

2021

## Emergency Managers' Perspectives on Social Media Use for Situational Awareness During Disasters

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# Walden University

College of Social and Behavioral Sciences

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2020

Abstract

Emergency Managers' Perspectives on Social Media Use for Situational Awareness  
During Disasters

by

Teresa Anne Scott Hoggard

MPhil, Walden University, 2020

MA, University of Maryland, University College, 2015

BS, University of Richmond, 2011

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Policy and Administration

Walden University

February 2021

## Abstract

Emergency managers are responsible for protecting lives, property, and the environment. Decisions are made based on the availability of information provided to emergency managers from the disaster site. Communication between first responders and emergency managers is crucial for obtaining situational awareness for decision-making purposes during disasters. The purpose of this qualitative explanatory case study was to understand the perspectives of emergency managers regarding the use of social media in obtaining situational awareness and providing disaster-specific information necessary for emergency managers to make informed decisions during disasters. The theoretical framework for this study was based on Endsley's situational awareness model and Rowley's data, information, knowledge, wisdom hierarchy. Data were collected from semistructured interviews with 11 participants. The results of the 6-step thematic analysis revealed the disaster-specific information emergency managers need to make informed decisions, current situational awareness strategies, the perspectives of emergency managers regarding social media, and training gaps associated with social media and its use for situational awareness. Findings may be used to promote positive social change to improve the use of social media in disaster response operations that aid emergency managers in meeting response priorities, including protection of life, property, and the environment.

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## Dedication

To my parents, Dennis and Kathy, for allowing me to go for my dreams; my brother, Chris, for being so proud of me; and to my husband, Chris, for his continued support throughout this process.

To Brevet Lt. Colonel Alonzo H. Cushing for being a hero to someone who needed one while growing up. Your life was honorable, and death was truly heroic.

## Acknowledgments

I would like to thank God for giving me the determination and stubbornness to reach my goals despite multiple setbacks in life. There were times I questioned whether this was meant to be, yet You kept me going.

I would like to express my sincere gratitude to Dr. Gregory Campbell for his continuous support, patience, and motivation during my dissertation journey. I could not have asked for a better chair, advisor, and mentor to guide me in my academic journey. His positive encouragement and gentle push made this dream a reality. When there is a way, the will follows.

I would like to thank the members of my dissertation committee, Dr. David DiBari and Ian Cole, for their support throughout the process.

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## Chapter 1: Introduction to the Study

Emergency managers are responsible for protecting communities by coordinating, collaborating, and maintaining situational awareness during natural, human-caused, and technological disasters (Federal Emergency Management Agency [FEMA], 2017). To accomplish this task, emergency managers work in an emergency operations center (EOC). The emergency managers' role is to coordinate and collaborate with the first responders through the incident command system (ICS) working from the disaster site. First responders (police, fire, and emergency medical services) quickly assess the situation and provide a report to the incident commander. The incident commander, based on the information provided by the first responders, identifies the needs and the impacted population and provides a disaster situation report using portable radios. The disaster-specific information provided by the incident commander is crucial because it aids in the decision-making process between the disaster site and the EOC and is essential when developing disaster planning strategies and requesting additional needed resources. However, there are times when first responders are unable to provide information to emergency managers. As a result, emergency managers are unable to coordinate disaster planning strategies due to the lack of situational awareness, which impacts the decision-making process and the effectiveness of the disaster response operation.

When disaster-specific information is not available, emergency managers seek other methods of obtaining situational awareness, such as the mainstream media or 911 communications (Curnin, Owen, Paton, & Brooks, 2015). However, these methods have limitations. For example, mainstream media obtain information from reporters located at

the disaster site and from social media using posts by the public (Bouvier, 2019). In previous disasters, 911 lines of communications quickly became overwhelmed, and the public could not reach first responders (Pogrebnyakov & Maldonado, 2018).

Social media is a tool that emergency managers have to communicate with the public. Emergency managers have been successful in providing preparedness messages before a disaster and after when there is potential loss of life. However, emergency managers have not embraced the use of social media as a tool for obtaining situational awareness information during disasters (Plotnick & Hiltz, 2016), even though local officials seeking to identify the disaster's impact on the population and jurisdiction pressure emergency managers to gather information quickly.

