment of new procedures using available resources. Both are essential if improvisation is going to be effective.

Suppose we consider novice chess players as an example. We can understand that their lack of expertise requires them to channel all of their conscious thinking into how they might react to a given threatening situation. They would need to think explicitly about the details of the situation to address it. Alternatively, a chess master has seen it all before and would in all probability choose an appropriate move immediately. In fact, the master chess player probably would not have found him or herself in such a predicament in the first place, realizing the trap that was waiting and playing his or her way out of it.

We can also use the analogy of jazz musicianship (Mendonça & Wallace, 2007). Improvisation is at the heart of jazz. Talented jazz musicians are experts with their instruments and with how music works, and this expertise is critical before a musician can



be expected to improvise within the genre. Without mastery of the fundamentals, jazz is sloppy.

Suppose we apply the analogy to the operation of a nuclear reactor, the mitigation of flooding within a community, or running a complex hazardous materials emergency response. It is not difficult to predict the outcome when we improvise with a lack of expertise. Insufficient understanding of the context and alternative solutions would only magnify the impact of the event.

There is a false dichotomy that emergency management operations must be performed subject to the dictates of previously prepared plans with little room for improvisation, versus a second view that plans cannot possibly be detailed enough to account for all possible eventualities and, therefore, can only provide a general framework within which improvisation flourishes. A somewhat more rational approach looks at response operations as occurring along a continuum (figure 1). It is likely that, for emergency managers, every response will be different and fall at a slightly different spot along this continuum. Indeed, it can be argued that even the slightest deviation from the plan is, by definition, improvisation.

**FIGURE 1. A CONTINUUM MODEL WHERE A PROPER SOLUTION TO EVERY SITUATION (LARGE ARROW, FOR EXAMPLE) INVOLVES A MIXTURE OF PLANNING AND IMPROVISATION.**

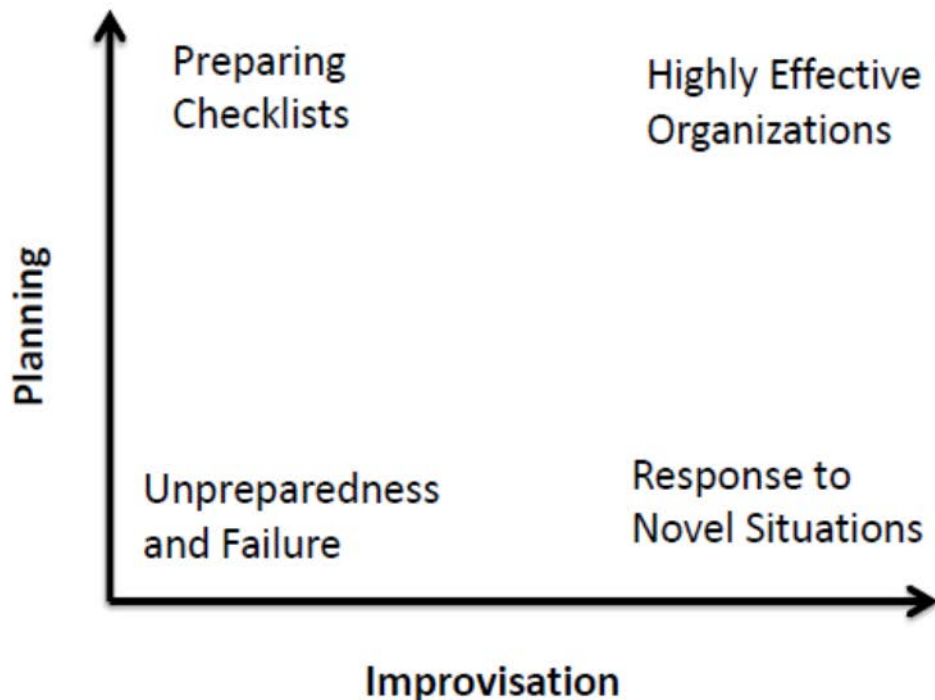


It is also possible to think of planning and innovation as being orthogonal axes on a graph where all activities performed in emergency management consist of a specific combination of both innovation and planning (figure 2).

For instance, the development and use of a checklist involves a high degree of planning and relatively little improvisation. Reacting successfully to a novel situation — especially in a time-sensitive manner — requires a high degree of improvisation and, perhaps, little formal planning. Little planning and little improvisation would be the realm of unpreparedness and failure. Highly effective organizations are characterized by large amounts of both planning and improvisation tempered by an awareness of when each should be employed. Retired Marine Corps Lieutenant General Paul Van Riper comes very near this point when he says that “when we talk about analytic versus intuitive decision making, neither is good or bad. What is bad is if you use either of them in an inappropriate

circumstance” (Gladwell, 2005, p. 143). By thinking about planning and improvisation on a graph, we can sense the fundamental independence of these two approaches and how they are correlated among specific tasks. We also avoid looking at planning and innovation as being “opposites.”

