EXPLORING SPONTANEOUS PLANNING DURING THE NORTH TEXAS APRIL 3, 2012, TORNADOES: AN ASSESSMENT OF DECISION-MAKING PROCESSES
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The primary purpose of this research program is to confirm the spontaneous planning behavior in post-disaster operations while at the same time contribute to the development of the concept in a tornado type disaster. An additional goal also includes examining how the process takes place in resolving unanticipated problems as a disaster unfolds. This study uses qualitative methodology which is case study to probe the concept of spontaneous planning behavior to solve unexpected challenges as a disaster develops. Specifically, semi-structured, open-ended questions were utilized to collect data from stakeholders in eleven functional organizations in three impacted cities during the North Texas April 3, 2012, tornadoes. Findings indicate that debris removal and ensuring public safety, search and rescue, securing damaged neighborhoods, activation of emergency operations centers, damage assessment, restoration of communication system, public relations and media, and volunteer and donation management activities appear to have benefited from spontaneous planning behavior. Further findings suggest that the driving forces behind the phenomenon were gathering valuable new information, learning opportunity within the disaster, relative freedom and significant high degree of discretion, response was innovative with flexibility, and solutions waiting for problems features proposed in the integrated decision-making model (IDMM). However, it was uncovered that interview respondents’ answers tend to indicate that mixed organizational structures helped in problem resolutions rather than just flat organizational structure as some decision making literature may suggest.
Analysis of this decision-making model expanded the understanding of how spontaneous planning behavior took place in resolving unforeseen problems in post-disaster operations. This research project confirmed the concept of spontaneous planning in the North Texas tornadoes as well as suggesting how it occurred. The research program validates spontaneous planning behavior in tornadoes; advances and develops the concept of spontaneous planning; increases understanding, description, and management of post-disaster operations; improves emergency management operations; promotes spontaneous planning as a key principle among responders and others involved in emergency management; and proposes IDMM as a useful model that explains decision-making behavior during a disaster.
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. INTRODUCTION</td>
</tr>
<tr>
<td>Definition of a Disaster</td>
</tr>
<tr>
<td>Disaster in Historical Perspective</td>
</tr>
<tr>
<td>Emergency Management</td>
</tr>
<tr>
<td>Pre-Disaster Planning</td>
</tr>
<tr>
<td>The Concept of Spontaneous Planning</td>
</tr>
<tr>
<td>Merit of Spontaneous Planning</td>
</tr>
<tr>
<td>Sensemaking Event and Assumptions</td>
</tr>
<tr>
<td>Organization of the Dissertation</td>
</tr>
<tr>
<td>Summary</td>
</tr>
<tr>
<td>2. LITERATURE REVIEW</td>
</tr>
<tr>
<td>Definition of Disaster Planning</td>
</tr>
<tr>
<td>Historical Background of Modern Disaster Planning</td>
</tr>
<tr>
<td>Characteristics of Good Disaster Planning</td>
</tr>
<tr>
<td>Guidelines for Judging Effective Disaster Planning</td>
</tr>
<tr>
<td>Weaknesses in Disaster Planning</td>
</tr>
<tr>
<td>Definition of Improvisation</td>
</tr>
<tr>
<td>Levels of Improvisation</td>
</tr>
</tbody>
</table>
Disaster Planning and Improvisation as Continuous Processes

Spontaneous Planning

Integrating Disaster Planning and Improvisation through Spontaneous Planning

Summary

3. THEORETICAL DECISION-MAKING MODELS FOR DISASTERS

Incident Command System (ICS)

ICS Weakness as a Decision-Making Tool

The Decision-Making Context of Disasters

Organizational Learning Theory

Strengths and Weaknesses of Organizational Learning Theory

Theory of Street-Level Bureaucracy

Garbage Can Model

Integrated Decision-Making Model (IDDM)

Spontaneous Planning Bridges Disaster Planning and Improvisation

Summary

4. RESEARCH DESIGN

Context

Methodology

Summary

5. FINDINGS FROM THE DATA

Findings

Discussion
Summary.......................................................................................................................... 171

6. ANALYSIS......................................................................................................................... 173
   The Integrated Decision-Making Model................................................................. 173
   Summary..................................................................................................................... 199

7. CONCLUSION.................................................................................................................. 201
   Review of the Findings.............................................................................................. 201
   Implications for Practitioners .................................................................................. 212
   Implications for Researchers................................................................................... 217
   Conclusion.................................................................................................................. 221

APPENDICES....................................................................................................................... 224

REFERENCES..................................................................................................................... 230
LIST OF TABLES

1. Disaster in Historical Perspective ................................................................. 85
2. IDDM Features and Source .............................................................................. 77
3. Enhanced Fujita (EF) Scale for Tornado Damage ........................................... 85
4. Cities in North Texas Impacted by the April 3, 2012, Tornadoes .................. 92
5. IDMM Elements and Related Questions .......................................................... 98
6. Cities and Organizations From which Data were Collected ......................... 101
7. Functions Where Spontaneous Planning was Evident ..................................... 170
8. IDDM Features ................................................................................................. 175
9. IDMM Elements ............................................................................................... 211
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Spontaneous planning timeline</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>Schematic IDMM used under spontaneous planning</td>
<td>76</td>
</tr>
<tr>
<td>3</td>
<td>The timing of spontaneous planning</td>
<td>81</td>
</tr>
<tr>
<td>4</td>
<td>April 3, 2012, EF3 tornado touchdown in Forney, TX</td>
<td>85</td>
</tr>
<tr>
<td>5</td>
<td>April 3, 2012, EF2 tornado touchdown in Lancaster, TX</td>
<td>87</td>
</tr>
<tr>
<td>6</td>
<td>April 3, 2012, tornado damage in Arlington, TX, aerial view</td>
<td>88</td>
</tr>
<tr>
<td>7</td>
<td>April 3, 2012, EF3 tornado damage in Kaufman Count, aerial view, Kaufman County, TX</td>
<td>89</td>
</tr>
<tr>
<td>8</td>
<td>EOC at Arlington, TX, operating during the April 3, 2012, tornados</td>
<td>90</td>
</tr>
</tbody>
</table>
CHAPTER 1
INTRODUCTION

A natural disaster is one of the phenomena that occurs in every nation and at time requires international assistance in the affected nations. Because the frequency and the magnitude of the phenomenon may be increasing, on-time activation of early warning systems and advances in mitigation measures help reduce casualties. Regarding mitigation, for example, adoption of hazard mitigation measures by properly securing furniture and other accessories provide passive protection at the time of disaster impact and actively responding by shutting off gas and electricity when a disaster strikes may contribute to fatality and damage reduction (Lindell, Arlikatti, & Prater, 2009; Lindell & Perry, 2000; Lindell & Prater, 2002; Lindell & Whitney, 2000). However, when a disaster strikes, we have to respond to unanticipated and uncertain circumstances during and after the event. It is this ambiguous situation which is the focus of this research study. In this introduction, this dissertation will elucidate the concept of disaster, briefly look at the history of disaster, present the concept of spontaneous planning to deal with ambiguity as a disaster unfolds, and justify undertaking this research.

Definition of a Disaster

Natural disasters, such as hurricanes, tornadoes, tropical cyclones, floods, earthquakes, volcanic eruptions, fires, famines, and droughts have claimed millions of lives worldwide, rendered millions more homeless, and have affected national economies (Williamson, Hertzfeld, Cordes, & Logsdon, 2001; Kahn, 2005; Noji, 1996). For example, in 2011 the United Nations (UN) put the worldwide economic cost of
natural disasters between $366 billion and $380 billion (AFP, 2012; Huffington Post, 2012; Schiermeier, 2012). A total of 29,782 people were killed in 302 disasters last year (AFP, 2012). Worldwide, it is estimated that a major disaster occurs almost daily and affects varying populations around the world (Binder & Sanderson, 1987). This fact is not lost as Noji (1996) astutely observes that the disasters of today involve economic dislocation; the collapse of political structures; violence ranging from banditry, through civil conflict, to all-out international war, famine, and mass population displacement.

Since extreme phenomenon is framed in the context of a disaster, it is worthwhile considering what constitutes a disaster. It is not enough for disaster scholars to accept the view that “… a disaster is perhaps easier to recognize than it is to define” (Barkun 1974, p. 51). Countering this view, Quarantelli (1985) notes that “while there has been relatively little manifest scholarly attention to the problem, anyone who conducts studies of or undertakes planning for disasters must have at least an implicit image or conception of the phenomenon” (p. 43). With this in mind, our purpose here is to heed Quarantelli’s advice by conceptualizing disaster.

There are many definitions of disaster and as such, the meaning of disaster is diffuse “and means different things to different people” (Britton 1986, p. 257). Research has shown that there is no universally accepted definition of disaster (Turn & Pedgeon, 1997) and also there are no universally available criteria to define the phenomenon in terms of the consequences, such as magnitude, casualties and the cost of damage (Britton 1986; Shaluf, Ahmadun, & Said 2003). Shaluf et al. (2003) further note that the definition used seems to depend upon the discipline using the term. For example, within the sociological school, the term disaster is described as summative concept
(Kreps, 1984) while Quarantelli and Dynes (1970) write that the term has attributes of a “sponge word” (p. 328). According to Britton (1986), these two phrases imply that the concept is used in many ways and means different things in different disciplines.

However, Britton (1986) notes that the majority of sociological definitions of disaster couch their conceptualizations within the broader umbrella terms of disaster being a specific type of “collective stress situation” (Barton, 1969, p. 38) or a “social crisis period” (Quarantelli & Dynes, 1977, p. 23). On the other hand, a non-sociological perspective attempts to define disaster in terms of the magnitude of the event or the degree and extent of physical damage incurred as a result of the hazard event (Foster 1976, 1983). Others have attempted to define disaster in terms of casualties and/or injuries (Michaelis 1973, 1982). Based on the non-sociological disaster definition – that is not regarded primarily as a social phenomenon - Britton (1986) observes that these have not met with great deal of success when an explanation of either the cause or the consequence of the agent becomes necessary.

From the standpoint of emergency management, a disaster should be defined on the basis of its consequences on the community, organization, or a group of people. A search of the literature offers two such possibilities. One of the most widely referenced definitions of disaster, popular with disaster practitioners is the one proposed by Fritz (1961):

... an event, concentrated in time and space, in which a society, or a relatively self-sufficient sub-division of a society, undergoes severe danger and incurs such losses to its members and physical appurtenances that the social structure is disrupted and the fulfillment of all or some of the essential functions of the society is prevented. (p. 655)

This definition is also adopted by UNDRO (1984). Another definition of disaster, salient in the emergency management field, is the one suggested by Parker (1992):
an unusual natural or man-made event, including an event caused by failure of technological systems, which temporarily overwhelms the response capacity of human communities, groups of individuals or natural environments and which causes massive damage, economic loss, disruption, injury, and/or loss of life (p. 6).

These two definitions synthesize the disaster characteristics found in a major disaster as a phenomenon that causes mass casualties, economic losses, damage to structures, and disruption of daily routines. In short, a disaster is a phenomenon that causes mass casualty, injuries, economic loss, damage to structures, and disruption of daily routines.

The above definitions have some drawbacks. They do not take into consideration that a disaster leaves psychological, emotional and spiritual scares in its wake that takes time to heal. Additionally, these scares go beyond the point of initial impact. For example, in the wake of 2005 Hurricane Katrina, people were uprooted from their neighborhoods in New Orleans to different parts of the US. These people lost everything in the disaster including their spiritual attachment to the abandoned neighborhoods. The dispersion of numerous Hurricane Katrina victims from New Orleans to Houston, Texas, for example, overload Houston’s infrastructure, social and school systems. Even today, some Hurricane Katrina victims have not been settled. In terms of time and space concentration, the impact of the incident is beyond New Orleans as well as the initial time of impact. These types of impacts are not factored in the above disaster definitions.

Similar observation could be made of the March 11, 2011, Fukushima Daiichi Nuclear Power Plant disaster in Japan regarding concentration in time and space in the above disaster definition. Reports indicate that the disaster debris was spread far and wide, even into Washington State in the US (Gratia, 2013). Additionally, Emspak (2012) reports that radioactive materials from the Fukushima nuclear disaster has been found
in tiny sea creatures and ocean water 186 miles off the coast of Japan. These radioactive materials could be transported to other countries boarding Pacific Ocean. Depending on the quantity of the pollutants (radioactive materials), it could last for years and may cause diseases in humans who eats contaminated fish from the Pacific Ocean.

Natural, man-made and technological disasters have been with us since creation, though in varying degrees as our climate changes and dangerous technologies become widespread. Indeed, Hoetmer (1991) suggests “the potential for highly destructive events is increasing as the world’s population increases, as certain potentially dangerous technologies become more widespread, and – especially – as populations become more concentrated in urban areas” (p. xxii). Next section briefly looks at important disasters in historical perspective.

Disaster in Historical Perspective

Although there is no consensus on the definition of a disaster, the literature on the subject agrees on its destructive and damaging force. For example, disasters in the history of the human race are estimated to have brought about the loss of millions of lives and billions of dollars in property damages as well as increase in its frequency (Emergency Events Database: EM-DAT: www.emdat.be; Disaster Center: DCW: www.disastercenter.com; US-National Hurricane Center: US-NHC: www.nhc.noaa.gov/pastdeadlya1.html; National Climatic Data Center: NCDC: www.nchc.noaa.gov; Eshghi & Larson 2008). Other scholars have documented the occurrence of flood in Noah’s time (Dynes, 2003; Dynes, Quarantelli, & Kreps, 1981), the brimstone and fire that rained upon Sodom and Gomorrah, and the famine that drove Abram from Canaan to Egypt (Dynes, 2003). Following the lead of these
scholars, Table 1 shows some notable examples of natural, technological, and man-made disasters in historical perspective.

Table 1

**Disaster in Historical Perspective**

<table>
<thead>
<tr>
<th>Year</th>
<th>Type of Disaster</th>
<th>Name of Disaster</th>
<th>Fatalities (#)</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900</td>
<td>Hurricane</td>
<td>The Galveston Hurricane of 1900</td>
<td>6,000-12,000</td>
<td>USA</td>
</tr>
<tr>
<td>1902</td>
<td>Volcanic</td>
<td>Mt. Pelée Eruption</td>
<td>30,000</td>
<td>Martinique (Caribbean)</td>
</tr>
<tr>
<td>1918</td>
<td>Forest Fire</td>
<td>The Great Fires of 1918</td>
<td>1,000</td>
<td>USA</td>
</tr>
<tr>
<td>1928</td>
<td>Drought</td>
<td>Chinese Famine of 1928</td>
<td>3,000,000</td>
<td>China</td>
</tr>
<tr>
<td>1931</td>
<td>Flood</td>
<td>Central China Floods</td>
<td>3,700,000</td>
<td>China</td>
</tr>
<tr>
<td>1952</td>
<td>Smog</td>
<td>The Great Smog of London</td>
<td>4,000</td>
<td>UK</td>
</tr>
<tr>
<td>1963</td>
<td>Hurricane</td>
<td>Hurricane Flora</td>
<td>7,186-8,000</td>
<td>Haiti, Cuba</td>
</tr>
<tr>
<td>1970</td>
<td>Tropical Cyclone</td>
<td>Bhola Cyclone</td>
<td>300,000</td>
<td>Bangladesh</td>
</tr>
<tr>
<td>1976</td>
<td>Earthquake</td>
<td>Tangshan Earthquake</td>
<td>242,000</td>
<td>China</td>
</tr>
<tr>
<td>1977</td>
<td>Technological</td>
<td>Tenerife Air Disaster</td>
<td>583</td>
<td>Tenerife (Canary Island)</td>
</tr>
<tr>
<td>1984</td>
<td>Technological</td>
<td>Bhopal Disaster</td>
<td>3,800-10,000</td>
<td>India</td>
</tr>
<tr>
<td>2001</td>
<td>Terrorism</td>
<td>9/11</td>
<td>3,000</td>
<td>USA</td>
</tr>
<tr>
<td>2010</td>
<td>Heat Wave</td>
<td>Russian Heatwave</td>
<td>55,736</td>
<td>Russia</td>
</tr>
</tbody>
</table>

*Sources:* EM-DAT: [www.emdat.be](http://www.emdat.be); US-NHC: [www.nhc.noaa.gov/pastdeadlya1.html](http://www.nhc.noaa.gov/pastdeadlya1.html); DCW: [www.disastercenter.com](http://www.disastercenter.com); NCDC: [www.ncdc.noaa.gov](http://www.ncdc.noaa.gov); BBC NEWS, Trivedi: [www.bbc.co.uk](http://www.bbc.co.uk); The Telegraph, Lean: [www.telegraph.co.uk](http://www.telegraph.co.uk); Browning 1993; No. HM-2013-1: [www.usfa.fema.gov/nfa/coffee-break](http://www.usfa.fema.gov/nfa/coffee-break); ABC NEWS, Ross: [www.abcnews.go.com](http://www.abcnews.go.com)

Emergency Management

Broadly speaking, Hoetmer (1991) defines emergency management as “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” (p. xvii). Specifically, emergency management may be defined as the process of developing and implementing policies
that are concerned with mitigation, preparedness, response, and recovery (Gunes & Kovel, 2000; Petak, 1985). Briefly, mitigation is deciding what to do where a risk to the health, safety, and welfare of the public has been determined to exist and implementing a hazard reduction programs. Preparedness involves developing a response plan and training first responders to save lives and reduce disaster impact, including the identification of critical resources; and the development of mutual aids agreement with other agencies and jurisdiction. Response covers the efforts taken immediately before, during, or directly after an emergency that save lives, minimize property damage, or improve recovery. Recovery activities aim to restore vital life support systems to minimum operation levels and continue to provide support until the community returns to normal. However, prior to a disaster, there is a pre-disaster planning in the preparedness phase to warn, educate, and anticipate resources when the event hits.

Pre-Disaster Planning

Noah’s flood is generally cited by disaster planning scholars as good example of planning against extreme event threat (Dynes, 2003; Dynes, Quarantelli, & Kreps 1981;). As illustrated in Table 1, natural, technological, and man-made disasters offer ample examples of the need for disaster planning and emergency management because of the number of fatalities and damage cause by these events including their increasing frequency (Hoetmer, 1991). Fortunately, learning from Noah’s experience led to the development of modern emergency management as an attempt to mitigate against the destructive impact of extreme events around the world which appears to be aided by climate change.
Irrespective of agendas or interests of those involved in disaster planning, Landesman (2001) maintains that disasters are extreme events that cannot be effectively managed by the application of routine procedures or resources. Further, Landesman (2001), PAHO (2000) and Levy and Sidel (2003) note that natural disaster such as floods, earthquakes, and hurricanes pose a greater risk to populations than terrorism. Hence, many feel it is important for emergency planners to take a broad approach to disaster preparedness and plan for the consequences from both natural and man-made disasters (Gilmore et al., 2003; Landesman, 2001; Rudman et al., 2003; Waeckerle, 1991). This “all-hazards” approach ensures that resources are effectively utilized in the dual capacity of responding to natural disasters as well as terrorist attacks (Rudman et al., 2003, p. 11). According to Crondstedt (2002), this approach is one of four key principles espoused by Emergency Management Australia (EMA) as being the core policies to be pursued by emergency and related agencies. In the United States, Federal Emergency Management Agency (FEMA) advocates an all-hazards approach which is based on the fact that many emergency management functions are appropriate to a range of hazards (Godschalk, 1991; Daines, 1991). For example, Birkland (2009) argues, “resilient communities that seriously adopt the all-hazards approach will therefore be able to respond to and bounce back from terrorism as well as from natural disasters” (p. 433).

The essence of employing all-hazards approach in pre-disaster planning is simple. According to Kreps (1991) and other literature on emergency management, disasters may differ in important ways in characteristics, but for many disaster management needs and problems, whether natural, technological, or man-made, it does not matter. Take for example, the function of a warning system. Kreps (1991)
argues that regardless of whether the threat is a hurricane, a chemical spill, a flood, a tidal wave, or a nuclear emergency, what matters is whether people will understand, believe, and respond to warning messages. He added that there must be an alerting system that works, and warning messages must be accurate, precise, consistent, and timely. Similarly, Kreps (1991) maintains that because any number of disasters can generate demands for search and rescue, damage assessment and control, emergency medical services, or restoration of essential public services, the important preparedness issues arise not from differences between hazards but from organizational problems that any number of hazards commonly create.

Further, Kreps (1991) indicates practical reasons for adopting all-hazards approach planning in pre-disaster. He advances that the method is efficient in its use of time, effort, money, and other resources. He asserts that an all-hazards approach helps avoid duplication of effort, gaps in disaster response, and possible conflicts arising from divergent approaches to planning. Furthermore, the approach is politically desirable strategy because it eliminates the need to sell different plans to different constituencies. Kreps is of the opinion that the all-hazards approach to disaster planning increases the efficiency and effectiveness of disaster response through an integrated community planning effort. The literature on disaster planning argues that basing the process on general approach rather than specific functions avoid writing disaster plans that are too detail (Gilmore et al., 2003; Godschalk, 1991; Kreps, 1991; Landesman, 2001; Pickett & Block, 1991; Rudman et al., 2003).

The all-hazard approach to planning does not come without critiques. For example, Hoard et al. (2005) maintain that one of the problems with the all-hazards approach is the need for, and coordination of, a mixed cadre of community personnel
such as fire, police, hospitals, public health, and public works to plan for and respond to a wide range of disasters. They argue that these community responders may have already reached or exceeded their limitations. Hoard et al. base their argument on the capacity of these departments, funding, resources, and the number of adequate trained personnel.

The pre-disaster planning enables emergency managers and disaster planners to anticipatorily put in place a plan to be activated when extreme event of any type occurs. For example, they have to consider warning and communication system, evacuation routes, transportation of vulnerable populations, management and allocation of resources, coordination of mixed cadre of community responders, training of community responders, and exercising the plan. A good pre-disaster plan can promote effective response during a disaster (more on disaster planning in Chapter 2). However, no matter how good the pre-disaster planning may be, emergency planners including emergency managers, cannot anticipate every action needed during or after a disaster because of limited information at the planning stage. Moreover, human cognition is limited and needs to respond to changing situations when responding to a disaster event. Thus, the concept of spontaneous planning is introduced into emergency management to respond to uncertainties as a disaster unfolds.

This dissertation focuses on preparedness and response phases of emergency management. Specifically, planning (in the preparedness phase) as well as spontaneous planning and improvisation activities (both in response phase) are discussed. The elucidation starts first with a newly developed concept of spontaneous planning recently introduced into emergency management (McEntire et al., 2013). As discussed above, four phases of emergency management (mitigation, preparedness,
response, and recovery) were defined. However, planning here refers to determining what needs to be done and how to do it in event of a disaster while improvisation is the implementation of completely unexpected post-disaster operations. Thinking of emergency management in this fashion is too simplistic, and the approach needs rethinking because emergency management is a complex undertaking. Thus, the concept of spontaneous planning behavior comes into play and is examined next.

The Concept of Spontaneous Planning

The Webster’s New Universal Unabridged Dictionary (1996) defines spontaneous as coming or resulting from a natural impulse or tendency; without effort or premeditation; natural and unconstrained; unplanned: for example, a spontaneous burst of applause. On the other hand, planning is define as: to form a scheme or program for the accomplishment or attainment of; to have as a specific aim or purpose; intend; to draw or make a graphic representation of (American Heritage College Dictionary, 1993). Combining these two definitions and with particular reference to a disaster event, spontaneous planning could be viewed as unanticipated but planned programs put forward by organizations with a specific aim or purpose of saving lives and property, minimizing disruption, facilitating coordination while allowing organizations to fulfill their functions during and after a disaster. In other words, the activation of spontaneous planning may reduce losses, minimizes disruption, facilitates coordination, and allows organizations to fulfill their functions. This program is different from disaster planning in that it takes place during or after a disaster. On the other hand, traditional disaster planning (see Chapter 2) occurs before a disaster strikes.
The concept of spontaneous planning originally conceived by McEntire, Kelly, Kendra and Long (2013) refers to “planning that occurs during or after a disaster, but is not equivalent to emergent improvisation” (p. 1). The literature further differentiates spontaneous planning from usual disaster planning in that the former does not take place before an emergency or disaster occurs. McEntire et al. (2013) stress that spontaneous planning is an anticipatory activity but occurs after an incident have taken place and takes into account actual hazards and unfolding disaster consequences. Although emergency managers make every effort to incorporate all possible eventualities in disaster plans, the plans are laced with uncertainties and as such “spontaneous planning will, at times, be based on or expand from existing planning documents” (p. 1). However, as the literature observes, spontaneous planning may also vary from “agreed-upon procedures and result in completely unanticipated post-disaster activities” (p. 1).

Another way to distinguish disaster planning from spontaneous planning is by employing military distinction between strategy and tactics as taught and implemented in the field, and highlighting the differences between the two (Quarantelli, 1988). Following military reasoning, strategy could be equated to overall approach to a problem or objective while on the other hand, tactics may be influenced by situational factors or other contingencies which require particular adjustments to achieve a specific goal if the overall objective is to be attained (Quarantelli, 1988, 1993). Based on this reasoning, disaster planning is synonymous to “a strategy” while “tactics” relates to spontaneous planning used to handle the specific situational contingencies which are present or which arise during and after the course of a disaster (Quarantelli, 1993, p. 17). This explanation is in line with McEntire et al.’s (2012) overall description of the
concept of spontaneous planning as well as the differences between disaster planning, improvisation, and spontaneous planning.

It is important to stress that spontaneous planning is not a pure improvisation. While improvisation is the implementation of completely unanticipated post-disaster operations, spontaneous planning is a quasi-formal process of evaluating existing and unfolding problems as well as determining potential solutions and required emergency management actions (McEntire et al., 2013). The premier article on the concept further notes that spontaneous planning is a decision-making process that takes place during or after disaster “to identify available options and specify additional or novel tactical guidelines based on situational awareness and the acquisition of context-specific knowledge” (p. 1). These scholars state that spontaneous planning addresses disaster contingencies as the situation evolves and informs improvised behavior in a more systematic manner.

The importance of spontaneous planning cannot be overemphasized as studies in disaster planning find that actual operations in response to a crisis do not follow the instructions specified in the disaster plan (Mors, Valk, & Witterveen, 2005). These authors argue that disaster plans do not lend themselves to easy extraction of relevant information by what Hoard et al. (2005) called “a mixed cadre of community personnel (e.g. fire, police, hospitals, public health, public works, etc.)” (p. 118). Mors et al. (2005) are concerned that some activities called for in formal disaster plans may be inoperable while others such as Mendoca and Fiedrick (2004) suggest that disaster plans may be abandoned altogether due to their ineffectiveness and urged researchers to focus on alternative approach. On the other hand, Quarantelli (1988) argues that there is often a variance between what is planned and what actually happens in a major disaster crisis.
In addition, he maintains that disaster planning can be poor in the first instance. To address the observed shortcomings in the formal disaster plans noted by researchers during and after a disaster which could be caused by shortsightedness, we introduce the concept of spontaneous planning. The concept of spontaneous planning or the recognition that spontaneous planning is to be expected will empower first responders as they are in uncertain situation as a disaster evolves.

The concept of spontaneous planning as well as its usefulness has been demonstrated by McEntire et al. (2013) utilizing the September 9, 2010, San Bruno, California, gas pipeline explosion. Since that study was the first in spontaneous planning, it potentially raised more questions than answers. Thus, the research question is taken from McEntire et al.’s initial study and contributes to their investigation. The purpose of the following research the exploration of the concept of spontaneous planning started in the San Bruno gas pipeline explosion. Additionally, this research extends the concept of spontaneous planning to another type of disaster event, tornadoes, by utilizing the April 3, 2012, tornadoes that hit Dallas-Fort Worth region of North Texas as a case study. If the current study on tornadic activities confirms the findings observed in the investigation on gas pipeline explosion, it may suggest that spontaneous planning is a valid descriptor of disaster response and recovery behavior not just with the gas pipeline explosion but with another type of a disaster as well. Broadly speaking, the research question is: What processes do organizations employ to deal with changing and challenging situations, and instantaneously solve unanticipated problems as a disaster unfolds? Associated with this question is the need to learn more about how the process occur which leads to the question: How did the phenomenon take place when dealing with a disaster? Furthermore, findings in the
current tornadoes study may shed light on some questions generated in McEntire’s and colleague investigation such as: Is spontaneous planning a valid descriptor of disaster response and recovery behavior? Can spontaneous planning improve emergency management operations when and after disasters occur? Should spontaneous planning be promoted as a key principle among responders and others involved in emergency management?

Spontaneous planning is a new concept introduced into emergency management field recently. It could be described as one of the “sensitizing concepts” in emergency management which scholars in field study (Blumer 1954, p. 7). The sensitizing concept gives scholars “a general sense of reference and guidance in approaching empirical instances” and they “merely suggest directions along which to look” (p. 7). With this in mind, Figure 1 schematically represents a spontaneous planning timeline.

![Spontaneous Planning Timeline](image)

**Figure 1.** Spontaneous planning timeline.

The dash lines in Figure 1 symbolize the fact that planning for and/or during a disaster is a dynamic process and changes as more information becomes available.
(Perry & Lindell, 2003). At the disaster onset, as shown in Figure 1 in the response phase, spontaneous planning process is intense. However, as the disaster progresses, spontaneous planning process fades.

Cumulative knowledge is the foundation of a scientific endeavor and digging more into the concept of spontaneous planning in a variety of disaster types can give researchers confidence about the concept and makes transferability possible (Drisko, 1997; Lincoln, & Guba, 1985). Drisko (1997) notes that transferability of results is often important to the consumers of qualitative studies while Lincoln and Guba (1985) stress that qualitative research should be judged not in terms of generalizability but terms of transferability. This is because every event, setting, organization, and person is different as well as the context. Learning how organizations utilize spontaneous planning can order a way of describing unique behaviors and activities during response and recovery operations to a disaster. Since spontaneous planning takes place during and after a disaster event, it may be regarded as a bridge between disaster planning and improvisation during response operations. An understanding of the spontaneous planning phenomenon may improve models of organizational response to disaster events.

Merit of Spontaneous Planning

The merit of spontaneous planning has been demonstrated especially in rapid onset events such as the California San Bruno gas pipeline explosion (McEntire et al., 2013). With this event, it may be reasoned that detailed disaster plans are unavailable, incomplete or incapable of guiding response activities. On the other hand, in slow onset (hurricanes) or creeping events where detailed disaster plans are significantly
developed, spontaneous planning may still be necessary since disasters are rife with unexpected, ambiguous, challenging and changing situations. Moreover, in developing future rational disaster plans for regular occurring event as hurricane, humans have limited knowledge and information to imagine and evaluate all future problems and provide solutions for them.

If the concept of spontaneous planning in emergency management is valid, the process may save lives and property, minimize daily routine disruption; facilitate coordination while allowing organizations to fulfill their functions during and after a disaster. Further, spontaneous planning if valid as a process may enable emergency responders with decision-making authority to manage emergencies. Additionally and hopefully, it may improve improvisation.

Furthermore, if the concept of spontaneous planning is valid, emergency responding organizations such as emergency management department, fire, police, hospitals, public health, and supporting units (public works, media department, planning and code enforcement) will benefit from the current study. In short, it is the practitioners that will greatly benefit from this project because they will be enabled with a planning process as a disaster unfolds as well as equipped with a decision-making model under a disaster.

Sensemaking Event and Assumptions

This study, the concept of spontaneous planning, is patterned after the idea of sensemaking enunciated by Weick (1993, 1995) and colleagues (Weick, Sutcliffe, & Obsteld, 2005). According to Weick (1995), “sensemaking is best described as a developing set of ideas with explanatory possibilities, rather than as a body of
knowledge. This means that the topic exists in the form of an ongoing conversation …” (p. xi). Further, Weick et al. (2005) astutely note,

Organizational sensemaking is first and foremost about the question: How does something come to be an event for organizational members? ..., sensemaking is about the question: What does an event mean? In the context of everyday life, when people confront something unintelligible and ask “what’s the story here?” their question has the force of bringing an event into existence. When people then ask “now what should I do?” this added question has the force of bringing meaning into existence, meaning that they hope is stable enough for them to act into the future, continue to act, and to have the sense that they remain in touch with the continuing flow of experience. (p. 205)

Expanding on the sensemaking notion and in the context of spontaneous planning, this dissertation aims at explaining, describing and interpreting how a mixed cadre of community organizations such as fire, police, hospitals, public health, public works, code enforcement, and even teachers respond to a disaster as it unfolds. The purpose is to unpack the planning process and decision making in the face of uncertainty as more information becomes available during and after a disaster. It is hoped that the examination of the process can provide insight about instantaneous planning and decision making under ambiguity so that emergency managers and disaster responders could have more tools available to them when responding to future events.

In order to make sense of the concept of spontaneous planning, this study makes an important assumption. The primary assumption made in this study is Max Weber’s notion of “ideal type” (Manen, 1977, p. 206). According to Manen (1977), an ideal type is a conceptual formulation in social science that is regarded as a working hypothesis until its realistic worth has been demonstrated by observation. Though ideal type may be thought of as being in the imaginative realm, however, Weber insists that an ideal type is not just a fictional mental construct (Manen, 1977). From this perspective,
Manen (1977) argues that ideal type is a descriptive device usable both as a tool for classification and as an instrument for understanding reality. Although the study of spontaneous planning invokes the notion of ideal type, it is more complex and complicated than this. This study brings abstraction into reality by using the April 3, 2012, tornado to examine the concept of spontaneous planning.

Organization of the Dissertation

The dissertation focuses on spontaneous planning behavior which is argued to be a process of resolving unanticipated problems in changing and uncertain circumstances as a disaster unfolds. In order to understand the process, a case study approach is utilized to examine the North Texas April 3, 2012, tornadic activity on how organizations in the region reacted to the event. Before proceeding to substantive chapters, this section offers an overview of the organization of the dissertation. Because spontaneous planning behavior is a newly introduced concept in emergency management and little literature exists in the field, Chapter 2 reviews literature on disaster planning and improvisation. The chapter defines disaster planning and explains improvisation, looks at the historical development of modern planning, highlights characteristics of good planning while pointing out what makes a disaster plan a bad one. The chapter further discusses spontaneous planning in relation to disaster planning and improvisation activities.

Chapter 3 presents a theoretical framework on which the research study is grounded. The framework is an integrated decision-making theory common in political science and public administration.
Chapter 4 presents the research contextual background, methodology, and describes the sample selection process, the interview instrument design, and explains qualitative methodology employed in the analysis of data collected in this research study.

Chapter 5 presents the results from the face-to-face interview data from organizational members interviewed by employing qualitative analysis showing likely support for the use of spontaneous planning during and after a disaster event. Furthermore, it is hoped that the findings may shed light on questions generated in McEntire et al.’s (2013) study.

Chapter 6 provides analysis of the hypothesized decision-making model. Chapter 7 recaps findings, looks at implications of the study for practitioners and researchers, and provides suggestions for future research.

Chapters 1, 2, 3, and 4 of this dissertation show it has a justifiable subject, adequate literature review, theoretical framework and suggested research methodology that warrants approval for development of a quality dissertation that contributes new knowledge to the fields of public administration and emergency management. Additionally, this dissertation includes the interview instrument as Appendix A while Appendix B includes a timeline of major milestones leading to an approved dissertation that allows the author to graduate in August 2014.
Summary

Natural disasters caused by hurricanes, flooding, earthquakes, tornadoes, and tsunamis are phenomena that are destructive even with a disaster plan and a robust response. These extreme events require emergency management with emergency managers focusing on planning effort and disaster scholars seeking improvement in improvisation activities in response to these events. To bridge planning and improvisation as well as provide flexibility to disaster responders, we conceive spontaneous planning to solve unanticipated problems, changes, and challenging situations as disaster unfolds. While in the thick of a disaster, spontaneous planning could enable emergency managers and a mixed cadre of community personnel to utilize new information gathered about the disaster to resolve evolving problem during and after a disaster. Moreover, it could lead to better and improved improvisation activities. We hope to use this tornadic event study to contribute to the literature on spontaneous planning and enlarge our understanding of the concept first published by McEntire et al. (2013).
CHAPTER 2

LITERATURE REVIEW

In his comprehensive study of organizational improvisation during a disaster, Kreps (1991) views preparedness (in particular, planning) and improvisation as foundations of emergency management. This view gives rise to Kreps’ assertion that preparedness and improvisation go hand in hand and that good preparedness enhances the ability to improvise. However, these twin foundations, disaster planning and improvisation, are generally seen as separate activities in emergency management by others. For example, on the one hand, emergency managers are concerned with disaster planning located in the preparation phase (FEMA, 2008; McEntire, 2003) while on the other hand, disaster scholars focus their investigations on improvisation’s role as a response activity (Kendra & Wachtendorf, 2006; Kreps, 1991; Mendonca, Beroggi, & Wallace 2001). Both groups often see disaster planning and improvisation as distinct activities which are related, but mutually exclusive concepts (McEntire et al., 2013). For instance, Kreps (1991) argues that improvisation in emergency management gives rise to flexibility to tackle changing and challenging situations during a disaster while preparedness ensures meeting essentials of disaster-related demands.

In this literature review chapter, the focus will be on disaster planning in the preparedness phase of emergency management and improvisation in the response phase. Though emergency managers and disaster scholars may view disaster planning and improvisation as distinct activities, this ought not to be so. This literature review argues for integration and suggests ways of achieving this at the end of the chapter. Since the only literature on the concept of spontaneous planning has already been
reviewed in the introduction, it receives less attention here. First, the chapter attempts to answer the question: what is disaster planning?

**Definition of Disaster Planning**

In general, disaster planning is an attempt made prior to the occurrence of a crisis to facilitate the recognition of emergency related-demands, and to ensure effective response to the crisis event (e.g., a hurricane; Dynes, Quarantelli, & Kreps, 1981). Essentially, it is an activity in anticipation of what might be needed of an organization, a community or a group to avert or minimize casualties or property destruction. It involves taking appropriate steps to ensure that in the response phase, all the resources and materials needed are well organized and mobilized effectively and efficiently. Planning seeks to anticipate problems under uncertain situations and seeks to anticipate solutions to these problems. In essence, planning aims to enhance the ability to respond when disaster occurs (Tierney, 1993). Like any other human endeavor, planning depends on the resources, skills and motivation of those that engage in that activity (Perry & Lindell, 2003). Simply put, planning is figuring out what needs to be done by applying knowledge to resolve basic disaster problems. It “involves setting objectives, gathering and analyzing information, and formulating and evaluating alternative policies, projects, or designs to meet the objective” (Randolph, 2004, p. 16).

Disaster scholars describe planning as a process (not a product) but the outcome may be a living document known as a disaster plan (Alexander, 2002; Dynes, 1993; Perry & Lindell, 2003; Tierney, 1993). As a living document, the plan has to be updated regularly to reflect new information derived from the field to ensure that the plan remains functional as conditions change. The document has to be an accepted ways of
approaching problems dealing with preparedness, response, recovery, and/or mitigation (Dynes, 1993). Secondly, Dynes emphasizes that planning measures should be integrated in behaviors and structures that follow everyday expectations and routines as closely as possible. This approach would not throw people off their everyday routines or requires learning new routines. Now that we have conceptualized disaster planning, we turn our attention to the historical development of modern planning.