Recent studies focused on the sporadic use of social media during disasters and recommended developing policies and procedures to include the use of social media (Luna & Pennock, 2018; Martínez-Rojas, Pardo-Ferreira, & Rubio-Romero, 2018). There is limited research on emergency management current situational awareness practices, as well as the procedures of obtaining situational awareness information from the disaster site when first responders are unable to provide information or when the communications infrastructure fails. Additional research is needed to understand the perspective of emergency managers regarding the use of social media as a tool for situational awareness and to determine whether the information provided by social media is useful for situational awareness during disasters that aids in the decision-making process (Pogrebnyakov & Maldonado, 2018).



Chapter 1 provides an overview of the study and the background concerning the ability of emergency managers to obtain up-to-date situational awareness when the incident commander is unable to provide the information that emergency managers need for the decision-making process. This chapter also includes the problem statement, purpose of the study, research questions, limitations of the study, and implications for social change. In addition, Chapter 1 contains the definition of terms, theoretical foundation, nature of the study, significance of the study, and a summary.

### **Background**

Disaster management and response are complex and require that the jurisdiction utilize the ICS structure. ICS is adaptable, flexible, and scalable, which is necessary for command and control during disaster response (FEMA, 2017). The incident commander is in charge of coordinating with first responders representing multiple agencies and organizations, as well as providing situational awareness information to the emergency manager working in the EOC (Reynolds, Michaels, & Spiess, 2017). The situational awareness information provided by the incident commander allows emergency managers to make decisions regarding coordination, requesting resources, documenting the disaster response effort, strategizing, and sharing the disaster-specific information with local officials, as well as internal and external stakeholders (FEMA, 2017). Emergency managers analyze and verify the information provided by the incident commander before making decisions. Communication between the disaster site and the EOC is essential for maintaining accurate situational awareness during a disaster (Simon, Goldberg, & Adini, 2015). However, a no-notice catastrophic disaster is more likely to destroy the

communications infrastructure, which will prevent the incident commander from communicating with the EOC (Wukich, 2015).

Social media is a communications tool consisting of 23 platforms in which users can post and share information with others in real time (Hornmoen & Backholm, 2018). Two thirds of Americans use social media. Facebook, Twitter, and Snapchat are the most popular platforms for individuals between the ages of 18 and 29 (Alhasbash & Ma, 2017). As the popularity of social media increases, so does the public's reliance on it as a means of obtaining information (Alhasbash & Ma, 2017). According to Pogrebnyakov and Maldonado (2018), the public expects first responders to use social media as a method of communicating during disasters. However, emergency managers see social media as a one-way tool for communicating with the public, which is evident in emergency managers' use of social media to provide the public with disaster-specific information. Emergency managers have not accepted the use of social media as a two-way method of communicating with the public or a tool for situational awareness gathering (Eismann, Posegga, & Fischbach, 2018; Luna & Pennock, 2018; Plotnick & Hiltz, 2016; Plotnick, Kushma, Hiltz, & Tapia, 2015). The use of social media by emergency managers for crisis communications strategies has been researched extensively (Cheng, 2018; Liu, Fraustino, & Jin, 2016; Rosham, Warren, & Carr, 2016). However, understanding emergency managers' perspectives on the use of social media and the best method of incorporating social media into disaster response strategies to obtain situational awareness during disasters is a subject overlooked by scholars

(Eismann et al., 2018; Luna & Pennock, 2018; Plotnick & Hiltz, 2016; Plotnick et al., 2015).

### **Problem Statement**

Emergency managers have the responsibility of protecting lives, property, and the environment. Decisions are made based on the available information provided to emergency managers from the disaster site. Communication from the disaster site between first responders and emergency managers is a crucial component of obtaining situational awareness for decision-making purposes during disasters (Simon et al., 2015). For the current study, the definition of disasters includes no-notice natural, human-caused, or technological incidents. The problem this study addressed was the lack of knowledge regarding current situational awareness strategies used by emergency managers and whether social media is a useful tool to utilize during disasters to obtain critical disaster-specific information. When disasters occur that cause catastrophic damage, gathering information from the disaster site will take time until the first responders can assess the situation and identify the immediate needs of the first responders and the public (Wukich, 2015). When minutes count, emergency managers need to find another method of obtaining up-to-the-minute disaster information that aids them in the decision-making process. Social media is a tool that emergency managers have to communicate with the public before and after disasters. However, social media is not used consistently during disasters to obtain situational awareness for emergency management.