**FIGURE 2. THE GRAPH MODEL, WHERE SOLUTIONS CAN BE IDENTIFIED ASSOCIATED WITH INDEPENDENTLY VARYING AMOUNTS OF IMPROVISATION AND PLANNING. THE AREAS IDENTIFIED SUGGEST REGIONS CHARACTERIZED BY SPECIFIED AMOUNTS OF IMPROVISATION AND PLANNING.**



### Applying Improvisation

Crisis situations are characterized by ambiguity and unplanned-for events (Rankin, Dahlback, & Lundberg, 2011). This can require the solution of highly novel problems and the need to act quickly. These factors reduce the opportunity for extensive planning in emergency management (Mendonça & Wallace, 2007). A clear example of this would be the Apollo 13 mission. After an oxygen tank explosion in the Service Module crippled the spacecraft on its way to the moon, the crew and mission control were confronted with a clear need for improvisation. Using the Lunar Module as the crew’s “lifeboat”; constructing a method of mating the Command Module’s carbon dioxide filters to the different size and shape of the Lunar Module’s; and the manual control of the spacecraft aligning it for reentry: all of these demonstrate improvisation at its highest degree. When the plan failed, improvisation literally saved lives.

### A Bias in Emergency Management?

The literature and general understanding tell us that improvisation is critical to successful emergency management (Waugh & Streib, 2006). It is, therefore, a bit shocking that, despite clear evidence that improvisation is a fundamentally necessary component of the response repertoire, the written and published doctrine of emergency management in the United States is skewed decisively in favor of plans over improvisation. Why does emergency management doctrine place plans above improvisation? Why does emergency training not encourage and develop intuition, creativity, and bricolage? Arguably, the profession of emergency management would be greatly improved through adopting these approaches.

In addition, why do we see in the documents describing the National Response Framework, the *National Disaster Recovery Framework*, the National Response System, and NIMS only scant attention paid to intuition and improvisation? A quick search of these documents finds only three occurrences of the word *improvise* and its derivatives (such as *improvisation* or *improvised*) — all used in connection with “improvised explosive devises” — and no occurrences of the word *intuition* or its derivatives (such as *intuitive*). The term *flexible* and its derivatives occur frequently (seventy-six times in these documents), but used in the context of a need for “flexibility” in plans and programs, not in the context of operational art or creative thinking. Only the National Response Framework bears general reference to “innovation” in the sense of promoting on-scene initiative and innovation, although it does not indicate how this might be encouraged. It appears that these terms and concepts are nearly absent from the Department of Homeland Security and FEMA lexicon.

FEMA has produced the Comprehensive Preparedness Guide (CPG) 101 to illustrate how states and local governments should develop emergency operations plans. Unfortunately, there is no similar document that illustrates how to develop intuition or encourage improvisation in emergency management. CPG 101 only mentions improvisation once and that is in reference to ensuring that the planning team is diverse so as to bring creativity and innovation to the process.

### Training and Teaching Improvisation

Another question centers on how we might go about training and teaching improvisation, Coaches have for years addressed how to develop decision-making skills and intuition in athletes. Some of their experience is helpful.

Assuming that expertise is required before we would expect meaningful training on improvisation to be successful, this suggests that the target audience for improvisation training should be mid-career professionals who have already mastered the basics. While all emergency managers could benefit from improvisation training — even those with limited

practical experience — the greatest benefit should be achieved when we target those with around ten years of actual experience in emergency management or with a combination of relevant emergency management experience in related fields. We should not restrict improvisation training to only management staff. Many highly experienced personnel choose to practice their profession as firefighters or police officers without entering management ranks. These true experts would be valuable recipients of improvisation training as well.

It seems that the traditional trainer-student relationship of the classroom would not be expected to develop improvisation. The training environments we see most commonly today tend toward sharing information on what already works along with existing policy and procedures rather than improvisation. The preferred relationship should probably be more akin to that of a coach-athlete or a mentor-protégé relationship. This, of course, requires moving away from a 30 to 1 student–instructor ratio. We would need to change our learning approach and individualize the training if we are to develop successful improvisation. We would expect that the coaching or mentoring would be appropriately paced and require an increased investment in time and resources.