Historical Background of Modern Disaster Planning

The historical background of modern disaster planning can be traced to the Cold War era and World War II experience based on the concept of civil defense for civil protection (Alexander, 2002; Dynes, 1994; Dynes & Quarantelli, 1975; Quarantelli, 2000). Alexander (2002) captures the origin of modern planning with this:

The field of civil protection (known as emergency preparedness in the USA) is relatively new and rapidly evolving. It was born out of the civil defence organizations that were set up at the beginning of the Cold War with the perhaps futile aim of protecting the population and vital institutions against the effects of nuclear attack (its earlier origins can be found in the air-raid precautions brigades of the Second World War, and in pre-war measures to protect civilians against armed aggression). (p. ix)

Emerging from the World War II experience and in the context of Cold War, the United States enacted a premier comprehensive legislation, the Federal Civil Defense Act of 1950, to deal with emergency planning (Dynes, 1994). The objective of the legislation was to provide a system of civil defense for the protection of life and property in the United States. The enacting of this law ushers in a dominant model popularly known as the “military model of emergency planning” to indicate its primary origin” (p. 142).

The military model was based on the assumption that in time of emergencies, there is chaos in need of command and control (Dynes 1993, 1994). Because of this
belief, this planning approach is termed “command and control model” signaling the conception from “long standing ideas about the capacity of military organizations to deal effectively with threatening situations” (Dynes, 1994, p. 142). According to Dynes and Quarantelli (1981) this notion has also become deeply embedded in civilian organizations which may deal with emergencies or respond to disasters. The assumption is that some organizational forms such as the military structure with its command and control may deal effectively, efficiently, and quickly than other organizational forms. This thinking is a product of disaster warfare mentality.

However, by the 1970s, Alexander (2002) suggests that the emphasis began to shift to disasters not resulting from warfare. This is the period Dynes and Quarantelli (1975) characterize as transition from warfare concern to planning on disasters caused by natural and technological hazards. The move away from “enemy attack” mentality to other forms of disasters was enshrined in the public consciousness with the enactment of the 1970 Disaster Relief Act (Dynes, 1994, p. 143). This legislation may be assumed to pave the way for the provision of aids and relief assistance to the affected communities. There was one important development which this new change brought about during Carter’s Administration, the creation of new agency overseeing disaster relief as well as disaster reduction activities. With this new direction in disaster planning and response, Dynes (1994) pointed out, “... there was a major change during the Carter Administration when various disparate organization in the government were merged into the Federal Emergency Management Agency” (p. 143). One of the responsibilities of the new agency was to coordinate Federal response and to encourage state and local planning, thus creating what May and Williams (1986) termed
shared governance in the title of their publication. This new approach instituted the modern disaster planning.

Characteristics of Good Disaster Planning

With the institutionalization of modern disaster planning in the United States in the 1970s, a number of scholars have described some principles characterizing good disaster planning (Drabek, 1985; Dynes, 1993; Dynes, Quarantelli, & Kreps, 1981; Perry, & Lindell 2003; Quarantelli, 1997, 1998; Tierney, 1993). Furthermore, research suggests that many response-related problems have their origins in planning that makes incorrect assumptions about how disaster should be managed (Tierney, 1993). In order to minimize these problems, this section discusses some general principles of good disaster planning identified by scholars which public sector organizations, private sector organizations, nonprofit organizations, and other social units can employ in their disaster planning.

Planning is a Continuous Process

One of the general principles in evaluating disaster planning is that planning is a continuous process. The idea here is that disaster planning does not consist of producing a definite plan as a product. Rather it is an ongoing process that requires updating and revising the plan as conditions change.

Planning Attempts to Minimize the Unknown in Disasters

The second principle is that of attempting to anticipate problems and to profess probable solutions. Although planning is based on information available on the disaster
hazards threatening the community or organization, no planning effort can anticipate everything that may occur as disaster strikes and conditions unfold. However, a good plan can at least identify major problems that are expected and attempts to devise solutions. Since everything about a future disaster situation cannot possibly be known, it is impossible to pre-plan all aspects of a disaster response. Therefore, flexibility is a premier requisite that must be incorporated into the plan (Tierney, 1993). The objective of a disaster plan is to limit uncertainty to the best extent possible.

Planning Aims at Evoking Appropriate Action

Another planning principle is its aim at evoking appropriate action. Researchers have argued that rather than responding quickly to a disaster situation and being wrong, planning should emphasize acting correctly with the available information at the time. Dynes et al. (1981) contend,

... it is far more important in a disaster to obtain valid information as to what is happening than it is to take immediate actions. Reacting to the immediate situation may seem the most natural and human thing to do, but it is rarely the most efficient and effective response.” (p. 2)

Planning Should be Based on What is Likely to Happen

Although imagining ideal disaster scenarios in mind may seem intellectually potent during planning process, researchers maintain that planning should be oriented toward possibilities which are realistically probable (Drabek, 1985; Dynes, 1993, 1994; Dynes et al., 1981; Tierney, 1993). The literature argues that plans should be based on empirically-grounded assumptions about how the public will respond in emergency situations rather than myths about disaster behavior. It further stresses that there is considerable continuity between how people behave during non-disaster times and how
they behave during disaster. The myths of irrational and antisocial behavior in disaster are erroneous and research has debunk them (Perry & Lindell, 2003). The literature insists that these myths hamper the effectiveness of disaster planning by misdirecting the allocation of resources and the dissemination of information (Tierney, Lindell, & Perry, 2001).

Planning Should Incorporate Community’s Cultural and Social Structure

A fifth principle for good planning rests on the idea that planning should incorporate community’s cultural and social structure. On this, Tierney (1993) argues that good plans rest on knowledge of how people are likely to respond in emergency situations, knowledge of the hazard itself and of associated vulnerabilities, and knowledge concerning the resources needed to respond to the hazard. Dynes (1993) even suggests that to increase effectiveness, disaster planning needs to be built into the culture and the social structure to ensure that habits and social mechanisms allow a community (I may add, organization) to mobilize the human and materials resources. Thus, developing disaster plan around the people rather than fitting them into the plan is essential and the approach allows planners to view the people as resources that could be deployed rather than viewing them as major problems.

Planning Should Focus on Principles

A sixth characteristic for good planning cautions that disaster planning should focus on general principles (approaches, rules, procedures. and not detail). One of the important reasons for keeping plans focused on principles according to Dynes et al. (1981, p. 3) and Quarantelli (1982, p. 24) is that “a complex and detailed plan is
generally forbidding to most potential users and tends to be ignored.” Another reason is that, since disaster situations constantly change, unfold and evolve quickly, no plan can ever hope to cover every contingency. In general, responding to a disaster situation always involves uncertainty as well as unexpected and unanticipated challenges, hence, plans should allow for flexibility.

Planning is Partly an Educational Activity

A good disaster planning involves not only the plan development but also bringing the community and organizations into the planning process (Tierney, 1993). According to Tierney (1993), the parties involved in the process should be educated on what the hazards are; how the plan will address the threat as expected; and what their roles would be in event of a disaster. In consonant with this, Quarantelli (1998) added,

... good disaster preparedness planning must include, in the larger term, education as a key component. Planning requires educating oneself and others. There is not only a need to teach one’s own group on what to expect and to do, but there is also the necessity of learning how others intend to respond. A frequent error in organizational disaster planning is that planners forget that they will have to educate other groups about their respective roles in disastrous occasion. (p. 12)

Quarantelli (1984) echoes this approach earlier.

Planning Always has to Overcome Resistance

The benefits for disaster planning are not readily self-evident to the public in general, thus leading to natural acceptance. Researchers believe that to overcome planning resistance, it requires persuasion to change behavior, change in thinking and ways of doing things as well as persuading public organizations, private enterprises and nonprofit organizations to budget for disaster preparedness (Dynes et al.,1981; Tierney,
Government officials, businesses and nonprofit organizations may have their expenditure priorities but educating them on the importance of having disaster plan can help them realize their priorities if their organizations are spared or experience minimal damage in event of disaster. To overcome this resistance, the emergency manager or planner has to sell disaster planning to these officials and their communities.

Planning Must be Exercised

Good disaster planning entails exercising and rehearsing the plan before actual disaster occurs to ensure that the plan works and hone the skills of the parties involved in the implementation of the document. All sorts of coordination and communication must be tested and refined to ensure that responders know their roles. The objective of the periodic dry runs and actual exercise is to instill confidence in responders’ ability to respond appropriately when disaster strikes. Additionally, the drills and exercises provide a setting in which operational details may be critically examined (Alexander, 2003; Ford & Schmidt, 2000; Simpson, 2001). Furthermore, Perry and Lindell (2003) note that drills constitute a simultaneous and comprehensive test of disaster plan, staffing levels, personnel training, procedures, facilities, equipment and materials. Another important role of testing which is related to coordination and communication, is that it brings responding organizations into contact and allow individuals to develop personal relationship with one another.

Planning is not Management

It is important to point out that disaster planning is not management. Tierney (1993) observes that the former entails developing general principles and strategies for
action during disasters while the latter attempts to apply those principles and strategies in the disaster setting. Since unfolding disaster may contain elements that are unanticipated in the plan, the actions ultimately taken by the manager may not be in the plan. However, the manager should remember that coordination, communication, media accessibility for information dissemination, and mutual aid agreement activation if needed are important in managing unfolding disaster.

Guidelines for Judging Effective Disaster Planning

In another related work, Quarantelli (1988) discusses other important guidelines for judging good disaster planning. First, according to the literature, it is important in the planning process to recognize that disasters are qualitatively different, not just quantitatively different, from smaller incidents such as accident or regular emergencies. In contrast with these normal events, disasters are events that disrupt daily routines, result in mass casualties, cause tremendous damages, and require convergence of numerous emergency organizations from federal, state, and local agencies as well as nonprofit organizations such as relief workers and Red Cross. In addition, they place tremendous stress on community infrastructure as well as other systems such as the social units. Hence, disaster planning is not merely an extension of planning for daily emergencies.

Another important aspect of planning is that it should be generic and not agent-specific. Although disaster caused by such hazard as flooding, earthquake, hurricane, tornado, and other natural and technological phenomena may differ from one another and may require specialized resources, the literature on planning insists planning should be generic rather than agent-specific. This argument is based on the fact that
the same general tasks will need to be planned for regardless of type of disaster. As could be seen in any disaster, for example, there will always be a need to care for the sick and injured, damage assessment, and the provision of shelter to displaced victims, regardless of the cause (Tierney, 1993).

Finally, the disaster planning literature maintains that good planning is most effective when it is integrated rather than fragmented. The argument is that rather than various organizations and governmental agencies (e.g., law enforcement agencies, fire departments, medical-care organizations, local governments) developing their own disaster plans, it is far better for these various organizations to engage in collective preparedness efforts (Tierney, 1993). The effort should not stop at this collaborative formal plan; such collectiveness should extend to disaster drills and training activities (Dynes et al., 1981; Quarantelli, 1992). By pooling resources together, such approach may save cooperating parties money which could be used for other activities while at the same time minimizes power struggle in event of actual disaster. This argument assumes that during the planning process, the role of each party was formally delineated.

Weaknesses in Disaster Planning

Research indicates that it is rare to find an American community of some size without emergency plan and preparedness (Quarantelli, 1974). This observation comes about partly as a result of federal or state government policies pertaining to disaster preparation requirement. However, it has also been found that these community plans are rarely adequate or sufficient for any major disaster. Quarantelli (1974) notes that when these plans are examined, domains often have not been clearly defined, tasks
integrated, resources allocated and efficiently mobilized, and effective disaster performed. One of the interesting weakness in community disaster plan, particularly in disaster-prone communities, there is a tendency to plan for the most likely kinds of disasters. According to Quarantelli (1974), effective disaster planning takes into account the full range of possible disasters in a locality even though it may concentrate on the more probably likelihood. Another criticism of disaster plans is that they often remain paper plans and are not rehearsed in whole or in part. Thus, an effective disaster plan requires a realistic exercise of the document at both organizational and community levels (Perry & Lindell, 2003; Quarantelli, 1998; Tierney, 1993).

Further critique of the disaster planning is the tendency to let the plan get out of date (Quarantelli, 1974). Good disaster planning requires update the plan as new information about the hazard becomes available. However, Quarantelli (1974) suggests that plan revision could be automatically triggered by specific dates such as prior to local tornado, flood, or hurricane seasons, and exercises of such plans. Additional criticism of disaster planning is that very few plans take into account the transition from disaster period to recovery period with almost none dealing with the inevitable movement back to normalcy (Quarantelli, 1974). There is no excuse for the total absence of guidelines of returning communities to normalcy in the community disaster planning.

Another blistering criticism against disaster planning comes from Clarke (1999, 2006) in “Mission Improbable” (p. 6). In Mission Improbable, Clarke (1999) shows how situations often give rise to “fantasy documents” called plans that probably would not be very useful should a big disaster happens, mainly because they are on unrealistic assumptions. Based on the “fantasy documents” theme, Clarke argues:
... the plans are fantasy documents, imaginative fictions about what people hope will happen after things go wrong. They are fantasies either because the promises they make can never be fulfilled (as is the case for oil spills) or because we can never know whether they will be fulfilled (as is the case for nuclear evacuations and nuclear civil defense) until major catastrophe befalls us. (p. 16)

Clarke stressed that these written plans produced by organizations and their experts are not functional due to human capacity. He suggests that the purpose of the plans’ only function is asserting to others that “the uncontrollable can be controlled” (p. 16). To buttress his arguments, Clarke cites examples of plan failure from oil spill (Exxon Valdes) to nuclear power station construction cost overrun ($5.5 billion) on Long Island with plan to prevent radiation, and the 1976 plan for “nuclear civil protection” for El Paso County, Colorado, to protect people in event of nuclear war (pp. 19-40). Clarke calls all of these plans fantasy documents. He carried over this unrealistic nature of disaster planning to his second book, Worst Cases, with astonishing examples.

Clarke’s two books (1999, 2006) in essence try to portray those organizations that deal with highly dangerous activities such as oil transportation, nuclear power, nuclear war, toxic waste disposal, natural disaster relief as engaging in all sorts of often unrealistic planning documents. Clarke argues that the primary objective with these documents is to reassure various constituencies that they can deal with emergency situations imperiling lives of millions of people. Mission Improbable in particular, contends that organizations fantasize in writing about their ability to cope with disaster. In Clarke’s view, organizations whose activities are prone to large-scale disaster have to engage in planning even when it is apparent to virtually everyone involved that planning for such occurrences is an improbable task. Hence, he argues that planning becomes a rhetoric directed at outside audiences that need to be reassured about safety concerns.
As these criticisms of community disaster planning suggest, it is impossible for organizations to anticipate future problems during a disaster to incorporate all solutions in the community disaster plans. Specifically, human beings do not have the capacity to comprehend future problems as disaster strikes, hence, the need for improvisation activities. It is important stress that no disaster plan is perfect and may not work in a disaster situation because of new and unanticipated issues. This brings up the concept of improvisation.

Definition of Improvisation

Like most concepts in the social sciences, the concept of improvisation does not enjoy universal acceptance (Kendra & Wachtendorf, 2006). For example, Kreps (1991) defines improvisation as activity undertaken “during an event” (p. 34). It is Weick’s (1998) definition which is often cited as good example of improvisation:

Considered as a noun, an improvisation is a transformation of some original model. Considered as a verb, improvisation is composing in real time that begins with embellishments of a simple model, but increasingly feeds on these embellishments themselves to move father from the original melody and closer to a new composition. Whether treated as a noun or a verb, improvisation is guided activity whose guidance comes from elapsed patterns discovered retrospectively. (pp. 546-547)

Another improvisation definition that I find most interesting and instructive is that offered by Webb and Chevreau (2006): “Broadly speaking improvisation refers to social activities that are carried out in un-routine, atypical, or unexpected ways. . . . Improvisation, then, is the situation-based alteration of these stable patterns of activity” (p. 67). In both definitions, the common features present are time bound, situational-based and adjustment from original plan during implementation caused by changing conditions. For example, as Webb (2004) observes elsewhere, a private construction
workers may become involved in clearing disaster debris or an existing neighborhood association getting involved in disaster response and relief activities. Improvisation scholars argue succinctly throughout the literature that the objective of improvisation is to arrest plan implementation uncertainties occurring during disaster response activities arising either with planned-for contingencies or unplanned-for contingencies (Mendonca & Fiedrich, 2004; Mendonca et al., 2001). Thus, in general, improvisation as a process involves adjusting to planned-for activity in face of changing conditions during disaster or providing creative activity for unplanned-for incidents. This creativity idea was evident in responding to the 9/11 terrorist attack of World Trade Center in New York (Kendra & Wachtendorf, 2003a; Wachtendorf & Kendra, 2005; Kendra, & Wachtendorf 2006; Wachtendorf, 2004).

Levels of Improvisation

According to existing research, we can categorize improvisation at three levels: social settings, individual and organizational (Webb & Chevreau, 2006).

Social Setting Level

Improvisation in all social setting could be present in routine and non-routine settings (Kreps & Bosworth, 1993). In the routine setting the need for improvisation may be minimal while in the non-routine settings such as in crisis situation, demand for improvisation may be high. According to Stallings (1998), disaster disrupts society’s institutionalized ways of meeting basic routines and challenges the social order because established routines do not exist to cope with it. The high requirement of improvisation during a disaster is that the event disrupts daily routines and the social order is in
disarray. Thus, based on disaster definition, more creative improvised activities will be required at this time. To further the argument, Webb and Chevreau (2006) maintain that if this were not the case, then there would be no difference between a disaster and every day situation. They further suggest that it may be useful to think of routine and disaster situations as lying along a continuum. According to these scholars, ideally, at one end of the continuum lie routine social settings that involve purely established activities, and at the other end lies disaster situations that involve purely improvised activities. Earlier, Webb (2004) empirically addressed this social setting improvisation in his study of role improvising during crisis situations and interest readers may refer to it.

Individual Level

A second important level of improvisation is that at the individual level. At this level, improvisation scholars attempt to classify various ways in which emergency responders to disaster alter their roles to meet demand of the situation. For example, Webb (2004) argues that during disaster, individuals may engage in disaster-related actions that in normal circumstances would not have gotten involved. Another example, individuals may come together to complete some specific tasks such as relief distribution or help in evacuating injured victims. Kreps et al. (1994) also suggested people may form new social relationships to perform routine activities in new and innovative ways in disasters, particularly when people improvising have previous disaster experience.
Organizational Level

The third and final level of improvisation is the organizational level. The best examples for this level are Wachtendorf (2004) and Wachtendorf and Kendra (2005) publications suggesting that in responding to disasters, organizations sometimes reproduce old structure and processes; adapt to changing demands, thus producing new systems; and in some cases create entirely new structures and processes when none existed to perform necessary functions. These types of improvisations (reproductive, adaptive, and creative) are well elaborated by Wachtendorf (2004) and Wachtendorf and Kendra (2005) elsewhere and readers may refer to these publication.

The Link between Planning and Improvisation

Disaster planning and improvisation are located in different phases of emergency management. The former resides in preparedness phase and the latter in response phase (FEMA, 2008; Kendra, 2006; Mendonca, 2001; Mendonca & Fiedrick, 2004; Mendonca, Beroggi, & Wallace, 2001). However, Kreps (1991) notes that both are linked and go hand in hand when he said:

...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. Equally important, improvisation and preparedness go hand in hand. One needs not worry that preparedness will decrease the ability to improvise. On the contrary, even a modest effort to prepare enhances the ability to improvise. (p. 33)

The implication from Kreps’ observation is that preparedness (planning) increases efficiency in improvisation and by extension, spontaneous planning improves improvisation activities.
Disaster Planning and Improvisation as Continuous Processes

From above literature review, it is evident that both disaster planning and improvisation are continuous processes with built-in flexibility to undertake unanticipated activities as a disaster unfolds. In the planning phase, it is impossible to anticipate all future challenges and to incorporate all necessary information that could mitigate any changing situation. This is particularly true when we consider rational model decision-making process in light of information gathering and limits of human capacity for comprehensiveness of the future (Lindblom, 1959; Simon, 1955, 1978). In planning for future disasters, we have imperfect information about the community we plan for, the magnitude and direction of the hazards, available resources including manpower and equipment and as such, valuation of future consequences is imperfect. Moreover, our knowledge to evaluate the future is incomplete. Our anticipated analysis of future problems, solutions and consequences is at best estimate. According to Dynes et al., (1981), “certain problems are likely to arise despite what planners may do, and what can or cannot be planned” (p. iii). Thus, the importance of spontaneous planning cannot be overemphasized as this process can undertake contingencies not envisioned in the initial planning process before the disaster.

Improvisation though temporary in the response phase of a disaster, plays important role in restoring normalcy to an organization during a disaster. For example, during hurricane when regular power supply is knocked out, businesses may temporarily improvise with power generators. Another important improvisation example which could not be ignored occurred on September 11, 2001, when the Office of Emergency Management (OEM) and emergency operations center (EOC) located at 7 World Trade Center, adjacent to the Twin Towers were destroyed (Kendra &
Wachtendorf, 2006). With no back-up facility in place, OEM staff and city agency representatives improvised a temporary site in the police academy library. The new temporary location quickly improvised a new site of central coordination between numerous agencies that would need to respond to various emergency support functions. With these examples in mind, the benefits of improvisation are the restoration of normalcy to organizations that allow them to carry out their regular functions for which they were established.

While improvisation is necessary in disaster management, particularly the idea of novel creativity common in the improvisation literature, other scholars caution on impulse or quick creativity. For example, Weick (1993) writing on the Mann Gulch fire disaster in Montana cautions, “What we do not expect under life-threatening pressure is creativity” (p. 639). Similarly, Dynes et al. (1981) warn that in a disaster speedy response may not be appropriate and delay may be necessary. Their argument is that at times more information about the disaster situation is needed for proper response. This cautionary warning is in line with an incident when Pittsburg Steelers played against Baltimore Raven football club on Sunday, September 23, 2012. During the match, a Baltimore Raven’s player was knocked down unconscious. Although the medical team rushed to the field and surrounded the injured player, he was not attended to for about 11 minutes while he was lying on the field. One may theorize that the delay was to allow the medical team instantaneous consultation among them on appropriate beneficial action to be taken on the injured player. However, it was after 11 fearful and breath-taking minutes that the unconscious player was moved and placed on a stretcher and wheeled away. What was interesting was that while being wheeled away, he gave a thumps-up indicating that he was conscious with fans responding with applause.
With respect to the injured football player, the medical team’s action on the football field appears to follow Weick’s (1993) and Dynes et al.’s (1981) advice. Scholars’ caution on impulse or quick improvisation and the medical team response to the injured Baltimore Raven player are instructive. We could learn from established profession such as medicine on when to pause and think before responding to life-threatening situation. Such situation may point to the fact that on-the-spot planning can resolve unforeseen challenges during disaster episode that were not captured in the initial planning phase. Secondly, instantaneous planning can improve improvisation activities by allowing responders to pause for a while to gather information, analyze it, and plan before taking appropriate action in crisis situation. Thus, spontaneous planning bridges information gap between disaster planning and improvisation.

While spontaneous planning may have experimental quality (McEntire et al., 2013), its quality may improve as disaster responders bring field experience to similar situations they faced in previous disasters. If spontaneous planning concept is a viable concept in emergency management, its institutionalization may help in training and educating disaster responders. As a new concept, its utilization requires thinking outside the box and being innovative in planning and in decision-making process. It will require equipping responders and emergency managers with decision-making tool box to enhance their effectiveness when faced with challenging situations during and after a disaster.

Spontaneous Planning

As mentioned in Chapter 1, this study is predicated on the notion of the concept of spontaneous planning as a disaster unfolds. It is important to note that there is little or
no literature on the concept, except McEntire et al.’s (2013) work. Although the concept was exhaustively explained in Chapter 1, it is crucial to tie it to disaster planning and improvisation activity as well as noting their differences. First and foremost, spontaneous planning is similar to disaster planning in that both are processes and dynamic in nature. As a process, both are updated as useful information about the hazard is available before a disaster occurs (in case of disaster planning) or during and after a disaster (in case of spontaneous planning). However, spontaneous planning differs from disaster planning in that the former takes place as a disaster unfolds while the latter is a proactive process that takes place prior to a disaster.

Spontaneous planning could further be distinguished from disaster planning by invoking military warfare planning and differentiating strategy from tactics in the battlefield (Quarantelli, 1988). Based on military reasoning, strategy could be seen as an overall approach to resolving a problem or achieving an objective while tactics on the other hand, may be influenced by situational factors or other contingencies which require specific adjustments to achieve a particular goal if the overall objective is to be attained (Quarantelli, 1988, 1993). Inferring from this military logic, disaster planning is synonymous to “a strategy” while “tactics” relates to spontaneous planning used to handle the specific situational contingencies which are present or which arise during and after the course of a disaster (Quarantelli, 1993, p. 17). This explanation is consistent with McEntire et al.’s (2013) overall description of the concept of spontaneous planning as well as the differences between disaster planning, improvisation, and spontaneous planning.

Further, spontaneous planning could be viewed as unanticipated but planned programs put forward by organizations with a specific aim or purpose of saving lives
and property, minimizing disruption of daily routines, facilitating coordination while allowing organizations to fulfill their functions during and after a disaster. In other words, the activation of spontaneous planning may reduce losses, minimize daily routine disruption, facilitate coordination, and allow organizations to fulfill their respective functions. The need for spontaneous planning arises from the fact that during the disaster planning phase, disaster planners and emergency managers are unable to anticipate all situational eventualities prior to a disaster occurrence. The fact is that humans are limited in cognitive ability, and as such fall back on spontaneous planning process to resolve situational problems as a disaster unfolds.

With regards to improvisation activity, it is essential to note that spontaneous planning differs from improvisation. According to McEntire et al. (2013), while improvisation is the implementation of completely unanticipated post-disaster operations, spontaneous planning is a quasi-formal process of evaluating existing and unfolding problems as well as determining potential solutions and required emergency management actions. Further, McEntire (2011) astutely notes that spontaneous planning is a decision-making process that takes place during or after disaster “to identify available options and specify additional or novel tactical guidelines based on situational awareness and the acquisition of context-specific knowledge” (p. 1). Thus, spontaneous planning addresses disaster contingencies as the situation evolves and informs improvised behavior in a more systematic manner. It could also be said that spontaneous planning is a detailed planning occurring after a disaster to inform and shape improvised response and recovery activities.

Generally speaking, spontaneous planning as a solution formulating process, gathers information during and after a disaster and synthesizes it in an ambiguous
situation to resolve the contextual problems that may arise. These situational problems were not anticipated during pre-disaster planning. Thus, spontaneous planning involves instantaneous decision making, on-the-spot thinking as well as thinking out the box and being innovative. It could be surmised that this type of planning informs proper improvisation activity to be undertaken. Therefore, it could be argued that spontaneous planning is in the domain of decision-making process while improvisation activity is the implementation of the spontaneous plan developed to resolve situational problems as a disaster evolves. Thus, spontaneous planning and improvisation action go hand-in-hand and are intertwined as this discussion indicates. For this reason, this study is guided by the notions of “sensitizing concept” (Blumer, 1954, p. 7) and Weber’s “ideal type” (Manen, 1977, p. 206).

Integrating Disaster Planning and Improvisation through Spontaneous Planning

Building on the concept of preparedness (in particular, planning) and improvisation (in response phase) as foundations of emergency management (Kreps, 1991), this study argues that the two activities and spontaneous planning should be integrated as a process to effectively respond to a disaster event. Spontaneous planning as a bridge between disaster planning and improvisation activities extends planning process with new information gathered as a disaster unfolds while providing improved understanding of the possible range of improvisation activity to be taken to minimize destruction. This approach may encourage disaster scholars to conduct more rigorous research focusing on saving lives and property. After all, the three concepts’ objective is reduction in destruction from extreme natural, technological or terrorist events. This being the case, integration should be the goal.
Researchers and emergency managers should work together to ensure that frontline practitioners in the disaster field are aware of new knowledge in the field as well as its application. The former should be the generator and disseminator of this new knowledge while the latter should be the utilizer. Emergency managers should be encouraged to think beyond traditional disaster planning and to consider improvisation during the response phase as well as applying spontaneous planning as disaster unfolds. This outside the box thinking could only be possible with rigorous research in the three areas and not just improvisation as currently is the case (Kendra & Wachtendorf, 2006; Kreps, 1991; Mendonca, Beroggi, & Wallace, 2001). Awareness of the fact that disaster planning, spontaneous planning, and improvisation activities are integrally connected and essential understanding is necessary if disaster scholars and disaster practitioners aim is to reduce destruction in event of a disaster. The substantive questions to be examined in this research study are: Does spontaneous planning occur in disasters (e.g., tornadoes)? Also, what process does disaster responders employ instantaneously to solve unanticipated problems and changing, and challenging situations as a disaster unfolds?

Summary

This literature review reveals paucity of literature dealing with spontaneous planning which is essential to resolve unanticipated problems as disaster evolves except McEntire et al.’s (2013) initial publication. The literature review here focuses on disaster planning and improvisation activities stressing where each is applicable. However, missing in the literature narrative is the integrative argument of the three processes of disaster planning, spontaneous planning, and improvisation activities.
This gap was highlighted and argued for in this literature review chapter. Approaching disaster event from this perspective may minimize destruction during the actual event and the importance of research and new knowledge dissemination cannot be overemphasized.
CHAPTER 3
THEORETICAL DECISION-MAKING MODELS FOR DISASTERS

This chapter provides the context to study the process of spontaneous planning under disaster conditions that was reviewed in Chapter 2. It should be noted that a study on spontaneous planning really dives into decision making under ambiguous, changing, and challenging circumstances as a disaster unfolds. Spontaneous planning involves instant decision making to resolve unanticipated problems that arise during a disaster. As such, this chapter discusses Incident Command System (ICS) which is one of the most commonly and popularly utilized management tools for coordinating multiple agencies’ activities responding to a disaster. Second, the chapter reviews some decision-making theories/models available in other disciplines such as political science, public administration, organizational theory, and public policy which potentially could be applicable to emergency management during a disaster. Finally, the chapter articulates an integrated model of decision making under spontaneous planning to resolve problematical conditions during a disaster. The model combines decision-making theories/models from other social science fields into a coherent model of decision making under spontaneous planning. First, ICS is reviewed.

Incident Command System

The literature on emergency response indicates that all emergency responders use some command system to manage the overall response to an incident, the most common of which is the ICS (Bigley & Roberts, 2001; Buck, Trainor, & Aguirre, 2006; Jiang et al., 2004; Lutz & Lindell, 2008). The system has been adopted by many local, state, and federal agencies in the United States to manage emergencies of all kinds.
Jiang et al. (2004) note that ICS is also supported by various artifacts and procedures to help the command team assess, plan, and communicate with parties involved in the incident.

ICS is one of the three key organizational systems in command and management (ICS, Multiagency Coordination Systems, and Public Information Systems) of the national incident management system (NIMS, Department of Homeland Security, 2004). According to the Department of Homeland Security (DHS), NIMS refers to an incident management system that provides a consistent nationwide template to enable federal, state, local, and tribal governments and private-sector and nongovernmental organizations to work together effectively and efficiently to prepare for, prevent, respond to, and recover from domestic incidents, regardless of cause, size, or complexity, including acts of catastrophic terrorism. NIMS originates from the Homeland Security Presidential Directive (HSPD)-5, Management of Domestic Incidents, issued on February 28, 2003, by the President which directs the Secretary of Homeland Security to develop and administer a system to manage domestic incidents from all causes including both terrorism and natural disasters (Buck et al., 2006; DHS, 2004).

HSPD-5 requires all federal department and agencies to adopt the NIMS and to use it in their individual domestic incident management and emergency prevention, preparedness, response, recovery, and mitigation programs and activities, as well as in support of all actions taken to assist state, local, or tribal entities (DHS, 2004). NIMS is now mandated by the President for use by all federal departments and agencies, states and local organizations as a condition for federal preparedness grants (Buck et al., 2006).
Jurisdictions in the US have complied with an aspect of the NIMS command and management component by adopting ICS.

Structurally, ICS is constructed around five major functions: command, operations, planning, logistics, and administration (Bigley & Roberts, 2001; Jiang et al., 2004;). According to the literature, command is responsible for overseeing all incident activities, including developing and implementing a strategic plan. Incident commander is the person in charge of overall command and is the highest-ranking position within the ICS. The incident commander has responsibility for several other important functions, including release of information to external constituents, safety of personal, and liaison to assisting agencies (Bigley & Roberts, 2001). The operations section manages tactical operations to implement the overall strategic plan. The planning section is in charge of collecting, evaluating, and disseminating information such as maps, weather reports, road closures, and status of personnel and resources (this planning section of ICS is related to spontaneous planning, but it is different at the same time). The logistics section provides facilities and services to support ICS. Finally, the administration section provides accounting, procurement, and cost analysis. The incident commander may delegate authority for performing these functions to others.

Though highly bureaucratic, the ICS seems to serve as the basis for the exceptional organizational flexibility required for reliable performance under highly variable and risky circumstances.

ICS has received glowing review from one of its proponents, FEMA (2005). FEMA notes in the ICS-300 training manual that ICS increases organizational effectiveness through 14 features: (a) common terminology, (b) modular organization, (c) management by objectives, (d) reliance on an Incident Action Plan, (e) chain of
command and unity of command, (f) unified command, (g) manageable span of control, (h) pre-designated incident locations and facilities, (i) resource management, (j) information and intelligence management, (k) integrated communications, (l) transfer of command, (m) accountability, and (n) deployment.

Research shows that the ICS is arguably the most effective and efficient disaster management tool (Bigley & Roberts, 2001; Buck et al., 2006; Lindell, Perry, & Prater, 2005; Moynihan 2008, 2009; Perry, 2003). The system is credited for structuring the activity of disaster response agencies at the site of disasters in the United States as a mechanism for inter-organizational coordination designed to impose order on certain dimensions of the chaotic organizational environments of disasters (Buck et al., 2006). According to the literature it provides a set of rules and practices to guide the actions of the various organizations responding to disaster, and creates the necessary division of labor and coordination mechanisms among them. Further, ICS is useful in managing diverse resources such as personnel and equipment of network of responders at emergency scenes (Bigley & Roberts, 2001; Moynihan 2008). Structurally, ICS is a highly centralized system organized for effective and efficient governance operations of resources of many agencies and jurisdictions (Moynihan, 2009; Perry, 2003).

ICS Weakness as a Decision-Making Tool

Since ICS came to the scene more than thirty years ago, its effectiveness has been scrutinized by scholars studying disaster response (Drabek, 1985; Drabek, 2005; Lutz & Lindell, 2008; Neal & Phillips, 1995; Schneider, 1992; Trainor, 2004; Wenger, Quarantelli, & Dynes, 1990). Since ICS is constructed on a command and control model, Wenger et al. (1990) and Jiang et al. (2004) suggest that only quasi-military
organizations such as fire service, police and law enforcement can successfully implement such a response structure. Wenger et al. (1990) contended that these organizations have established a disciplined regiment, and the system is used on regular basis. They argued that organizations with standard civilian structure, such as public works and social services, cannot operate as effective under the command and control model. Lutz and Lindell (2008) had similar finding when they study ICS as a response model within emergency operation centers (EOC) during hurricane Rita. They concluded that “… staff from emergency relevant agencies (e.g., public works and social services) seemed to have more problems with ICS than did staff from emergency mission agencies (e.g., fire and police departments)” (p. 122). Buck, Trainor, and Aguirre (2006) conducted a systematic qualitative examination of ICS effectiveness in nine different incidents involving multi-organizational response in the Pentagon, North Ridge earthquake, Oklahoma City bombing, Atlanta Olympics bombing, DeBruce grain elevator explosion, Columbia Space shuttle accident, WTC, Hurricane Floyd and Humberto Vidal gas explosion. They acknowledged the many ways in which ICS promoted effective emergency response but qualified their endorsement by noting:

For ICS to be effective as a tool to coordinate the response, it must be used by a community of official responders who through training and shared experiences, over years of public develop technical confidence and interpersonal trust in each other. … Rather, it is an effective set of principles for coordinating the activities of well-trained and integrated communities of first responder organizations in emergencies and in some but not all aspects of disaster response where social and cultural emergence is at a minimum. (p. 14)

Buck et al.’s contention of ICS effectiveness with emergency mission agencies during an incident rests on Wenger et al.’s (1990) and Jiang et al.’s (2004) findings that civilian organizations such as public works and social services cannot operate effectively under the command and control model. In their study, Wenger et al. (1990) and Jiang et al.
(2004) seem to have made comparative analysis of ICS effectiveness in a civilian organization with a quasi-military structure. Similarly, Buck et al.'s (2006) observation is anchored on the fact that command and control organizations such as police and fire are used to taking orders and can easily adapt to ICS construction. Moreover, those in the emergency mission agencies are apt to responding to emergencies frequently while those in the emergency relevant agencies such as public works and social services only respond to emergencies such as hurricane and tornados in a supporting role. However, if these emergency relevant agencies are trained in the use of the ICS, they can utilize it as effective as those in the emergency mission agencies. Thus, Buck's et al. conclusion may be over generalization.

Another limitation common with the ICS is its negligence of volunteers and emergent organizations (Drabek, 1985; Drabek, 2005; Neal & Phillips, 1995; Schneider, 1992; Trainor, 2004; Wenger et al., 1990). For example, Schneider (1992) asserted that emergency responders operate under false assumptions of social behavior in times of disasters, that is, they think of ordinary citizens as impediments rather than assets during disaster response. Thus, according to Lutz and Lindell (2008), ICS lacked mechanisms for absorbing volunteers, which left gaps in the overall response effect. With regards to this, Neal and Phillips (1995) maintain that this neglect of volunteers ignores the emergent human resources model, which advocates the incorporation of emergent volunteers into an organized emergency response. At the time of these criticisms, the ICS response model was relatively new concept and lacked standardized implementation (Lutz & Lindell, 2008). Base on this, Wenger et al. (1990) contended that the omission of volunteers is an inherent problem within the ICS response model. However, other scholars have argued that the ICS limitation is not inherent deficiency of
the system itself, but rather due to ineffective implementation (Hanson, 2007). In response to the criticism, recently the Department of Homeland Security has refined ICS to include volunteer agencies and other governmental entities outside of law enforcement and fire service. In doing so, Lutz and Lindell (2008) observed that ICS has addressed the criticisms of Wenger and his associates, although it is not clear to what extent these reforms are being implemented in actual emergency response.