Emergency managers see social media as a one-way flow of information for the sole purpose of providing the public with disaster preparedness and immediate emergency messaging rather than a two-way flow with an opportunity of obtaining information from the public (Reuter & Kaufhold, 2018). Reuter and Kaufhold (2018) evaluated the use of social media in disasters. However, the data pertained to social media communication with the public before and after disasters, not during a disaster to obtain situational awareness. The use of social media during disasters to obtain situational awareness for the decision-making purpose is an example of the situational awareness model (Endsley, 2019), and the data, information, knowledge, and wisdom (DIKW) hierarchy theoretical framework (Yusof, Zakaria, Zainol, & Ananthan, 2018). Emergency managers have been slow to incorporate social media for obtaining situational awareness during disasters. Researchers have identified barriers that prevent emergency managers from utilizing social media (Eismann et al., 2018; Plotnick & Hiltz, 2016; Plotnick et al., 2015). However, emergency managers' perspectives of social media as a tool for obtaining situational awareness that aids in the decision-making process during disasters, current strategies of obtaining situational awareness, or policies and procedures that may prevent the utilization of social media by emergency managers for situational awareness had not been identified (Eismann et al., 2018; Luna & Pennock, 2018; Martínez-Rojas et al., 2018; Plotnick & Hiltz, 2016; Plotnick et al., 2015; Takeda, Jones, & Helms, 2017). The current study addressed the gap in the literature regarding emergency managers' perspectives on social media and its potential to obtain updated situational awareness during disasters, as well as current situational awareness strategies.

This study may provide a better understanding of emergency managers' perspective of social media and its role in obtaining situational awareness during disasters and providing disaster-specific information necessary for emergency managers to make informed decisions during disasters.

### **Purpose of the Study**

The purpose of this qualitative explanatory case study was to understand the perspectives of emergency managers regarding the use of social media and its role in obtaining situational awareness and providing disaster-specific information necessary for emergency managers to make informed decisions during disasters. Eismann et al. (2018); Neely and Collins (2018); and Haataja, Laajalahti, and Hyvärinen (2016) documented that a gap existed in the literature regarding the reason why the emergency management field was slow to incorporate social media into its situational awareness strategy. The current study addressed this area of emergency management situational awareness strategies.

### **Research Questions**

The research questions for this explanatory case study were the following:

RQ1: What are emergency managers' perspectives of social media as a tool for obtaining situational awareness during disasters?

RQ2: How does disaster-specific information required by emergency managers improve the ability to make informed decisions?

RQ3: How, if at all, does social media provide the information that emergency managers need during disasters?

## **Theoretical Framework**

Two theoretical frameworks were used to explore situational awareness and the decision-making process used by emergency managers and the incident commanders: Endsley's (2019) situational awareness model and Yusof et al.'s (2018) DIKW hierarchy. The situational awareness model emphasizes that leaders must have an understanding of a situation through perception, comprehension, and projection before making decisions (Endsley, 2019). Similarly, the DIKW hierarchy emphasizes the leaders' need to make informed decisions based on a process of converting the data into useful information and analyzing it against knowledge and wisdom (Frické, 2019). The frameworks provided guidance on the decision-making process. Although Endsley held that the building blocks of the decision-making process include perception, comprehension, and projection of a situation, Dammann (2018) argued that previous knowledge and wisdom, in addition to converting data into actionable information, were necessary before leaders make informed decisions. The two theoretical frameworks that emergency managers can use when seeking to assess disaster-specific information are the situational awareness model and the DIKW hierarchy. When information is received, especially from social media, emergency managers must analyze the information to determine its validity before it is applied to the decision-making process for effective and efficient response operations.