We might expect that the training pedagogy should involve frequent exposure of the improvisation-learners to novel situations where they must develop solutions based upon analogy from their experience. There frequently is no correct answer to these sorts of problems, so correct answers should not be sought. Successful learning outcomes are achieved when the improvisation student consistently realizes a “good enough” answer within the time frame of the problem. Example types of pedagogy would include off-the-shelf computer-based simulation training (Mendonça & Fiedrich, 2004) and decision-making exercises described by Klein (2003). Designing training for teaching improvisation is fundamentally different from designing for plan execution (Mendonça & Fiedrich, 2004).

The improvisation student must receive consistent and frequent feedback. We might conceive of this training environment to be characterized as a “feedback-rich zone.” The best feedback would be achieved through the process coaches have been using for years, which is described as “coaching through questioning.” Here, the improvisation student — working alone or in groups as the problem requires — is asked to describe the process of their solution to include their thoughts and feelings as they worked through the problem. The coach does not provide an answer to the student. The coach’s job is to get the student to figure it out for him or herself through open questions. The goal is to allow the improvisation student to practice drawing on their experiences and memories in an explicit way and, through articulating their own process, to draw on their knowledge and expertise to develop their own successful approach to improvisation. The selection of emergency management coaches who have displayed successful improvisation in their own careers would be essential to the process.

How different this is from our current approach to training: no lectures filled with PowerPoint presentations, no reporting of group activities that fail to engage improvisation, no multiple guess examinations. The improvisation student is presented with a novel (and, perhaps, unsolvable) problem and required to think his or her way to an improvised solution. The terminal objective is not focused on knowing, comprehending, or applying; it is focused on improvising.

Intuition is a key part of improvisation (Leyborne & Sadler-Smith, 2006) and research has shown that intuition can be taught and learned (Klein, 2003). However, in what kind of learning environment can we learn to be intuitive?

Hogarth (2001) differentiates between “kind” and “wicked” training environments. “Kind” environments are those where feedback is timely and relevant, and tasks are neither too lenient nor too exacting (Officer, 2005). Intuition learned in these environments is likely to be “good” in the sense of being dependably predictive within a reasonable range of tolerance. If feedback is poor or delayed and if the tasks are either too demanding or lacking in challenge (or worse, if they are a *mélange* of both) then the learning environment is “wicked.” Intuition developed in wicked environments is based upon unreliable feedback and is not dependable. It follows from this that “kind” environments are more conducive to facilitating “good” intuition and innovation.

### Conclusion

In the final analysis, the proper relationship is that plans meld together analysis and assumptions into suggested actions. Responders examine, validate, and verify the assumptions into facts based upon what they encounter at the time. If any or all of the assumptions are invalidated, the only recourse is to improvise. It is a mistake to assume that a response can be completely scripted (Waugh & Streib, 2006).

Nevertheless, there is evidently a bias in the emergency management profession toward a planning model and away from one that explicitly develops improvisation. This bias is evidenced in the paucity of improvisation training available to emergency managers and in the primacy of planning provided in doctrinal documents. This is unfortunate and counter-productive given the value that improvisation – when performed by experienced and expert emergency managers – can bring to the profession.

Improvisation can be taught and it can be learned. It will probably require a shift in our teaching paradigm and pedagogy to accomplish this goal, changing instructors into coaches and mentors. The profession of emergency management would be greatly enhanced by practitioners who are expert in both planning and improvisation.

## BRIDGING THE DIVIDE

### Introduction

We have enjoyed reading each other's work on planning and improvisation, and we believe that there are more points of agreement than disagreement in our respective treatment of these topics. Although there are a few points of departure between us based on our backgrounds in the profession of emergency management and academia, these differences are more of degree than of kind. The following joint section identifies several areas of agreement, explores divergent opinions, and concludes with a discussion about the future.

### Areas of Consensus

As a first point, we agree that the development of plans to guide emergency management is critical for the success of emergency management. Professional emergency managers must clearly be involved in the planning process to anticipate potential hazards and identify what the jurisdiction should do about them. Planning not only exposes what can go wrong, but it also identifies how crises can be averted (if that is possible) or dealt with in a more effective manner (when risk cannot be eliminated). Planning before a disaster allows time for rational thought about probable risks, likely consequences, and needed response and recovery actions. Furthermore, disaster planning allows divergent actors and organizations to spend time together, which fosters awareness of roles for improved preparedness and capacity building. Likewise, disaster planning increases the probability of coordination when response and recovery operations are needed, because the participants are already aware of partners and stakeholders who can assist in post-disaster operations. Therefore, the value and importance of planning cannot be denied.