Although ICS has been in use for more than thirty years, there have been very few empirical investigations of its effectiveness. However, Bigley and Roberts (2001) used document reviews, observations, and interviews, to study ICS use within the fire department of a major metropolitan area. They maintained that ICS provided mechanisms for rapidly modifying formal organizational structures, constraining improvisation, and managing emergency responders’ cognitions. In addition, they also concluded that these mechanisms led to organizational reliability in an emergency response. Specifically, Bigley and Roberts’ research suggest that:

… to the extent an organization had the capacity to implement preplanned organizational solutions rapidly enough to meet the more predictable aspects of an evolving incident, potential reaction speed is increased, depletion of cognitive and other resources is reduced, and the probability of organizational dysfunction is diminished. (p. 1297)

As noted earlier, study on spontaneous planning delves into organizational decision making under ambiguity as a disaster evolves. Even though ICS is good for resource management and interagency coordination of disaster responders, it does not lend itself to organizational decision making as these entities respond to unfolding disaster. The system assumes existence of a “perfect” disaster plan in place prior to a disaster and just imposes command and control in response phase. As already indicated in Chapter 2, there is no perfect disaster plan which anticipates every future
problem before a disaster strikes. Additionally, I have argued elsewhere that human beings possess limited knowledge to assemble solutions to future unanticipated problems. As disaster planners lack this future cognitive ability, disaster responders must rely on on-the-spot information to make decision during a disaster. ICS is not design for this type of approach. Thus, I argue for decision-making theories and models from other social science fields to enable disaster responders who are under pressure resolve problems in a changing and challenging situations during a disaster. This vision is to strengthen decision making under disaster in emergency management and to equip practitioners with on-the-scene decision-making tools.

The Decision-Making Context of Disasters

It is important to note that the ICS section on preparedness encompasses an integrated combination of planning, training, exercises, personnel qualification and certification standards, equipment acquisition and certification standards, and publication management processes activities (DHS, 2004). Of interest in this dissertation is the planning section of the ICS which proposes planning for response during the response phase of a disaster. According to DHS, the planning component describes how personnel, equipment, and other resources are used to support incident management and emergency response activities. Further, the planning section provide mechanisms and systems for setting priorities, integrating multiple entities and functions, and ensuring that communications and other systems are available and integrated in support of a full spectrum of incident management requirements. Simply put, the planning section develops the action plan to accomplish the system’s objectives (Bigley & Roberts, 2001). In other words, as a management mechanism, the planning
section is in charge of collecting, evaluating, and disseminating information such as maps, weather reports, road closures, and status of personnel and resources (Bigley & Roberts, 2001; Jiang et al., 2004).

Although ICS is an excellent disaster scene management tool, however, it does not theoretically give insight on how disaster responders make decisions to resolve unanticipated problems as disaster unfolds. To understand theory underpinning decision making under disaster reviewed in Chapter 2, we have to turn to public administration and social science decision-making theories and models. In traditional disaster planning in the preparedness phase, planning decisions are based on rational model. Under this theory, information about the hazard under consideration is gathered and analyzed from which a plan document is developed with the hope that when implemented during actual disaster will reduce destruction. However, this rational decision-making model is limited by human knowledge and cost of information gathering. Moreover, traditional disaster planning cannot anticipate all problems, changes, and challenges situations as a disaster evolves. No matter how good a disaster plan is as reviewed in Chapter 2, mankind cannot fathom the future to adequately plan for. Thus, disaster responders have to fall back to decisions made “on the fly” as disaster unfolds which is appropriate for spontaneous planning to resolve problems during and after a disaster.

Therefore, to answer the question on how disaster responders react during and after extreme event in what McEntire et al. (2013) call spontaneous planning, this study have to look at responders’ decision-making behavior. To this end, the study hope to adapt decision-making models available in public administration and other social sciences to inform of appropriate decision-making models under pressure, changing,
and challenging conditions such as a disaster. The approach this study intends to employ here is what is termed “integrated theoretical framework” that equips disaster responders with “decision tool box” for use under spontaneous planning process. Though the discussion may be discrete for explanation purposes, the intention is that this should be seen as an integrated approach to decision-making applicable to spontaneous planning. During a disaster, responders call on their autonomy, delegated decision-making authority with high degree of latitude, experience, and skill to safe life and property.

The remainder of the chapter focuses on the theoretical framework in which this research study, spontaneous planning, is located. In general, organizations are created to solve well-defined problems with structures to resolve conflict through bargaining (Cohen, March, & Olsen, 1972). Additionally, they also provide sets of procedures through which participants arrive at an interpretation of what they are doing and what they have done while in the process of doing it. These organizations are populated with individuals who make decisions to advance the goals and values of the organizations. In terms of disaster response, the objective of the responding agency is to safe life and property by implementing the prepared disaster plan. However, it has been argued earlier that disaster plans are anticipatory of future events and are riddled with uncertainties. Hence, the responding teams have to make decisions as the disaster unfolds with accompanying challenging situations to mitigate loss of life and property. With this in mind, our theoretical framework centers on decision-making theories that equip disaster responders with decision tools to handle unanticipated events.

One important element in disaster study is that decision-making is viewed in an environment of uncertainty, intense time pressure, stress, strain, and challenging (Boin
& Hart, 2010; Dror, 1988; Dynes, & Quarantelli, 1977). The very notion of disaster implies uncertainty and unforeseen events; therefore a mixed cadre of community personnel such as emergency manager, fire, police, hospitals, public health, public words, and volunteers (Hoard, 2005) need what we call “decision tool box” to draw from appropriate tool to meet the demand of the situation. As such, the theoretical framework approach in the study is what we term “integrated theoretical framework” based on decision-making processes which consist of the theory of street-level bureaucracy (Lipsky, 1980; Moore, 1987), organizational learning theory (Birkland, 2004; Busenberg, 2000, 2001; Carley & Harrald, 1997; Ford & Schmidt, 2000; Huber, 1991; Levy, 1994; May, 1992; Popper & Lipshitz, 1998; Simon, 1991), and the garbage can model (Cohen, March, & Olsen 1972). Spontaneous planning operates in the realm of uncertainty, intense time pressure, changing, and challenging situations as disaster unfolds and these theories provide tools for spontaneous decision-making.

The challenge in this chapter is to describe theories at the operational level where disaster responders who are closest to the disaster utilize the theories to address the threat, minimize the consequences, and provide immediate relief as the disaster evolves (Boin & Hart, 2010). Regarding this, Dror (1988) argues for actual devolution of decision authority on individual, often of low rank (street-level bureaucrats), because time pressures prevent hierarchical controls from working. Thus, this study argues for decentralization of decision-making authority under disaster conditions where individual disaster responder employs his expertise and creativity as disaster unfolds. The task here is to describe decision-making models pertinent under disaster conditions starting with the organizational learning theory, the theory of street-level bureaucracy, and garbage can model. The description starts with organizational learning theory.
Organizational Learning Theory

The first decision-making theory pertinent in explaining the phenomenon of spontaneous planning decision is organizational learning theory. One of the expectations of organizations in disasters is minimizing the disaster’s impact. To undertake this expectation, Carley and Harrald (1997) believe that learning is expected to be one of the key mechanisms through which organizations come to prevent and minimize the impact of disasters. Busenberg (2001) provides a simple and elegant definition of learning as “a process in which individuals apply new information and ideas to policy decisions” (p. 173). Similarly, Levy (1994) provide another parsimonious definition of “experimental learning” as “a change in beliefs (or the degree of confidence in one’s beliefs) or the development of new beliefs, skills, or procedures as a result of the observation and interpretation of experience” (p. 283). The author explicitly notes that his definition of learning does not require actual policy change but merely requires “an improved understanding of the world, or an increasingly complex cognitive structure” (p. 283). In this research study, the focus is on changing and challenging situation as a disaster unfolds.

Changing and challenging situations, what Birkland (2004) calls focusing events, cause individual actors to react to the event in certain ways. A focusing event, interpreted here as an onset of a disaster, will lead to the obvious response to the event itself providing pressured decision-making opportunity to actors different from original plan embodied within what Busenberg (2001) terms as a learning process and what Levy (1994) views as a change in beliefs. Studies show evidence of learning from focusing events at the institutional level that have led to debates, news stories,
proposed laws and regulations, enacted laws and regulations and give insight on whether and to what extent the key participants in these institutions have learned (Birkland, 2004).

If we look at the aviation security, learning and policy improvement have occurred after disasters. For example, in a study of aviation security, Birkland (2004) finds that the loss of Pan Am Flight 103 in 1988 and TWA Flight 800 in 1996 lead to greater policy-making attention to a relatively narrow range of issues raised by these events. The author also finds that the September 11 terrorist attacks led to a comprehensive search for improved policy tools to prevent a recurrence of the attacks. Birkland argues that in all three of these cases, and learning that derives from direct experience is evident after both Pan Am 103 and September 11. In particular, he show that policy-making activity after the 1988 and 1996 events provided the raw material for many of the debates surrounding policy change following the September 11 hijackings and attacks.

Another learning experience from a disaster came during the Exxon Valdez accident in 1989 in which the tanker spilled approximately 11 million gallons of oil into the Sound (Busenberg, 2001; Birkland, 1998). The accident mobilized environmental groups that pressed claims of policy failure in congressional hearings, which led to the resolution of a 14-year deadlock over improved oil spill policy and the passage of the Oil Pollution Act of 1990 (Birkland, 1998; Busenberg, 2001). According to Busenberg (2001), the new regulatory framework mandated enhancements in three critical system safeguards in the Sound: tug escort vessels, vessel tracking equipment, and spill response equipment. Prior to the 1989 disaster, laden tankers were not protected by
either escorts or vessel tracking for most of their passage through the Sound and only a limited amount of response equipment was deployed at the terminal.

The aviation security and Exxon Valdez examples point to the presence of agents’ disaster experience which may include new information that influence action to mitigate focusing events. We learn from experience as commonly used axiom says “experience is the best teacher.” With experience on the job, disaster responders learn making reasonable decision as disaster unfolds to meet changing and challenging conditions since they may face similar situations in future disasters.

There are two learning arrangements within the organizational learning literature that may favor organizational learning. They are learning mechanisms and learning cultures (Huber, 1991; Popper & Lipshitz, 1998; Simon 1991). According to Busenberg (2000) these concepts are useful because they provide a basis for observing institutional learning process. Popper and Lipshitz (1998) define organizational learning mechanisms as “institutionalized structural and procedural arrangements that allow organizations to systematically collect, analyze, store, disseminate, and use information relevant to the performance of the organization and its members” (p. 170). The authors also define a learning culture as a set of values shared by organizational members that supports the learning process.

To understand Popper and Lipshitz (1998) definition, it is important to unpack the terms used and illustrate its application with concrete example. By organizational learning mechanisms, Cook and Yanow (1993) refer to experiences and actions of organizational members which relates to structural and procedural arrangements whereby “actions by [individual organization] members” are “understood to entail learning” and are “followed by observable changes in the organizations’ pattern of
activities” (p. 375). The Israel Defense Force (IDF) Air Force flight units are a typical example where these mechanisms are visible and are attributed for the Force successes during missions (Popper & Lipshitz 1998). For example, during the Six Day War and the destruction of Iraq’s nuclear reactor, the Israeli’s pilots and crews who flew the missions faced rigorous after-action review. In the debriefing room, everyone is equal, irrespective of religion, race, sex or rank. Here everyone is criticized on what went wrong and the errors made as well as noting what was done right during the missions. These were the rules of the game so that the air force can learn from its mistakes. In addition to these criticisms, the review sessions presented changes in doctrine, standard operating procedures, and other lessons learned from the incidents. Pilots’ and crews’ willingness to confront errors is acquired through the process of socialization into the air force. This process begins at flight school, where cadets are educated to treat after-action reviews as second nature. In addition to reviewing successes, the air force pilots and crews also review accidents and near accidents.

According to Popper and Lipshitz (1998), the after-action reviews and the review of accidents and near accidents in the IDF Air Force are two examples of organizational learning models (OLMs). Theses OLMs are concrete organizational arrangements that (a) enable individual pilots to collect and analyze information on their own performance, (b) enable groups of pilots to learn from each other’s experiences and expertise, and (c) enable the air force to disseminate knowledge gained in one unit to other units where it is relevant and to change its doctrine on the basis of this knowledge. Thus, after-reviews allow individuals to learn from their own experiences and from those of others. In order to ensure the continuation of the Israel Defense Force (IDF) Air Force, the reviews are institutionalized, that is, their conduct and culture are not left to the
initiative of particular generals, and the air force’s commander probably has no authority to annul them, and serve to disseminate information and develop standard operating procedures.

Concomitant with reviews is the learning culture which aids in the IDF Air Force mission successes. Learning culture consists of shared values and beliefs that ensure that the mechanisms produce actual learning by providing new insights and behavior and not mere rituals of learning (Popper & Lipshitz, 1998). By organizational culture, the author means a normative system of shared values and beliefs that shape how organization members feel, think, and behave. Although values are not observable entities, however, their existence is inferred from the rhetoric that culture members use to describe what is appropriate, important, and worthy of sacrifice and from what members actually do that requires cost or some lesser investment of resources and effort.

The concepts of learning mechanisms and learning cultures are adapted here in the study of decision making by organization members during and after disasters. For the purposes of this study, we also adapt the term learning arrangements which refers to collections of formal structures and procedures (learning mechanisms) and informal customs (learning cultures) that promote learning (Busenberg, 2000). Observing the use of learning arrangements in organizations requires conceptual adaptations concerning the role of organization and members when responding to disasters in the learning process. The term organization members here include members from a number of public, nonprofit and private organizations. Learning mechanisms and cultures can operate within any collection of individuals pursuing common goal (Popper & Lipshitz, 1998), and the common goal is saving live and property as disaster unfolds.
The salient observation in organizational learning is an attempt to apply lessons of an event such as Katrina to mitigate the impacts of future such events. Such event gives the responding organization members new information and ideas for decision making as well as providing a change in beliefs while affording the development of new beliefs, skills, and procedures which result from observation and interpretation of experience. This can lead to an improved understanding of the problem at hand in complex disaster situations for appropriate decision making. Learning reflects the accumulation and application of knowledge that lead to better decisions in pressured situations (Birkland, 2004). The lessons of experience should allow the organization to respond to future events in a more efficacious fashion, thus minimizing the impact of failures (Carley, 1991). By adapting and, - by changing, - organizations should be able to respond better to future disasters (Carley & Harrald, 1997). The discussion of organizational learning theory thus far, indicates its saliency in decision making under extreme events.

Strengths and Weaknesses of Organizational Learning Theory

The strength of the organizational learning theory is in three factors posited as conducive to organizational learning: environmental uncertainty, members’ professionalism, and committed leadership (Popper & Lipshitz, 1998). Research indicates that organizations that operate in fast-changing, competitive environments such as high-tech industries in the civilian organizations are pressured to learn to survive the threats of hostile competitors and incompatible environments (Chapman & Kennedy, 1958; Howard & Haas, 1993; Toffler, 1990). This environmental uncertainty is one of the characteristics that disaster responding organizations operate under a
disaster. As such, personnel in these organizations have to learn new ways to resolve problems they face when responding to a disaster by knowledge acquired through experience and also by interpreting new information acquired as the disaster unfolds (Huber, 1991).

Another strength of organizational learning theory is found in organizations’ apt to learning is professionalism. Popper and Lipshitz (1998) define professionalism as “a system of attitudes, intentions, and practices that distinguish professionals from amateurs” (p. 176). An important criterion by which professionals are evaluated among their peers is the extent to which they keep abreast of the state of their art in their field (Hoffman, 1989). Under this standard, emergency responding organizations could be said to be abreast in their profession since they belong to professional organizations in their field and regularly undertake training and educational programs to sharpen their skills. Generally, these professional bodies’ public journals tailored to emergency response development.

Finally, the strength of organizational learning theory depends on committed leadership (Popper & Lipshitz, 1998). According to Carlzon (1989), managers are the central figures on stage and all watched by all. They influence the day-to-day operation and the long-term behavior, value, and culture of their entities by creating structures, setting objectives and action plan, giving orders and monitoring their implementation, disseminating information, and striving as role models (Popper & Lipshitz, 1998). Consequently, they are the arbiters whose commitment to learning rest and can institute a learning culture and change values in their organizations. With respect to disaster responding organizations, the unfreezing caused by the disaster allows these entities
and the leadership to get out of rut, to alter their pattern of response, and to develop new procedures (Carley & Harrald, 1997).

However, the limitation to ongoing organizational learning in an organization exists within organizational membership. Its manifestation is seen when there is an exodus of memberships from current organization to others which are not staffed with experienced and competent personnel due to attractive rewards such as immediate promotion and high pay from upcoming entities.

Theory of Street-Level Bureaucracy

Public organization workers such as first responders (emergency managers, firefighters, public safety officers, and paramedics) presently occupy critical position in American society. These individuals whom the public interact with and normally regard as low-level employees, their actions actually constitute the services delivered by government (Lipsky, 1980). One salient aspect of these public employees is the significant high degree of discretion they have in decision-making. In terms of organization or agency policy, its impact is felt through contact with low-level employees. For example, with regards to public safety, the public experience with police officer at street corner gives us a sense of law enforcement. Similarly, parents encounter with their children’s teachers on grades, tells us the processes employed by teachers to assign grades to students. According to Lipsky (1980), each of this kind represents an instance of policy delivery.

With this in mind and with reference to emergency response, public agency employees (first responders) such as firefighters, paramedics, police officers, emergency managers and leaders of various departments, who interact directly with
citizens and manage emergencies in the course of their duties with substantial discretion in the course of executing their responsibility are called “street-level bureaucrats” (Lipsky, 1980, p. 3). On the other hand, the agencies that employ a significant number of the street-level bureaucrats in proportion to their work force are called “street-level bureaucracies” (p. 3). Examples of typical street-level bureaucrats are teachers, police officers and other law enforcement personnel, social workers, judges, public lawyers and other court officers, health workers, and many other public employees who grant access to government programs and provide services within them. I may hasten to add first responders such as fire fighters to this list who risk their lives during disaster to safe others as exemplified during the 9/11 terrorist attack as well as disaster planners and emergency managers who develop disaster plans. We may also include in this list nonprofit organization employees such as the Red Cross and emergent groups during disaster. They have high degree discretionary latitude and relative autonomy from organizational authority in decision-making during and after disaster to respond to unanticipated problems with a goal to safe life and property.

One of the most important observations in the theory of street-level bureaucracy is casting street-level bureaucrats as inventors and innovators with flexibility in decision-making as situation warrants. Moore (1987) captures this notion when he writes, “Street-level bureaucrats are conceived as inventive strategists seeking technical, social, and moral capacity and sophistication as well as strategic success in negotiating ambiguous work settings” (p. 74). Although individual employees working in the street-level bureaucracies are guided by organizational rules, guidelines and standard operating procedures (SOP), they frequently make important daily decisions outside these general guidelines in the field without checking with their superiors. For example,
a police officer on patrol has to decide issuing a ticket, warning or letting go a speeding
driver who exceeds speed limit by 5 or 6 mph. Clearly this is a discretionary decision
the public safety officer has to make because the officer is able to appraise the situation
and makes appropriate judgment. This argues that organizational or public policy
making continues even in the implementation phase due to wide discretionary latitude
granted implementers as they carry out their duties (Epstein & O’Halloran, 1999).

We argue that the theory of street-level bureaucracy is relevant to spontaneous
planning similar to police patrol to enhance decision-making process as street-level
bureaucrats confront uncertainties, intense time pressure, stress, strain, and challenges
as disaster unfolds. Disaster responders need to invent a device, mechanism, an
element or a process that bridges or link disaster planning with improvisation. This
process or mechanism is spontaneous planning which permits disaster responders to
act in challenging situations as a disaster unfolds.

In summary, one of Lipsky’s (1980) arguments is that street-level bureaucrats, as
frontline employees in service delivery face an ongoing challenges which are adjusted
with high degree discretionary latitude. Relevant to disaster conditions, Moore (1985)
attributes street-level bureaucrats’ struggle for autonomy to (a) the need to adapt to the
unanticipatability and complexity of the work situation, and (b) the need to remain
flexible and sensitive to the human dimensions of the services provided. These
conditions are commonplace in disaster situations and with spontaneous planning
during and after the disaster, disaster responders should have similar substantial
discretion as a law enforcement officer in the execution of their duties.

With regard to Lipsky’s theory of street-level bureaucracy, one can see a
relationship between significant high degree of discretion, relative autonomy,
decentralized decision making and decentralized organizations corresponding to flat organizational structure (Aoki, 1986; *The Economist*, 1995; Zabojnik, 2002). These studies have shown that decentralized decision making in organizations with flat structures is in sync with decentralized organizations where midlevel managers are able to take decisions on matters that affect the business. Most of the organizations involved with disasters are similarly structured. In studying organizational decision making, Aoki, (1986) argues that decentralized decision making should be predominant where quick response to changing technologies and environment is necessary and the flow of new information is upward through the hierarchy. Moreover, studies have shown that it may be less costly to motivate a worker who is allowed to work on his own idea than a worker who is forced to follow the manager’s idea (Zabojnik, 2002). In a study of centralized versus decentralized decision making in organizations, Zabojnik concludes that it may be optimal to let workers decide on the method for doing their job. Adapting this logic, Nordstrom, an American department store, issued its workers a simple instruction: “use your good judgment in all situations” (*The Economist*, 1995, p. 1). It is hoped that in this study, flat organizational structures will predominates emergency management establishments for quick decision making to resolve post-disaster problems.

The strength of the theory of street-level bureaucracy is the discretionary power residing with the bureaucrats who work in agencies and departments. These bureaucrats are “conceived as inventive strategists seeking technical, social, and moral capacity and sophistication as well as strategic success in negotiating ambiguous work settings” (Moore, 1987, p. 74). Their inventiveness allows for innovation with flexibility to respond to ambiguous and changing work situation. Additionally, they are able to ration
time, energy, sensitivity, and their organizational resources in a manner consistent with their tolerance for stress. The decision making of the street-level bureaucrats is context-dependent with discretionary latitude for decision making corresponding to the circumstances.

However, within street-level bureaucracies, a high degree of conflict exists between supervisors and the street-level bureaucrats (Moore, 1987). It is the very high degree of discretionary latitude that ensures context-dependent decision by bureaucrats that causes supervisor-subordinate conflict. To curtail these bureaucrats’ independency, managers attempt to limit discretionary authority of street-level bureaucrats (Lipsky, 1980). Another, weakness with the theory of street-level bureaucracy is that bureaucrats may not agree too.

Garbage Can Model

The third and final decision making under extreme event and suitable in spontaneous planning is the “garbage can model” (Carley, 1986a, 1986b; Cohen et al., 1972; Eisenhardt & Zbaracki, 1992; Lipson, 2007; Olsen, 2001; Peters, 2002). According to the literature, the model was largely in response to rational and political models of choice which Cohen and associates thought lacked sufficient sensitivity to decision-making in a complex, unstable, ambiguous world (Eisenhardt & Zbaracki, 1992). The model derives its name from a metaphor and views decision processes as:

... a choice opportunity as a garbage can into which various kinds of problems and solutions are dumped by participants as they are generated. The mix of garbage in a single can depends on the mix of cans available, on the labels attached to the alternative cans, on what garbage is currently being produced, and on the speed with which garbage is collected and removed from the scene (Cohen et al., 1972, p. 2).
First articulated by Cohen et al. (1972), the garbage can model describes decision-making characterized by severely ambiguous settings termed “organized anarchies” (p. 1). By organized anarchies, Cohen and colleagues meant organizations or decision situations characterized by three general properties: problematic preferences, unclear technology, and fluid participation. Problematic preferences, according to the literature, refer to ambiguity regarding problems and goals (Lipson, 2007). Furthermore, organization actors may be uncertain as to both the nature of problems they face and what they hope to achieve. Thus, as Cohen et al. (1972) noted, decision makers are as likely to discover their goals through action as they are to understand them prior to choice.

The second property, unclear technology, argues that organizational members are uncertain of the rules, structures, and processes by which decisions are made (Cohen et al., 1972; Eisenhardt & Zbaracki, 1992; Lipson, 2007; Peters, 2002). The term technology as used here refers to organizational processes and methods, and not technological artifacts. Thus, according to the literature, in organized anarchies, organizational members do not fully understand the workings of their organizations. It argues that people have only a loose understanding of means and ends. Both Cohen et al. (1972) and Eisenhardt and Zbaracki (1992) maintain that organizational actors gain knowledge by trial-and-error learning, but without clear understanding of underlying causes.

The third property of organized anarchies is fluid participation. According to Cohen et al. (1972), participants vary in the amount of time and effort they devote to different domains; involvement varies from one time to another. Thus, as a result, the boundaries of the organization are uncertain and changing; the audiences and decision
makers for any particular kind of choice change unpredictably. Thus, the mix of participants interacts with problematic preferences and unclear technology to produce patterns of decision-making (Lipton, 2007).

The garbage can model describes the accidental or random confluence of four streams: (1) choice opportunities – occasions which call for decision, (2) solutions – answers looking for problems, (3) participants – people come and go due to varying demand on them, and (4) problems – concerns of people within and outside the organization (Cohen et al., 1972; Eisenhardt & Zbaracki, 1992; Lipson, 2007). According to the literature, they may arise over crises of mankind interpreted by the mass media; issues of family; frustration of work; careers; or group relations within organization (Cohen et al., 1972). Thus, to Eisenhardt and Zbaracki (1992), “decision making occurs in a stochastic meeting of choices looking for problems, problems looking for choices, solutions looking for problems to answer, and decision makers looking for something to decide” (p. 27). This is the essence of garbage can model! It has found home in both simulation and empirical research (Carley, 1986a, 1986b; Eisenhardt & Zbaracki, 1992; Padgett, 1980).

Although Cohen et al. (1972) originally applied the garbage can model to decision-making in universities, the model has gained application in other areas. It was subsequently used in analyses of government agencies, grade schools, and military operations (March & Olsen, 1979; March & Weissinger-Baylon, 1986; Sproull, Weiner, & Wolf, 1978). The model has received its widest attention through its adaptation in Kingdom’s (1984) landmark examination of US national policy agenda setting. One of the original authors of the article, Olsen (2001) discussed the possibility of its application to the European Union as a relatively diffuse, unstructured political system.
Further, Lipson (2007) applied the garbage can model to explain the development of the United Nation’s second-generation peacekeeping.

Strengths and Weaknesses of Garbage Can Model

The strength of the garbage can model is organizational efficiency (Carley, 1986b). This efficiency comes from an organization with flexible structure and differentiated unit for an effective crisis management in the short-run. Many responding organizations to disaster in a city such as emergency management department, fire, police, hospitals, public health, and public works are staffed with differentiated units. They can respond efficiently and effectively to any disaster on quick notice. Moreover, since these organizations have experience with different types of disasters, solution from another disaster could be applied to a similar disaster. However, the major limitation with the garbage can model is that crowded incident scene faces coordination and collaboration problems (Hoard et al., 2005).

Integrated Decision Making Model (IDMM)

A review of literature and numerous models used in political science, public administration, organization theory, public policy, administrative sciences, management sciences, and behavioral sciences including emergency management, leads to an understanding that these models are inadequate to capture the decision-making process during rapid onset events. Hence, a new model, the integrated decision-making model (IDMM) is proposed to bridge this gap. This model highlights the role of aforementioned and discussed theories/models and demonstrates how they may inform and shape a new element spontaneous planning. A close look at the model reveals an
intersection between organizational learning theory and garbage can model. For example, at the height of insurgency during the Iraqi war, the US introduced surge to combat the militants. The military tactic was very successful and the insurgency activities were abated. This experience was replicated in the Afghanistan theater after numerous attempts to subdue up-ticks in Taliban militancy. It appears that while battling the Afghanistan’s Taliban militants, the US commanders in the Afghanistan war reached into well of experience for solution based on the Iraqi’s insurgency quelling. Here we see the effectiveness of combining organizational learning theory with garbage can model in decision-making situations under ambiguity and fluid conditions.

Disaster situations are problematic requiring attention and happen under conditions of ambiguity and fluidity. Thus, we can adapt garbage can model to a disaster situation where disaster responding mixed cadre of community personnel may encounter chaos, confusion, uncertainties, unanticipated conditions, and challenges as the disaster unfolds. The disaster responding organizations face decision situations involving fluid conditions during and after a disaster. Thus, if the implications of the garbage can model are applicable anywhere, they are applicable to a disaster situation. Choices are often made on-the-fly and conditions continually change during the process of resolution which appears both in the model and in actual observations of a disaster. The application of garbage can model to military operations and the UN peacekeeping analyses, both of which are crises situations, indicates its applicability to such ambiguous and fluid conditions of disaster as it unfolds. However, the requirement for this integrated theoretical framework to be useful and effective, it should be less hierarchical structurally.
Although the discussion of this theoretical decision-making framework appears to be discrete, the purpose is to elucidate each theory intellectually. As stated earlier, the aim is to integrate the theory of street-level bureaucracy, organizational learning theory, and garbage can model into a whole to what is called IDMM, thus, providing a decision tool box to disaster responding mixed community of personnel for decision-making under spontaneous planning during and after disaster. These theories are interrelated. For example, in the theory of street-level level bureaucracy, actors are autonomous with high degree of discretion. On the other hand, with organizational learning theory, disaster responding personnel has new information as disaster unfold and as a result of the observation and experience, apply this new information to improve decision-making of the changing complex situation. Similarly, from the garbage can model, disaster responding organizations can select a solution in the can to apply to the problem at hand. Thus, the decision tool box affords disaster responding mixed cadre of personnel under spontaneous planning newly generated accumulation of knowledge for decision-making in unpredictable disaster situation as the event evolves. The IDMM is proposed taking into account its characteristics of flat structure, high degree of discretion, new information availability, learning from experience, solutions waiting for problems, and autonomy as a possible platform for better decision-making under extreme events.

This IDMM recognizes the limitations of a single model of the theory of street-level bureaucracy, organizational learning theory, or garbage can model in meeting disaster responders need of decision-making under pressure, changing and challenging conditions. The responding organizations have to respond to the unpredictable situation under spontaneous planning with IDMM because of uncertainties to increase actors’ decision making capabilities. Comfort (2005) recognizes this when she said:
The classic response to uncertainty is to recognize the limitations of the existing system and to broaden the scope of actors, agents, and knowledge that can be marshaled for action, as needed. In managing risk, whether from natural, technological, or deliberate disaster, this basic principle of widening the set of resources available to reduce risk applies. (p. 347)

The IDMM used under spontaneous planning resulting from a combination of organizational learning theory, the theory of street-level bureaucracy and garbage can model is represented schematically in Figure 2, and Table 2 indicates the sources of the model’s features. IDMM is characterized by combined decision-making factors from the organizational learning theory, the theory of street-level bureaucracy, and the garbage can model. These elements are: gathering valuable new information, learning opportunity within the disaster, relative freedom and significant high degree of discretion, response was innovative with flexibility, flat organizational structure, and solutions waiting for problems. These factors equip personnel of organizations responding to a disaster with decision-making ability. What follow is a brief explanation of each factor. Gathering valuable new information as a disaster unfolds is important in resolving unexpected problems. The purpose of gathering this new information from the National Weather Service, TV, radio and the disaster victims is to apply it to address issues and challenges as they arise (Busenberg, 2001).
Figure 2. Schematic IDMM used under spontaneous planning.
Table 2

IDMM Features and Source

<table>
<thead>
<tr>
<th>IDMM Features</th>
<th>Decision-Making Model Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gathering valuable new information</td>
<td>Organizational Learning Theory</td>
</tr>
<tr>
<td>Learning opportunity within the disaster</td>
<td>Organizational Learning Theory</td>
</tr>
<tr>
<td>Relative freedom and significant high degree of discretion</td>
<td>Theory of Street-Level Bureaucracy</td>
</tr>
<tr>
<td>Response is innovative with flexibility</td>
<td>Theory of Street-Level Bureaucracy</td>
</tr>
<tr>
<td>Flat organizational structure</td>
<td>Theory of Street-Level Bureaucracy</td>
</tr>
<tr>
<td>Solutions waiting for problems</td>
<td>Garbage Can Model</td>
</tr>
</tbody>
</table>

Another factor in the IDMM is the learning opportunity within the disaster. This element refers to expanding understanding in the incident. It means that the responding teams have the capability of using information generated to make decisions. It has been said that experience is the best teacher. There are two formal avenues that people can learn. The first is formal education and the other is on-the-job-training (what is called experience) or putting into practice what was formally learned. The more experience one have on the job, the better that the person is at doing the job. Tie to this job experience is the fact that the worker may be having this experience in different environments which could help in a similar environment familiar to the worker. The experience enables the responding personnel to have different solutions waiting for familiar problems which could be applied to in a severe ambiguity condition.

The relative freedom and significant high degree of discretion further affords disaster responding organizational personnel the latitude for decision making to solve
unanticipated problems during and after a disaster using new information derived on the scene. It was indicated elsewhere that disaster planning as well as spontaneous planning are dynamic processes and are updated as information becomes available. Thus, as a disaster unfolds, new information becomes available for the resolution of problems that may arise. Thus, responding personnel does not need to seek approval from superiors in the office to incorporate this new information to resolve problems on the scene. It could be argued that delaying the incorporation of this new information to alleviate the problem may cause unnecessary harm or damage. The new information may afford the responding personnel the opportunity for invention and innovation because of the flexibility to think outside the box. This is aided by the relative autonomy of the worker, that is, freedom to make decision depending to the situation.

The flat organizational structure refers to an organization with decentralized decision-making power. Traditionally, most organizations are laid out hierarchically with decision-making authority reserved for officers at the top but those at the bottom cannot make decision. However, if flat organizational structure is adopted in entities responding to emergencies or disasters, it is believed this will give the responding personnel the flexibility and authority for decision making to resolve problems they encounter as disaster unfolds. This on-the-spot decision making does not infringe on policy making reserved for political appointees and elected officials.

Finally, the feature solutions waiting for problems occur through experience from similar types of disaster, general experience with disasters, training, exercises and drills. Disaster responders with wealth of experience have in their toolbox solutions that could readily be applied to similar situations.
From this short explanation of the IDMM characteristics, it is evident that these factors are interdependent and closely interwoven. One factor leads to another and this is the strength of the proposed IDMM which combines some elements from the theory of street-level bureaucracy, the theory of organizational learning, and the garbage can model.

Spontaneous Planning Bridges Disaster Planning and Improvisation

From the beginning, it has been indicated that this study follows the idea of "sensitizing concepts" which gives the investigator a general sense of reference and guidance in approaching spontaneous planning examination (Blumer, 1954, p. 7). Furthermore, the investigator leans on Max Weber’s “ideal type” (Manen, 1977, p. 206) in interpreting spontaneous planning behavior even though aware of its complexity and complication as a process. With these qualifications in mind, what follows is the investigator’s explanation of the relationship between spontaneous planning, disaster planning, and improvisation.

Spontaneous planning links disaster planning and improvisation. Disaster planning is one of the elements in the preparedness phase in emergency management while improvisation belongs to the response phase. Thus, spontaneous planning bridges the two phases of emergency management. Spontaneous planning takes care of unpredictable contingencies during disaster planning process that arise in the course of a disaster event while improving improvisation activities. Therefore, spontaneous planning anchors unforeseen future in the preparedness phase due to limited knowledge about evolving situation. Additionally, spontaneous planning enhances improvisation activities because of new information gleaned from the developing
situation. Moreover, the phenomenon blends into improvisation activity as a disaster unfolds.

To ensure the appropriation of accumulated knowledge on the unfolding situation during and after extreme event, it is hypothesized that understanding of spontaneous planning could be enhanced by elements of the decision-making model (Figure 2). It is proposed that the IDMM features may explain decision making under a disaster. The decision tool box explains different types of decision-making process undertaken (elaborated earlier) by the actors with their gained relative autonomy. The decision tool box is transformed into an IDMM.

It is hard to conceive a situation where improvisation activity takes place without spontaneous planning regardless of the degree of improvisation. One can imagine spontaneous planning having a bell curve shape between planned or routine response and improvised response as shown in Figure 3. Here we are not talking about ideal spontaneous planning or ideal improvisation but envisioning their practicality as people respond to a disaster event. Again, it is important to note that spontaneous planning is a decision-making process that shapes and informs improvised responses. In essence, they are related but not the same. Thus, spontaneous planning is a decision-making activity whereas improvisation is the implementation of those new decisions.

Figure 3 could be demonstrated with the WTC EOC which was destroyed during the terrorist attack and needed improvisation since there was no back-up within the WTC (Kendra & Wachtendorf, 2006). According to Kendra and Wachtendorf, “the initial goal was clear: improvise in such a way as to closely reproduce the 7 World Trade Center EOC. … In other words, improvisation manifested itself so as to employ substitutes in an effort to replicate the original facility” (p. 4). While improvisations do
not always result in replication, one can imagine that improvisation of this magnitude is accompanied by formal spontaneous planning behavior to meet the goal of the EOC users. Without this process, it is arguable that the much sought goal may not be met.

![Spontaneous Planning Diagram](image)

**Figure 3.** The timing of spontaneous planning.

**Summary**

The above discussion explicates decision-making under spontaneous planning phase in emergency management. The model offered here is informed by extreme conditions and pressure in which disaster responders are exposed during and after a disaster. We call the approach an integrated theoretical framework which integrates decision-making theories into what we term decision tool box. The tool box equips disaster responders with autonomous decision-making tools while responding to a disaster. Furthermore, they have high degree discretionary latitude in decision-making during and after a disaster. As a bridge between disaster planning phase and improvisation activities, decision-making under spontaneous planning phase close
information gap about the future which was unavailable in the disaster planning phase as well as providing better improvement in the development of improvisation activities. Thus, spontaneous planning acts to link current activity and future endeavor.
CHAPTER 4

RESEARCH DESIGN

The main question to examine in this research study is: What processes do organizations employ to deal with changing and challenging situations, and instantaneously solve unanticipated problems as a disaster unfolds? Associated with this question is the need to learn more about how the process occur which leads to the question: How did the phenomenon take place?

The overall goal of this research is to contribute to the understanding of the concept of spontaneous planning behavior originally conceived by McEntire and colleagues. Secondly, explore the phenomenon in another disaster type (tornadoes). Thirdly, test IDMM which proposes that the model’s features drive planning decisions during spontaneous planning process in order to resolve unanticipated problems as the disaster unfolds. These activities should be viewed as being integrated and not isolated.

To begin with, this section briefly reviews the details of April 3, 2012, tornadoes event that battered North Texas region. First, provide some contextual background for later sections through the discussion of the event itself and its consequences. The objective is to utilize the event as a laboratory to study spontaneous planning behavior as organizations responded to unfolding disaster. The discussion of contextual background is followed by methodological approach which includes discussions on case study research which this research utilizes, data collection method, and analytical approach employed in the study. The chapter also highlights the role played by the Institutional Review Board in this study.
Context

On April 3, 2012, a tornado outbreak cut across part of North Texas region, commonly known as the Dallas-Fort Worth Metroplex. Before its manifestation, the tornado was tracked across the Southern Plains on April 3, 2012, as a low pressure system, hence only a slight risk of severe thunderstorm watch was issued for the region by the Storm Prediction Center in Norman, Oklahoma, at 9:20 a.m. CDT (Mead, 2012). However, once the system became more conducive for tornado activity, it was upgraded to a tornado watch for North Texas region at 12:10 p.m. CDT (Mead, 2012). From various media reports, several strong to mostly weak tornadoes touched down near Dallas, Fort Worth and surrounding cities. This included an EF3 in Forney, TX, (Figure 4) which devastated the Diamond Creek subdivision and significantly damaged Crosby Elementary School (ABC News, 2012; CBSDFW, 2012; Hennessy-Fiske, 2012).