## **Nature of the Study**

For this study, I used a qualitative case study design, which was appropriate because the focus was on a phenomenon and in-depth and intensive data analysis (see Pacho, 2015). Qualitative research was the appropriate methodology to explore the

perspectives of emergency managers regarding the use of social media, and whether it is a tool that would provide emergency managers with the information necessary to make decisions during disasters. I focused on current situational awareness strategies and how the use of social media would impact the decision-making process of emergency managers during disasters.

The population for this study included local or state emergency management professionals who worked within the Commonwealth of Virginia, had experience working in the EOC during large-scale disasters, and possessed a solid knowledge of the national incident management system and the ICS. For a case study, the recommended sample size is 25-50 participants (Gentles, Charles, Ploeg, & McKibbon, 2015). Patton (2015) suggested a sample size of 15, Yin (2018) on the other hand, did not provide a specific number for a case study. Based on these recommendations, I determined that the sample size for the study would be 11 emergency managers to meet data saturation. Participants were interviewed using a self-developed interview guide based on the gaps identified in the literature review.

### **Definitions**

The following terms were used in this qualitative study:

*Emergency manager:* The person who coordinates the response operations, including advising and informing internal and external stakeholders, elected officials, and the public regarding emergency management activities during a disaster (FEMA, 2016).

*Emergency operations center:* A physical facility where the coordination of information and resources occurs to help support disaster response activities (Virginia Department of Emergency Management, 2015).

*Incident command system:* An incident management system that is mandated for responding agencies to use for all hazards regardless of the location, duration, or complexity (Jensen & Thompson, 2016).

*Situational awareness:* The perception of a situation as it relates to the environment, time and space, comprehension, and projection of the status in the future (Mohsin, Steinhäusler, Madl, & Kiefel, 2016).

*Social media:* Internet-based computer communication applications that allow users to create, share, and exchange content in real time (Hornmoen & Backholm, 2018).

### **Assumptions**

For this study, several assumptions guided data collection and analysis. The first assumption was that emergency managers could adequately respond to disasters using the situational awareness model and the DIKW hierarchy. The second assumption was that the participants would answer interview questions honestly. The third assumption was that the case study approach would be an appropriate method for data collection and analysis.

### **Scope and Delimitations**

I used two sources of data, which included interviews and documentation. The interviews indicated the perceptions of emergency managers regarding the use of social media as a tool for situation awareness, as well as current situational awareness



strategies, and whether social media could provide the information necessary to make decisions during a disaster. This qualitative explanatory case study focused on interviewing emergency managers who had experience working in EOC at the local or state government level during a disaster. The rationale for this group of individuals was that emergency managers are responsible for working closely with the first responders through the ICS structure. The first delimitation was excluding emergency management professionals who lacked experience working in an emergency operations center. Not all emergency management professionals have the same kind of knowledge and skills. For this study, the participants needed to have specific experiences to provide pertinent data. The second delimitation was the decision not to use the situational crisis communications theory (Van Rensburg, Coradie, & Dondolo, 2017) or the social-mediated crisis communication model (Wan, Koh, Ong, & Pang, 2015). I decided not to use the situational crisis communications theory or the social-mediated crisis communication model because they focus on how organizations respond to social media posts based on an organization's crisis communications plan rather than using the information to obtain situational awareness to develop disaster response policies. The third delimitation was the potential for transferability of the data results to other local or state emergency management organizations seeking to incorporate social media into current situational awareness strategies. Encouraging emergency managers to incorporate the results into situational awareness strategies may be a challenge. Because there was little to no data available from previous studies that assisted in incorporating social media as a tool for

situational awareness, the results from this study may provide emergency managers with recommendations.

### **Limitations**

Limitations are aspects of the study that are beyond the researcher's control. The first limitation was using a sample size large enough to meet saturation. When the sample size is too small, the researcher might not obtain in-depth results. The second limitation was using a self-developed interview guide for data collection. The self-developed interview guide contained questions that were identified as gaps in previous studies. The third limitation was the use of the case study approach for the research design to capture data-rich information on the phenomenon. The case study approach allows the researcher to use direct quotes from the participants.