Second, we concur that planning has been the predominant approach practitioners have pursued in emergency management, but we underscore the fact that this is not necessarily without limitations. Scholars have for years expressed the need for emergency managers to consider the possible drawbacks of a planning-only philosophy. No amount of planning – regardless of time and commitment – will cover every possible contingency. While plans based on highly educated guesses about the future are possible and required, there are simply too many hazards, vulnerabilities, and dynamic variables that have to be taken into consideration. No plan is perfect or complete in any given moment in time – they are meant to be scalable, flexible, and dynamic. In addition, researchers have expressed concern about the command and control mentality derived from planning assumptions that may jeopardize multi-organizational collaboration in disasters. Such attitudes will often backfire during the preparedness phase or, more disturbingly, when diverse agencies meet in the field or at the EOC in an actual disaster. Therefore, practitioners' observations regarding U.S. policy being slanted toward planning reinforces prior academic research on the subject.

Third, we fully recognize that improvisation may be necessary in emergency management on many occasions. Because plans are insufficient, are always works in progress, and are often too rigid in the context of unfolding disasters, prior operational conceptualizations may deserve further scrutiny or rejection and new methods for problem resolution must be identified and implemented. The sporting analogy consequently deserves additional elaboration here. For instance, a quarterback may have been given a particular play to run by the coach or offensive coordinator, but the leader on the field realizes he must call an audible based on the formation of the defense he reads in front of him. In the context of basketball, the point guard may also have to set aside a called play if the offensive scheme breaks down as times wanes on the shot clock. In either case, the departure from the existing play is a wise move that may generate a greater chance of success, or even take the defense by surprise and result in a touchdown or basket. Emergency managers should therefore acknowledge the merit of improvisation when prior plans will not work as anticipated. Improvisations are just another means to accomplish goals that have been identified previously in plans or new ways to adapt to shifting disaster conditions.

Fourth, we are generally of the same mind regarding the steps relating to improvisation. When confronted with an unanticipated disaster or a unique situation that calls for the alteration of a scripted function, it is true that emergency managers must first recognize why the current plan is not applicable and then develop new procedures to address the challenge confronting them. If emergency managers do not allow themselves to think “outside of the box” and if they cannot come up with novel solutions, the unfolding operations will be severely constrained in terms of possibility and success. In this sense, there is no doubt that improvisation requires flexibility as well as a combination of intuition, creativity, and bricolage.

Fifth, we accept the fact that both planning and improvisation have merit and that neither is inherently better or worse than the other. Both approaches are needed for emergency management to be effective. Van Riper’s comments on analytic versus intuitive decision making deserve repetition: “what is bad is if you use either of them in an inappropriate circumstance” (Gladwell, 2005, p. 143). In the context of emergency management, this implies that improvisation is not to be pursued if plans will work as initially conceived. Or, in contrast, if prior plans are inadequate to the task, improvisation should be fully pursued and embraced.

Finally, we fully agree that there is a false dichotomy between planning and improvisation. While it is true that planning predominantly occurs before a disaster and improvisation commonly takes place during or after an incident, this conceptualization of chronology masks what it really happening in the heat of an emergency or catastrophe. First responders and emergency managers make sense of the situation facing them and they begin to plan how to implement plans or they plan how to undertake improvisations. This

planning process requires situational awareness, in-person meetings or other forms of communication, a discussion of options, a selection of the decision or decisions, and the identification of how the policy choices will be implemented and by whom. Thus, we agree that planning occurs during and after disasters, and not only prior to their occurrence.

### Differences of Opinion

In spite of the numerous areas of agreement mentioned above, there are a few points of departure between us, although these differences are more of degree than of kind. First, we did not reach consensus on the practitioner's claim that "humans do not analyze their options rationally and then choose the best solution." On the one hand, practitioners are clearly aware of the ample evidence that suggests people do not have all of the information necessary to make rational decisions about disasters. Mistakes may frequently be made in emergency management for a variety of reasons. The failure to anticipate the possibility of the Twin Towers collapsing on 9/11 is a perfect example that could be given. First responders staged equipment and the incident command posts in and around the World Trade Center. They based their actions on how they responded to the 1993 bombing rather than consider all possible outcomes of the 2001 terrorist attack involving airplanes. The failures witnessed in Hurricane Katrina also reveal the imperfections of individuals and organizations. The assumption that people would or could evacuate when warned proved to be false in many cases. In addition, local efforts to prepare for probable hazards were clearly incomplete, the state did not follow proper protocol for damage assessment and requests for a Presidential Declaration, and the federal government was confused about the proper relationship between the Department of Homeland Security and FEMA. Hence, there can be no doubt that rational decision-making is highly unlikely most of the time.