The National Weather Service’s Fort Worth teams assessing the damage in the field categorized the tornadoes as EF2 and EF1 (CNN Wire Staff, 2012; Hennessy-Fiske, 2012). The agency suggests that about 12 to 17 tornadoes hit North Texas region bringing high winds, rain and hail to roughly 6.3 million residents (CNN Wire Staff, 2012; Dixon & Weber, 2012; Newswatch, 2012).

To rank tornado events, meteorologists and researchers use a wind damage scale to categorize them into six classes known as the Enhanced Fujita (EF) scale as summarized in Table 3. A few days following the tornadoes that lasted 6 hours and 27 minutes, it was estimated that over 1,100 homes were damaged in the outbreak, including at least 349 that were destroyed. Remarkably, despite hitting one of the most heavily populated regions in Texas, no one was killed and very few people were injured.
Table 3

*Enhanced Fujita (EF) Scale for Tornado Damage*

<table>
<thead>
<tr>
<th>EF Number</th>
<th>Wind Gusts (mph)</th>
<th>Type of Damage</th>
<th>Damage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>65-85</td>
<td>Light damage</td>
<td>Causes some damage to siding and shingles</td>
</tr>
<tr>
<td>1</td>
<td>86-110</td>
<td>Moderate damage</td>
<td>Considerable roof damage; winds can uproot trees and overturn</td>
</tr>
</tbody>
</table>

*(table continues)*
Table 3 (continued).

<table>
<thead>
<tr>
<th>EF Number</th>
<th>Wind Gusts (mph)</th>
<th>Type of Damage</th>
<th>Damage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>111-135</td>
<td>Considerable damage</td>
<td>Most single-wide mobile homes destroyed; permanent home can shift off foundation; flagpoles collapse; softwood trees debarked.</td>
</tr>
<tr>
<td>3</td>
<td>136-165</td>
<td>Severe damage</td>
<td>Hardwood trees debarked; all but small portions of houses destroyed</td>
</tr>
<tr>
<td>4</td>
<td>166-200</td>
<td>Devastating damage</td>
<td>Complete destruction of well-built residence; large sections of school buildings.</td>
</tr>
<tr>
<td>5</td>
<td>Above 200</td>
<td>Incredible damage</td>
<td>Significant structural deformation of mid- and high-rise buildings.</td>
</tr>
</tbody>
</table>

Sources: NOAA 2012; Wind Science and Engineering Center, Texas Tech University, 2004; USATODAY.com 2012

In Lancaster, TX, south of Dallas, an EF2 tornado touched down on April 3, 2012. About 300 buildings were damaged (some reports estimated 650 buildings), a citywide curfew was put in place, and a shelter was opened for those whose homes were destroyed (CNN Wire Staff, 2012; Dixon & Weber, 2012; Hennessy-Fiske, 2012; Newswatch, 2012). Among the most dramatic and stunning videos of the tornado in Lancaster was from a freight truck depot, the Schneider National truck terminal, where one twister flung semitrailers in the air like toys and hundreds of feet from their parking spots (ABC News, 2012; CNN Wire Staff, 2012). In all, the slow-moving storms injured about 10 people in Lancaster, with two of them seriously injured. Figures 6 and 7 show damages from the tornadic activities that hit North Texas on April 3, 2012.
Figure 5: April 3, 2012, EF2 tornado touchdown in Lancaster, TX (Courtesy of Thomas Griffith, Fire Chief, City of Lancaster, Lancaster Fire Department, Lancaster, TX. Picture used by permission.)
Figure 6. April 3, 2012, tornado damage in Arlington, TX, aerial view (Courtesy David Carroll, Assistant Chief, Fire Rescue Support, Arlington Fire Department, Arlington, TX. Picture used with written permission.)
Figure 7. April 3, 2012, EF3 tornado damage in Kaufman County, aerial view, Kaufman County, TX. (Courtesy Steve Howie, Kaufman County, TX, Emergency Management Coordinator. Picture used with written permission.)

The storms also affected power supply in the region, knocking out power for thousands. By Tuesday evening, Oncor Electric Delivery reported that more than 47,000 homes and businesses in North Texas were without power (CNN Wire Staff, 2012). In Arlington alone, the utility company reported that nearly 14,000 customers still had no electricity by early Wednesday (Dixon & Weber, 2012). Figure 8 depicts pictorially the Emergency Operations Center (EOC) in Arlington, TX, in action during the April 3, 2012, tornadoes.
Despite the intensity of the storms hitting populated areas in North Texas, quick thoughtful decisions and actions taken by some organizations and individuals proved fruitful. For example, at the Green Oaks Nursing and Rehabilitation Center in Arlington, the workers there adhere to safety standard operating procedure (SOP) in herding the “patients into the hallway in the order trained: walkers, wheelchairs, then beds” (Dixon & Weber, 2012, p. 1). In Lancaster, one of the badly hit cities, a pastor brought about 30 children, including newborns, into a windowless room during the storm while at the church’s school nearby, 60 children hid in the women’s bathroom (Newswatch, 2012).
In Forney, similar report indicated that a grandmother and three children, including her 18-month-old grandson survived the storm by huddling together in a bathtub.

The Dallas-Fort Worth International Airport and Dallas Love Field were not spared by the twisters. Hundreds of flights into and out of the Dallas-Fort Worth International Airport were canceled or diverted elsewhere overnight, leaving 1,400 passengers stranded in the terminals (ABC News, 2012; CNN Wire Staff, 2012; Dixon and Weber, 2012; Hennessy-Fiske, 2012; Newswatch, 2012). According to news reports, American Airlines canceled 424 flights in and out of the airport on Wednesday, and on Tuesday, April 3, 2012, about 800 flights were canceled. Further, the tornadoes damaged dozens of American Airlines planes resulting with about 94 American and American Eagle planes that remained out of service on Wednesday. CNN Wire Staff (2012) and ABC News (2012) reported that about 110 aircrafts at Dallas-Fort Worth International sustained various degrees of hail damage. The news organizations further reported that Southwest Airlines canceled more than 40 flights at Dallas Love Field.

In summary, about nine cities in North Texas suffered damages as a result of the tornadoes, including DeSoto, Lancaster, Mesquite, Cleburne, Joshua, Forney, Royse City, Kennedale, and Arlington (CBSDFW, 2012). The mayors of Arlington and Lancaster declared a state of disaster following the storm strike, thus, clearing the way for state assistance.

Of the nine cities that were affected by the tornadic activity, this study focused on three of the cities that had significant damages (Table 4). They are Arlington and Lancaster which declared state of disaster following the event. The third city was Forney which was hit by EF3 magnitude with significant damage to property. This allowed an in-depth study of organizational response to the tornadic event. The study of
organizational response to the incident is interesting because the event required a quick response to save lives and minimize disruption of daily routines. Decisions became very important so the reaction could be effective.

Table 4

*Cities in North Texas Impacted by the April 3, 2012, Tornadoes*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DeSoto</td>
<td>49,047</td>
<td>50,045</td>
<td>Information not available</td>
</tr>
<tr>
<td>Lancaster</td>
<td>36,361</td>
<td>37,097</td>
<td>650 houses damaged; several large tractor-trailers tossed into the air at Schneider National truck terminal; 10 people injured</td>
</tr>
<tr>
<td>Mesquite</td>
<td>139,824</td>
<td>142,674</td>
<td>Several trees downed and houses suffered roof damage; one business badly damaged</td>
</tr>
<tr>
<td>Cleburne</td>
<td>29,337</td>
<td>29,681</td>
<td>Several houses damaged; mobile home destroyed</td>
</tr>
<tr>
<td>Joshua</td>
<td>5,910</td>
<td>5,982</td>
<td>Information not available</td>
</tr>
<tr>
<td>Forney</td>
<td>14,661</td>
<td>14,950</td>
<td>Severe damage in Diamond Creek subdivision; significant roof damage to Crosby Elementary School</td>
</tr>
<tr>
<td>Royse City</td>
<td>9,349</td>
<td>9,689</td>
<td>Several homes badly damaged; multiple buildings destroyed at an industrial park; trees snapped and uprooted; gas station destroyed</td>
</tr>
<tr>
<td>Kennedale</td>
<td>6,763</td>
<td>6,916</td>
<td>Over 200 homes and businesses damaged</td>
</tr>
<tr>
<td>Arlington</td>
<td>365,438</td>
<td>373,698</td>
<td>14,000 customers lost electricity; Green Oaks Nursing and Rehabilitation Center suffered severe damage; seven people injured</td>
</tr>
</tbody>
</table>

Methodology

The approach employed in conducting this research is a qualitative methodology used in social sciences and is context-based. Broadly defined, qualitative research means “any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification” (Strauss & Corbin, 1990, p. 17). Qualitative research is a kind of inquiry that produces findings arrived from real-world settings where the “phenomenon of interest unfold naturally” (Patton, 2001, p. 39). From a quantitative perspective, researchers in this school of thought seek causal relationship, prediction, and generalization of findings while qualitative researchers seek illumination, understanding, extrapolation and transferability to similar situations (Drisko, 1997; Hoepfl, 1997; Lincoln & Guba, 1985). In summary,

Qualitative research is multimethod in its focus, involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meaning people bring to them (Denzin & Lincoln, 1994, p. 2).

Case Study Research

Qualitative research has gained currency in social and behavioral sciences in such fields as sociology, psychology, anthropology, public administration, political science, business, medicine, nursing, social work, communications, history as well as in educational research and is enjoying rapid growth and change (Denzin & Lincoln, 1994; Gall, Gall, & Borg, 2007). According to Golafshani (2003), qualitative research uses a naturalistic approach that seeks to understand phenomena in context-specific settings, such as “real world setting [where] the researcher does not attempt to manipulate the phenomenon of interest” (Patton, 2001, p. 39). Currently, one of the most widely used
approaches to qualitative inquiry is case study research (Gall et al., 2007). According to the literature, case study design represents a basic form of qualitative research and could be used to study almost any topic or type of phenomenon, with the entire range of data collection and analytic methods used by a qualitative researcher, called “qualitative research traditions” (Gall et al., 2007, p. 447). Yin (1981a, 1981b, 2003) echoes similar sentiment adding that case studies can be done by using either qualitative or quantitative evidence. Gall et al. (2007, 447) define case study research as “(a) the in-depth of (b) one or more instances of a phenomenon (c) in its real-life context that (d) reflects the perspective of the participants involved in the phenomenon” (p. 447).

In general, researchers conduct case studies for one of three purposes: (a) to produce detailed descriptions of a phenomenon; (b) to develop possible explanations of it; or (c) to evaluate the phenomenon (Corbin & Strauss, 2008; Gall et al., 2007; Rubin & Rubin, 2005; Yin, 1981a, 1981b, 2003). With description, the researcher attempts to depict a phenomenon and conceptualize it. The depiction can focus on various phenomena, such as the meanings that the research participants ascribe to their life and environment, contextual factors that influence their lives, a series of events and their possible outcomes, or the new or unusual in society (Gall et al., 2007). Description conveys ideas about things, people, and places (Corbin & Strauss, 2008). Further, description also makes use of similes and metaphors when ordinary words fail to make the point or more colorful mental pictures are called for (Lakoff & Johnson, 1980).

Another aim for conducting a case study is providing explanation for the phenomenon of interest. In the literature, this is referred to as patterns, meaning that that one type of variation observed in a case study is systematically related to another observed variation (Gall et al., 2007). If a claim of one variation causing effect on the
other, this is referred to as causal pattern and if not, this is described as relational pattern. The third objective of undertaking a case study is evaluation. Evaluative study entails passing formal judgment on a program, particularly government funded programs. For example, a case study by Liang and Creasy (2004) involves an analysis of how teachers conduct classroom assessment in Web-based graduate education courses. The authors identified common assessment strategies and suggested changes to promote greater learner autonomy.

In addition to those discussed above, Yin (1981a, 1981b, 2003) mentioned that case studies can be used for exploratory purposes, which is the approach utilized in this research study. In the case of exploratory study, the researcher investigates a phenomenon or a concept for validation. Such a phenomenon or a concept under examination is not widely understood in the literature but may be useful in knowledge advancement.

Even though the case study strategy has gained currency in various academic fields to investigate varieties of phenomena, its limitations have been noted by its fervent critics, particularly from the physical sciences (Gable, 1994). However, more objective criticisms have also come from the social sciences. According to Lee (1989), there are four problems with case study research. These problems are lack of controllability, deductibility, repeatability, and generalizability. Lee attributed the last two limitations to lack of randomization in the case study research strategy. However, Lee defended the case study research method by suggesting that these problems are not endemic or insurmountable, they nonetheless remain relative to other research methods.
These limitations notwithstanding, the literature on case study strategy maintains that the method lends itself to data collection from a small number of organizations through participant-observation, in-depth interviews, and longitudinal studies (Gable, 1994). Further, case study approach seeks to understand the problem being investigated. It provides the opportunity to ask penetrating questions and to capture the richness of organizational behavior. Furthermore, Yin (1981a, 1981b, 2003) mentioned that case studies can be used for exploratory purposes. It is these aforementioned strong characteristics of the case study strategy that make me utilize the method for this research.

Interview Design

To examine the spontaneous planning behavior and the proposed decision-making model, the North Texas April 3, 2012, tornadoes were utilized. The open-ended questions (followed with probes during the interview) presented in the prepared interview instrument were to elicit from the Interview Respondents what processes their organizations used when responding to the tornadoes to resolve unanticipated problems and challenges as the incident unfolded. Questions on how the processes occurred were included. Some of the questions related directly to the spontaneous planning behavior (e.g., What was/were the major problem(s) your organization was/were facing during/after the tornadoes? Where and when did you meet to address this/these problem(s) the first time? What was said at the meeting and how did planning take place?) With regard to examining the hypothesized integrated decision-making model (IDMM), an example of a question related to is: While responding to the incident, did you have new information to deal with it? Please elaborate. (See Table 5 for
questions related to the decision-making model from the interview instrument.)

However, it should be noted that some questions in the instrument may have elicited responses for both spontaneous planning and decision making. The complete interview instrument is in Appendix A, while what follows are samples of some questions used in the actual interview:

- How did your organization’s pre-event planning impact the response operations?
- What was/were the major problem(s) your organization was/were facing during/after the tornadoes?
- Where and when did you meet to address this/these problem(s) the first time?
- What was said at the meeting and how did planning take place?
- Who was/were involved in the planning process?
- Were all your activities as per plan or did you need to improvise?
- How did the meeting help you coordinate and improvise?
- Were follow-up meetings necessary? If so, how often and were the same people involved?
- Please tell me if you met to plan your response to the tornadoes in more detail before swinging into action.
- Have you implemented these actions before or was this spontaneous planning?
- What were the merits of this type of planning to response activities? What were the demerits?

One of the research questions examined how spontaneous planning behavior occurs. This inquiry led to the proposed IDMM since spontaneous planning delves into decision making to solve unexpected problems as a disaster develops. The goal here was to introduce IDMM into spontaneous planning process, and the questions in the interview instrument relate to the main features in the model. In particular, Table 5
summarizes the elements in the proposed IDMM and the research questions related to them.

Table 5

*IDMM Elements and Related Questions*

<table>
<thead>
<tr>
<th>IDMM Elements</th>
<th>Research Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gathering valuable new information</td>
<td>While responding to the incident, did you have new information to deal with it? Please elaborate.</td>
</tr>
<tr>
<td>Learning opportunity within the disaster</td>
<td>Please describe and evaluate the environment you responded to; the environment the tornado touchdown or damage done. Did the environment need professional response or attention? If so, what type? What was/were the major problem(s) your organization was/were facing during and after the tornadoes?</td>
</tr>
<tr>
<td>Relative freedom and significant high degree of discretion</td>
<td>During the incident, did responders have the freedom to make decisions to resolve unanticipated problems? While in the field, was there any time you had to refer situational decision making to your boss in the office? If so, why?</td>
</tr>
<tr>
<td>Response was innovative with flexibility</td>
<td>Was your response to the inventive, innovative and flexible? Please elaborate.</td>
</tr>
<tr>
<td>Solutions waiting for problems</td>
<td>How did your past experience help you resolve the problems you encountered during the tornado? Have you undertaken these processes before or was this the first time? Please tell me more about how you characterize this process?</td>
</tr>
</tbody>
</table>

*(table continues)*
Table 5 (*continued*).

<table>
<thead>
<tr>
<th>IDDM</th>
<th>Research Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat organizational structure</td>
<td>This element (assigned to the Theory of Street-Level Bureaucracy) was based on relative autonomy, freedom and significant high degree of discretion in the Theory of Street-Level Bureaucracy as well as decentralized decision making in the decision-making literature. The organizational structures of the establishments involved in the North Texas tornadoes were analyzed in light of decision-making model and the literature and uncovered mixed organizational structures in the organizations that played role in the disaster. (Direct questioning may not uncover the organizational structure except by analysis and observation)</td>
</tr>
</tbody>
</table>

Data Collection

As mentioned earlier, this research program utilized a case study method based on the contextual background of the tornadic event of April 3, 2012, that occurred in North Texas elaborated earlier to answer the research question outlined above. To obtain data about this tornadic event, the research study conducted an in-depth study of selected organizations in the most impacted cities (#1, #2 and #3). The interview guide instrument utilized for the study is semi-structured and is shown in Appendix A.

In order to seek answers to these questions posed, organizations became the unit of analysis with purposive sampling method employed in the selection of cities in which organizational members interviewed are located. Individual stakeholders in various organizations were identified using snowball sampling and purposive sampling techniques and the sample size depended on Interview Respondents who accepted the
request to be interviewed and the concept of saturation. Gall, et al. (2007) define snowball sampling as:

A group of cases that are selected by asking one person to recommend someone else suitable as a case of the phenomenon of interest, who then recommends another person who is suitable case or who knows of other potential cases; the process continues until the desired sample size is achieved. (p. 653)

The interviews were conducted as soon as the research prospectus was approved and the organizational sampling method afforded the investigator the opportunity to interview some city functional organizations such as Emergency Management, Fire, Police, Public Works and Transportation, Community Development and Planning, Code Compliance Service, Media Department, and an Elementary School that responded to the April 3, 2012, tornadic incident and its recovery activities. In general, the Interview Respondents sampled includes representatives from eleven functional organizations of three cities (#1, #2 and #3) in the Dallas-Fort Worth area that responded to the tornadic event. These Interview Respondents were in the management positions and were aware of their organizations’ activities. Moreover, they were intimately involved in running their organizations and can make decisions during the disaster. For example, in cities #1 and #2 where disaster declarations were made, city officials were involved in decision making.

The primary objective for conducting these interviews was to uncover what planning process organizations took to solve unanticipated problems, changing, and challenging ambiguous situations during and after the disaster. Thus, the Interview Respondents included Fire Chiefs, Fire Assistant Chief and Deputy Police Chief who commanded first responders as the disaster evolves. The interviews with the stakeholders lasted between 45 minutes and about 1 hour and 15 minutes, and took
place in their respective offices. These interviews were recorded using a digital recorder. Table 6 summarizes cities, functional organizations and Interview Respondents from which the data for the research was collected.

Although Table 6 identifies 11 functional organizations that responded to the pre-interview letters requesting interviews for the research, 23 such requests were sent out. This notwithstanding, the response rate per the table was about 48%. Another observation about Table 6 is that the organizations which granted the interviews were all public sector establishments. An attempt was made to include private sector businesses and nonprofit entities but none responded to the interview requests. During the actual interview, one of the focus groups did not permit the session to be recorded. Their request was honored per IRB instruction.

Table 6

*Cities and Organizations From Which Data Were Collected*

<table>
<thead>
<tr>
<th>City</th>
<th>Organization</th>
<th>Respondent(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Police Department</td>
<td>An Individual</td>
</tr>
<tr>
<td>#1</td>
<td>Public Works &amp; Transportation</td>
<td>An Individual</td>
</tr>
<tr>
<td>#1</td>
<td>Code Compliance Services</td>
<td>An Individual</td>
</tr>
<tr>
<td>#1</td>
<td>Emergency Management</td>
<td>Focus Group</td>
</tr>
<tr>
<td>#1</td>
<td>Community Development &amp; Planning</td>
<td>An Individual</td>
</tr>
<tr>
<td>#1</td>
<td>Fire Department</td>
<td>An Individual</td>
</tr>
<tr>
<td>#1</td>
<td>Media &amp; Communication</td>
<td>An Individual</td>
</tr>
<tr>
<td>#2</td>
<td>Fire Department/Emergency Management</td>
<td>An Individual</td>
</tr>
<tr>
<td>#3</td>
<td>Fire Department</td>
<td>Focus Group</td>
</tr>
<tr>
<td>#3</td>
<td>Emergency Management</td>
<td>Focus Group</td>
</tr>
<tr>
<td>#3</td>
<td>Elementary School</td>
<td>An Individual</td>
</tr>
</tbody>
</table>

Data Analysis

Although with interviewing method, the actual data analysis started after the first few interviews (Rubin and Rubin, 2005), the recorded version were transcribed and
other sources of materials pertinent to the research study such as news articles and city government reports were reviewed and qualitatively analyzed. Corbin and Strauss (2008) observe that qualitative analysis is “a process of examining and interpreting data in order to elicit meaning, gain understanding, and develop empirical knowledge” (p. 1). Specifically, interpretive tradition was utilized to analyze the transcribed data (Bryman & Burgess, 1994; Denzin & Lincoln, 2000; Gall et al., 2007; Golafshani, 2003; Mays & Pope, 1995; Rubin & Rubin, 2005; Sandelowski, 2000). Gall et al. (2007) describe interpretational analysis as “the process of examining case study data closely in order to find constructs, themes, and patterns that can be used to describe and explain the phenomenon being studied” (p. 466). Sandelowski (2000) views all inquiry as encompassing description and interpretation. The analyses were systematically and rigorously endeavor to adhere to the defining features of interpretive analysis embodied in these views.

While analyzing the data, memos were used to record the analyses in preparation for the final empirical findings write-up (Corbin & Strauss 2008; Rubin & Rubin, 2005). These memos are rudimentary representations of thought and may grow in complexity, density, clarity, and accuracy as a research progresses (Corbin & Strauss, 2008). Memos keeping started in the field while collecting data because it was then the researcher began thinking about and classifying the information. Patton (2002) suggests, “Recording and tracking analytical insights that occur during data collection are part of fieldwork and the beginning of qualitative analysis” (p. 436). It is important to jot down analytical ideas while in the field, since Patton also states, “Repressing analytical insights may mean losing them forever, for there’s no guarantee they’ll return” (p. 406). The functions of memos are multifarious and include, but are not limited to:
Forcing the analyst to work with concepts rather than raw data; additionally, the memos enable analysts to use creativity and imagination, often stimulating new insights into data.

Reflecting analytic thought; the literature argues that a lack of logic and coherence of thought quickly manifests itself when analysts are forced to put ideas down on paper.

Providing a storehouse of analytic ideas that can be sorted, ordered and reordered, and retrieved according to the evolving analytic scheme; this ability becomes useful when it comes time to write about the topic, or when analysts want to cross-reference categories or evaluate their analytic progress. Reviewing memos an also reveal which concepts are in need of further development and refinement. (Corbin & Strauss, 2008, p. 120)

Rubin and Rubin (2005) point out that analysis proceeds in several stages that overlap. According to the authors, the first stage is recognition, in which the researcher finds the concepts, themes, events, and topical markers in the interviews. A concept is a word or term that represents an idea important to a researcher’s problems contained in the data while themes are summary statements and explanations of what is going on and enable the analyst to reduce and combine data (Corbin & Strauss, 2008; Rubin & Rubin, 2005). On the other hand, events are occurrence that have taken place, for example, public meeting while topical markers are names of places, people, organizations, pets, numbers – such as dates, addresses, or legislative bills – or public laws (Rubin & Rubin, 2005).

After finding, refining, elaborating, and integrating concepts, and themes, the task of coding them began, that is, the investigator figured out a brief label to designate each and then marked in the transcript where the concepts, themes, events or topical markers were found (Rubin & Rubin, 2005). Corbin and Strauss (2008, p. 159) define coding as “extracting concepts from raw data and developing them in terms of their properties and dimensions.” Coding involves systematically labeling concepts, themes,
events, and topical markers so that the researcher readily retrieved and examined all of the data units that refer to the same subject across all the interviews (Rubin & Rubin, 2005). Coding concepts and themes needed precision to recognize when they are present, especially if they were not explicitly mentioned by an exact name. The distinct label a researcher uses for each concept, theme, event, or topical marker is termed a code (Rubin & Rubin, 2005). For example, if an Interview Respondent used such terms as unplanned, instinctive, and natural arrangement, these concepts were coded as spontaneous planning.

Concepts coding or operationalization with qualitative data was challenging because of the nature of what we study in social science. Blumer (1954, p. 7) makes the case that phenomenon examination in social science involves “sensitizing concepts.” The author succinctly notes that, “definitive concepts” have precise measures and specific or precise references in empirical world while “sensitizing concepts” point us in a general direction (Blumer, 1954, p. 7). Thus, great care was taken to code concepts, themes and phrases the Interview Respondent utilized to describe spontaneous planning developed when responding to the April 3, 2012, tornadoes.

In conducting this research, the researcher was concerned with reliability, validity, and transferability (generalizability) (Mays & Pope, 1995). Reliability refers to the “extent to which other researchers would arrive at similar results if they studied the same case using exactly the same procedures as the first researcher” (Gall et al., 2007, p. 477). On the one hand, construct validity is the “extent to which a measure used in a case study correctly operationalizes the concepts being studied” while on the other hand, external validity is the “extent to which the findings of a case study can be
generalized to similar cases” (Gall et al., 2007, 477). In order to ensure reliability of analyses arrived at in this research, the researcher maintained meticulous records of the interviews and transcripts and by documenting the process of analysis in detail (Mays & Pope, 1995). Additionally, further reliability of the analysis of the data was ensured through assessment by the study’s committee members who are skilled in qualitative research. However, the data and documentation is being stored in the researcher’s supervisor’s office, Prof. David McEntire, of the Department of Public Administration and Management and may be available for other researchers for the purposes of study replication.

Alongside the issue of reliability, attention was given to the validity of the transcribed data and findings. The strategy used in the research was feedback from the study Interview respondents (Mays & Pope, 1995; Corbin and Strauss, 2008). Their comments were salient and crucial for validation. The objective was to see if they regard the transcribed data and findings as reasonable account of their experience.

With regards to transferability (generalizability) of this case study, the findings should be compared to the initial study findings of spontaneous planning conducted by McEntire et al. (2013) on pipeline gas explosion in California. If this tornadic event study finds spontaneous planning behavior as a mechanism utilized in resolving unanticipated problems, shifting, and challenging situations as a disaster unfolds, this will contribute to our understanding of the concept. Second, finding of spontaneous planning in a different context, confirms the pipeline gas fire findings and by knowledge accumulation, then it the findings may be transferred to other disaster context. Third, from the findings, we can infer that spontaneous planning is a valid concept and should be introduced into emergency management literature. Fourth, the finding of spontaneous
planning process in the tornadic context may signal the linkage between the activity and improvisation actions.

The above narrative highlights the approach used in analyzing the data. This interpretive approach encompasses description, explanation, conceptualization, exploration to comprehensively answer the research question (Ritchie & Spencer, 1994). In addition, follow-up calls and e-mails, and relevant organizational after action reports were used to bolster the research’s findings. The purpose here was to weave the discovery of how responders to a disaster reacted in solving unanticipated problems, shifting, and challenging and ambiguous situations as the disaster unfolded utilizing the data collected as well as supplemental information from organizations interviewed. While analyzing the data, formal names of individuals and organizations interviewed were replaced with anonymity for confidentiality.

Institutional Review Board Approval

Any research that involves human subjects, The University of North Texas Institutional Review Board (IRB) “requires that all individuals working with human subjects in research complete an institutional program before the IRB will review an application” (UNT 2012, 1). The objective of this policy is to protect the rights and welfare of human subjects in research. In compliance with this policy, the researcher of this study and the supervising professor has undergone the required training. After the IRB training, a certificate of completion of Number 468997 was issued to the researcher on June 24, 2010.

The IRB application was first submitted on May 2012 and a revised version resubmitted on July 2012. Other materials that accompanied the application form were:
Informed Consent Form; Interview Instrument Guide; and Certificate of Completion of IRB Training for “Protecting Human Subject Research Participants.” The “Informed Consent Form” was approved on July 18, 2012. In addition, an official letter of IRB approval titled “Human Subjects Application No. 12279” dated July 18, 2012 was sent to the Supervising Investigator, Dr. David McEntire.

Summary

This chapter laid out the process of data collection to investigate the occurrence of spontaneous planning behavior in the North Texas tornadoes as well as examining how the phenomenon occurred. The approach used in the research program was qualitative methodology based on a case study method. Semi-structured, open-ended questions were used to collect data from 11 public functional organizations that permitted interviews. These interviews were digitally recorded, lasted between 45 minutes and 1 hour, 15 minutes, and were conducted in the respective individuals’ respondent offices.
CHAPTER 5
FINDINGS FROM THE DATA

The primary purpose of this research study is to answer the question: What processes do organizations employ to deal with changing and challenging situations, and instantaneously solve unanticipated problems as a disaster unfolds? Associated with this question is the need to learn more about how the process occur which leads to the question: How did the phenomenon take place when dealing with a disaster? This chapter focuses on answering the first question while the how question is dealt with in Chapter 6. Although the main goal of the inquiry is to answer the research question, this study also contributes to the advancement of spontaneous planning concept pioneered by McEntire et al. (2013) in the investigation of a gas pipeline fire explosion. This effort on spontaneous planning grounded theory building is achieved by extending the phenomenon to a tornadic activity that occurred in the DFW region on April 3, 2012. The inquiry focuses on how the concept of spontaneous planning is utilized to solve unexpected problems and challenges during and after the incident as well as the development of the concept of spontaneous planning through grounded theory. The research findings are based on transcribed interview data collected from eleven functional organizations in three North Texas cities. Functional organization implies departments, entities or agencies that actively responded to the April 3, 2012, tornadoes as they unfolded.

Findings

As mentioned in Chapter 4, to undertake the above tasks, eleven functional organizations in three North Texas cities that responded to the April 3, 2012, tornadoes...
(coded City #1, City #2 and City #3) were studied by interviewing those who took part in the actual response and recovery operations. The eleven individuals interviewed from these organizations in the three cities include Fire, Police, Emergency Management staff, Emergency Operations Center personnel, Public Works and Transportation, Code Compliance Services, Community Development and Planning and one Elementary School. Individuals interviewed from these organizations were coded generically as Interview Respondents to protect their identities. From the transcribed digitally recorded interviews, broad general patterns, recurring themes or constructs were discovered. The term construct is a concept that is inferred from commonalities among observed phenomena and can be used to explain those phenomena (Gall et al., 2007). Thus, in theory development, according to Gall et al. (2007), a construct is a concept that refers to a structure or process that is hypothesized to underlie particular observable phenomena.

In an attempt to better understand spontaneous planning during the April 3, 2012, tornadoes in North Texas, the findings of this chapter are broken down into nine sections which review the major activities during response and recovery operations. In the first section, the review looks at organized approach to resolving problems and challenges by mixed multi-disaster responders in the study cities. The second section discusses debris removal and ensuring public safety to enable safe access to the damaged neighborhoods by disaster responders as well as ensuring citizens’ safety. The third section includes a discussion of search and rescue operation of the victims. The fourth section is a review of securing damaged neighborhoods and dispatching from the field in an effort to protect property and assist the disaster victims. The fifth section looks at the activation of emergency operations centers where overall strategic
spontaneous planning took place. The sixth section discusses damage assessment. The seventh section includes a discussion of restoration of communication system as services in the region were interrupted by the tornadoes. The eighth section is a review of public relations and media activities and how they were adapted to meet the needs of the public. The final section concludes with a review of volunteer and donation management.

Organized Approach to Resolving Problems

From transcribed interview data, it was discovered that the three cities in the study had similar organized approach to resolving problems in the aftermath of the tornadoes. The noted problems and challenges were what mixed multi-disaster responders in City #1, City #2, and City #3 tried to resolve through spontaneous planning processes under study in the response and recovery phases. For example, when the tornadoes struck, City #1 was having City Council meeting and went into emergency operations mode according to an Interview Respondent. The Interview Respondent further notes:

And for the first 24 hours … our emergency operations team, which includes fire and police, public works, and some other entities in the city, they manage that first 24-hour period. That transitioned over the next 24 hours into a recovery effort, which our city manager asked me to lead (Interview Respondent, 2013).

This Interview Respondent indicates that the Fire, Police, and Public Works were initial departments that swung into action first as soon as the disaster hits. The primary response activities included debris removal, public safety and security. Such quick action would enable emergency vehicles such as fire engines, ambulances, police cars and other emergency responder quick access to the damaged neighborhoods and attend to the victims. Moreover, the removal of debris would minimize further injuries.
Furthermore, the Interview Respondent’s narrative also shows that these functions went on simultaneously. Describing the responsibility of the leadership team, the Interview Respondent went on to state:

So literally from the first hour … of post-disaster, we were in a mode of problem solving and decision making. There was no downtime, and we worked 24 hours a day until we … (1) got everything and property secured; (2) started to clean the area up so it could be safe for people to be in; and (3) initiated pretty robust recovery efforts that were really beneficial to try to get … the area back up into its original, restored condition (Interview Respondent, 2013).

From this statement, it is apparent that the disaster responders were concerned with post-disaster “problem solving and decision making” which is the crux of spontaneous planning (Interview Respondent 2013). In this case, the problem solving is concerned with efforts to deal with unanticipated issues while decision making needed to be deliberate and quick. It also entails thinking on-the-feet while responding to the disaster. Additionally, spontaneous planning could be novel; it could also be adaptation as well as modification of or change in existing plan to match current challenges. Furthermore, spontaneous planning could be anticipatory. The process could also involve choosing competing best alternative plan to solve the problem. In City #1 those involved in this overall strategic planning process were “fire chief, the police chief, myself, our city manager, our deputy city managers, our public works director, our finance people, our City Council, executive team and essentially the disaster team” (Interview Respondent, 2013). Recalling the planning process, this Interview Respondent observed:

It was a very organized approach. … Initially, once the disaster happened, we went into … basically a National Incident Management System approach where our Emergency Operations Center takes the lead. … And we would sit in a room and identify every issue, and we’d identify what actions we were going to take, and what are the challenges to make that happen, and we wouldn’t leave the room until we had a very defined set of actions that we were going to take to address those issues (Interview Respondent, 2013).
Based on Interview Respondents’ (2013) interview transcripts, discussions on the research findings proceed with debris removal and ensuring public safety first. Then the rest of the sections follow earlier layout.

Debris Removal and Ensuring Public Safety

The April 3, 2012, tornadic activity in North Texas took place at day time when people were at work and students at school. According to the interview transcripts, the Interview Respondents contend that the afternoon event helped avert many injuries and deaths compare to it happening in the night when people were sleeping and in the dark. However, unlike other emergencies, the tornadoes uprooted trees, broke tree limbs, down power lines and spread glass, shingles and nails in the affected neighborhoods. Interview Respondents (2013) describe the scenes as “dangerous and hazardous.” Worst still, the uprooted trees, down power lines, and other debris blocked roadways and streets in the affected neighborhoods. For public safety, all these dangerous and hazards must be cleared from the neighborhoods. There were also numerous cars that had been damaged by uprooted trees and broken tree limbs. The stakeholders immediately come to the conclusion early that debris removal would have to be addressed quickly and effectively if recovery was to be facilitated. In addition, to expedite access to the damaged neighborhoods by fire engines and police cars, roadways have to be cleared of debris too.

In this study, it was discovered that under normal circumstances, the Department of Public Works in each of the three cities is usually responsible for debris removal because they have heavy equipment such as tractors for the task (Interview Respondent, 2013). This was reaffirmed at the leadership team meeting when it was
spontaneously anticipating and assessing the debris removal needs. With this information at hand, an example of spontaneous planning was implemented. In City #1 for example, it was determined that other departments such as Water Personnel, Parks and Recreation, and Community Development and Planning were mobilized to assist the Department of Public Works in the debris clearance (Interview Respondent, 2013). The assigned responsibility to Public Works Department was changed because of the magnitude of debris to be cleared in the three cities. Secondly, stakeholders wanted to do the clearing as quickly as possible to enable other operations take place. Third, at the planning meetings, it was noted that other departments in the cities have heavy equipment that could be useful in the debris removal.

As could be seen here, a reasoned effort went into decision making on debris removal at the EOC in order to speed-up debris clearing task off the roadways to enable the Fire Department move its heavy fire equipment into the damaged neighborhoods for search and rescue. The on-the-fly decision further facilitates the accessibility of the damaged areas by Police Department security teams to guaranty security and protection. The change in the debris clearing operation plan engineered at EOC furthermore ensures public safety from hazardous materials. The modification of existing disaster plan in place before the disaster to a disaster specific type situation as the event unfolds is termed spontaneous planning. Its core principle decision behavior is on-the-fly or on-the-spot decision taken by community of disaster responders to solve unanticipated problems and challenges. The phenomenon’s findings in this research is aimed at contributing to the development of spontaneous planning through grounded theory, thus, enabling the discovery of decision-making behavior of disaster responders.
This mission is coupled with demonstrated instances to exemplify the spontaneous planning phenomenon.

Debris removal operations were the most singular critical part of the tasks during the April 3, 2012, tornadoes in North Texas cities. It was a forerunner for effective and successful implementation of search and rescue as well as neighborhood security as they also involve deploying some heavy equipment. The urgency and importance of clearing debris off the roadways for fire and police operations was captured by one of the Interview Respondents:

Yeah … probably always the biggest … [challenge for debris removal] … depends on how widespread it is. [Then, the question is]: do you have enough staff … and equipment to … go out … and address the needs of the community? You know, our first priority … for the emergency … is to clear the roadways of any debris so [the] police and fire … can get in and do their job and secure the area. … That [was] … our biggest challenge. This specific event was isolated to a pretty small section of town - west City #1. So, from a staff standpoint, we were able to respond very quickly and get the roadways clear so that emergency … response people … could get in. … I think we had most of our roadways clear within just a matter of a couple hours (Interview Respondent, 2013).

The Interview Respondent went on to stress that clearing roadways of debris was a priority with needed equipment as noted thus:

We knew our first priority was the streets, so, as soon as it was safe … we … marshaled all our field staff together. So once it was safe for them to leave, we knew our first priority. You know, we needed loaders; we needed equipment, dump trucks, and things like that … to physically move the debris out of the roadways. And again, from our standpoint … that was our first priority (Interview Respondent, 2013).