One challenge was the fact that I work in the emergency management field, so I needed to ensure that there was a separation of my perspectives and opinions to prevent researcher bias. The second challenge was getting participants from the professional organization in which I am a member. In this study, I did not face any barriers regarding the data collection process or accessing the population for this study because of my membership with a professional emergency management organization. However, the data collection process took longer than anticipated because it occurred during the COVID-19 pandemic, which limited the availability of emergency managers to participate in this study.

### **Significance**

The purpose of this study was to fill a gap by focusing on the perspectives of emergency managers regarding social media as a tool for obtaining situational awareness that aids in the decision-making process during disasters. This research was unique because it addressed an unresearched area of the emergency management field that focused on utilizing social media to obtain situational awareness to make decisions (see Eismann et al., 2018; Plotnick & Hiltz, 2016). The results of this study may provide needed insights into emergency managers' situational awareness strategies and perspectives on social media as a tool for emergency managers to utilize during disasters. The study's findings may aid those in the emergency management field when developing situational awareness strategies to incorporate the utilization of social media during disasters. The emergency management field has a direct impact on social change as it relates to the public. Emergency managers' responsibilities include protecting lives, property, and the environment. Tasked with coordinating disaster response operations among multiple agencies (Curnin et al., 2015), emergency managers may include social media in their situational awareness strategies. However, there was a lack of understanding of how to incorporate social media into current situational awareness that would allow emergency managers to have the latest information about the disaster to meet the needs of the first responders and the public (Curnin et al., 2015; Pogrebnyakow & Maldonado, 2018). The findings from this study may provide emergency managers with guidance regarding incorporating social media into their situational awareness strategies.

## Summary

The use of social media by emergency managers should increase disaster-specific situational awareness. Initial situational awareness information provided by the mainstream media, 911 calls, or the incident commander fails to provide emergency managers with a complete common operating picture of the disaster. Endsley's (2019) situational awareness model represents the processes involved when making decisions. The DIKW hierarchy represents how the data are interpreted based on the decision-makers' experience and knowledge (Yusof et al., 2018). A qualitative explanatory case study design was the most appropriate methodology to understand the use of social media for situational awareness information during a disaster.

In this chapter, I introduced the disaster response operation concepts that emerged through the existing literature on social media, collaboration, communications, coordination, and maintaining situational awareness during disasters. Chapter 2 provides a literature review of research that related to the problem statement and research questions. The literature review also addresses the theoretical framework, which explains situational awareness and the decision-making process. The last section of Chapter 2 includes a summary of the positive and negative consequences of emergency managers' use of social media during disaster response efforts.

## Chapter 2: Literature Review

Emergency managers' priorities during a disaster include the protection of lives, property, and the environment. Decisions are made based on the available information provided to emergency managers from the disaster site. Communication from the disaster site between first responders and emergency managers is a crucial component of obtaining situational awareness for decision-making purposes during disasters (Simon et al., 2015). Gathering information from the disaster site will take time until the first responders arrive at the disaster site and provide immediate needs for the response operations (Wukich, 2015). When minutes count, emergency managers need to find another method of obtaining up-to-the-minute disaster information that aids them in the decision-making process. Social media is a tool that emergency managers have to communicate with the public before and after disasters. However, social media to obtain situational awareness has not been used consistently during disasters in the field of emergency management. The purpose of this qualitative explanatory case study was to understand the perspectives of emergency managers regarding the use of social media in obtaining situational awareness and providing disaster-specific information necessary for emergency managers to make informed decisions during disasters.

Emergency managers working in the EOC during a disaster rely on first responders to provide them with situational awareness information from the disaster site. First responders and the emergency managers use ICS for communications, coordination, and disaster response operations to maintain a common operational picture (Boersma, Comfort, Groenendaal, & Wolbers, 2014; Curnin et al., 2015). There are times when first

responders are unable to provide information through the ICS chain of command. As a result, emergency managers must rely on other methods such as mainstream media and 911 calls to obtain disaster-specific information (Pogrebnyakov & Maldonado, 2018). However, there are times when these methods are not available or fail to provide emergency managers with the disaster-specific information necessary to make decisions.