On the other hand, there are times when leaders and those in the field do make what can be described as logical decisions under a condition called "bounded rationality." The reference to sports is again an example of this assertion. For instance, a football or basketball team may call a time-out so the coaches and players can identify options and select the best play to surprise the defense and score a touchdown or basket. It is true that the coaches and players do not have time to review the footage of their opponent and generate a well-developed plan (like they would during the week leading up to the game). In spite of time limitations, they can still make educated guesses about what might work in the given situation at hand. The reaction to the explosion of the Apollo 13 spacecraft is another case in point. The engineers, astronauts, and flight control crew worked diligently to understand what was happening, determine alternative courses of action along with their consequences, and respond in the most reasonable manner possible. While the Apollo 13 case illustrates many characteristics of improvisation, there were problem-solving efforts occurring in real-time as well. The makeshift engineering of the oxygen scrubber and the plan to power up the re-entry vehicle approximate the bounded rationality in what we term the concept of spontaneous planning.



We also differ in our opinion on the point regarding whether intuition is the most important element for improvisation. Yes, intuition can be right in many cases and it should not be ignored as a critical variable. For instance, there were individuals with no engineering knowledge whatsoever who thought the Twin Towers might tumble to the ground on 9/11. Police officers in New York City saw the Towers leaning from their vantage point in the helicopter and tried to relay this information to firefighters in the buildings. Had this intuition been conveyed fully and followed, fewer lives would have been lost in the incident. However, it is vital to recognize that intuition can also be wrong at times. As an example, the mayor of New Orleans delayed issuing an immediate warning for Hurricane Katrina because he thought the storm would veer to the north and east. This mistake sent mixed messages to the citizens of New Orleans or at least delayed evacuation for some individuals. Thus, we agree that intuition is very important, just as flexibility, creativity, and bricolage are. Nevertheless, hunches about the future could also be wrong and have negative consequences in emergency management.

Finally, there is a difference of opinion as to whether improvisation training should be limited to those with considerable experience or provided to everyone. We do agree that an expert is more likely to make good decisions regarding improvisation than a novice. Just as the expert chess player will be able to anticipate subsequent moves with confidence much better than the amateur, a seasoned emergency manager will be able to improvise with greater skill and finesse than an apprentice. Nonetheless, we can argue whether or not we should teach and train for improvisation and the process of spontaneous planning to everyone who is interested and involved in emergency management. In spite of this, we do feel that the more people who understand and value these additional and alternative concepts to planning the better.

### Discussion and Conclusion

Our individual contributions and the collective evaluation of our respective pieces reveal many areas of agreement and a few points of divergence. Based on our comments thus far, we feel it is necessary to provide some recommendations for the future. These suggestions are directed to both practitioners and academics, and may have significant implications for the profession of emergency management, training programs, scholarly research, and education.

- Recognize that planning is indispensable but is not the only approach in emergency management. Planning will always be a main priority of emergency managers, and it should be strengthened and improved over time. However, this should not imply that different knowledge and skills pertaining to response and recovery operations should be downplayed or neglected.
- Understand that improvisation is often needed and can be effective in many situations where plans are insufficient. Since it is impossible to predict every

potential disaster and estimate all types of necessary reactions, emergency management officials should always consider if improvisation is required and how it might benefit response and recovery operations. At the same time, it is imperative that we acquire more information about the potential drawbacks of improvisation, since most case studies praise this behavior instead of deciphering when it may prove problematic. For instance, there are many cases where laws prohibit actions that depart from prescribed actions.

- Learn more about planning and improvisation, and when and under what conditions we should choose one approach over the other. Since planning and improvisation are essential principles in emergency management, it will be vital to comprehend when one should be applied versus the other. As of right now, we lack knowledge about choices between a reliance on planning and the pursuit of improvisations.
- Uncover the relationship between planning and improvisation, and explore how planning during response operations may benefit those involved in emergency management. Because planning and improvisation are tightly coupled phenomena, additional insight must be gained about their complex interaction. In particular, there is room for improvement in terms of how planning may impact response operations and improvisations.
- Examine the extent of rationality in emergency management, the value of intuition in decision making, and who should receive training about improvisation. Right now, our comprehension of these subjects is extremely limited and this fact may be harming the progression of emergency management. Further information on such topics could help emergency managers meet the demands of the future.

In conclusion, it should be pointed out that the authors of this chapter agree that both planning and improvisation have merit and are vital for the success of emergency management. Differing opinions do exist about these important concepts and processes, but the divergence presented in this chapter is more of scale than kind. Although there are certainly distinct points of view among professionals and researchers, we each share a desire to improve emergency management. Continued discussion within and across these groups will therefore positively influence what we do in terms of research, teaching, training, and application.

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