According to an Interview Respondent, the department has a generic disaster plan for resource mobilization but was not applicable to a tornado type event. The typical plan at hand alluded to by the Interview Respondent is produced for any type of incident that may occur in the city. The reason for such a plan is cost minimization. Secondly, such a plan gives disaster responders the opportunity to adapt the typical
plan to a particular event at the scene. Therefore, in this tornado event, a spontaneous planning decision was considered and implemented by crews that responded in the affected neighborhoods to clear the debris. The on-the-fly decision-making process though quick and conscientious involves the creation of alternative plans, debating upon them, and then selecting the best plan to accomplish the task. It may also entail spontaneously anticipating future needs of equipment and manpower to achieve the department’s priority of debris clearance. People with varying experience were involved in the plan development. The aim is the production of competing alternative plans to ensure that the best plan wins out. The plan development may include different people with varying experiences that may ensure the production of good competing plans. The decision-making process involves semi-rational quick-thinking to solve situational problems. This well-developed thoughtful decision has a purpose. It saved money and time in accomplishing the job because appropriate plan is chosen among competing alternatives. Thus it minimized waste and delay. Based on this assertion, there was no preplan for tornadic operations before swinging into action. Planning and decisions were updated hour by hour as new information becomes available in the field:

We have a pretty typical plan. … It doesn’t even matter if it’s a tornado, flooding, or anything. We mobilize so we have all the resources there, but then, yeah, I mean, … decisions are made hourly … this is what we need to do, and … as you get more knowledgeable of the situation, then you have to change, so … it’s constant change. There’s how you address … mobilization is pretty typical. I mean … you kind of mobilize and marshal all your forces [and work with] … the Emergency Operations Center. … But then how we actually mobilize and push out into the field … it changes all the time. … Yeah … it’s hard to [produce] a full plan. … But how you respond to every plan … you can’t really detail that out in advance because it’s all based upon the actual … destruction that was caused, so … you kind of have one plan. … And that’s not the case here. A tornado, there’s not a lot of preplanning you can do other than like we did; … marshal your staff … if you see it’s coming, make sure all of your vehicles are filled up, all your equipment’s ready to go, and … then you’re ready to roll … (Interview Respondent, 2013).
The resolution of the debris removal problem was one of the “critical and tactical decisions” (Interview Respondent, 2013) made in the field and was made immediately after the tornado hit:

Yeah … our public safety areas, they had to make decisions, you know, literally out in the field. You know … how to deal with debris, what to … do with … downed power wires that require removal, you know, power should … be turned off. Those are just really important, critical decisions that have to be made immediately; they can't wait two hours, you know, to just kind of sit on someone's desk and then decide. This was essentially … a full warrant emergency, so you have … to respond as such. … Plus the training gave a good set of direction for people as they were making tactical decisions (Interview Respondent, 2013).

As this Interview Respondent shows, spontaneous planning also involves quick-thinking in the field to resolve issues. In this particular instance, public safety concern was due to a power outage, downed live power lines, and cable lines and other hazardous debris on the ground. A slow but careful decision was taken in the field to contact power and cable companies to come and attend to their property to minimize damage or injury to people. Moreover, calculated decision was made by the field commanders limiting residents and vendors from entering damaged neighborhoods because of the dangers these debris posed. During the response and recovery phase operations, decisions on contacting service providers to restore utilities and other services to the residents in the damaged areas were prerogative of the Police field commanders. This decision is different from regular blackout in which customers normally contact their service providers. This change in decision making during a disaster signifies the application of spontaneous planning that illustrates decision-making behavior of disaster responders.

When field commanding officers arrived at the ravaged neighborhoods, they realized how dangerous and hazardous these neighborhoods were. Thus, they took a
bit of time to discuss things thoroughly and make good decisions on how best to handle the situation. Additionally, at the meeting, a decision on authorized lists of vendors were tabled and debated upon to ensure accuracy. At the end, an authorized list of the vendors was collated. It was only those vendors on the authorized list that were permitted in the damaged neighborhoods. Finally, at this field team meeting, it was spontaneously decided that field commanding offices should be getting information for the disaster victims and vendors that tried to enter the affected communities. This was a novel spontaneous decision aimed at providing correct information to nervous and concerned public. Thus, based on the field commanding team’s decision that was made on-the-fly at spontaneous planning meeting, the field officers spontaneously became information officers in addition to their normal security responsibility. This decision gave the public confidence with the information it has as being accurate. This approach is noted by this Interview Respondent:

One of the things … was officers in the field getting information for citizens … or people trying to get into the area. So you may be working for Oncor electricity, and you would come up… and say … I need to get over there. … So we very quickly worked with Oncor and a variety of different people, Time Warner Cable, the water department, and came up with a list of authorized … subcontracts … (an authorized list of vendors as well as resources for people). … We wanted our officers in the field to be points of contact. That's who the people saw. … When they were coming and going from their neighborhoods, [officers were] … their point of contact. So we wanted to make sure they had as much information as possible. … Oncor was probably a huge partner for us because electricity … was an issue, and a lot of times the electricity was important for some responders too … (Interview Respondent, 2013).

This on-the-spot decision in the field by the crews to become an invaluable resource for both residents and vendors speaks volume to the centrality of spontaneous planning decision behavior of disaster responders in the April 3, 2012, tornado. These crews took
public safety seriously in the discharge of their duties by making on-the-spot decisions that mitigate dangers to residents as well as vendors in damaged neighborhoods.

In City #2, a planned removal of debris came from a collaborative effort from various people from different parts of the state present at a briefing that resulted in setting up a task force to plan the action. The Interview Respondent narrated it thus:

… And we had all the players there, so we were talking about how best to do the debris removal. And one of the stakeholders … currently living in … East Texas … said, “why don’t you try this? Why don’t you try this group?” And so we brought in something that we hadn’t planned on before, based on their recommendation, and we formed a little committee right then. You guys handle this, here are the parameters, make this happen. And so they moved aside and mad it happen (Interview Respondent, 2013).

One of the most novel and impressive examples of spontaneous planning in City #2 in the study relates to the use of volunteers to clear debris. In normal circumstances, debris clearance during incidents is the job of Transportation Department. However, the decision to utilize volunteers came at one of the spontaneous planning meetings where one of the meeting participants suggested to the leadership “why don’t you try this?” (Interview Respondent, 2013). What happened next was the formation of a committee to sort out solution to quick debris removal. The committee’s recommendation was the utilization of volunteers to remove debris. This proposal required a significant degree of on-the-fly planning decisions when considering how volunteers are normally deployed during a disaster. In general, in most disaster situations, volunteers are used for light duty but in this tornado incident, they were employed in heavy task of removing debris. This volunteer usage in debris removal in a disaster is unheard of. No wonder why the involvement of “volunteers on the debris removal” was described as “very inventive” (Interview Respondent, 2013). This on-the-fly decision to engage volunteers on the part
of the committee charged with providing solution to the debris removal further illustrates the utility of thinking outside the box when confronting challenges during a disaster.

Instantaneous and tactical field decisions in debris removal as Interview Respondents (2013) noted, and collaborative planning effort in City #2 are manifestation of spontaneous planning decision behavior. In an attempt to achieve the goals of clearing the debris as quickly as possible and efficiently, the disaster responders and in this case as decision makers did not sit at the desk to decide or draw-up plan. They immediately, tactically and creatively exhibit spontaneous planning decision by marshaling all the functional organizations, human and material resources in the city including bringing in contractors to get the job done.

Search and Rescue Operations

The April 3, 2012, tornadoes in North Texas hit one of the most populated areas (DFW) of the state. Though this incident happened in the day time when people were at work and students at school, it still warranted search and rescue at homes, businesses, schools and damaged neighborhoods. It was not possible to tell where an injured person may be without searching the damaged places. One important aspect of the search and rescue operation is that the field commanders had the ability to make on-the-scene decision to solve unforeseen issues by using tactical methods appropriate to the situation. This thoughtful and methodical decision behavior is the crux of spontaneous planning grounded theory and could be taken both at the EOC and in the field. Therefore, the elucidation of findings here is attempting to advance the theory including providing functional examples in support of the phenomenon.
One of the common observed general patterns, themes or constructs from the interview transcripts on the tornado operations is search and rescue in the three cities studied. When a disaster hits populated areas or any city for that matter, the responding teams take the operation seriously in order to save lives and transport the injured to the hospital. In the April 3, 2012, tornadoes that hit North Texas, (particularly Cities #1, #2 and #3 that severely sustained extensive damages), the cities’ Fire Department personnel swung into action as soon as the tornadoes passed through and was safe to do so according to transcribed interviews. They did so even when the roadways were not completely cleared of debris or downed live power lines. Furthermore, the responding crews contended with controlling traffic flow in the damaged neighborhoods as well as dealing with bystanders. Since the tornado incident took place while people were at work, homeowners rushed home to make sure that their houses were safe to return to. Unfortunately, their action caused a traffic jam, thus interfering with fire crew’s operation. Similarly, the incident drew bystanders in the community to the affected neighborhoods because they wanted to see those injured who were treated on the scene by paramedics. Moreover, these bystanders wanted to see the extent of damage also. Such behavior was a distraction to the paramedics from concentrating with the injured as well as obstructing the search and rescue operations.

In order to manage the response activities effectively and efficiently, unified command centers for Fire and Police were established in the affected neighborhoods and Fire Departments in two of the cities studied took charge of overall operations. However, in City #1, there was field operational command tussle that arose between Fire and Police Department. This operational leadership struggle offered an excellent example of spontaneous planning utilization in problem resolution. Since the interview
transcript had no indication that there has been field operational command leadership feuding between Fire and Police Department in prior events, no one expected it in this particular tornado incident. The bickering started in the response phase of the event. When the Fire Department that responded first to the incident setup field commanding post in a trailer, they wanted the Police field command to share that post with them. However, the Police command argued that their side of the trailer lacked utilities and that they would not be able to use their equipment. For this reason, the Police preference was a nearby building that had electricity for their equipment. With both sides not agreeing on where the command post should be, suddenly, the situation got out of control while the Fire field commander tried to assert field operational authority by reporting the matter to the entire planning city leadership team that assembled at the EOC to seek a resolution.

When the matter came to the attention of the city leadership, the leadership team paused awhile for consultation before making a bidding decision. This was one of the most challenging well-worked out decision-making process that the overall city leadership at the EOC had to make during their spontaneous planning meeting if response and recovery operations were to proceed smoothly. It was a pivotal decision that can determine the direction of the entire disaster activities and the will of the city leadership in ensuring cooperation among the city departments and units. Thus, at its initial spontaneous planning meeting, the city leadership team debated the efficacy of Fire Department taking charge of field operational command during natural disasters. Similarly, consideration was given to Police command controlling events that are bothered on criminality. At the end, the city leadership team consciously and spontaneously resolved the field operational command leadership with respect to the
type of incident occurring. The on-the-fly decision was that Fire should be in charge of
the tornadic and natural disaster operations while the Police should be in command of
all criminal episodes in the City. Hence, it was recognized that in City #1 field
operational command should depend on the major category of functions that needs to
be performed during an incident. This stark categorization of operational leadership
command between Fire and Police Departments based on the type of event is an
illustration of spontaneous decision which was made on-the-fly. The reasoning behind
this sharp division of operational command in terms of incident type is to avoid current
and future feuding between Fire and Police. Moreover, the decision ensures unity of
command, operational command efficacy, response effectiveness, and efficiency. This
is how the Fire Department field commander recalled the potential feuding with the
Police and how to diffuse it:

So, when the leaders from all the departments came in … we … initially … have
to set command [assignment] and who's responsible. … They [the leadership]
have to know that a tornado … was a different type of situation, say, [un]like a
bomb, where it's a crime scene, [which] … the police would be the lead agency,
and we [the Fire Department] would [play a supporting role]. We … established …
right off the bat [that] the police are the lead agency [in crime situation] and
they're calling the shots. But this incident was a tornado where the fire
department is the lead agency, and so we established that immediately with that
small group of leaders, so that they know fire is running this show and everybody
else is in support role. … So … we establish that right off the bat. And we had
some issues in this particular incident, particularly on scene with fire and police
because … we responded … and formed a command post at one location. It
wasn't very convenient; it was working out of the back of a Suburban. And the
police wanted to move us into a building (Interview Respondent, 2013).

This statement from the field Fire Department commander was a forewarned potential
commanding squabbling between the department and the Police command. Thus, as
discussed earlier, to defuse potential operational command feuding, the city leadership
team intervened and assigned the tornadic and natural disaster operational command to
Fire Department. On the other hand, the Police was assigned manmade disaster operational commanding responsibility. The resolution of a potential commanding responsibility disagreement between the Fire and Police by the leadership team illustrates the case of spontaneously anticipating a problem and making a meditative decision on the issue before the dispute occurs. This was a careful decision to avoid open feuding between Fire and Police and is one of the core principles of spontaneous decision making. If this conscientious decision was not taken, an open operation commanding disputing would have had detrimental impact on the event’s response and recovery activities. However, since this problem was amicably resolved, the Police cooperated with the search and rescue teams and helped in the operations.

During the search and rescue operations, the teams in the three cities encountered numerous challenges. For example, the search and rescue teams were discharging their duties under dangerous condition with down live power lines and gas leaks (Interview Respondent). Though their primary duty and plan was to search for injured disaster victims inside and outside damaged structures, the rescue teams had to contain with gas leaks and downed live power lines in the environment. Thus, rather than concentrating on their main plan of search and rescue, the rescue teams had to undertake the work of utility companies which was not initially planned for to minimize the dangers these damaged infrastructure posed to the public. Therefore, these rescue teams on-the-spot spontaneously discussed shutting off utilities safely to avoid explosion, fire and injuries. The decision to do so was quick and immediate without delay to reduce an explosion or a fire disaster as this action was a defensive one. After the decision, they went about structure by structure shutting off gas and electricity in damaged structures before utility companies came in. These damaged structures were
marked with visible markers by the search and rescue teams. This role combination by the search and rescue teams was spontaneous decision and was taken at the scene of destruction. It corresponds to rational decisions and deliberations with quick-thinking which are associated with spontaneous planning decision to resolve unanticipated problems. Furthermore, the rescue teams’ swift action demonstrates quick thinking as well as spontaneously anticipating potential future disaster of explosion or fire if those broken gas and downed power lines were not shot off immediately. Here is a description of the spontaneous decision-making environment:

... When they [search and rescue teams] arrived on [the] scene, they knew that they had a … number of houses and structures that were damaged and possible victims and possible electric and gas utilities that were damaged. So at that point … they just … go to each house, rescue any victims, shut off any … utilities that may be damaged, and then once they did that, once they stabilized the immediate issues … TJ makes a note of that … (Interview Respondent, 2013).

As far as the search and rescue operations (the primary function) were concerned, decisions on “how we actually perform search and rescue operations and how we marked homes that had been searched” were quickly and spontaneously made carefully while scouting the area (Interview Respondent, 2013). In this particular disaster, quick field planning decisions have to be made since rescue crews have never responded to this type of massive and expansive destruction before. The situation demanded quick-thinking and immediate action. Therefore, the field command in consultation with the crews quickly decided that teams of searchers and markers would do the search and marking operations. Furthermore, still in consultation with the crews, it was decided that each team should be led by a team leader who can further adapt the plan as need arises. Another on-the-spot spontaneous decision that the responding Fire Department field commanding officer made quickly was calling up crews that were not
on rotation to report for duty. This was in addition to requesting staff from other fire
stations that were not directly impacted by the disaster to come and help in the search
and rescue effort. These decisions were immediately taken after spontaneously
anticipating the manpower needs of the rescue team. These measures required a
significant degree of logical planning while responding to the incident requiring saving
lives. Although a decision was made to utilize Police Officers at the scene in the search
and rescue operations, the Fire field commanding officer noted that Police were not
trained in that art. However, after spontaneously assessing the future manpower needs
for search and rescue operations, the Fire field commanding officer made a
spontaneous decision to train Police Officers in the art too:

We didn't realize how many police officers would be doing that [search and
rescue] as well. So … that's something … we're going to work on is training not
only our fire officers but our police officers as well in search and rescue
techniques … and tactics and marking, so that when … we send the police
people out to do that, that we're all working on the same program (Interview

This realization came about only through an on-the-fly assessment of trained and
certified search and rescue staff. Without this quick on-the-fly rescue planning
operation, the anticipated training of Police Officers in search and rescue would not
have occurred.

It is interesting to note that while the role improvisation by search and rescue
teams as utility companies’ representatives was going on, they simultaneously
“conducted a primary search of houses for victims and marked those [searched] houses
as checked” with visible markers (Interview Respondent, 2013). Further “secondary
search of the structures were conducted [again] and the structures were marked with a
different color as checked” (Interview Respondent, 2013). The aim of the “second
search through of the houses [was] to determine if there was any [further] fire danger from gas leak or from electricity, so that [they could be] shut off any possibility of further damage” (Interview Respondent, 2013). The search and rescue teams activities of consciously shutting off damaged gas and live power lines illustrates the case of the rescue teams spontaneously anticipating future dangers of fire flaring up in destroyed neighborhoods. Their on-the-spot decision stabilized the environment and reduced “possible fire danger and danger from any live electric lines” (Interview Respondent, 2013). However, when the utility companies’ representatives finally arrived at the damaged neighborhoods, the search and rescue teams “worked with the gas and electric utility to condemn and mark certain houses and remove the gas and electrical meters” (Interview Respondent, 2013).

Another problem that became glaringly apparent during the response was inability to maneuver large fire engines in the damaged neighborhoods because of debris. Typically, when an incident occurs, the Fire Department usually responds by sending out large fire engines to the scene. This approach seems to be normal routine with most Fire Departments and may be because they have similar generic response plan for any type of incident. A similar approach was employed in the April 3, 2012, tornadoes in the DFW area. However, this routine response did not work here because large debris blocked the streets and the neighborhoods. These heavy fire engines were unable to maneuver the cluttered districts. Thus, a swift deliberative decision had to be made on the best course of action. This intentional planning decision (a principle of spontaneous planning) could only be useful in this situation on the type of emergency vehicles that can maneuver in the destroyed communities. It was a kind of spontaneously assessing immediate and future operation needs. This particular
response plan to the tornadic event was not written before the incident but has to be spontaneously developed on-the-scene during this emergency operation. This new plan was communicated to the Fire Stations for immediate action. One of the Interview Respondents recalled decision-making process utilized to resolve this unanticipated problem encountered when responding to the tornado incident:

Our “imaginative” plan adjustment was to pull larger vehicles out, and dispatched our EMS Squad units to the scene. These are small, automobile sized SUVs with two fire fighters on board. They carry EMS equipment, but not heavy rescue equipment. The smaller Squads could more easily access the neighborhoods and provide medical care if needed … (Interview Respondent, 2013).

This Interview Respondent’s idea of a potential modified plan indicates a significant departure from routine response to an incident by Fire Departments. This event was not an ordinary incident requiring normal response but needed on-the-fly planning as well as on-the-spot decision to resolve unexpected problems as the disaster unfolds. The on-the-scene “imaginative” decision appeared to have been taken after the field commanders sized-up the environment for the maneuverability of the automobile used in the damaged area for the rescue operations. This on-the-fly decision made by the field commanders illustrates tactical thinking on-the-feet technique in problem resolution. This decision-making behavior of disaster responders is at the center of spontaneous planning concept. Still on a follow-up explanation on resolving unanticipated problems in the field, another Interview Respondent replied:

In the several activities that I can think of, we used a combination approach or use … multiple styles to get [to] where we wanted to go. … Think of the solution of the issue as just another goal to reach and give that goal to the right people. … When you get down to it, “all decisions are on-the-fly in a disaster even the ones you have planned for” … (Interview Respondent, 2013).

This Interview Respondent (2013) captured the essence of spontaneous planning through goal setting approach to problem resolution. It entails on-the-fly decision
making as disasters are characterized by dynamism which may alter even planned activity. Understanding that a disaster event is a dynamic incident may improve decision-making process by cadres of disaster responders by knowing that every second counts as the event unfolds.

Tactically, spontaneous planning was apparent in the field as crews attempted to resolve unforeseen issues as the disaster unfolds. This method was epitomized in City #3:

... A lot of the long-range planning occurred at that point. ... As the disaster was happening and shortly after it ... our fire crews and police crews were on scene ... within minutes. They ... did some basic planning at that point. It was just ... very basic. ... So at that point, they ... just formed a basic plan on what to do. ... And [they] ... quickly set up a command center on site, and I think a lot of the semi-longer-range planning went on at that time out there (Interview Respondent, 2013).

Spontaneously resolving unanticipated problems as the April 3, 2012, tornado disaster unfolds, was the goal of disaster responders who took part in the response operations. Such a process hinged on on-the-fly planning or on-the-spot decision making while thinking on-the-feet. As such concepts, themes, and constructs such as “imaginative plan adjustment,” “modify,” or “match” the generic plan to “make it fit” the tornado event (Interview Respondent, 2013), development of “long-range planning,” and undertaken “basic planning,” (Interview Respondent, 2013) were used by Interview Respondents in this study to describe their decision-making process. These phrases were coded as expressing the concept of spontaneous planning process. This is the process utilized in resolving unanticipated problems and challenges during and after the disaster. These on-the-spot remediation decisions as a planning phenomenon helped reduce dangers to people in the damaged neighborhoods. Another observation from the
transcripts was that all the homes that were searched were marked with visible markers to avoid repetition. These processes were done on-the-fly.

Securing Damaged Neighborhoods and Dispatching from the Field

On April 3, 2012, tornadoes of magnitude between EF1 and EF3 hit DFW region causing huge damage to property and infrastructure. The incident uprooted trees, caused widespread power outage and injuries, and interrupted regular routines. Thankfully, the tornado occurred at day time when most people were at work and students at schools. Hazardous debris were scattered all over the damaged neighborhoods including roadways that were blocked with downed trees, live power lines, and other cables. As such, the devastated neighborhoods had to be secured and patrolled by police officers. The presence of security teams can ensure controlled ingress and exit of the damaged neighborhoods.

The application of spontaneous planning to resolve issues during and after the April 3, 2012, tornadoes in North Texas was also seen in police department duty scheduled plan changes or modification. While responding to the disaster and spontaneously anticipating future work schedule, Police field commanders discovered that continuing with the usual staff schedule would not meet the workload required to maintain its presence in the affected communities. Moreover, in this tornadic event, the department wanted to have staff rotation that included more experienced officers who initially responded to the event. This new on-the-fly rotation schedule plan departs from the routine ones that give new recruits more opportunity of working side-by-side with experienced officers. However, in this event, the field Police commanders scheduled seasoned officers who originally responded to the incident for more overtime, though at
the same time included new recruits at regular scheduled work rotation. The objective was to ensure continuity in the event response performance with seasoned officers on the scene that can make rational decision to solve unforeseen challenges. The Police field commanding officers decision was to put the department in par with other departments to ensure consistent response job performance while ensuring stability as this Interview Respondent stresses:

The fire department was much more consistent … with their staffing. From the field perspective, I had the field command for the entire two to three weeks during the day, and, you know, my shift was 12 hours, but I typically worked about 16 to 20. So we were very consistent in the field. The fire department was very consistent in the field and the EOC with the same person. In our EOC we kind of rotated the positions through, and while it provided people with some experience, it was problematic in that you might be assigned to a position that you’ve never held … you know, it’s different when you read about it in a book or take a class versus doing it. So there was a lot of … problems and … a lot of challenges because somebody may be new and they really didn't understand what they had to do. They didn't know what had been done yesterday or the day before, so there was no continuity from us and that was somewhat problematic. … I [therefore] had a staff of two or three people that were constant … for the first two or three days. I had the same staff, and then I started rotating some people through to where I was still able to provide learning opportunities, but I still had a core group of staff that was constant and had that continuity … (Interview Respondent, 2013).

This well-thought out plan, though developed on-the-fly, was necessary to maintain continuity with officers who responded to the tornado incident first. The choice was based on comparing alternative scenarios. The scheduled rotation modification plan was also necessitated by limited available experienced officers including those who responded initially to this event. Although the police field commanders were mindful of on-the-job training for new recruits, such concern was superseded by continuity in the security staffing at response sites.

When an Interview Respondent who was a field commander during the response and recovery operations responded to field decision making, the person noted that it
was specific to the situation. The commander further observed that those on-the-scene
decisions were tailored to dovetail spontaneous planning. When probed further, the
Police field commander offered this explanation:

Spontaneous planning is having to address issues as they arise, usually
customizing our response based on the dynamics of the situation and resources
available. An example is beginning to dispatch from the field. This is not a
standard response, but worked well for us as we spontaneously transitioned to
utilizing this tactic (Interview Respondent, 2013).

Expanding on this spontaneous planning definition, the Interview Respondent
continued:

The dispatchers at [the] station got very overwhelmed [with emergency calls and
couldn't handle the volume coming in]. [So] … we began dispatching from the
field. And it … was one of those things that happened. … [It was] probably
about 10 or 15 minutes into the situation … we realized that the dispatcher [at the
station] isn't dispatching any longer. [So] … we [had to] take over that function. …
It was just something that we [had to] do and we kept it that way for several days,
where the field command dispatched (Interview Respondent, 2013).

Interpreting this Interview Respondent’s definition of spontaneous planning given
above with respect to “dispatch from the field,” one must be aware that the Interview
Respondent’s emergency response training covers a wide variety of situations
(Interview Respondent, 2013). Such training included on-the-spot decision making or
quick thinking on-the-feet problem solving using simulated incident situations at The
Ballpark and Cowboy Stadium. The idea of using simulated decision-making situations
was to adapt the process to other real circumstances. However, according to the
Interview Respondent, such experience was not in place for a quick onset event like a
tornado. Though no drill for a tornado incident like the one that occurred in DFW on
April 3, 2012, was done prior to the event, experience with the stadiums’ exercises may
have helped in the field on-the-scene dispatch quick decision.
On the other hand, a closer look at this Interview Respondent’s statement revealed a departure from standard dispatching procedure. From the statement, it is evident that emergency dispatching is usually done from the station. In this particular incident, though the station was responding to emergency calls, the dispatchers were flooded with the volumes of calls that came in. However, at one point the dispatchers were overcome and could not dispatch any longer. Unable to comprehend non-responsiveness from the dispatchers at the station, the Police command in the field took over the dispatching function in the field. The Police took over this responsibility because dispatchers at the station were overwhelmed with emergency callers. In short, they could not handle the numerous calls that came in to the station. The police decision to take over dispatching from the field was logical and purposeful rooted in quick-thinking because of the urgency of giving information to disaster victims as well as meeting their needs. Dispatching from the field is not a standard operating procedure for police. However, because of the need, the commanding field officer had to adapt the procedure to the current situation. The reason for the on-scene dispatch was twofold. The first was to relief the station of the volume of calls coming in. The second was to answer disaster victims’ inquiries and direct them to appropriate quarters for action. Without this calculated decision to takeover dispatching function in the field, victims of the disaster may not have been able to find needed help. With this action, it could be inferred that the victims were able to seek shelter from the element and find food for the moment. This conscious spontaneous decision on the part of the police commanding field officer to dispatch from the field is at the center of spontaneous planning phenomenon.
Although dispatching from the field was an important function the Police team spontaneously undertook, the task of securing the damaged neighborhoods was critical as well. Though led by the Police Department, a number of groups, teams and individuals were involved in the security planning response process including council members who were at the police command posts. The security teams were mainly concern with contractors scamming residents whose properties were damaged. Secondly, they wanted “to keep the looters” out from the damaged neighborhoods (Interview Respondent, 2013). The notion of keeping looters away from the damaged neighborhoods is in conflict with long-standing assertion in sociological literature on disasters portraying widespread looting as a myth (Quarantelli & Dynes, 1972; Wenger, Dykes, Sebok and Neff, 1975; Quarantelli, 1994; Gray & Wilson, 1984; Goltz, 1984). These and other research show that people are sympathetic with disaster victims and went out of their way to render help (Barsky, Trainor, & Torres, 2006). However, to attend to these dual apprehensions, the cities quickly decided to put credentialing process in place before permitting access to the damaged neighborhoods. This was a novel idea of permitting those who can or cannot enter the damaged neighborhoods. This was an initial problem the police departments faced when responding. However, with careful planning and through credentialing, the situation was later rectified.

In City #1, the public safety department was well staffed and did not have to activate mutual aid security agreement. However, in Cities #1 and #2, based on their spontaneously anticipated future needs for manpower and workload assessment for the response and recovery operations, they consciously made on-the-fly decision to activate their mutual aid security agreement. Therefore, to meet this shortfall, the
security teams quickly made a decision to boost their manpower by activating the security agreement as captured here:

Yeah, we had mutual crews come in … Someone [one of the fire lieutenants] got on the [radio] channel and said “City #3 was leveled and they need all the help they can get.” That’s what brought other police in. Yeah, a lot of unofficial communication went out, but that’s just what you’ll get in today’s world [when a disaster strikes] (Interview Respondent, 2013).

The fact “a lot of unofficial communication went out” shows that even though the mutual aid security agreement was activated after a careful spontaneous anticipation of future manpower needs assessment, the action of the fire lieutenant departed from normal process or standard channel of official communication. For a fire lieutenant to get on the radio channel to plead for more security officers from neighboring cities conveys the idea of quick thinking on-the-fly decision by the lieutenant. The lieutenant’s prompt on-the-fly decision did not even consider whether City #3 has mutual aid security agreement with other neighboring cities or not. The objective of this quick thinking decision was to resolve unanticipated problem brought about by the tornadoes and the decision departed from City #3 standard operating procedures. This is the essence of on-the-fly decision making which is associated with spontaneous planning concept.

During the response and recovery operations the security teams held meetings covering decisions on many parameters (patrolling damaged communities, collaborating with other departments, ensuring that all damaged areas are cordoned off, and scheduling staff to maintain police presence). A number of experienced participants were involved in these spontaneous planning meetings. The meetings made decisions on immediate action to be taken as well as anticipatory plans for the coming hours, days and weeks. These planning meetings were helpful per this testimony:
I think the meetings helped because a lot of different people came together. I like working in that [type of] environment because everyone has different strengths and weaknesses and experience. ... I think we were able to draw upon everyone’s experience. ... So it really helped. I think, bringing together different ideas is important. And at the same time, people would think of things that maybe one person … couldn't think of, everything that needed to be done, and to have … five or ten people around me, we pretty much were able … to think of everything that needed to be covered. So it was very helpful (Interview Respondent, 2013).

This is the type of environment where spontaneous planning did benefit by having diversity of disaster planners brainstorming in the development of viable competitive alternative plans to resolve unforeseen problems as a disaster unfolds. Secondly, it permits these alternative plans to be debated upon and then select the best plan well suited for the situation. This group approach to spontaneous planning decision making is just one method of creating a novel plan for problem resolution during response and recovery activities. Though a group approach, decision making in such environment like in any other spontaneous planning situation entails quick-thinking and logical application. Such was the method taken when deciding on collaborating with other departments and ensuring that all damaged areas are cordoned off. The Police field command made these decisions in consultation with officers in the field to gain their support since these officers contributed to the decision-making process.

In securing damaged neighborhoods, the Police Departments made a lot of instantaneous decisions specific to the tornadoes that hit their cities to resolve unanticipated issues such as maintaining experience officers on duty, dispatching from the field and activation of mutual aid agreement. The invocation of tactics and comradeship in the planning process in a dynamic situation to resolve problems were apparent. These decisions were made quickly and on-the-fly to resolve situational problems. The process infers spontaneous planning in action. The initial and periodic
spontaneous planning meetings helped in immediate and long-term operation in response and recovery operations. This spontaneous planning involved current and anticipatory issues.

Activation of Emergency Operations Centers

The April 3, 2012, response plan and overall strategic decisions to the tornadoes that hit the DFW area began at each respective emergency operations center (EOC) in the three cities studied in this research. The tornadoes which occurred at lunch time caused injuries and extensive damage to homes, businesses, and schools in the DFW area. Due to the seriousness of the incident, the three cities in this research activated their respective EOCs to initiate quick response operations.

In every major emergency, the EOC is the nerve facility tasked with the coordination and collaboration of a multi-organizational, large-scale response and recovery effort in an emergency situation (Militello et al., 2007; Waugh, & Streib, 2006). According to Militello et al. (2007), an “EOC is an ad hoc team that assembles in a central location during an emergency to support on-scene emergency response personnel and coordinate the response across incident command centers, with the media, and through EOCs at different levels of government” (p. 25). Evidence from the tornado data supports this assertion. Since it is the emergency management team that writes all emergency response and recovery plans (which are very generic), the leadership team and the emergency management personnel that gather at the EOC have the responsibility modifying and adapting these general plans to match the tornado incident response and recovery operations (Interview Respondent, 2013). This quick thinking on-the-fly or on-the-spot decision is what this research terms spontaneous
planning and is the focus of the investigation in the tornado event of April 3, 2012, in the DFW area. It is the critical task of these decision makers to think through the overall strategic response and recovery plans immediately before modifying the original generic plans to the tornado type incident. Such plans, modifications, and adaptations include but are not limited to coordination, collaboration, resource management, needs assessment, mutual aid activation decision, staff mobilization, provision of maps of the damaged areas, and making funds available for response and recovery operations. However, before choosing the best response plan, different alternative plans are developed, and the one that best suits the current situation is selected. Choosing the best plan out of alternatives is the soul of spontaneous planning which is a planning decision-making process.

The substance of the systematic decision is to resolve unanticipated problems and challenges as the leadership team, emergency management staff, and field commanders and crews respond to a disaster. Resolving the unforeseen issues may also include developing a totally new plan relating to the problem at hand or taking anticipatory action to mitigate other future unanticipated problems. This type of thoughtful decision making further involves purposeful thinking or thinking outside-the-box that corresponds to the core principle of spontaneous planning. Aiding this focused plan decision making is gathering new information on the incident as it develops in the response and recovery activities. The approach was evident at both the EOC and in the field.

As soon as the tornadoes struck, City #1, City #2 and City #3 activated their respective Emergency Operations Centers (EOC) and went into spontaneous planning to coordinate field operations to meet the needs of crews in the field as well as getting
progress updates and new information from the field. For instance, at each EOC were representatives from all city departments, including City Manager, Mayor and some Council members who utilize the National Incident Management System (NIMS) to manage the disaster response operations. The quick meeting of departmental representatives, respective managers and others at their individual EOCs under a “tactical command” (Interview Respondent, 2013) facilitated the resolution of unanticipated problems by developing “incident action plans” (Interview Respondent, 2013) to tackle these challenges. This thought was astutely offered by an Interview Respondent in reference to the usefulness of National Incident Management System:

Yes, the National Incident Management System provides … various branches for operations, logistics, planning. And those, if you break them down, you have your … resource management parts, your response parts for the people actually doing the work, such as police and fire. The planning would be conducted at the EOC… to develop incident action plans, which in this instance I don't think there was ever an incident action plan written. I know it was in heads, but that's an improvement we need to make, is to start doing written incident action plans using the ICS forms (Interview Respondent, 2013).

The April 3, 2012, tornadic activity in North Texas occurred in the afternoon during lunch time according to the Interview Respondents. On the day of the incident, some Emergency Managers and their staff were at a professional conference in San Antonio. On hearing the severe weather report from the National Weather Center, these professionals headed back to their respective cities to supervise the response operations. They met with various departmental representatives and directors at the EOC for on-the-spot planning decisions. Regarding what was discussed at the planning meetings and how the process took place, one participant said:

We kept it simple. … We had everybody in … a big room with … key players, and we went … group by group [to get an update on the situation] … We said, Police Department, tell us … where you’re at in your operation, what you’re doing in your operation, what are your needs in your operation, and where do you see
your operation going. And so they would say things like, we have this area contained, we are going to need 50 more officers. ... So, they would give their input in their operation. And then we would move to the next group and would say, okay, Public Works, tell us about your operation. We are removing debris; ... we have this many tractors, we have this many backhoes; we are going to need this... and this. And then when all of those were through, we would develop our plan. Okay, Police needed this, we need this .... We answered all the questions, and we put that down in our action plan (Interview Respondent, 2013).

These decisions are the essence of spontaneous planning, on-the-spot decision making. On spontaneous planning at the EOC in particular, this Interview Respondent said:

... The planning that we did was ... essentially led by myself and included all of the departments, including our communications personnel. And we would sit in a room and identify every issue, and we'd identify what actions we were going to take, and what are the challenges to make that happen, and we wouldn't leave the room until ... we had a [well]-defined set of actions that we were going to take to address those issues (Interview Respondent, 2013).

The presence of high-level decision makers at each respective EOC was to speed up on-the-fly decisions in the response and recovery operations which were critical in spontaneous planning decisions (Interview Respondent, 2013). One of the problems that became conspicuously apparent in Cities #2 and #3 during response to the tornado event was lack of large pieces of equipment and other numerous items needed for operation. Such items included batteries for portable radios, portable lights for night operations, oxygen for shelters, portable toilets, meals for response workers, and dumpsters needed for response and recovery activities (City #2 Tornado Time Log, April 3-10, 2012). These cities have never experienced this type of tornadic destruction before and had no need for large equipment. Quick spontaneous decision has to be made regarding these items. These cities’ administrators present at the EOC in consultation with their departmental directors quickly on-the-spot decided to approve
budgets for the purchase or rental of this large equipment. This type of on-the-fly budgetary decision has not taken place in these cities in recent time.

Another example of spontaneous decision that came out of the EOC relates to the operation of traffic lights in the disaster impacted neighborhoods. This type of decision is the prerogative of the city administrators and EOC staff and was apparent in City #1. Though cities may have sundry existing contracts in place with various vendors for services, the activation of those contracts may be predicated on needs. This was the case when the tornados struck North Texas and put some traffic signals out of commission in City #1. Quick-thinking of public safety concern on the part of these administrators and EOC personnel resulted in the reviewing and activation of existing generator contracts with various vendors for traffic signal operation in the affected communities. This was a spontaneous decision to implement existing generator contracts to power the affected traffic signals in the tornados impacted communities.

We have contracts with different companies, for … generators, a lot of times in instances like this you need a lot of generators to actually … run our signal system if … the power [have] been lost. We have those relationships and contracts with the private … companies where we can pull in … those resources. And that’s also part of the EOC [responsibility]. … They … also have the connections and contracts with different vendors, depending on what those needs are (Interview Respondent, 2013).

Still, one more other immediate quick decision that Cities #1 and #2 made on-the-fly that came from EOC was disaster declaration. Though the announcement was formally made by respective Mayor of each city was a collective decision by each city’s leadership. Such a declaration if approved at the Federal level would entitle these cities funds for clean-ups.

In all the three cities in this research, strategic spontaneous planning response to the tornado started at the EOC where representatives from various departments and
administrators were present for diverse inputs. As shown in the examples, participants’ contributions in the processes used in the resolution of unanticipated problems and challenges point to the fact that the personnel at the EOCs and the response teams in the field use spontaneous planning process. Those in the EOCs developed incident action plans which were carried in their heads as well as making on-the-spot decisions. The decisions and activities at EOCs portray spontaneous planning process decision-making behavior to quickly plan and execute what was not planned prior to the tornadoes.

Damage Assessment

The April 3, 2012, tornado that hit DFW area devastated many communities where it touchdown. In the aftermath of the incident, it was estimated that over 1,100 homes were damaged, including at least 349 that were completely destroyed. In Lancaster alone, about 300 to 650 buildings were damaged. The slow-moving storm injured about ten people in the city with two of them seriously while semitrailers were twisted and thrown in the air like toys. One of the Elementary School that was severely damaged was restored at a cost of between one million to two million dollars (Interview Respondent, 2013). The storm also affected power supply in the DFW region. Oncor Electric Delivery Company reported that more than 47,000 homes and businesses in North Texas were without power. In Arlington alone, about 14,000 Oncor customers were affected, according to reports. Trees were uprooted and streets were clogged with fallen trees while neighborhoods were littered with debris including live power lines and other cables. At the DFW International Airport, about 110 aircrafts sustained various
degrees of hail damage. (Detailed discussion on the tornado damage can be found in Chapter 4).