When standard methods of receiving information are not available, the emergency manager must seek information from other methods. Social media has become the public's first choice of communicating and seeking information during disasters. Emergency managers utilize social media as a form of one-way communication with the public before and after a disaster with emergency preparedness and recovery messages. When a disaster occurs, the public seeks disaster information from government agencies (Maresh-Fuehrer & Smith, 2016; Rosham et al., 2016). However, emergency managers have not integrated social media into disaster response operations for situational awareness (Eismann et al., 2018; Haataja et al., 2016; Luna & Pennock, 2018; Martínez-Rojas et al., 2018; Plotnick & Hiltz, 2016; Pogrebnyakov & Maldonado, 2018; Wukich, 2015). Researchers noted that the integration of social media into current situational awareness strategies will help emergency managers obtain disaster-specific information regarding an ongoing disaster and its impacts on the public (Martínez-Rojas et al., 2018; Pogrebnyakov & Maldonado, 2018; Simon et al., 2015; Stieglitz, Bunker, Mirbabaie, & Ehnis, 2018; Tapia & Moore, 2014). However, despite the popularity of social media use by the public, the emergency management field has not embraced social media for situational awareness.

The literature review in Chapter 2 presents the theories of situational awareness and the analysis of data for the decision-making process. This literature review includes a brief overview of the gathering of disaster-specific information through ICS and current situational awareness strategies employed by emergency managers operating out of the EOC. In addition, this literature review focuses on social media as a tool used by the public during disasters and the information made available by the public. Lastly, this literature review focuses on social media situational awareness strategies for emergency managers to integrate into disaster response operations. The chapter concludes with a summary of the literature and the implications of the study.

### **Literature Search Strategy**

The literature review includes peer-reviewed scholarly articles, professional websites, books, and federal government publications. The sources for the articles were Google Scholar and the Walden University library databases such as Emerald Insight, ProQuest Central, Sage Journal, Science Direct, and Thoreau multidatabase search. Extensive database searches consisted of the following keywords and phrases: *crisis communications, decision-making, disaster response, emergency management, incident command system, situational awareness, and social media*. The search yielded over 250 articles, and 110 were relevant to the study.

### **Theoretical Foundation**

The two theories used in this study were the situational awareness model and the DIKW hierarchy. Each theory contributed to the understanding of situational awareness and the data analysis process necessary for the decision-making process by emergency

managers during disasters (see Figure 1). Dionne, Gooty, Yammarino, and Sayama (2018) noted that certain factors impact the decision-making process, including emotions and multilevel issues from the individual and the team. The decision-making process for an individual consists of an assessment of the environment and using previous experiences (memory) to form situational awareness. The decision-making process for a group or team is similar to that of an individual. However, there are aspects of the decision-making process that the team must consider, such as an analysis based on the interdependencies of the group or team. During disaster response operations, rarely does the decision-making process occur between individuals face-to-face; rather, the process occurs among several individuals in an established hierarchy (Dionne et al., 2018; Jensen & Thompson, 2016). When emergency managers make decisions during a disaster, there are several factors considered, such as concerns for the safety of the public and first responders, collaboration with multiple partners, working under pressure with time constraints, and a focus to resolve issues or situations simultaneously that require an immediate response (Khorram-Manesh, Berlin, & Carlström, 2016). However, to make decisions, emergency managers need to incorporate situational awareness into the decision-making process.





*Figure 1.* The theories incorporated in disaster response.

### **Situational Awareness Theory**

Situational awareness is a common term in the emergency management field. However, the term was first associated with aviation during World War I as a reference to understanding an enemy's situation before the enemy could obtain situational awareness (Nazir, Colombo, & Manca, 2012). In terms of the disaster response operations, situational awareness refers to the knowledge about a disaster, which includes the latest information regarding hazards or other dynamics (Mohsin et al., 2016). Endsley (2019) developed a situational awareness model to improve the dynamic human decision-making process among members of aviation. Situational awareness is not only having an understanding of what has occurred within the environment as assessed by the individual, but also includes a combination of a high-level intelligence of current situational awareness and perception of future pertinent goals (Endsley, 2019).