With this tornado impacting the area, damage assessment was necessary to evaluate the integrity of the existing structures. According to the literature, damage assessment is a “field survey to determine levels of damage for structures and identify the condition of structures” (Schwab et al., 1998, p. 151). It also deals with infrastructure and needed repairs, and is a “process of identifying the extent of destruction, including individual impact as well as overall economic losses in the community” (McEntire, 2007, p. 211). Although damage assessment is related to but different from needs assessment for individuals or an impact assessment for businesses and the government (McEntire et al., 2013).

Damage assessment is one of the operations that must be carried out after a disaster occurs and is a crucial aspect of emergency management. It has been argued that a thorough damage assessment can assure an effective response, while a sloppy and unorganized damage assessment may result in poor performance of post-disaster functions (McEntire et al., 2013). Without delving into the nuances of damage assessment, it is worthwhile noting some of its functions applicable to this research since two cities in the study declared a disaster in its jurisdictions. One of the purposes of the damage assessment in this tornado is that it is a necessary in applying for federal funding to assist in the cleaning-up, reconstruction and refurbishing of homes and businesses in the damaged communities (McEntire et al., 2012; Gabe, Falk, McCarty, & Mason, 2005; Bea, 2010; Downton & Pielke, 2005). Another important function of post-disaster damage assessment is that it draws attention to specific unworthiness in infrastructure and buildings as well as uncovers other vulnerabilities in the damaged
neighborhoods that can be addressed in subsequent recovery and mitigation activities (McEntire et al., 2012; Gabe, Falk, McCarty, & Mason, 2005; Bea, 2010; Downton & Pielke, 2005).

Interview Respondents in charge of damage assessments understand that the assessment document is crucial to the recovery phase of emergency management (McEntire & Cope, 2004). Since the preliminary data assessment (PDA) is the most accurate estimate of damage, city leaders or disaster victims may choose to use it for insurance quotation estimate comparison. In City #3, the damage assessment was assisted by FEMA and the County Emergency Management agency (Interview Respondent, 2013). According to an Interview Respondent (2013), “… they helped tremendously … with the city gathering information for the amount of damage, the possible reimbursement of funds.”

With this in mind, the important aspect of damage assessment in the recovery phase of the tornado ravaged neighborhoods cannot be overemphasized. What was different in this damage assessment in City #1 is that the process was led by Code Compliance Services instead of Fire Marshall (Interview Respondent, 2013) while City #2 was assisted by some Code Inspectors from neighboring jurisdictions through mutual aid program (Interview Respondent, 2013). The responsibility of the Code Compliance Services and Code Inspectors was ensuring the integrity of existing structures after the tornadic activity. The damage assessment in the three cities in the study was performed to satisfy the functions discussed above.

When asked how pre-event planning impacted response operations, one of the Interview Respondents without giving detail indicated that the unit has “standard policies and procedures on response, and it’s a matter of following those protocols” (Interview
Respondent, 2013). Nonetheless, the Interview Respondent contended that during the tornado response it was different because “this time … our department was brought in to lead the damage assessment and then the recovery portion of the event” (Interview Respondent, 2013). The decision in City #1 to transfer damage assessment responsibility to Code Compliance Services was a significant departure in task assignment during this particular disaster. From the interview transcript, the impression is that in previous disasters, damage assessment was done by the Fire Department's Inspection Unit in City #1. But the role change in this tornado disaster was consciously taken spontaneously by the leadership team that assembled at the EOC during their spontaneous anticipatory assessment of future resource and manpower needs. The quick-thinking role change exemplified the importance of spontaneously anticipating future needs in problem resolution during a disaster. This decision may have been taken to relief the Fire Department from task overload since the Code Compliance Services may have had certified quality staff needed to accomplish the task. The role change led an Interview Respondent (2013) to observe that initially, there was organizational confusion because of the leadership role the department was thrust into. However, with the role change, the Interview Respondent who is one of the lead officers in the Code Compliance Services astutely courted cooperation from other departments by meeting with “the staff from the EOC and the fire department's inspections unit … to develop a plan, an operational plan, together” (Interview Respondent, 2013).

Although the Code Compliance Services was assigned the lead agency to conduct the damage assessment, the department wisely collaborated with other units to develop operational plan for the activity. This decision may have been taken to avoid interference from other departments or to get timely information from them since these
other agencies were involved in other operations. Moreover, since the area to conduct the damage assessment was large, the spontaneously developed operational plan may have included phased operation as well as securing maps of the damaged neighborhoods (these maps were made available for this research). Information presentation and the format of the document were consciously decided in the plan development stage taking into consideration spontaneously anticipated different users of the damage assessment information collected. Of particular concern was the understanding of the data by policy makers. With this in mind and driven by quick-thinking, a decision was made by the team to present the damage assessment data in both Excel spreadsheet and MS Word. Additional issue to address in the operational plan was manpower as the Code Compliance Services never conducted damage assessment prior to this. In this particular tornado response, it was the vastness of damaged areas to perform assessment that complicated the matter as this Interview Respondent observes:

In … this situation we …. had a … skeleton framework on damage assessment procedure to which we used. What complicated the situation was that the tornado actually affected three different areas within the city, so trying to then determine the best approach on how we were going to utilize staff and how we were going to collect the information we needed, and then once we collected it, how that was going to be represented in a manner that is easily understood by those that are making the decisions (Interview Respondent, 2013).

With the skeleton framework on the damage assessment procedure at hand, the assessment director and the crews hurdled into an initial spontaneous planning meeting. This original planning meeting mapped out: (a) manpower requirement to accomplish the job and how best to use the teams effectively; (b) collection of maps of the damaged neighborhoods; (c) decided on what data to be collected and the format presentation to policy makers for decision making; (d) determined phased or not phased
approach assessment because of the vastness of the area; (e) time frame of completing the task; and (f) other resources that may be needed as the assignment progresses. Subsequent planning meetings were scheduled for progress updates and to modify the plan as needed for timely completion of the damage assessment assignment. The mapped damaged properties to be assessed were categorized into those with swimming pool and those without it. These structures were further classified into three groups: completely destroyed; sustained major damage; and minor damage. With maps at their disposal that came out of the spontaneous planning meeting, the damage assessment teams set out for the job. (Maps showing the locations of these damaged properties were made available to the researcher for use.)

As soon as the Code Compliance Services in City #1 took lead charge of damage assessment and recovery operations, it quickly set out ambitious goals to accomplish the task. The twofold goals included timely completion of the assessment so that it could be used in the application of funds from the federal government for cleaning-up. The second aspect of the goal was to present the damage assessment report to the decision makers in a format that is useful and understandable. At the planning meeting, the leadership immediately moved forward systematically and cooperated with Fire Department to achieve its program. The move is captured here:

Once we determined what our specific goal was going to be and that we were going to be involved in damage assessment, then we began to develop task force teams that were then provided the materials and information that was needed to determine the damage assessment, and ... they were then imbedded within the fire department operations. We had a team leader that was responsible for disseminating those task force into the area, answering any questions that they might have, and essentially taking care of any other immediate needs that they might have, such as, you know, safety, the ability to take breaks, food, beverage, and all those other types of needs that they would have while they were, you know, in the field. And this was new for us, we had
not previously embedded within … what I guess would be called an operations center in the field (Interview Respondent, 2013).

While the initial spontaneous planning meeting mapped out the process of the damage assessment framework, its detail implementation was left with each taskforce leader. It was this taskforce leaders who further planned for each teams’ breaks for rest or lunch, safety, material resources, and answered questions from the crews as they arise. Furthermore, it was the taskforce leaders who attended subsequent spontaneous planning meetings with the damage assessment director for progress updates, needs assessments, or modification of the assessment plans.

According to the Interview Respondent, a preliminary meeting took place “before we take any action … to determine what the course of action is going to be” (Interview Respondent, 2013). However, the Interview Respondent indicated that its departmental response activities were not as per plan. “In this particular situation, since we changed what role we played, there was some improvisation on our part; however, you know, it was … consistent with the developed plans, it was just new for us.

It is significant to restate that damage assessment in City #1 is not Code Compliance Services responsibility but normally falls on Fire Department Inspection Unit to carry out the task. As such, the Code Compliance Services did not pre-planned for the task but consciously and spontaneously created competing plans for the task and debated upon each plan before selecting the best plan to accomplish the job. This type of planning decision is another method of achieving spontaneous planning. It requires quick-thinking on-the-feet while making on-the-fly decision deemed appropriate to accomplish the task or resolve the problem.

Upon assuming the task of damage assessment and recovery leadership, the Code Compliance Services in City #1 discovered that the initial assessment the Fire
Department did was not in compliance with the FEMA and State damage assessment requirements. Therefore, rather than incorporating this data with their own, they decided to use the flawed information from the Fire Department Inspection Unit as a baseline for the assessment:

There was some original information that was collected by the fire department. When we later reviewed that information … the information that was collected wasn't consistent with what FEMA and the state requirements as far as how we assess the damage rating and what we were looking for in damage to then identify that particular type of damage assessment to those properties. So really we took the information, used that as sort of a baseline and then went out and then … reevaluated it and … corrected any of the damage assessments that were improperly identified (Interview Respondent, 2013).

This quick-thinking on-the-feet by this Interview Respondent demonstrates the efficacy of the on-the-fly planning in resolving unexpected problem during a disaster. This dexterity in decision making led to the discovery of flaw in the original data. The primary objective of on-the-fly planning is to resolve unanticipated problem as it occurs in post-disaster operations. And this was evident in this damage assessment program through alert thinking by the crews. Their on-the-fly decision brought the data into FEMA and state compliance.

The ability to catch flaws in the preliminary damage assessment (PDA) and the decision to use the on-the-fly decision illustrates the utility of quick-thinking in spontaneous planning. Though the assignment of damage assessment task to Code Compliance Services departed from the norm of that unit responsibility, however, quick-thinking on the part the staff resulted in meeting the damage assessment requirements.

Restoration of Communication System
The April 3, 2012, tornado in the DFW area interrupted operation of infrastructure services such as telephone, internet, and other social media platforms. Numerous homes, schools, and businesses were without communication system. Even the response teams’ operations were affected by communication system interruption since there was no electricity to power or recharge them. Every effort was made to restore services to affected customers. In other instances, alternative mode of communication was made by affected customers while waiting for the restoration of regular services.

In City #1, the communication problem was ameliorated when the Police field command was moved from a command trailer to the fire training center where they were able to charge their equipment (Interview Respondent, 2013). The Interview Respondent diagnosed the problem this way:

So we get out into the field into their command trailer, and our side of the trailer has no electricity, so we were not able … to use any of our computers. We were not able to charge up our radios which were getting a lot of usage because we’re on the radio the entire time. Both the radio and phone were not working. Well, the phone goes dead and we can't charge the phones because there’s no electricity … We don’t have electricity. You know, this side of the trailer is broken (Interview Respondent, 2013).

The issues encountered in the initial response operations by disaster responders could be illustrated with communication system disruption examples as noted here. In the three cities studied, communication systems such as land lines that were jammed in one elementary school while cellular phones and internet failures were reported when the tornado hit. Phone communication in all the three cities failed. Thus, swiftly, the incident responders resort to instantaneous decisions to use radios and satellite for communication. There was no pre-event communication planning for the situation these cities encountered. However, in the elementary school in question, the school administrators regularly carried out safety practices in event of bad weather. Fortunately
during the current tornado incident, the school was able to use the PA system to direct teachers and students to move to the library in the interior part of the building for safety (Interview Respondent, 2013). However, a day following the incident, April 4, 2012, in their post-disaster planning meeting, the school administrators took a closer look at other communication systems that could withstand a tornadic event. At the meeting, numerous systems were discussed with respect to their usefulness, cost, durability and ease of operation before selecting one thought to be better in any type of emergency situation. The chosen communication system has never been in use or tried in this elementary school campus before. Moreover, the school administrators never had this type of opportunity to make a decision on the school communication system prior to this incident. This new agreed upon system was anticipatorily quickly put in place in case of future emergency per this statement:

They actually met the following day. Our principal then was Mr. TJ……., and he met with admin the very next day. And they’ve actually already corrected that problem. We actually have radios on our campus now … Every facility has a radio, and in the same situation we wouldn’t try to use the internet, the phone [land line], the cell phones; we would all go to the radio. And they’re turned on every day and the administrators are told… to actually carry it with them [on] certain days. Otherwise … you know, we get notices through [the radios]. … [The administrators] actually started working on that plan on April the 4th … [a day after the tornadoes] (Interview Respondent, 2013).

By this Interview Respondent recollection, the original communication system (internet, land line and cellular phones) in place at the school at the time the tornadoes struck did not work. This experience led the elementary school administrators to swiftly institute the usage of another communication system (the radios) the following day. In fact, the faculty was instructed instantly to start using the new system immediately. The decision to change from the old communication system to radios was consciously taken by the school administrators at the recovery planning meeting. This quick-thinking
decision is another typical spontaneous planning decision since it occurred in post-disaster operation phase. Moreover, the decision to change to the new communication system (radios) in the elementary school also anticipated future usage to ensure problem free communication in event of another disaster.

Another spontaneous planning decision for communication system could be seen in City #3 jurisdiction. Unlike the elementary school, in City #3, the city’s representative was consulting with the telephone company and cell companies for planned resolution. However, while this effort was going on, City #3 representative decided exploring other communication alternatives. The Interview Respondent who coordinated with the phone companies to resolve the communication problem in the city notes:

During [the tornadoes], the communication [systems went down]. I wasn’t sure if the radio system in City of #3 was damaged by the tornadoes [because] it was not working; the phone lines went down at some point, pushing everybody onto the cell phones, and once that got to a certain level that system failed [too]. So getting communications was extremely difficult, and I finally made communications with the county’s mobile command post which has satellite capabilities that was set up on scene. And I had to go through [the satellite] to get information and provide information. … When you’re in a mobile situation [since I was in a car] you can’t really address it [the phone problem]. It was more addressed after we got here the next day, coordinating with the phone company and the cell companies. Things kind of eased up and … the systems started to come back on their own (Interview Respondent, 2013).

From this Interview Respondent’s statement, it is clear that all normal communication systems failed. The Interview Respondent tried frantically to contact disaster responders in City #3 to no avail. However, it was when the Interview Respondent decided to change or adapt the communication medium to connect with the county’s mobile command post that had satellite capabilities was the Interview Respondent able to contact the emergency manager and disaster responders in City #3. It was this quick decision making to change from standard communication mode to
the satellite method was the Interview Respondent able to exchange information on the disaster with other disaster responders. This unplanned change of communication method is spontaneous planning decision. It was quick-thinking on-the-fly that resulted in the communication system mode adaptation by the Interview Respondent. This alternative mode of communication was not planned for prior to the tornadic disaster and as such indicates spontaneous planning.

However, spontaneous planning meetings between an Interview Respondent and phone companies took place on arriving home from professional conference. The phone companies met with the Interview Respondent in City #3’s office to draw up service restoration plan. The restoration plan decided upon by both groups included time frame in which complete services will be become fully operational. At the planning meeting, it was agreed that the Interview Respondent be responsible with the implementation of the developed restoration plan as well as coordinating service repairs with concern companies. The plan was to ensure quick service restoration to the affected customers. According to the Interview Respondent, the spontaneous planning meeting was a valuable process that provided an impetus for quick service restoration.

In City #1, the communication problem was compounded by power outage in the field trailer that the police command was in. The police crews were unable to use their computer, cellular phones or recharge radio batteries. As a result, the police field commander could not contact the leadership team at the EOC to report security progress. On the other hand, the leadership team at the EOC was unable to communicate with the police command field. Perplexed by the situation, this leadership team decided to take unplanned visit to the Police command post in the field to investigate why they could not communicate with the command. Prior to the visit, the
EOC overall planning leadership team was unaware that the trailer where the Police command post locates was damaged. On discovering how broken and unusable the Police commanding field trailer was, they swiftly made on-the-spot decision as a group to move the security crews to the fire training center where other field commanders ultimately ended up being together (Interview Respondent, 2013). It was this unprecedented and spontaneously unplanned leadership team visit that triggered on-the-fly decision to relocate the Police command post to another building. This type of decision making is at the center of spontaneous planning concept.

Making on-the-spot decision to resolve unforeseen problem is one of the cardinal core principles of spontaneous planning. It entails quick-thinking embodying in on-the-fly decision or outside-the-box thinking. Spontaneous planning may involves modifying or adapting existing plan as well as having imaginative ideas to resolve unanticipated challenges as a disaster unfolds. The process could be carried out at a group planning meeting where developed competing plans could be debated upon before selecting the best that suits the situation. On the other hand, spontaneous planning decision could be made by an individual to resolve an expected challenge in post-disaster operation. In the case of the communication problem the Police field command encountered, its resolution was on-the-spot group decision made on-the-fly.

These narrative examples of planned communication problem resolution decisions among various groups after the tornado hit, demonstrate the utility of spontaneous planning. As already discussed, the spontaneous planning decisions in this tornadic incident took place in post-disaster operations. The process affords groups or individuals the ability to solve unexpected challenges as a group or as individuals. Thus, as an example in this particular event, spontaneous planning decisions enable
the responding teams to put in place a communication system linking them to other
departments for proper coordination and resources management.

Public Relations and Media

Any major disaster requires good media public relations to disseminate
necessary information to the public for action. The information could be on road
closures, school closures, locations to get help and whom to contact, shelter locations,
and availability of public services. These issues came up during the April 3, 2012,
tornadoes that hit the DFW area. Each city in the study developed methods of getting
information about the incident to the public through media.

In his research on media and disaster, Wenger (1985) describes the relationship
between public officials and mass media as mutual love-hate affairs because of the
latter’s activities and coverage of disaster events. In it, the literature notes that, on one
hand, public officials have great expectations for the media and see it as a valuable
element for distribution of needed information during the time of disaster. It further
observes that on the other hand, public officials are often frustrated, disappointed, and
disturbed at media’s newsgathering procedures, their content and their impact.
Focusing on the love relationship with the media, both researchers and emergency
management professionals agree on the vital role mass media plays during disasters.

For example, in the sociology of natural disasters, the media are primarily viewed
as management tools that have potential to change people’s preparedness behavior as
well as their response to natural disasters (Perez-Lugo, 2004). As the literature notes,
the audience receives official information concerning how to prepare before the impact
of the natural event and, after the impact, information on the community’s recovery
(Perez-Lugo, 2004). In order to accomplish this expectations, particularly during response and recovery phases, the Public Information Officer (PIO) have to work closely with the media to ensure that accurate information is being relayed to the citizens of the affected city (McEntire, 2002).

In addition to the manifest functions of providing information, according to Perez-Lugo (2004), the media also have latent functions in disasters, consisting of emotional support and companionship. This study further found that media similarly help isolated individuals to feel connected with “outside world” (Perez-Lugo, 2004, 210). Perez-Lugo (2004) argues that these functions are most salient in the impact phase of disasters. This is particularly true in this study as vast area of one of the rural counties in North Texas was seriously impacted (Interview Respondent, 2013). Victims in this rural county were not immediately reached by the disaster responders. It was the TV news reports that linked victims in this rural county to other destroyed urban neighborhoods and the outside world of DFW areas. Through this alternative mode of communication, the TV reports, victims of the incident were able to contact authorities and access needed services in post-disaster phase. In this instance, the TV reports through its producers instantaneously played the role of informants to these rural victims. Their circumstances were immediately changed or altered because they were able to get assistance by contacting authorities through the information provided by the TV reports. With this information, these rural county victims were able to plan their recovery accordingly. This form of spontaneous planning is novel and innovative because of the role the media played.

In general, during a disaster, it is assumed that public relations will be handled by a single public information officer (PIO) for consistent information on the incident to the
public. However, in City #2 there was evident that two forms of interaction with the public that could be characterized as spontaneous planning took place. Because of the enormity of the disaster, expected extended nature of response and recovery period of the event, and intense public interest for information, it was decided that the normal PIO would be overwhelmed. Thus, the city officials requested that the normal City #2 PIO should set in motion two approaches to address the public on the disaster. On the one hand, City #2 PIO should address the City’s overall response to the disaster. On the other hand, regarding detail departmental response, this should be addressed by each unit’s PIO since they are familiar with their departments’ activities. These arrangements were to be executed from two fronts: by phone and at press briefings. It is assumed that every phone call from the public or the disaster victim for information should be directed to appropriate department. However, if it were a general question about the City’s action, that phone call should be directed to the office of the City’s PIO. Similarly, at the scheduled regular press briefings, the City’s normal PIO would address the media first on general issues, and then detailed disaster response and recovery activities would be followed by each department’s PIO. This arrangement was recalled by an Interview Respondent in City #2 who described the press briefings this way: the “police, fire, public works, parks and recreation department, the school district, the county and the state representative” gave situation reports of their activities to the press (Interview Respondent, 2013). These PIOs from each unit also gave directives such as street closures to the public through the press for dissemination. This approach departed and is different from assumed unified PIO and signals spontaneously responding to current event situation.
In City #1, the approach to public relations and media was different when compared to the other two cities in the study. As far as public relations and interaction with the media goes, there was evidence of some forms of processes that could be considered as spontaneous planning. First, the liaising need between the City’s Media Department and the converging press corps was addressed. Focusing on this need, the Department’s staff layout a plan for outside press corps such as CNN to tour the disaster damaged neighborhoods of the city. This decision was also to address requests from the press corps to “do a live shot” of the disaster sites for their newscasts (Interview Respondent, 2013). Also in the works was agreed planned tour of the Mayor of the affected neighborhoods. Second, the Department was directed to give out scheduled press conference time as well as noting blocked streets before taking the press on tour. The leadership team at the EOC did not want the press corps to interfere with “on-going damage assessment” (Interview Respondent, 2013). Another need that was to be addressed that was tabled at the EOC leadership planning meeting was press releases. The City #1 Media Department was obligated to distribute “press releases” at regular intervals to the press so that “in that way it kind of keeps the media at bay a little bit, but … gives them something to report on” (Interview Respondent, 2013).

Another need that arose was related to updating the City’s website to reflect current information on the disaster response and recovery activities. The Media Department spontaneously developed tactics to resolve the website updates as the disaster unfolds. For example, in order to regularly update the website with current information, the Media Department in City #1 adopted two work schedules during its planning meeting to accommodate the present needs. It was decided that one group of
staff should be working from the office. In the same vein, another group of workers were asked to work from home, thus reducing driving time to work for some staff. The change in work schedule was also aimed at meeting future manpower requirement which was spontaneously anticipated by the department without overworking some staff. To achieve the developed plan, the webmaster was asked to update the website from home while other team members would cover his shift. This plan worked well for the department and got commendation as noted here:

In short … the … webmaster … was told … to [work from] home. I would cover his EOC shift, because I thought he needed to be there to be able to put up the updates. He could do that from home. … The website that we made for this [incident] … had everything on it, but it was always in one place and it was chronological so … the newest was always at the top. And we did get … some statewide award [for its friendly usage] … (Interview Respondent, 2013).

A further spontaneous planning decision that was made at the planning meeting was revamping the website to accommodate different users as well as being friendly. This was a quick-thinking novel web development for the department because of the enormous information requirement on the tornadoes. The web creation integrated sections for the disaster victims, the media, volunteers and location for donations. This novel and friendly web design was well-thought out and was impressive too. Because of its welcoming and responsive layout, the website was recognized by the state with an award. Although it was implemented on-the-fly too, it helped varieties of the web browsers. This innovative and effective fulfilled plan was apparent in this Interview Respondent’s observation:

We had different sections on the website. Here’s information for residents. Here are … media postings. … Then, if volunteer organizations or people wanted to donate stuff, we had places to channel everybody through that website. And that … was a modification of what we did for the flooding event. It was built upon something that we had come up with before and we greatly expanded it, and I don’t think I see any kind of incident happening in the future where we don’t use
it. We kind of modified it in a way … In January … UP Railroad came [up] … and shut down several crossings for several days at a time, and we also … based an up-to-the-date website … on the one we had for the tornadoes, letting residents know which crossings were open, you know, up-to-the-minute details with webcams and things like that … (Interview Respondent, 2013).

The essence of spontaneous planning is adapting, modifying or adjusting existing website design or information on it on-the-fly to solve unexpected problems. It may also involve novel ideas to resolve unforeseen challenges. Furthermore, spontaneous planning corresponds to spontaneously anticipating future needs of the organization. All these forms of phenomenon were apparent in this website development and promised to be useful in future incidents as attested to by the Interview Respondent. In this website development all elements of spontaneous planning were in play and its efficacy could not be denied. Moreover, it anticipates its future utilization for different types of emergencies. This is spontaneous planning in action.

According to an Interview Respondent, the process of updating the website this time was different from those of previous events. Through this spontaneous planning process, City # 1 Media Department overcame unexpected problems as it undertook on-the-fly decisions by complying with EOC leadership teams’ directives discussed earlier. The department instantaneously liaised with the press corps while instantly modifying its website promptly to accommodate different interests during the response and recovery phases of the tornado (Interview Respondent, 2013).

Volunteer and Donation Management

Like in any other disaster incident, the April 3, 2012, tornado event in North Texas witnessed deluge of volunteers and assortment of donations. As such, the need to manage these unplanned corps of volunteers, donations and its distribution arose as
people were eager to help in this time of crisis. Volunteers are citizens and organizations that give their time freely to help others during a disaster while donations are things or items provided to needy disaster victims. With regards to volunteer and donation management, there were some actions on the part of the cities studied that could be characterized as spontaneous planning. First, there was urgent need for reputable nonprofit organizations to manage volunteers who offered their time to help during the disaster. This need was reflected upon by one of the Interview Respondents that described the problem this way: “One is the management of volunteers and developing … a stronger process for that” (Interview Respondent, 2013). This Interview Respondent went on to say: “Anytime you have a natural disaster, you have a lot of volunteers … and especially in a city like ours … where people care for each other, they're going to want to participate” (Interview Respondent, 2013).

This fact was evident in the three cities studied. It was assumed that if these volunteers were supervised by trusted nonprofit groups, disaster responders would concentrate on their specific response and recovery activities without distraction. In City #2 for example, post-disaster planners came up with a novel idea. During one of the post-disaster planning meetings, one of the planning participants suggested that Citizen’s Emergency Response Team (CERT) should be charged with the management of volunteers. According to an Interview Respondent (2013), “that idea” of using CERT to manage volunteers “came from somebody” in one of the planning meetings. This spontaneous planning approach is expressed in this interview response:

You know the CERT group, the Citizen’s Emergency Response Team, we called them too, and they came. … And they were over the volunteer groups and led them in the recovery effort. [They] did a fantastic job. … That was something that we did that probably hadn’t been done before. That was one of those innovative things … that … we went with (Interview Respondent, 2013).
As this Interview Respondent indicates, the mobilization of CERT to manage volunteers have never been tried in the past recovery activity. It was on-the-spot adoption of a novel idea which worked out well (Interview Respondent, 2013). This on-the-fly decision implementation to resolve unanticipated issue of volunteer management is one of the core norms of spontaneous planning behavior on the part of community disaster responders.

A second need that arose was related to the storage and management of donated items to the disaster victims in the three cities. This was another area that spontaneous planning played a major role in resolving the issue. In City #2, the plan to manage large donations at a Disaster Assistance Center at the high school came from collaborative planning effort at a briefing. As observed in the interview transcript, throughout the tornado response operations, Interview Respondent in City #2 was an astute leader who works well with the stakeholders. With the assistance of the stakeholders, the Interview Respondent created a structure and tasks them to make the Disaster Assistance Center operational. The Center plan development which was post-disaster action was thinking on-the-feet decision making and is consistent with the concept of spontaneous planning. It was entirely a new thought out plan which has never been attempted before. The planning group responsible for the plan’s feasibility brainstormed during the planning sessions and came up with a workable plan. The success of this new plan is a testament that spontaneous planning may involves modification of existing plan or development of an entirely new plan to resolve unanticipated challenges. This donation management problem resolution was based on the group developed plan and was captured by this Interview Respondent:

The other thing I can think of improvising was the Disaster Assistance Center, where we set up at the high school. … That came out of one of our briefings
where they said, our donations are getting big, we’ve outgrown this area for receiving donations. We need something bigger, we need something greater. And someone in the group said, hey, what about this? This person said, hey, we can do this. … Multiple ideas started flowing in. We committed, we created a structure. Here is the structure for this operation, you are in charge, here are people working for you, go make this happen. And … they made it happen. And that was really one of the greatest things we did out of it, and it was something that was not planned for beforehand (Interview Respondent, 2013).

Similarly, at an elementary school in this study, outside donations (books, toys, money, and material) were also flowing in. Here too, there was no preexisting storage for the donated goods. However, at one of the spontaneous planning meetings, the school administrators immediately set aside a room called “tornado room” in commemoration of the event to store surplus items. This fact was communicated to the interviewer by a representative of the school:

We also had outside places that donated to the school. … And we … had a school in New York that sent books to us; we had a school in Prosper that sent toys for the kids who lost their homes. … So, we had a lot of people that did stuff like that for the individuals affected. So … a lot [of] response … I mean … unexpected. … We actually have a classroom … we call the tornado room [where donated stuffs are stored]. …. We got so many school supplies from other places that now we just have a room full of stuff, and our teachers [can] just go [and] get [whatever] … they need. I mean … we were sent so much stuff. … We had a lot of response, whether it was … the days right after the tornado or maybe even weeks after that … (Interview Respondent, 2013).

With stuff donated to this elementary school, there were two alternative decisions that the school administrators had to make. The first was to distribute all the donated items to the students. The second was to create a storage room to store surplus stuff for teachers’ and students’ usage. In this situation the school administrators determined that the latter choice was the best alternative. It is important to remember that spontaneous planning is concerned with planning decision-making process that considers alternative choices and selects the best line of action to resolve situational
problems as disaster unfolds. Thus, the creation of a tornado room to store extra
donated items in the elementary school was the best decision that the school
administrators made and is consistent with the principle of spontaneous planning.

In this elementary school that was severely damaged, it could be inferred from
this interview that it did not have preexisting storage for the items that were donated to
the school. The storage room known as the tornado room was created in post-disaster
planning phase. This decision was not taken prior to the disaster because no one
foresaw the destruction before the tornadoes hit. This spontaneous planning decision
behavior on the part of the school administrators illustrates the phenomenon in action.

A third need that evolved from the disaster was a resource center that the
disaster victims can access recovery information and resources. This was the problem
that City #1 had to contend with spontaneously. The decision to establish the recovery
resource center was taken at one of the spontaneous planning meetings through a
coordinated effort by the leadership team at EOC. This new one-stop-shop recovery
resource center was setup at the Fire Training Center to meet citizens’ needs and
inquiries. With regard to this, an Interview Respondent said:

One of the things that we did in this incident that we didn't plan for was our
tornado recovery center, which ... we set it up at our fire training center. It
[became] ... a resource [center] for citizens to come to. It was a place for them
to come and access city resources. We ... put people from all different
departments in the city in that building. So, ... when citizens came there, they
had access to fire department, police department, public works, inspections,
[and] code enforcement. We even ended up putting representatives from
insurance companies in there, Red Cross, things like that. So that when people
came to that building, they had access to resources that they needed. And that
was something we didn't even think about prior to a tornado hitting, but ... it
became something that we saw as necessary. So we implemented that right
away, and it was ... because of our coordinated effort and ... the way we work
within our EOC. It was relatively easy to do ... because we were all working
together (Interview Respondent, 2013).
It was quick and deliberate decision when the overall leadership team overseeing the response and recovery operations realized that the fire training center was bigger and spacious and can accommodate other units. The realization on the speciousness of the building was apparent to the EOC overall leadership team only when they visited the Police field commander and the security team that were relocated to the structure. Because of the massiveness of the building, even the insurance companies and Red Cross were located there too. The usage of this structure was not preplanned but the decision was made on-the-fly to meet donation storage as well as victims’ needs.

This first-time-ever “tornado recovery center” (Interview Respondent, 2013) came about when the security field commanding post relocation was agreed upon by the leadership team at the EOC that resolved the problem the police team had with the field commanding trailer (see above). This was attested to by the Police field commander who appreciated the new location:

We ended up … at the fire training center which is right across the street. … And that gave us several classrooms. And ultimately it was where the public came because … the resource center was located there [also]. So we were able to put all of the city resources and departments at one location. … The field commanders were all together, and that made it very nice (Interview Respondent, 2013).

The bringing together of city resources, departments, and field commanders under one roof came as a result of concerted coordinated spontaneous planning effort in problem resolution at the EOC. The plan development was made on-the-fly because the response and recovery planners discovered that the tornado recovery center has numerous classrooms that could accommodate other entities in addition to the security teams. This type of decision is at the heart of spontaneous planning. The establishment of the tornado recovery center demonstrates the saliency of spontaneous planning.
While attempting to resolve an unanticipated problem, other ancillary issue such as access to insurance companies by the disaster victims was solved because these companies were located in this spacious building too.

Still, one of the most novel and impressive example of spontaneous planning relates to the location of donation storage facility and its management. In line with the idea of one-stop-shop tornado recovery resource center, a room within the facility was allocated for donation storage. In addition, a well-known nonprofit organization, Mission City #1, in the City was entrusted with the task of managing those donations. The organization also had an office in the tornado recovery resource center. The presence of this Mission City #1 in this center afforded the disaster victims to access it while attending to other services at the center. The idea of engaging Mission City #1 in the management of the donated items came from the EOC spontaneous planning session and was communicated to the interviewer thus:

Another problem that we had, and … I think you have with any disaster, is … donations management. And once again, we were fortunate in the City of #1 that we have … a major organization here, Mission City #1, which is very good at donations management. They do that on a daily basis, so we utilized their expertise in that, and that helped us considerably … (Interview Respondent, 2013).

As an expert in donation management, Mission City #1 spontaneously adapted its generic donation management plan to fit current situation. The organization was able to meet the needs of the disaster victims throughout the estimated duration of recovery. The entrustment of donation management to Mission City #1 came as a result of thinking on-the-feet or outside-the-box while deliberating at the spontaneous planning meeting which nonprofit organization could manage the donation best. Such on-the-fly decision making includes recalling expert nonprofit organizations that can assist in
managing donations as seen here. The decision was not preplanned but occurred in post-disaster phase. Spontaneous planning is all about processes undertaken during and after a disaster to resolve unforeseen problems.

The establishments of the respective disaster assistance center, a tornado room, recovery resource center, and assignment of volunteer and donation management tasks were decided at spontaneous planning meetings. These issues were cooperatively resolved by each respective city in post-disaster phase. These examples of spontaneous planning illustrate on-the-fly or on-the-spot decision making as well as anticipating the future needs for successful problem resolution.

Discussion

This particular study leans heavily on and expands upon the initial examination of the concept of spontaneous planning that McEntire and associates conducted on the San Bruno, California, gas pipeline fire explosion. Though this research was limited by a small sample size (11 functional organizations) and to specific details of a tornadic event, the purpose has been to contribute to the development of the concept of spontaneous planning beyond the gas pipeline explosion in San Bruno, California. To this effect, the aim of the study appeared to have been achieved because the findings support spontaneous planning utilization in resolving unanticipated and anticipatory future problems as this tornadic disaster unfolded. Although this study had small sample size, its findings in conjunction with the gas pipeline explosion study could be tentatively transferred to other types of disasters (Lincoln & Guba, 1985).

In the study, it was observed that the field commanders, team leaders and crews were concerned with micro-level problems as they responded to the event using
spontaneous planning process by looking at alternative and competing plans and deciding the best line of action. The field crews at the scenes used particularistic tactics to solve the challenges they encountered as one Interview Respondent observed:

I might interject that the … personnel that were actually on scene, [did] … greater situational planning … than we could in the Emergency Operations Center. They saw exactly what was going on, and then they had to relay that information to the Emergency Operations Center (Interview Respondent, 2013).

During the interview, one of the Interview Respondents noted that spontaneous planning process produced incident action plan and allowed the manager to manage the team. This Interview Respondent further observed that the process permits transmitting responsibilities down the chain of command. However, it should be noted that not all spontaneous planning efforts resulted in a written action plan. Further merit of spontaneous planning uncovered in the interview transcripts is developing a unified plan to solve unexpected and anticipatory problems. This approach was particularly evident at each respective EOC since these centers developed overall response and recovery plans.

Regardless, evidence from the research data also indicates that spontaneous planning may improves emergency management operations as the disaster unfolded. For example, there was no volunteer or donation management plans prior to the North Texas April 3, 2012, tornadoes. However, as the disaster unfolds, plans were set in motion to manage volunteers and donations in the cities studied (see above). These decisions greatly improve emergency management operations in the response and recovery phases of the event. With these supporting evidences from this tornadoes research and in conjunction with original findings by scholars in the San Bruno, California, gas pipeline explosion, the promotion of spontaneous planning as a key principle among responders and others involved in emergency management is in order.
Research findings in the two studies may help emergency management professionals and their supporting agencies to acquire the knowledge and tools they need to manage unanticipated problems and challenges during and after a disaster.

The management of disaster recovery phase is an important undertaking in terms of infrastructure restoration and psychological debriefing (Dyregrov, 1989). In this research, spontaneous planning was seen as playing a pivotal role in infrastructure restoration and responders' debriefing. At planning meetings, discussions centered on plans to restore damaged infrastructure such as roads, power supply, and communication system to normalcy as well as quick removal of debris. Additionally, plans to meet the psychological needs of responders were afoot at the planning meetings. The plans included giving them some time off for rest, meeting with counselors, and attending to medical needs.

Moreover, from the interview transcripts it was evident that spontaneous planning process was utilized by multitude of disaster responders in City #1, City #2 and City #3. For example, in the tri-city response to the April 3, 2012, tornadic event in North Texas, numerous organizations were involved. This army of responders termed “a mixed cadre of community personnel” (Hoard et al., 2005, p. 118) included Fire, Police, Emergency Management staff (emergency managers, emergency management coordinators and emergency management administrators), Public Works and Transportation, Community Development and Planning, Code Compliance Services, Building Inspectors, School District, city administrators, policy makers (Council members), and nonprofit organizations. Each of these personnel collaborated with and complimented one another while responding to the tornado event. Thus, primarily and directly, spontaneous planning concept benefits emergency management professionals and
their supporting organizations including city administrators and policy makers. With the exploration of this concept, it is evident that disaster planners were aware that their vast knowledge and experience in disaster planning can be put to use during and after a disaster to resolve unforeseen issues. This realization gives hope to emergency management organizations the ability to resolve unexpected problems and challenges as a disaster unfolds. It also assures and gives them confidence of the capability to restore a ravaged neighborhoods to normalcy.

Furthermore, the planning process encouraged cooperation and collaboration among various departments during the post-disaster operations. An Interview Respondent in one of the cities’ Fire Department sum up the impact of spontaneous planning this way:

Well … because we’re all in the same room, you know everybody has a role [to play]. … [It was clear that] we can’t all be acting independently. We … all have to be in the same room talking about the needs of each group. You know, the police have a security issue and we have a life safety and search and rescue role and public works has to clean the streets. … We all have to coordinate that because we can’t even get in there and do search and rescue until public works starts clearing the streets. So we have to be all in the same room talking about the needs of each city department and how we’re going to work through that and … prioritize. For instance, the streets, you know, we’ve got to get those streets cleaned before we can even do our job, so, you know, we … make those priorities all talking together (Interview Respondent, 2013).

In this study, it was uncovered that approach to the application of spontaneous planning was without reference to an individual or doing business as usual. The mantra was that we are in this together and solace could only be achieved by working in unison. However, oneness notwithstanding, disaster responders should be able to adapt any plan produced at a group planning meeting to situational problem which was evident in the study.
Another aspect of how it helped was seen when considering the phenomenon as process. As a process, it requires and provides communication among disaster responders and the EOC. Apart from having an input, the process helped everyone acquires a broader view of the disaster. Having this bigger picture of the event allowed the mixed cadre of disaster responders to appreciate the enormity of challenges facing everyone and not just their team. This merit of communication link was not lost with one of the Interview Respondents:

... Under our system, we meet, we set up periodic meetings. The EOC set ... the meeting time. ... They [the leadership team] were having meetings on their own, and I had asked if we could be included because they were making a lot of decisions that affected us but we didn't have any input into them. So, soon after that we began being included, so we had like a speaker, you know, speaker phone system where we were able … to communicate with the EOC, and then eventually we utilized the video teleconferencing system. … And so we were able to see face-to-face … and be involved … in the planning meetings, and … that was very helpful … to see the total picture because … we had a … narrower picture, but once we were included with the EOC, … we really got the entire picture (Interview Respondent, 2013).

The findings in this research seem to confirm McEntire et al.’s (2013) study. Thus, Table 7 is a cursory glance of functions where spontaneous planning occurred in the two studies (tornadoes and the gas pipeline explosion).

Table 7

*Functions where Spontaneous Planning was Evident*

<table>
<thead>
<tr>
<th>North Texas Tornadoes</th>
<th>McEntire et al.’s Gas Pipeline Explosion</th>
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<tbody>
<tr>
<td>Debris Removal and Ensuring Public Safety</td>
<td>Initial activity</td>
</tr>
<tr>
<td>Search and Rescue Operation</td>
<td>Mass Care and Public Relations</td>
</tr>
<tr>
<td>Securing Damaged Neighborhoods</td>
<td>Damage Assessment and Site Security</td>
</tr>
<tr>
<td>Activation of EOCs</td>
<td>Re-entry</td>
</tr>
<tr>
<td>Damage Assessment</td>
<td>Debris Removal</td>
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<tr>
<td>Restoration of Communication System</td>
<td>Environmental Remediation</td>
</tr>
<tr>
<td>Public Relations and Media</td>
<td>Long-Term Recovery Activities</td>
</tr>
<tr>
<td>Volunteer and Donation Management</td>
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**Summary**

At the inception of this research program, the prime goal of the inquiry was to answer the research question of Chapter 1. Further, the study aimed at contributing to the advancement of the concept of spontaneous planning through grounded theory as well as the extension of the concept of spontaneous planning from the gas pipeline fire explosion to a tornado type disaster. From the data collected in the field, findings indicate that these propositions were successfully accomplished. Findings from the data shows that overall incident planning at respective EOCs to resolve unanticipated problems in the response and recovery phases of the post-disaster in the three cities studied benefited from spontaneous planning. Similarly, findings also reveal that cadre of community disaster responders in debris removal and ensuring public safety, search and rescue operation, securing damaged neighborhoods, damage assessment, restoration of communication system, public relations and media, and volunteer and donation management utilized spontaneous planning to resolve unexpected situational issues in response and recovery activities. The chapter further provides discussion on spontaneous planning as a complex process utilizing NIMS and ICS structure to manage the tornadic event. Finally, with the findings from transcribed interview data of the eleven functional organizations, evidence shows possible extension of the concept of spontaneous planning to a tornadic activity. By collating these findings, the objective
of contributing to the advancement of the concept of spontaneous planning through grounded theory is apparent.

As this chapter shows, solving unanticipated problems and challenges through spontaneous planning process as a disaster unfolds entails quick-thinking on-the-fly and on-the-spot decision making. This means thinking on-the-feet. Spontaneous planning further entails anticipating future resource and manpower needs in a match to resolve problems. Furthermore, the research data has shown that spontaneous planning as a planning decision process considers alternative choices and selects the best line of action to resolve situational problems as a disaster develops.
CHAPTER 6

ANALYSIS

As illustrated in Chapter 5, spontaneous planning behavior occurred in the North Texas tornadoes disaster and it is a complex and complicated process. It has further been illustrated that the phenomenon is a planning process which takes place in a condensed fashion due to the urgent nature of the problem at hand. With this understanding in mind, effort has been made to simplify the concept and research findings so as to make sense to readers. Therefore, we need to learn more about this planning decision-making process by asking the how question: How did the phenomenon take place when dealing with a disaster? In this chapter, the analysis explores how decisions were made under spontaneous planning to resolve unanticipated problems in the tornadic event as well as anticipatorily reduce future problems. However, prior decision-making models are incomplete under a disaster situation. Thus, this chapter explores hypothesized integrated decision-making model (IDMM) usefulness in explaining decision-making under spontaneous planning behavior during a disaster.

The Integrated Decision-Making Model

The purposes of this analysis chapter are twofold. The first objective is to use the proposed model to draw out spontaneous planning behavior. That is how or why the phenomenon occurs. The second objective is to fill the gap in disaster decision-making theory under disaster since prior individual decision-making theories such as organizational learning theory, the theory of street-level bureaucracy and garbage can model by themselves are inadequate. It is their weaknesses that led to the proposed
model intended to show how or why spontaneous planning occurs. To this end, it is vital to review the weaknesses of the aforementioned theories first.

In Chapter 3, it was suggested that the limitation to ongoing organizational learning in an organization exists within organizational membership. Its manifestation is seen when there is an exodus of memberships from current organization to others which are not staffed with experienced and competent personnel due to attractive rewards such as immediate promotion and high pay from upcoming entities. Moreover, organizational learning theory as it exists cannot capture issues and challenges in the heat of the battle or in a pressured situation. Furthermore, one can only learn something new in an organization in the heat of the battle even though the lesson could also be learned retrospectively. However, this tornado incident may be where the army of responders to the event can learn firsthand new strategies and tactics to resolve problems. On the other hand, within street-level bureaucracies, not every bureaucrat is proximate to decision-making authority or is knowledgeable of the issues in the emergency management profession. Secondly, not all bureaucrats within the street-level bureaucracies have the freedom to act independently. With regards to the garbage can model, the major problems with crowded incident scene are coordination and collaboration (Hoard et al., 2005). These disaster responding organizations may have different interests. For example, law enforcement officers may be interested in gathering evidence at the scene while medical personnel is concerned with patient confidential requirement of medical record (Hoard et al., 2005).

With these apparent weaknesses in the prior individual theories as outlined above, the IDMM is therefore proposed to bridge these gaps. The model combines the best elements from the organizational learning theory, the theory of street-level
bureaucracy, and garbage can model. IDMM highlights the role of organizational learning theory, the theory of street-level bureaucracy, and garbage can model and demonstrates a new element in spontaneous planning.

Chapter 5 of this dissertation illustrates the application of the concept of spontaneous planning in addition to the extension of the concept as originally conceived by McEntire et al.(2013) in the San Bruno, California, gas pipeline fire explosion to a tornado event. Evidence from the data in Chapter 5 supports the theory that spontaneous planning occurs during disasters. Spontaneous planning process is based on bounded rationality occurring during and after a disaster to resolve unanticipated issues. Such decisions depend on the characteristics of available decision-making model. To this end, it is hypothesized that IDMM could be a useful explanatory decision-making model behavior under a disaster. The hypothesized model features are: gathering valuable new information; learning opportunity within the disaster; response was innovative with flexibility; relative freedom and significant high degree of discretion; solutions waiting for problems; and flat organizational structure. These elements and their usefulness in the present study are summarized in Table 8 below.

Table 8

<table>
<thead>
<tr>
<th>IDMM Features</th>
<th>Source of the Feature</th>
<th>Witness in this Study</th>
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<tbody>
<tr>
<td>Gathering valuable new information</td>
<td>Organizational learning theory</td>
<td>Yes</td>
</tr>
</tbody>
</table>
| Learning opportunity within the disaster | Organizational learning theory | Yes                   (

*table continues*
IDMM is a parsimonious model and could be useful to understand decision making under a disaster. Its characteristics help scholars understand how practitioners responded to the North Texas April 3, 2012, tornadoes. The characteristics of this model were fully discussed in Chapter 3 of this dissertation. IDMM signifies decision-making process when responding to disaster and is worth analyzing in light of spontaneous planning concept. Positive outcome of this hypothesized model may offer disaster responders decision-making tool when responding to a disasters. Moreover, if the analysis is positive, it may indicate where future improvement is necessary. Therefore, in this analysis, IDMM outcome warrants a closer look within spontaneous planning behavior that took place during and after the North Texas April 3, 2012, tornadic incident.

The analysis follows this layout: First, IDMM and its features is analyzed. This is followed by the linkage between IDMM and spontaneous planning behavior. And the enquiry ends with a recap of the chapter. The analysis of the model begins with gathering streams of valuable new information as the disaster unfolds. Thus, this
section focuses on analyzing the model in relation to the concept of spontaneous planning used in resolving problems and challenges as community of disaster responders reacted to the tornadic incident.

Gathering Valuable New Information

One of the features of the IDMM is availability of streams of valuable new information as a disaster evolves. This characteristic describes facts that are generated prior to and during the tornadoes. Such was the experience with the tornadoes that hit North Texas. In every precarious situation, the availability of valuable new information is the key to resolving problems and challenges. As community of disaster responders were responding to the disaster, they were gathering new information from the Weather Channel, TV news reports as well as at the scene of the incident that can help in issue resolution. One important source of new information during this tornado event was underscored by an Interview Respondent who noted: “[Monitored] weather reports for updates and contacted National Weather Service (NWS) for new [weather] information” (Interview Respondent, 2013). In fact, in City #3, new facts about the impending tornadoes in the DFW area prompted the emergency management staff to monitor the TV Weather Channel for severe weather reports. It was monitoring the progression of the weather in the metroplex that induced the firefighters on duty that day to take shelter before the tornadoes hit next to their station. This foreknowledge of the incident triggered life-saving action as noted here:

We were on duty at the fire station here at this location … in City #3. We had been monitoring the weather situation really for the past two days ….. The weather service in the metroplex had been pre-warning the metroplex that there would be … some severe weather coming in. So we knew that there was a possibility [of tornadoes]. And as the morning of that day progressed, we saw more and more severe activity starting around the metroplex. Eventually in the
afternoon it progressed to where there were tornadoes occurring in the metroplex area. We were watching the television and monitoring the … weather programs, and we were pretty much aware that there was a tornado on the ground close to our location, and we … we took shelter. At that time the tornado actually touched down close to our location, probably within a block of this location, passed over our station and headed northeast in City #3. Shortly after that we exited the station with our crew and with our equipment and started treating injuries and monitoring the damage and just taking action with … that after the tornado had touched down (Interview Respondent, 2013).

Still new knowledge about the oncoming incident as it develops prompted the activation of warning system. This was the case in City #1 that led to the sounding of alarm and was captured by this Interview Respondent:

On that day I was actually having lunch when I first found out about [the tornadoes] … A member of our … Emergency Operations Center called my cell phone and told me that there were reports of a tornado in City X, which is southwest of here. So I immediately ended my lunch and came back to the EOC. And then by that point, we had a report of a tornado in City Y, which is just south of City #1. I mean, it was pretty reliable reports, and we were acting on them, we were sounding the sirens based on those reports. So … I was confident enough in it to sound the sirens (Interview Respondent, 2013).

When this Interview Respondent acted on the new knowledge based on reliable news reports, it could be inferred that sounding the alarm before the tornadoes struck saved lives. Similar action was taken in City #2 based on news reports on the approaching tornadoes.

During response and recovery activities, streams of valuable new information were available for the resolution of challenges that the disaster responders encountered. Furthermore, the new information gleaned in the field was constantly relayed to the overall strategic planners at each respective EOCs for plan updates, resource management, needs requests and assessment, and decision making. This wealth of valuable new information provides the field crews and those at EOCs the opportunity for rational decision making under pressure in an uncertain circumstance as
the disaster unfolds. For example, during initial damage assessment operation, the team overlooked part of the damaged neighborhood. However, it was a day before the assessment was to begin that they got new information about this neglected damaged portion of the city. This is how an Interview Respondent recollected the incident:

I think that during any major event there is going to be new information presented during the event that you may not be aware of as assessments are being conducted. And in fact, it wasn't until a day later that we identified that there was a [neighborhood] … we weren't [aware] … had been hit by the tornado … and [that] damage assessments hadn't been completed yet. So, we had to go back out the following day to conduct those damage assessments (Interview Respondent, 2013).

In City #3, the story was the same. Constant new knowledge from crews in the field facilitated bounded rational decision making both at the command center and in the field. This situation was captured in response to the new information availability for decision making:

Yes, I would say that we … constantly received information. When we … first responded from the station, we only had some basic information that there were some injuries at certain locations, but within minutes, within an hour of … leaving the station, … we constantly received information, such as … : a school that was possibly damaged; a gas leak at the school; and X amount of houses that were damaged. So, you know, it was just a constant flow of information that we received while we were responding (Interview Respondent, 2013).

These examples show that tremendous valuable new information was available for on-the-fly informed decision making as the April 3, 201 unfolded. They suggest that valuable new information availability is essential for the resolution of problems and challenges under pressure when responding to a disaster. Thus, this is why cadres of responders to the April 3, 2012, tornado in North Texas were successful at their job. The new information gathered in the damaged environment shows the practicality of this feature in the IDMM as on-the-fly or on-the-spot decision making tool in issue resolution under a disaster. This opportunity came when disaster responders were on the ground
in damaged neighborhoods as well as in the EOCs and were able to assess the resources needed to accomplish the job. Even though they suspected damages and even took pictures of tornadoes passing and touching down, they did not comprehend the seriousness or the extent of the situation until they survey the neighborhoods (Interview Respondents, 2013). The importance of evaluating the destruction at the scene cannot be overemphasized. Assessing destroyed environment aids in information gathering which is a vital feature in the IDMM for on-the-fly decision making under a disaster. Citing some examples illustrates the import of sifting the environment for valuable information. This Interview Respondent captures this thought:

... So we knew we had damage, but we didn't know the extent of the damage or the injuries, so ... it was really a couple of hours, I think, before we truly knew the scope of damage and the fact that there were no injuries. You know, it took the fire department, you know, several hours to search houses and account for everyone. ... Out in the field ... we had several streets that weren't passable, we had electric lines down. So, we had houses ... without electricity (Interview Respondent, 2013).

However, another Interview Respondent noted that the extent of destruction in the rural county of the region was not apparent from the ground. According to this Interview Respondent, it was the aerial survey that revealed the magnitude of damage in the rural part of the county:

... But once I was able to get with the Department of Public Safety and get in a helicopter and go up, we found considerably more damage out in the rural part of the county outside the city that nobody even realized was there. And it wasn't houses blown down as in that subdivision [in the city near the school], but there were some ... pretty good roof damage to some homes further on out that were being unattended. So [the aerial survey] ... helped us to identify ... a better parameter or perimeter of the path, and make sure that Red Cross and other relief agencies could get to those that might need help (Interview Respondent, 2013).

Similarly, in City #2, an Interview Respondent recounted how stream of new knowledge on the disaster helped. The example this Interview Respondent cited was
the location of Disaster Assistance Center at high school indoor practice facility that was not planned for (Interview Respondent, 2013). The utilization of the high school facility as a Disaster Assistance Center came about on the suggestion that the facility is spacious enough and that some rooms could be used as storage for excess donations as well. This Interview Respondent did not just present new knowledge about the facility but also illustrated its implementation plan. The information spurred the setting up of taskforce to explore where the excess donated items could be stored. This exploration led to the creation of the Disaster Assistance Center at the High School where donated stuffs were stored. This example illustrates the usefulness of new facts as the disaster progresses.

With Weather Channel programing, TV news reports and new reliable facts from the damaged neighborhoods as stated by these Interview Respondents resulted in sound decision making. These examples demonstrate the indispensability of streams of valuable new information in IDMM in decision making as disaster unfolds.

Learning Opportunity within the Disaster

Another important element in the IDMM is the learning opportunity in this tornado incident. This element refers to expanding understanding in the event as mixed cadres of disaster responders had in this particular incident. This fact about the event was evident from Interview Respondents who responded that in every incident there is an opportunity to understand issues and build on practical experience that brings improvement professionally (Interview Respondents, 2013). Still another Interview Respondent noted that in these tornadoes there were teaching moments for new recruits in the department. In this incident, one of the field commanders realized that
new recruits were learning the art of communicating and collaborating with other
departments to resolve problems. In regard with this, the field commander
was very satisfied to observe that the new recruits mastered the art of communication
and collaborating techniques. This commander compared previous disaster experiences
where guidance was provided to new recruits with the current situation in which the
recruits were actually performing by saying:

    And a lot of times [in the past], I would have to guide people [the recruits by
telling them], call Interview Respondents so-and-so, call so-and-so, and … that
[worked, but now these recruits are performing on their own] … (Interview

In this tornado event, as evidenced in the interview response above, this field
commander came to the knowledge that the recruits in the department can use new
information to make decision by communicating and collaborating with other
departments without being told what to do. This evaluative aspect in these tornadoes
indicates that the recruits have learned the intricacies of their job and could accomplish
assigned responsibilities without persistent supervision. This observation in the tornado
response and recovery activities implies that the recruits have learned the ropes of their
jobs and that the training they got is effective.

In a similar vein, another Interview Respondent observed that in this tornado
disaster some agencies did not coordinate their disaster response planning with the
City’s Public Safety Department. According to the Interview Respondent, this
observation did not change from past practices where some agencies planned their
disaster response activities independently (Interview Respondent, 2013). This lack of
coordination by some agencies learned in this tornado event points to the need for
better integration of disaster response planning activities with the City’s Public Safety
Department. Moreover, this learning helped the department to pursue more
collaboration and coordination with other agencies in the city. These problems could be resolved by regularly having disaster response planning meetings with all agencies involved with emergency response responsibility.

Another interesting observation with the learning aspect in the current tornado incident is concerned with sharing the new knowledge with co-workers. An Interview Respondent who oversaw the media activities during the disaster wanted the media staff to share their new knowledge with one another so as to enrich their experience. This is how the idea was communicated:

... And then ask for feedback because ... not all of us are sitting in that chair every time; ... when they're [staff] done with their shift, [they should] pass on what they knew or what they learned like, you know what, this guy doesn't want this, he's looking for something more like this every time. Just ... pass that knowledge along. So ... there's no reason for us to each individually be learning these pieces over and over again (Interview Respondent, 2013).

This is an organizational learning perspective from a leader that goes to the heart of group learning and cohesion, rotation coordination, and proper shift handing over.

This is the practical aspect of this disaster and can only be actualized in live situation.

Further learning aspect in this tornado disaster relates to the usefulness of the geographic information system (GIS) in one city. This incident might have been a test-run for the city’s GIS program. Whatever was the case, one Interview Respondent was so impressed with the program’s utility in identifying property owners in damaged neighborhoods. The Interview Respondent’s enthusiasm was expressed this way:

I think that the other thing ... that we learned was ... we had a pretty strong geographic information system that helped us understand who owns what properties. [The GIS program] ...really [helped identify] a lot of data related to the [property in the damaged] neighborhoods. That was very helpful (Interview Respondent, 2013).
These learning in the present disaster exemplify the importance of how current event can help resolve problems and can be seen as a laboratory for mixed cadres of disaster responders. It helped highlight the fact that spontaneous planning is learning in current event which could have ramifications for approaches in future disasters. Therefore, learning opportunity within the present disaster is an important feature in IDMM.

Response was Innovative with Flexibility

The next attribute in the IDMM to be discussed is innovative response to a disaster with flexibility. This attribute may be described as novel ideas and capable of being adaptable to situations as need arises. One popular adage says that necessity is the mother of invention. This maxim was apparent when responding to the April 3, 2012, tornado incident in North Texas. During the interview, respondents agreed that they were inventive and innovative with flexibility in their approach to problem resolution when the tornadoes hit. They further stated that their inventiveness and innovation were predicated on past experience (Interview Respondent, 2013). In fact, one of the Interview Respondents suggested that some of their actions “was out of the box, inventive thinking” (Interview Respondent, 2013). Here is this Interview Respondent’s response to the inventiveness and innovation question in problem resolution:

There were innovative [things we did]. … I would say everything was very flexible. I would say inventive, yes, on certain things. We had … [to invent] on certain things … and certain things it was not. On certain things, we did exactly as we planned, and … it worked. But there were certain thing that we said, this isn’t going to work, we need to invent something and we need to come up [with workable approach]. So, flexible, inventive, and [innovation] …. Yeah, we had … numerous innovative things. I would say … the Disaster Assistance … Center that was very innovative. … What we did with the volunteers on the debris removal, the volunteer accountability, … certain groups that we brought in, that
was all very inventive as we were going along. … You know the CERT group, the Citizen’s Emergency Response Team, we called them too, and they came … That was one of those innovative things, and … that idea came from somebody [else] … (Interview Respondent, 2013).

It was the CERT group that came to City #2 aid that managed the volunteer groups in the recovery effort and they did fantastic job, according to the Interview Respondent (2013). The assignment of management responsibility to the CERT team “hadn’t been done before” in previous emergencies that the City experienced, noted this same Interview Respondent (2013). As such, this was an innovative idea that was experimented and had excellent outcome.

On the question of flexibility, another Interview Respondent just like the previous Interview Respondent stressed the significance of creativity in problem resolution when responding to a disaster by utilizing all the available resources at one’s disposal:

I think … flexibility … and creativity … [are necessary] anytime you have a natural disaster. … You’ve got field decisions that are going to need to be innovative and creative. I mean something as simple as how do you deal with getting rid of all of the debris as quickly as possible. … We immediately looked at what tools we already have in place that could be deployed, and, in fact, you know, that’s what we did. So we didn’t rely on one department to be responsible for that or one contractor. We said … in order to achieve our goals of doing it as quickly as possible and as efficiently as possible, we deployed all of the available resources, which meant … [all available] … personnel, [including] … our parks department that had pickup trucks … Folks that typically are field personnel in our water department, who, …, build water and sewer lines, but had big trucks, they were deployed [also] (Interview Respondent, 2013).

Still relating to flexibility, one Interview Respondent described it as being fluid in decision making when a disaster strikes. This Interview Respondent believes in practicality that conjures flexibility and not theorizing about solving situational problems. The Interview Respondent used communication plan example to boost the argument as noted here:
I would say yes [to utilizing flexibility]. … You can look at the communications plan all day long, but you're not going to discover the intricacies until … an actual incident [or] … until you experience it. You may have the right person to call, but what if they don't answer the phone? You have … an e-mail list, and all of a sudden that person … left for another job the week before. There are things that are going to come up, so learning to be fluid, having backups and alternatives that ultimately meet the same goal, even though they're not procedurally [followed as] set down … you need to be able to work with and meet the goals of the command staff … (Interview Respondent, 2013).

These examples illustrate the application of innovation and flexibility in post-disaster operations. Their usefulness in on-the-fly decision making were apparent in this event. Therefore, the innovative feature with flexibility in IDMM were utilized by mixed community of responders in the April 3, 2012, tornadoes and the elements aided them met challenges they faced in the response and recovery phases of the incident. The model's elements facilitated responders' decision making appropriate to the circumstances they encountered.

Relative Freedom and Significant High Degree of Discretion

Another feature in the IDMM is that a variety of disaster responders have relative freedom and high degree of discretion for decision making to resolve problems as disaster evolves. This attribute depicts carefulness, prudence, ability or power to decide responsibly including the freedom to act or judge on one's own (American Heritage College Dictionary, 1993). As discussed above, streams of valuable new information flow during and after a disaster. However, this new knowledge is useful only if various disaster responders have the freedom and high degree of discretion of utilizing the information in on-the-fly decision making to resolve unanticipated problems and challenges they encountered. As a disaster unfolds, frontline disaster responders and supporting agencies may face challenges that were not anticipated prior to the incident.
Hence, the IDMM posits relative freedom and high degree of discretion in decision making for disaster responding personnel who are under tremendous pressure to resolve problems and challenges in the response and recovery phases of the disaster.

In this research, evidence from the data supports the proposition. For example, on the question of freedom of decision making to tackle problems and challenges, this Interview Respondent was in the agreement:

If … we needed something, we followed the process, but then we … had a dual set of processes where if we needed something right away, we would make it happen. … We would make it happen over here [in the field]. So … I had [the freedom to make decisions]. … I was pretty much making the decisions … from a field perspective on anything that we needed or anything that we wanted to do. … Pretty [much] … do what we needed to do [to resolve problems on-the-spot] (Interview Respondent, 2013).

In another instance, one Interview Respondent observed that the practice of freedom in decision making to resolve problems during emergency has been in place in the Fire Department. According to this Interview Respondent, it allows on-the-spot decision making ability by the emergency personnel to resolve problems for appropriate outcome:

Oh, sure. Yeah. And in the fire service … that's common. We … give a lot of autonomy to the on-scene commander and to the officer of a responding unit. They … have the ability to [make on-the-fly or on-the-spot decisions], to do whatever is necessary … to save lives … or rescue folks, you know, regarding their own safety, of course (Interview Respondent, 2013).

On the other hand, another Interview Respondent that agreed on relative freedom to disaster responders in decision making to resolve unforeseen challenges, this Interview Respondent noted that such freedom is not extended to policy areas. This Interview Respondent’s reasoning is that issues bothering on policies are the sole responsibility of legislature and in this case, the City Council. And that City employee has no right to temper with that. This is how the Interview Respondent couched this
limited relative freedom for decision making by disaster responders, “yes … they have the authority, within certain parameters, to make an on-scene decision … that will render the best outcome, we'll put it that way” (Interview Respondent, 2013).

Similarly, another Interview Respondent agreed with the freedom of on-the-scene decision making as well as at the EOC, but added that the leadership team at the EOC should be informed about on-the-scene decision in the field and the type of action taken. Therefore, whoever took the decision have to furnish detailed information on the problem that was resolved including the resources and staff used. Such information serves dual purposes of accountability and transparency. Additionally, providing feedback to the leadership team at EOC is necessary in order to allow them update their strategic overall plan in accordance to the current situation. With these facts from the Interview Respondents, the IDMM element of relative freedom of decision making by disaster responders to resolve unexpected problems in the April 3, 2012, in North Texas is supported by the data. Thus, the utility of the model is attested to.

In order to get a handle of problems as a disaster unfolds, relative freedom and high degree of discretion go hand-in-hand. However, this does not mean that spontaneous planning is divorced from existing plans and standard operating procedures. The fact is that relative freedom and high degree of discretion cannot be decoupled in decision making since the degree of discretion may not be easily determined except in policy area. During a disaster, for effective problem resolution, relative freedom and high degree of discretion in decision making should be in tandem. However, this assumption is tempered in policy making as captured by this Interview Respondent:

I think there were some leadership decisions that had to occur in the recovery effort that really required either council action or a city manager action. You
know, for instance … when people were rebuilding their homes, we altered our processes so that they would have the first priority in our permitting. They would have 24-hour permitting and inspections, and they would not be charged a fee for that (Interview Respondent, 2013).

This distinction is important in that it follows American institutionalized system of government: the executive, the legislative and the judiciary. For example, the decision to alter rebuilding processes to 24-hour permitting without fee has to be legislated by the City Council for it to take effect. It is only the Council that has this power to codify the emergency permitting action and not the Code Compliance Services or the Department of Community Development and Planning or any other department. This separation of powers between the legislative and the executive comports to the American system of governance.

The foregone observation was echoed by another Interview Respondent concerning decision making with policy implication:

[One example was]: How long … to control the area to prevent people from going back in. Those are higher-level decisions. More policy driven things, who are we going to let back in, what groups … can we [let in]. There … were quite a few decisions that … they [the commanders in the field] could not make, and they knew to pass those things up. And … luckily … they didn’t try to make those [decisions]. … If they felt like they could make the decision, they made them (Interview Respondent, 2013).

Another area where the crews deferred to their superiors for decision was when big-ticket items such as large front-end loaders were involved. In one of the cities, requests for such big items were made by high-level manager in the county as indicated here:

I think big items, large items, and large-ticket items [the field crews couldn’t make decision on them.] I … know that several items that were requested [from the County] that … the City of City #3 did not possess were big [equipment.] … [Such requests were made by the City Manager in consultation with the Council] (Interview Respondent, 2013).
In this tornado research, evidence shows that disaster responders had high degree of discretion for decision making. However, this high degree of judgment was tempered in policy areas and big-ticket items as demonstrated in above examples. The high degree of discretion feature in the IDMM is supported by the data as essential factor in successful decision making under a disaster.

Solutions Waiting for Problems

A further characteristic of IDMM is solutions are waiting for problems. The idea of solutions waiting for problems as an attribute in IDMM stems from the fact that most of the disaster responders are experienced professionals who have taken active role in responding to different types of disasters in the past. There is an axiom that says experience is the best teacher. In this tornado research, several Interview Respondents have recounted their experiences in their respective fields responding to emergencies. Most of these Interview Respondents have over fifteen years of experience at their respective jobs and have been involved in actual emergencies, emergency response trainings, exercises, drills and practices. Therefore, they may have faced similar or different challenges in the course of their profession with plans to resolve the problems. Moreover, in the course of their duties, the Interview Respondents also related responding to previous tornados and floods. They maintained that these experiences and trainings facilitated their response and planning during the April 3, 2012, tornado. This Interview Respondent expresses the importance of experience in this statement:

I ... was working here when the 1994 tornado hit, so I had seen and participated in the process. I have done major chemical spills and floods before, so I had seen this process. Most people that have not seen it before, they get bogged down in trying to micromanage every aspect because they think that’s what they have to do. And for someone in this position [Chief], they have to step back and realize that it’s bigger than them and have to manage the managers. ... You no
longer … manage the incident; you manage the people that are managing the incident. So … that’s something I have learned over the years – that you need to do [and that experience help in this event] (Interview Respondent, 2013).

It should be remembered that some of the developed plans during a disaster may not have fitted the situation but could be used in another incident situation. This means that they can recall the idea to apply it to the current event. It is like reaching into the tool box and selecting the right tool for the job. In support of this assumption, one of the Interview Respondents said: “We have [al]most anything in our repertoire that we” can use to resolve any challenge we may “encounter in a disaster” (Interview Respondent, 2013). With such a tool box having ready solutions in it, disaster responder can reach into it and pull out a useful solution. For example, this Interview Respondent was elegant in summing up the richness and wealth of solutions in the respondent’s repertoire:

I spent 32 years as a firefighter in Dallas and responded to tornadoes and floods there. I was a Red Cross volunteer for probably 20 years and went to about 14 national disasters with the Red Cross. So … building upon my volunteer and professional experience and seeing what others have done in the past has helped me … to be an effective emergency manager at this point. … And every time something happens, you’re always going to have something to build upon and make … your response better next time (Interview Respondent, 2013).

This Interview Respondent’s statement suggests that by involving in professional development, volunteering, and seeing what other emergency professionals have done enriches the participant’s stocks with solutions waiting for deployment in problem resolution. Increasing one’s tool kit with solutions to be utilized in a disaster is the essence of solutions waiting for problems.

Still solutions waiting for problems relating to past experience allows one to reflect on what was done right in previous events, what went wrong, so that changes could be effected in current incident. Reflecting on past event is important because it
presents one with alternative options in solving similar problem in another incident. This mode of approach enriches ones solution tool box stock. One of the Interview Respondents brought this to light when pondering on the tornado of March 2000 response:

We had … a tornado hit town in March of 2000, and I was actually on a fire unit at that time. I was a lieutenant on a fire engine. And … I've thought about that … tornado a lot since then … and some of the things … that we didn't do in that first response that we did this [time] … And … one of those things is to identify the perimeter. … We needed to know what was damaged and how much, because when the first tornado hit, it went all the way through town. It … started west and went all the way across from City W into City P and swiped a path through City #1, all the way through. And when we got sent out, we showed up at an intersection, and we thought we were … [at the right scene but we were wrong] … And this time, being in the position I'm in, that was one of the first things I thought of is [that] we need to identify the damage area and what areas we need to be concerned about, and … we did that pretty quickly (Interview Respondent, 2013).

Another way to look at solutions waiting for problems is knowing what to do when a disaster strikes without waiting for someone to give you directions or orders. This type of reaction indicates understanding which solution to apply in a particular situation. This was apparent in City #2 when emergency staff responded to the April 3, 2012, tornadoes. According to an Interview Respondent, everyone knew what to do; they came in and took their positions, and acted professionally:

They [emergency management staff] come through the door, go grab their book, sit at their place, get on the phone, and I see that [response progressed quickly]. … They go right to work. That was something that helped me because I knew we got this [under control]. We … are ready, and we will handle this [situation] because I [see] all of them [the staff] taking their place [and acting professionally] (Interview Respondent, 2013).

From this Interview Respondent’s statement, it is possible to infer that “go grab their book” signifies emergency management personnel carrying their tool box with them (Interview Respondent, 2013). The significance of this is to allow the staff quick access
to existing solutions in that tool kit that may be used in problem resolution. It further shows that knowing where solutions to issues are is critical in problem resolutions during a disaster. Solutions might be complied into a booklet and kept in a safe place where everyone can have quick access to or may be in individual’s tool box which could be reach into promptly. The objective here is easy accessibility when needed. The possession and availability of this tool kit may give disaster responders some confidence when responding to disasters because they have a tool with them that could be used to resolve problems. Thus, having this element in the IDMM is essential as answers from the Interview Respondents tend to follow solutions waiting for problems feature in the model.

Flat Organizational Structure

Flat organizational structure is a further element in the IDMM. Yes, this flat structure was evident in this research but, a hierarchical one was apparent too. This finding appears to be inconclusive. Which organizational structure is best for quick decision making.

Although the literature on organizational decision making predicted flat structure to dominate emergency management organizations for quick decision making, however, this study uncovers mixed organizational structures. These mixed organizational structures refer to three different types of establishments: organizations with traditional hierarchical organizational chart where centralized decision making is entrenched; those with less hierarchical organizational chart with decision-making authority more dispersed; and others with flat organizational structure where decision-making power is
decentralized. These types of decision-making structures were observed within organizations that responded to the April 3, 2012, tornadoes in North Texas.

For example, the traditional hierarchical decision-making structure came into play when the fire and police seek input from the city leadership to resolve a disagreement among them on who was the lead agency in the tornado incident. This type of decision-making structure is necessary for interdepartmental or multiagency problem resolution. In most disaster response like the tornadoes in North Texas, independent departments, units and agencies play vital roles in the response and recovery activities. They have to cooperate and collaborate with one another. Therefore, the best decision-making structure to resolve interdependent dispute is hierarchical. This type of structure sees the big picture in a disaster situation.

Another organizational structure that was evident in this study was those with less hierarchical organizational chart with decision-making authority more dispersed. An example of this came from the damage assessment unit led by Interview Respondent. It is worth noting that the Interview Respondent was a midlevel manager. However, interview transcript indicated that the Interview Respondent did not report to anyone. With the assignment, Interview Respondent (2013) noted, “task force teams” were developed and “were … provided the materials and information that was needed to determine the damage assessment.” Further, each task force “had a team leader that was responsible for disseminating those task force into the area, answering any questions that they might have, and essentially taking care of any other immediate needs that they might have” (Interview Respondent, 2013). As observed in this quote, the team leaders had delegated power to make decisions to resolve any problem they
may encounter while executing the project. This dispersed decision-making authority facilitated the timely accomplishment of damaged assessment project.

Finally, one other structure that was seen in this study was flat organizational structure where decision-making power is decentralized. Such organization may include the Red Cross and other nonprofit organizations whose workers responded to the April 3, 2012, tornadoes in North Texas. These groups of workers have relative freedom and high degree of discretion in decision making in problem resolution. This characteristic is possible because midlevel managers in organizations with flat structures have delegated authority for decision making. Further examples are the police patrol and fire units. This decision-making structure was present in the organizations that responded to the tornadoes. The literature on organization decision making have shown that establishments with flat structures predominantly adopts decentralized decision-making process (Zabojnik, 2002; The Economist, 1995; Aoki, 1986).

Based on this knowledge, it could be argued that most organizations involved with disasters are similarly structured because it entails quick response where the flow of new information is upward through the hierarchy (Aoki, 1986). However, in this study, both flat and hierarchical organizational chart structures were observed in the three cities. It was further observed that in the flat as well as hierarchical organizational structure, there was upward information flow. This means that organizational decision making is a complex matter whether the organizational structure is flat or hierarchical. It depends on the extent of decision-making authority delegated to the subordinates and units by organizational leaders. This was evident within the organizations in this study which comprised of departments, agencies and units with hierarchical as well as flat structures. These organizations are exemplified below to show complexity in
organizational decision making during the April 3, 2013 tornadoes. In fact, mixed organizational structures as demonstrated below were found in this research.

For example, in the cities studied, organizational members interviewed included Fire Chiefs, Assistant Fire Chief, Deputy Police Chief, Directors, Assistant Directors, Fire Marshall, Lieutenant, Emergency Management Administrator, Emergency Management Coordinators, Media Editor, and a teacher. A closer look at one of the cities’ organizational chart structure revealed that the Fire Chief, Police Chief, and Directors considered midlevel managers report directly to the Deputy City Manager. The latter, the Deputy City Manager then is accountable to the City Manager who is the head of the executive branch. On the other hand, Assistant Fire Chief and Deputy Police Chief report directly to their respective Chiefs. Under the Assistant Fire Chief are Emergency Management Administrator, Emergency Management Coordinator, and a Lieutenant. Similarly, the Police Organizational Chart shows that the Deputy Police Chief is in charge of junior officers. In the April 3, 2013 tornadoes, although the Assistant Fire Chief and the Deputy Police Chief were in charge of their respective field commands, they had team leaders that were in charge of teams with delegated authority to make decisions. These crew leaderships had delegated authority for decision making and reported to their respective Deputy Chiefs. Similar relationships were observed regarding Directors and Assistant Directors with respect to their crews. What was common among the midlevel managers and the team leadership in the tornadoes post-disaster operations was their decision-making ability to resolve unanticipated problems.

These apparent decentralized decision-making observations in the post-disaster operations of April 3, 2013 tornadoes marks flat organizational structure characterized
emergency management establishments. The decentralized decision making embedded in the delegated authority “leads to a better utilization of information scattered throughout the lower levels” of organizations' hierarchy (Zabojnik, 2002, p. 2). This is a vivid description of organizations that were involved in the April 3, 2012, tornadoes disaster response and recovery operations. Their flat organizational structures as illustrated above enabled them make quick-thinking on-the-fly or on-the-spot decision to resolve unforeseen challenges as the disaster unfolded. This is why the element is included in the IDMM and is a crucial one. In a disaster event, decentralized decision making is best for issues resolution because it involves quick response to a changing environment with new information at the lower level of the hierarchy. The other two cities’ organizational charts were similarly structured as that exampled above. The observed structures is in line with the study regarding organizational decision making arguing that decentralized decision-making predominant establishments where quick response to changing technologies and environment is necessary and the flow of new information is upward through the hierarchy (Aoki, 1986). Adapting this logic, Nordstrom, an American department store, issued its workers a simple instruction: “use your good judgment in all situations” (The Economist, 1995, p. 1). The adoption of decentralized decision making by organizations via flat organizational structure is flourishing because of its potential in improving the establishments’ performance.

Linkage between Integrated Decision Making Model (IDMM) and Spontaneous Planning

As seen in this research data, it appears that IDMM and spontaneous planning are intricately linked together in problem resolutions in post-disaster operations. IDMM – based on gathering streams of valuable new information as disaster unfolds, learning
opportunity within the present disaster, innovative with flexible response to the disaster, having relative freedom and high degree of discretion, with solutions waiting for problems through prior experience and mixed organizational structure – enhances spontaneous planning decision-making behavior when responding to a disaster. For example, gathering valuable new information as the disaster unfolded helped responders to analyze the situation and used the new information to solved problems. Furthermore, solutions waiting for problems through experience aided in the application of prior disaster experience to resolve current challenges. Spontaneous planning behavior and decision making in the planning process cannot be disentangled in response and recovery phase operations of a disaster. Spontaneous planning as a planning process that considers different alternative choices before selecting the best line of action, is not a normative decision-making model (an acceptable decision-making model by scholars) per se. This means that it is not generally considered normal decision-making theory or model by organizational theorists. Thus, it has to be driven by a decision-making theory or model to ensure deliberate and quick decisions. This is where IDMM which is an integrated decision-making model comprising the best features from organizational learning theory, the theory of street-level bureaucracy, and garbage can model (see Chapter 3 and the beginning of this chapter) comes in. It is this new hypothesized integrated decision-making model that gives kinetic energy to spontaneous planning for quick-thinking with deliberate decision-making ability. The model is a useful tool for decision making under a disaster since answers from Interview Respondents tend to indicate that they followed features of the model.

This analysis is the first attempt to develop a decision-making model that may be useful to understand spontaneous planning in a disaster. Therefore, as it stands, the
theory seems to hold true for only the identified variables discussed above. The model analysis notes what was found in this particular study. However, some variables in the model may not have been fully explicated but they inform readers how decisions were made to resolve unanticipated problems during and after the tornadoes. The features identified in the model may not have been exhaustive or relevant to other study. Therefore, the theory should be tested with other types of disasters for ascertaining its utility.

The analysis of this proposed parsimonious model shows its usefulness in decision making in post-disaster operations. As illustrated throughout the analysis, the elements in IDMM were critical in decision making when responding to the April 3, 2012, tornadoes incident in North Texas in a group or individually. The model provided a quick tool per Interview Respondents’ answers for problem resolution which is an objective of disaster responders who normally experience tremendous pressure to perform in a demanding and challenging job.

Summary

This analysis shows that IDMM relates to spontaneous planning through decision making in resolving unanticipated problems under the disaster. The former is a decision-making model which is characterized by: gathering streams of valuable new information as the disaster unfolds; have learning opportunity within the present disaster; responders to the disaster was innovative with flexibility; relative freedom and high degree of discretion by mixed cadre of disaster responders; solutions waiting for problems through experience; and flat organizational structure. Spontaneous planning as a process involves planning decision making essential in resolving unanticipated
issues in response and recovery phases of the disaster. In order to accomplish this task, IDMM was proposed as a driving decision-making force for spontaneous planning phenomenon. Based in this chapter’s analysis, it is evident that Interview Respondents answers tend to follow IDMM features during the tornadoes post-disaster activities.
CHAPTER 7
CONCLUSION

The primary purpose of this dissertation is to contribute to the development of the concept of spontaneous planning originally conceived by McEntire et al. (2013) in the study of San Bruno, California, gas pipeline explosion. The research objectives were to extend the concept to the April 3, 2012, tornadoes in North Texas as well as attempt shedding light on some questions the original study generated. Based on findings from the primary data collected in the field as discussed in Chapter 5, these objectives have been achieved. Since spontaneous planning is regarded as a planning process to resolve unanticipated problems, it was further hypothesized that the decision-making process aspect is driven by integrated decision-making model (IDMM). The proposed model was analyzed in Chapter 6 and found to be useful in explaining decision making to resolve unanticipated problems as well as reducing anticipatory future challenges. Therefore, in this chapter, findings on spontaneous planning and IDMM are recapped. This is followed by reviewing implications of the study for practitioners. The third section focuses on implications of the study for researchers, and the chapter ends with conclusion.

Review of Findings

This section is devoted to the reviewing of the concept of spontaneous planning which is the main focus of this dissertation. Included in the section is a review of methods employed in the research program. Also slated for the section is a review of spontaneous planning findings as well as the hypothesized decision-making model, the integrated decision-making model (IDMM). The purpose of the section is to recapture
the important aspects of the study and to remind readers of pivotal issues in spontaneous planning as a process in response and recovery activities in the April 3, 2012, North Texas tornadoes. The discussion starts with reviewing the concept of spontaneous planning.

The Concept, Existence, and Complexity of Spontaneous Planning

This study is a continuation in the development of the concept of spontaneous planning as a way of describing unique behavior and activities made evident in post-disaster operations after the North Texas tornadoes. Spontaneous planning has been defined and described as a process utilized in problem resolution as a disaster unfolds. In brief, the phenomenon is regarded to be unique process that is neither equivalent to planning prior to disaster or improvisation after extreme events (McEntire et al., 2013). As mentioned in Chapter 1 as well as in other parts of this dissertation, spontaneous planning is related to and is a bridge between pre-disaster planning activities and post-disaster response and recovery operations. Further, spontaneous planning may be predicated on existing plans and could be anticipatory to reduce future challenges. Furthermore, spontaneous planning facilitates improvisation after disasters as it increases possibilities for consideration as well as potential approaches for problem resolution (McEntire et al., 2013).

As discussed in Chapter 1, spontaneous planning could further be distinguished from other aspects of disaster response and recovery activities through military reasoning regarding strategy and tactics (Quarantelli, 1988). As explicated in Chapter 1, another way to distinguish disaster planning from spontaneous planning is by employing military distinction between strategy and tactics as taught and implemented in the field,
and highlighting the differences between the two (Quarantelli, 1988). Following military
reasoning, strategy could be equated to overall approach to a problem or objective
while on the other hand, tactics may be influenced by situational factors or other
contingencies which require particular adjustments to achieve a specific goal if the
overall objective is to be attained (Quarantelli, 1988, 1993). Based on this reasoning,
disaster planning is synonymous to “a strategy” while “tactics” relates to spontaneous
planning used to handle the specific situational contingencies which are present or
which arise during and after the course of a disaster (Quarantelli, 1993, p. 17). This
explanation is in line with McEntire et al.’s (2012) overall description of the concept of
spontaneous planning as well as the differences between disaster planning,
improvisation, and spontaneous planning.

Both of these were evidenced in the April 3, 2012, tornadoes response and
recovery activities. The overall strategy for the event dominated decisions at respective
EOCs where each city’s leadership team met to coordinate, settle inter-agency
disputes, manage resources and made critical decisions with regard to response and
recovery operations. These leadership teams were concerned with the big picture of the
campaigns and aimed to return the damaged neighborhoods to daily regular routines.
On the other hand, tactics were mainly utilized in the field to determine specific
situational challenges.

In Chapter 1, it was indicated that the concept of spontaneous planning is a
complex idea introduced into the emergency management profession by McEntire and
colleagues. The theory could be described as sensitizing concept which gives scholars
“a general sense of reference and guidance in approaching empirical instances” and
“merely suggest directions along which to look” (Blumer, 1954, p. 7). Therefore, as
further explained in Chapter 1, this study of the concept of spontaneous planning is modeled after the notion of sensemaking articulated by Weick (1993, 1995) and colleagues (Weick, Sutcliffe, & Obsteld, 2005). In a nutshell, sensemaking describes developing a set of ideas that have explanatory possibilities and this approach is followed in the current study. The idea is used in explaining, describing and interpreting how armies of disaster responders to the April 3, 2012, tornadoes in North Texas resolved unanticipated problems as the disaster unfolded.

In order to successfully conduct an empirical study of the concept of spontaneous planning with its complexity, Max Weber’s notion of an ideal type phenomenon was assumed in Chapter 1 (Manen, 1977). This is a conceptual formulation in social science that is regarded as a working hypothesis until its realistic worth has been established by observation. In this sense, at the beginning of the study, the concept of spontaneous planning was imaginative. However, in Chapters 5 and 6, the abstraction of spontaneous planning has been brought to reality using the April 3, 2012, tornadoes.

Methods of the Study

The abstraction of spontaneous planning behavior was brought to reality by methods used in the examination of the phenomenon. As reviewed in Chapter 4, a case study approach was used in this research program to investigate the research question posed in Chapter 1 by utilizing the April 3, 2012, tornadoes in North Texas. Furthermore, as elaborated in Chapter 4 also, a qualitative method which is context-based was employed to explore how organizations’ members reacted to the tornadoes and solve unexpected issues in the unfolding disaster. The unit of analysis of the study
is organization. What follows next is a full review of how the data for the research was gathered and analyzed.

Before the field face-to-face interview was conducted with any respondent, the University of North Texas requirement of research that involves human subjects was met. The requirement from the Institutional Review Board (IRB) states that “all individuals working with human subjects in research complete an institutional program before the IRB will review an application” (UNT 2012, p. 1). In compliance with this policy, the researcher in this study and the supervising professor had undergone the required training. After the IRB training, a certificate of completion with Number 468997 was issued to the researcher on June 24, 2010. The IRB application was first submitted in May 2012 and a revised version resubmitted on July 2012. Other materials that accompanied the application form were: Informed Consent Form; Interview Instrument Guide; and Certificate of Completion of IRB Training for “Protecting Human Subject Research Participants.” The “Informed Consent Form” was approved on July 18, 2012. In addition, an official letter of IRB approval titled “Human Subjects Application No. 12279” dated July 18, 2012 was sent to the Supervising Investigator, Dr. David McEntire.

To test the spontaneous planning process and the hypothesized decision-making model (considered in Chapters 1 and 3 respectively) in the unfolding tornadoes, a semi-structured questionnaire as reviewed in Chapter 4 was administered to eleven organizational members in eleven functional organizations in three most affected tornadoes cities in the North Texas area. These organizational members and the three cities were assigned numbers to protect their identities as promised during the face-to-face interview sessions. The organizational members interviewed with their respective
cities were purposive or convenient sampling and were those who were actually involved in the post-disaster operations. Before each interview, respondent signed approved IRB Informed Consent Form indicating his/her willingness to take part in the research. During the interview, respondents’ answers were further probed to elicit explanation, clarification and description of the processes (spontaneous planning and decision making) where necessary. These interviews were digitally recorded and transcribed at the end of the interview phase. All the eleven face-to-face interview period lasted about one month, which was from March 27, 2013 to April 29, 2013. The face-to-face interview itself was conducted at the respondent's office and lasted about 50 minutes on average per respondent. While the transcribed interviews were reviewed, further contacts by e-mail were made with the respondents to clarify some facts in the documents. Before the collected data was analyzed, the transcribed documents were sent to Interview Respondents to ascertain the authenticity of the transcribed interviews. Of the eleven documents, only one Interview Respondent made minor correction and the corrected information was implemented in the said document. However, the remaining Interview Respondents attested to the correctness of the transcribed interview. Thus, after the accuracy of the interview transcription was confirmed to by the eleven respondents, the data was then analyzed.

After Chapter 5 findings and Chapter 6 analysis were completed and reviewed by the Dissertation Committee Chair, they were sent to all the Interview Respondents for examination and validation. This approach is to ensure that the findings and analysis are in sync with the Interview Respondents’ experiences in the post-disaster operations. From their feedback, the findings and the analysis corresponded to their actual experiences. This validation of the study confirms the application of spontaneous
planning to the resolution of problems during the April 3, 2012, tornadoes in North Texas. Furthermore, the validation of the research program by the Interview Respondents affirms the utility of IDMM as a driving force in decision making during the spontaneous planning process. The validation of the study from the Interview Respondents gives credence to the program while strengthening the findings.

Although the objectives of the study have been achieved, the program was limited by small sample size – eleven organizational members. Another limitation of the research is that this was directed at tornadoes and not at diverse disasters. To strengthen the research, the sample size should be a large and if possible with diverse type of disasters.

Review of the Findings about Spontaneous Planning

From the examination of the primary data collected in the field on the April 3, 2012, tornadoes in North Texas region as discussed in Chapter 5, it has been illustrated that spontaneous planning appears to have been apparent in the post-disaster operations. The analysis of the data furthermore demonstrated that debris removal and ensuring public safety, search and rescue operations, securing damaged neighborhoods and dispatching from the field, activation of emergency operation centers, damage assessment, restoration of communication systems, public relations and media, and volunteer and donation management may have benefited from these types of post-disaster spontaneous planning activities. Though improvisation appeared to have been inevitable in this research program, spontaneous planning may have helped to improve such improvisation.
For example, as found in Chapter 5, on the management of large donations that poured in during the tornadoes, this problem benefited from spontaneous planning. As discussed in Chapter 5, and reiterate here, in City #2, the plan to manage large donations at a Disaster Assistance Center at the high school came from collaborative planning effort at a briefing. As observed in the interview transcript, throughout the tornado response operations, this Interview Respondent was an astute leader who works well with the stakeholders. With the assistance of the stakeholders, the Interview Respondent created a structure and tasked them to make the Disaster Assistance Center operational. The Center plan development which was post-disaster action was a well-thought-out decision making and is consistent with the concept of spontaneous planning. It was entirely a new thought out plan which has never been attempted before. The planning group responsible for the plan’s feasibility brainstormed during the planning sessions and came up with a workable plan. The success of this new plan is a testament that spontaneous planning may involves modification of existing plan or development of an entirely a new plan to resolve unanticipated challenges. This donation management problem resolution was based on the group developed plan and was captured by an Interview Respondent as noted in Chapter 5. This example and findings in Chapter 5 show that spontaneous planning occurred in the North Texas April 3, 2012, tornadoes. On the other hand, Chapter 6 analysis indicates decision-making process during the phenomenon.

The exploration of the concept of spontaneous planning is to aid disaster planners and responders in the production of incident action plans (written or verbal) alluded to by one of the Interview Respondents (2013). This reference to the production of incident action plans is what the NIMS and ICS architecture (planning) calls for during
a disaster response as reviewed in Chapter 3. The purposes of such plans are to resolve unanticipated post-disaster problems. These incident action plans could be formal or informal. In other words, they could be written or just discussed. In fact many of the response plans are probably informal and discussed. It is weakness in disaster planning discussed in Chapter 3 that gives rise to the requirement of planning in the NIMS and ICS structure for post-disaster activities (Quarantelli, 1974, 1998; Tierney, 1993; Perry & Lindell, 2003; Clarke, 1999, 2006; Guillen, 2001). The result of this is the timely introduction of the concept of spontaneous planning into the emergency management profession by the original authors, McEntire et al. (2013).

The findings in this spontaneous planning study during the April 3, 2012, North Texas tornadoes underscore the importance of planning after disasters as recommended in NIMS and ICS structure highlighted in Chapter 3 (Jiang et al., 2004; Bigley & Roberts, 2001) (see Chapter 3 for NIMS and ICS discussion). Structurally, one function of the NIMS and ICS architecture calls for planning section which is involved with collecting, evaluating, and disseminating information such as maps, weather reports, road closures, and status of personnel and resources. Generally, written plans are incomplete and could be modified and adapted during an incident. Simply, this planning section of NIMS and ICS structure could be summarized as charged with resolving unanticipated problems during and after a disaster. This NIMS and ICS architectural function dovetails spontaneous planning observations made in the North Texas tornadoes of April 3, 2012. No wonder why one of the Interview Respondents (2013) referred to this NIMS and ICS function of planning as resulting in an unwritten “incident action plans.” This research program underscores the importance of planning after disasters as recommended in NIMS and ICS structure. In this study, it was found
that planning was less formal (that is, not written) and more verbal. The data from this research suggests that “spontaneous planning is a visible and empirical phenomenon which may have profound impact on disaster resilience” (McEntire et al., 2013, p. 20).

Review of the Decision Making Model Findings

Related to the concept of spontaneous planning is decision-making theory that drives the planning decision in problem resolution during response and recovery activities. The decision-making model directs attention to how or why spontaneous planning occurs. This proposed decision-making model is integration decision-making model (IDMM). As described in Chapter 3, the model is an integration of the best features from organizational learning theory, the theory of street-level bureaucracy and garbage can model. In Chapters 3 and 6, it was noted that individually, the aforementioned models is not useful in decision making under a disaster or in a pressured situation due to their limitations. Therefore, an IDMM which combines the best elements of organizational learning theory, the theory of street-level bureaucracy and garbage can model was hypothesized to be the driving decision-making mechanism in spontaneous planning post-disaster activities. As observed in Chapters 3 and 6, the proposed IDMM recognizes the limitations of a single model of organizational learning theory, the theory of street-level bureaucracy and the garbage can model in meeting disaster responders’ need of decision-making under pressure, changing and challenging conditions. The responding organizations have to respond to the unpredictable situation under spontaneous planning with IDMM because of uncertainties to increase actors’ decision-making capabilities. This proposed decision-
making model under a disaster was analyzed in Chapter 6 with data from the April 3, 2012, tornadoes in North Texas to ascertain its usefulness.

The presumed useful IDMM features and their sources are summarized in Table 9. IDMM variables used in the Chapter 6 analysis included gathering streams of valuable new information as the April 3, 2012, in North Texas unfolded; having learning opportunity within the tornadoes disaster; applying innovative ideas with flexibility in post-disaster activities; the army of the disaster responders had relative freedom and high degree of discretion to make necessary decision to facilitate problem resolution; mixed organizational structures were possible for problem resolution; and due to prior experience from other disasters, solutions were waiting for problems. For example, responders having relative freedom and significant degree of discretion with

Table 9

*IDMM Elements*

<table>
<thead>
<tr>
<th>IDDM Element</th>
<th>Model Source of the Element</th>
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<tbody>
<tr>
<td>Gathering valuable new information</td>
<td>Organizational Learning Theory</td>
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<tr>
<td>Learning opportunity within the disaster</td>
<td>Organizational Learning Theory</td>
</tr>
<tr>
<td>Relative freedom and significant high degree of discretion</td>
<td>Theory of Street-Level Bureaucracy</td>
</tr>
<tr>
<td>Response was innovative with flexibility</td>
<td>Theory of Street-Level Bureaucracy</td>
</tr>
<tr>
<td>Flat organizational structure</td>
<td>Theory Street-Level Bureaucracy</td>
</tr>
<tr>
<td>Solutions waiting for problems</td>
<td>Garbage Can Model</td>
</tr>
</tbody>
</table>
flexibility allowed them to make decision using new information to solve problems at the EOC and in the field. These IDMM elements may not be exhaustive but deemed appropriate for the tornadoes in which the analysis attempted to understand.

As analyzed in Chapter 6, IDMM features were found to follow Interview Respondents’ answers who played vital role during the North Texas April 3, 2012, tornadoes post-disaster activities. The model elements were found to be across the board among mixed cadre of disaster responders. The IDMM features found to follow the Interview Respondents’ answers and useful in decision making during the response and recovery phases of the tornadoes disaster were gathering streams of valuable new information as the disaster unfolds, learning opportunity within the present disaster, response to the disaster was innovative with flexibility, having relative freedom and high degree of discretion, solutions waiting for problems through experience, and where mixed organizational structures existed.

On the same subject of having relative freedom and high degree of discretion for decision making to resolve problems and challenges during the April 3, 2012, tornadoes in North Texas, disaster responders on-the-scene of the incident (in the field) as well as leadership teams at each respective EOCs had similar authority. Such a feature in the model allowed these mixed cadres of the disaster responders to do all within their ability to resolve any problem. However, the effectiveness, controllability, collaboration, and coordination with such wide latitude could be future research question.

Implications for Practitioners

The findings of the study discussed in Chapters 5 and 6 have some implications for emergency management practitioners. The findings offer opportunity to rethink
overall approach to emergency management activities. In order to perform effectively in a disaster, practitioners have to bring together discrete methods of problem resolution during post-disaster operations. This is being complemented by active research programs in the area of hazard mitigation, pre-disaster planning, post-disaster improvisation and recently through the concept of spontaneous planning pioneered by McEntire and associates. The current study is a direct contribution to the advancement of prior research with regard to post-disaster response and recovery activities. This particular study has again demonstrated that spontaneous planning bridges pre-disaster planning and improvisation occurring after a disaster. The study further showed that army of disaster responders are bringing well of experience to bear on problem and challenges when responding to disasters.

From the transcribed interview data, it was obvious that successful spontaneous planning undertaken to resolve unanticipated issues required the presence of departmental representatives at the planning meetings. This observation was evident in the three cities studied. These representatives inputs in the post-disaster planning meetings cannot be overemphasized as coordination, collaboration, and resource management are essential in problem resolutions. It was at these meetings that important decisions were made regarding the disaster response plan. These meetings took place at the cities’ respective EOCs where overall strategic planning happened. In fact, in City #2, according to its tornado log, the Mayor and the City Manager were present at the planning meetings that took place at the EOC on April 3, 2012, at 1:45 pm (Interview Respondent, 2013). Similar observation was made by an Interview Respondent (2013) in City #1. From the interview transcripts, there were revelations
that spontaneous planning helps in multi-organizational coordination and was evident in this study.

Furthermore, it was evident that spontaneous planning allowed original disaster plans to be adjusted, modified and have a novel idea to solve the problem at hand. This was communicated to the researcher by one of the Interview Respondents as noted here:

Well … it [spontaneous planning] allows you to adjust to the situation … like I said earlier; you can’t write a plan that you can follow every single time. Every plan has to be adjustable and modifiable. … But if that's not working for that incident, then it's useless. So you have to be able to adjust … or completely rewrite the plan, but that's why it’s best for your plan to be generic. It keeps you on a path, a guide – you know, it’s a guideline, but … your actual objective is to adjust to … particular incident (Interview Respondent, 2013).

This study further brings into focus the need for new knowledge and skills required in post-disaster response and recovery activities. Such new knowledge and skills include information gathering ability as well as being able to interpret the information and taking appropriate action. Another highlight of the study is based in Chapter 6 analysis of mixed organizational structures of traditional hierarchical organizational chart, those with less hierarchical organizational form and those with flat organizational structure that permit both centralized and decentralized decision-making authority. These organizational arrangements authorize decision making at all levels to quickly resolve unanticipated problems and challenges during a disaster. These forms of organizational arrangements stress the saliency of both centralized and decentralized decision-making establishments in the emergency management profession. Just one form of organizational structure cannot cut it.

A further finding from this research is the need for emergency managers and associated subordinates to develop conflict resolution skill in decision making. This is a
new skill that every emergency manager should acquire as emergency management is becoming complex involving different levels of governments and agencies. Mobilization of multi-agency disaster response and recovery involves resolving intergovernmental, interagency, and interdepartmental as well as intra-agency conflicts. Such conflict resolution was noted in Chapter 5, when the Fire Department and the Police in City #1 struggled in leading the response activities. Though the matter was settled by the city leadership, a prolong dispute between the two departments could have interfere with the post-disaster operations.

Still as shown in Chapter 6 analysis, the IDMM feature of solutions waiting for problems through prior experience aided in decision making in the spontaneous planning process during the North Texas April 3, 2012, tornadoes. This all-encompassing element includes on-the-job experience, volunteering as well as training, drills and exercises. They add up to having experience with disasters that may provide repertoire of solutions which could be applied to similar emergency situations. An Interview Respondent related to this type of experience as being helpful in current tornadoes incident (Interview Respondent, 2013).

In consonant with decision-making authority is the need for regular simulated drills and trainings for emergency management personnel in a variety of emergency scenarios under different types of disasters. This type of training could include management and leadership courses for those that do not have formal management or leadership programs. New recruits in the profession could be required to have management, leadership, decision making, inter-governmental relation, conflict resolution, and crisis management courses in addition to formal emergency management administration/planning education. These courses, especially inter-
governmental relations should expose emergency management personnel to the art of inter-agency cooperation, coordination and collaboration. This is crucial since emergency management profession involves working across different levels of governments, agencies, departments, medical facilities and public safety organizations. Furthermore and more importantly, spontaneous planning should be integrated into educational planning programs for future emergency managers and other subordinates. In addition, a yearly educational development and professional participation could be required to further strengthen personnel skills. All this is attempting to update emergency management professionals with latest development in the field.

Most of the educational training and developments recommended could be obtained through FEMA’s National Preparedness Directorate National Training and Education (https://www.training.fema.gov). For example, the Center for Domestic Preparedness (CDP) located in Anniston, Alabama, offers all-hazards training. On the other hand, the Emergency Management Institute (EMI), located at Emmitsburg, Maryland, serves as the national focal point for the development and delivery of emergency management training to enhance the capabilities of varieties of entities in the public and private sectors. Finally, the National Training and Educational Division (NTED) located in Washington, DC, offer a number of courses to nation’s first responder community to help build critical skills that responders need to function effectively in mass consequence events. States also offer numerous emergency management training to emergency management professionals in their respective states. For example, in Texas, such programs are offered through the Texas Division of Emergency Management and include State Conferences (http://www.txdps.state.tx.htm). This division is within Texas Department of Public Safety. In New Jersey, the emergency
management training programs are coordinated through the New Jersey Office of Emergency Management (NJOEM) (http://www.state.nj.us/njoem/programs/field_training.html). The NJOEM is under the Office of the Attorney General. Other avenues for training emergency management personnel are regional training, training in a city or with a local emergency planning committee.

The cost associated with the training and updating the skills of employed emergency management personnel should be borne by their respective employers. Additionally, such benefit should include sponsorship of membership in various emergency management organizations.

Implication for Researchers

Another aspect of this study is implication for researchers. As discussed in Chapter 1 and Chapter 4, spontaneous planning is a process that occurs during or after a disaster and is not equivalent of emergency improvisation (McEntire et al., 2013). Spontaneous planning is not the usual disaster planning in that the former does not take place before an emergency or a disaster (McEntire et al., 2013). The process is an anticipatory activity that takes place after an incident has occurred and takes into account actual hazards and unfolding consequences (McEntire et al., 2013). According to McEntire and colleagues, although emergency managers make every effort to incorporate all possible eventualities in disaster plans, the plans are laced with uncertainties and as such “spontaneous planning will, at times, be based on or expands from existing planning documents” (McEntire et al. 2013, p. 1). In essence, spontaneous
planning is a bridge between disaster planning and improvisation and contributes to the improvement of improvisation.

However, there are limitations to this research program and are noted here. First consideration will be given to the method limitations before getting into substantive theoretical drawbacks. This study is based on small size sampling consisting of eleven organizational members who actually took part in the disaster response and recovery operations. It is recommended here that the sample size should be increased to capture more variation in the response and recovery activities. Secondly, since data collection in this research was gathered on interviewing respondents, such an exercise is rife with exaggeration, inaccuracy and misrepresentation. Furthermore, studies have seen that with the face-to-face interview method, interviewers may introduce bias into the data in a number of ways (Singleton, Jr. & Straits 2005). For example, according to Singleton Jr. and Straits (2005), they may fail to stick to the interview schedule in the prescribed manner or may suggest answers to the respondents. Further sources of bias may come from a respondent’s reaction to the interviewer’s gender, race, and manner of dress or personality (Singleton, Jr. & Straits, 2005).

In this research program, although members of the public sector organizations were interviewed, private sector businesses and nonprofit organizations were involved in the post-disaster activities. However, this dissertation did not focus exclusively on those organizations. Thus, there is need to study organizations before disaster occurs to better understand which organizations are apt to using spontaneous planning and improvisation. For example, Diane Vaughn’s (1990, 1998, 2004) examination of the Challenger disaster led to the revelation of organizational negligence of responsibilities in the Shuttle Challenger program. In the Challenger studies, Vaughn (1990, 1998,
reviewed activities of organizations charged with regulating safety at the National Aeronautics and Space Administration (NASA) that failed to identify flaws in management procedures and technical design that contributed to the Challenger tragedy. In this after event organizational study, Vaughn (1990) uncovered that regulatory effectiveness of monitoring, investigating and sanctioning in the Space Shuttle Program was hindered by the autonomy and independence of NASA and its regulators. Vaughn suggested that technology was not the culprit in the accident, however, but added that organizations that run these risky enterprises often contribute to their technological failures. Other organizational failures where establishments did not master their technologies according to Vaughn (1990) included Three Mile Island, Union Carbide, Bhopal, and Chernobyl. Generally with such failures, organizations normally scramble to minimize catastrophes from happening and spreading the impact to other areas. Vaughn’s studies have implications for organizational study such as utility/power companies, Government Nuclear Regulatory Commission, Federal Aviation Administration, and Occupational Safety and Health Administration (OSHA), and independent agencies and technological driven organizations. The primary lesson from Vaughn’s studies is that one can imagine which organizations may use spontaneous planning and improvisation by studying them before any incident. Another area of interest to further expand the understanding of spontaneous planning behavior and improvisation is to further study the high reliability organizations (Roberts, 1990; Weick, Sutcliffe, & Obstfeld, 1999; Weick & Roberts, 1993; Starbuck & Milliken, 1988; Bierly & Spender, 1995; Weick, 1990).

Although this study has shed some light on initial questions generated in McEntire et al.’s (2012) first inquiry on the subject, those questions still warrant more
research using different disasters. However, this research has further generated more questions than answers for future research and should be examined to expand understanding in the application of spontaneous planning to solve problems and challenges as a disaster unfolds. These questions are presented in the following paragraph.

Are certain types of organizations more likely to engage in spontaneous planning than others? What is the degree of rationality in spontaneous planning? Is spontaneous planning quick or slow? Is it applicable to field and emergency operations center (EOC) decision making? Is spontaneous planning hierarchical or flat organizationally (see search and rescue – SAR – operations)? What is the relationship between spontaneous planning and standard operating procedures (SOP)? Is there a relationship between spontaneous planning, interagency and interdepartmental collaboration and cooperation during emergency operations? Is spontaneous planning an individual activity or a group activity? What is the relationship of spontaneous planning to planning and to improvisation? Is conflict resolution a needed skill for emergency managers in the future? Do we need to understand both the formal and informal aspects of spontaneous planning and National Incident Management System (NIMS)? Which organizational structure best suits decision making in spontaneous planning to solve unexpected problems? With regards to the utility of mixed organizational structure in decision making, based in Chapter 6 analysis, which form is best suited under a disaster through spontaneous planning?

Further research questions are: Can laws inhibit the use of spontaneous planning during a disaster? Could laws constrain the application of relative freedom and significant degree of discretion in decision making? Does spontaneous planning
predominate in the field or at emergency operation center? When does spontaneous planning ends during post-disaster activities? Does it bleed into the recovery phase of the incident? Are there laws in the book that could constrain spontaneous planning? Is IDMM applicable to some situations but not always in every disaster? Do solutions waiting for problems facilitate adapting prior solutions to current situation or does it impede/complicate adaptation in spontaneous planning behavior? Are current IDMM characteristics useful in decision making in other types of disasters with regards to spontaneous planning behavior? What other elements may be useful in decision making in other emergencies in the application of spontaneous planning?

Conclusion

At the inception of this research program, the primary goal of the inquiry is to contribute to the development of the concept of spontaneous planning process from the gas pipeline explosion to a tornado type disaster. This was achieved by asking: What processes do organizations employ to deal with changing and challenging situations, and instantaneously solve unanticipated problems as a disaster unfolds? Associated with this question was the need to learn more about how the process occur which led to the question: How did the phenomenon take place when dealing with a disaster? In addition, the research aimed at shedding light on some initial questions generated in the original study on the concept of spontaneous planning McEntire et al. (2013). Furthermore, the researcher posited an IDMM as a decision-making model useful in explaining spontaneous planning under a disaster condition. From the data collected in the field and examined in Chapter 5 and analyzed further in Chapter 6, these three propositions appeared to be accomplished. With the transcribed interview data from
eleven employees of eleven functional organizations discussed in Chapter 5, evidence showed possible benefits of the concept of spontaneous planning in the North Texas April 3, 2012, tornadoes incident. These findings were observed in: debris removal and ensuring public safety to enable safe access to the damaged neighborhoods by disaster responders as well as ensuring citizens’ safety; search and rescue operation of the victims; securing damaged neighborhoods and dispatching from the field in an effort to protect property and assist the disaster victims; activation of emergency operations centers where overall strategic spontaneous planning took place; damage assessment; restoration of communication system as services in the region were interrupted by the tornadoes; and public relations and media activities and how they were adapted to meet the needs of the public.

Furthermore, analysis of the IDMM features in Chapter 6 supports the proposition that the model is useful in explaining decision making under a disaster since the Interview Respondents’ answers in this tornadoes study tend to indicate that they followed features of the model. These were evidenced in: gathering streams of valuable new information as the disaster unfolds; learning opportunity from the present disaster; response to the disaster is inventive and innovative with flexibility; disaster responders have relative freedom and high degree of discretion for decision making; and solutions waiting for problems through experience. In the case of flat organizational structure, it was uncovered that mixed organizational structure was observed in the study.

Thus, the data suggests that spontaneous planning: is a valid descriptor of response and recovery behavior; could improve emergency management operations when and after disasters occur; and should be promoted as a key principle among community of disaster responders and others involved in emergency management.
Finally, based on the analysis in Chapter 6 of how and why spontaneous planning occurred, it could be concluded that IDMM is a useful tool to understand spontaneous planning behavior during a disaster. The Interview Respondents’ answers tend to indicate that they followed features of the model. This research has raised more questions than answers. Moreover, the study has generated questions and indicated some areas where more research is needed to advance further development in both spontaneous planning and IDMM. Therefore, examining the phenomenon and the decision-making model more could enrich emergency management field theoretically and professionally.
APPENDIX A

INTERVIEW INSTRUMENT GUIDE - SPONTANEOUS PLANNING
Thanks for accepting to be interviewed on the tornadoes that hit the Dallas-Fort Worth region on April 3, 2012. It was an event that caused tremendous damage in the region and fortunately, no live was lost. My name is Ekong Peters, a doctoral student in the Dept. of Public Administration and Management at the University of North Texas, Denton, Texas. The purpose of this interview is to collect data on your organization’s response to the April 3, 2012, tornadic incident for my dissertation and all information collected will be kept confidential.

- Please tell me your name, title, and the name of your organization.
- With regards to your organization, please tell me where and what you were doing when the tornadoes hit the region.
- How did your organization’s pre-event planning impact the response operations?
- What was/were the major problem(s) your organization was/were facing during and after the tornadoes?
- Where and when did you meet to address this/these problem(s) the first time?
- Who was/were involved in the planning process?
- What was said at the meeting and how did planning take place?
- How did the meeting help you coordinate and improvise?
- Were follow-up meetings necessary? If so, how often and were the same people involved?
- Please tell me if you met to plan your response to the tornadoes in more detail before swinging into action.
- While responding to the incident, did you have new information to deal with it? Please elaborate.
• Were all your activities as per plan before the tornado or did you need to improvise? If improvised, what process did you take to arrive at the improvisation? Please describe.

• Have you undertaken these processes before or was this the first time? Please tell me more about how you characterize this process.

• What were the merits of this type of planning to response activities?

• How would you alter this type of process you employed next time around?

• Is there a place for this type of processes in incident management? Please elaborate.

• During the incident, did responders have the freedom to make decisions to resolve unanticipated problems?

• How did past experience help you resolve the problems you encountered during the tornado?

• Was your response to the incident inventive, innovative and flexible? Please elaborate.

• Were you certain of the situation when responding to the tornado? How would you describe the situation? Was it what you expected? Please elaborate.

• Please describe and evaluate the environment you responded to; the environment the tornado touchdown or damage done. Did the environment need professional response or attention? If so, what type?

• Is there any other functional unit in your City you know that responded to the April 3, 2012, tornados which is important to this study that I should interview? If so, please give me the contact person and information.

• Please can you name any other three organizations that took active role in the incident?

• Please does the City have any official report on the tornado incident that can help me in this study? If so, can I have a copy?
• Please do you have any photograph of the tornado touchdown or damages I can use in my report? If so, I will need a written permission from you for its use. Thanks.

Thank you for taking part in this study. Please, I will like to have your e-mail address and telephone number in case I need to contact you for clarification during the interview transcription. I will also like to send the transcribed interview to you for your verification and validation.
APPENDIX B

CALENDAR OF MILESTONES
<table>
<thead>
<tr>
<th>Date Range</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2012</td>
<td>IRB application submitted</td>
</tr>
<tr>
<td>July 2012</td>
<td>Revised IRB application resubmitted</td>
</tr>
<tr>
<td>July 2012</td>
<td>IRB application approved</td>
</tr>
<tr>
<td>August – December 2012</td>
<td>Work on prospectus with the Supervisor (Prof. McEntire)</td>
</tr>
<tr>
<td>December 2012</td>
<td>Revised prospectus submitted to Supervisor</td>
</tr>
<tr>
<td>January 2013</td>
<td>More work on revising the prospectus to include Supervisor’s recommendations</td>
</tr>
<tr>
<td>February 2013</td>
<td>Incorporation of committee’s recommendations in the prospectus</td>
</tr>
<tr>
<td>March 2013</td>
<td>Final revision of the prospectus/defense; pre-interview letters sent out</td>
</tr>
<tr>
<td>March-April 2013</td>
<td>Data collection</td>
</tr>
<tr>
<td>May 2013</td>
<td>Apply for IRB extension</td>
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<tr>
<td>May-October 2013</td>
<td>Interview transcription/prospectus correction for dissertation</td>
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<tr>
<td>October 2013-April 2014</td>
<td>Data analysis/writing the dissertation</td>
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<tr>
<td>May 2014</td>
<td>Dissertation distributed to Committee members by the Chair</td>
</tr>
<tr>
<td>May 2014</td>
<td>Application for August 2014 graduation</td>
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<tr>
<td>June 10, 2014</td>
<td>Dissertation defense</td>
</tr>
<tr>
<td>June 2014</td>
<td>Edit dissertation to incorporate committee’s comment/submission to the Graduate School</td>
</tr>
<tr>
<td>August 2014</td>
<td>Graduation/Hooding ceremony</td>
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</tbody>
</table>
REFERENCES


McEntire, D. A. (2011). “What we’ve done continuously is to be anticipating what’s going to be needed and to do what needs to be done.” Manuscript


Quarantelli, E. L. (2000). Disaster planning, emergency management and civil protection: The historical development of organized efforts to plan for and to respond to disasters. University of Delaware Disaster Research Center, Newark, Delaware.


Tierney, K. J. & Trainor, J. E. (2004). *Networks and resilience in the World Trade Center Disaster*. Center for Earthquake Engineering Research, University of Buffalo, Buffalo, NY.