The situational awareness model includes three levels of situational awareness, perception, comprehension, and projection. The first level is the perception of the

environment. The definition of perception is the ability of the individual to achieve an understanding of the status, particulars, and other relevant information of the environment. The second level is the comprehension of the current situation. The individual relies on the information obtained in the first level to comprehend and synthesize the current situation as it relates to the individual's goals. In the second level, the individual as a decision-maker processes the information to help form "a holistic picture of the environment" (Endsley, 2015, p. 20). The third level consists of projecting the near future status based on the knowledge and understanding obtained in the first and second levels. During the third level, the individual predicts the future status and anticipates the appropriate courses of action to achieve goals. Once the individual completes the third level, they will have a comprehensive understanding of the situational awareness within the environment to make clear and decisive decisions. Endsley (2019) argued that situational awareness is a critical element of the decision-making process. The situational awareness model provides an understanding of the situational awareness phenomenon and the attributes associated with each level. Individuals must complete each level before proceeding to the next to obtain a complete understanding of the situation and determine the best course of action.

An individual's ability to obtain a comprehensive understanding of a situation requires an evaluation of the situation. When evaluating a situation, individuals need to ask questions such as what has happened, why did it happen, how did it happen, and what else will happen. Reichenbach (2009) argued that situational awareness is understanding what has happened to take appropriate action. However, when there are gaps with the

information in the perception of the environment, comprehension of the information, or evaluation for future needs, the decision-making process is not as effective as it could be. When a disaster occurs, the decision-making process is critical for developing effective and appropriate response actions. Ineffective decisions and response operations not only put the lives and safety of the first responders in jeopardy but also can have devastating impacts on the public, community, and the environment.

Decision-makers rely on situational awareness to make decisions. Situational awareness is essential when teams work together for collaboration and coordination and maintaining a common operating picture during a disaster. When a complex disaster occurs with time constraints, there is a need for rapid and coordinated actions based on the shared perception of the team members (Seppänen & Virrantaus, 2015).

Uitdewilligen and Waller (2018) argued that when a disaster response operation includes personnel from multidisciplinary agencies, the sharing of information and rapid decision-making needs to be a regular occurrence. Weick, Sutcliffe, and Obstfield (2005) noted that disasters are complex and dynamic environments with substantial issues that first responders do not face regularly. During the disaster response, making sense of the information is vital for completing tasks and reaching goals and objectives.

### **Situational Awareness Theory and Emergency Management**

Situational awareness theory was appropriate for this study because it explains the process that emergency managers and first responders follow to make decisions as an individual or as a member of a team. Van de Walle, Brughemans, and Comes (2016) noted that during disasters, disaster response teams encounter a rapidly changing

environment. There is a need to understand the situation as quickly as possible despite a high level of uncertainty.

### **Data, Information, Knowledge, Wisdom Theory**

The origin of the DIKW hierarchy is uncertain. The first mention of the DIKW hierarchy was in 1955 by Boulding (as cited in Nitecki, 1985). Since then, there have been several adaptations of the DIKW hierarchy with its use associated with engineering, as well as computer and information processing (Rowley, 2007). However, it was not until 1989, when Ackoff, an organizational theorist, brought the DIKW hierarchy back into prominence when addressing the International Society for General Systems Research (as cited in Weinberger, 2010). Ackoff (1989) proposed that additional clarification was needed to understand the difference between data, information, knowledge, and wisdom. According to Ackoff (1989), the characterization of data is either objects or events in which the process of data is necessary to identify whether the data contain useful information. Information consists of descriptions and provides answers to the who, what, when, where, and how questions. Ackoff (1989) argued that knowledge answers the how questions, while wisdom is the information based on knowledge to include “exercise of judgment” (p. 170). The DIKW hierarchy was not initially popular.

Achoff’s (1989) DIKW hierarchy gained popularity and became widely utilized in textbooks when discussing the process for analyzing data. Rowley (2007) felt that the definition Achoff (1989) developed failed to articulate the process of data analysis clearly and needed refinement. Rowely (2007) argued that textbooks minimized and, in some cases, eliminated the role of wisdom within the process and believed that this was a

mistake. Instead, Rowley (2007) felt that wisdom was similar to knowledge within the data analysis process. Knowledge, Rowely (2007) argued, was the processing and organization of data and information based on the individual's understanding and experiences to support the decision-making process. Rowley (2006) summarized wisdom as an individual's ability to utilize the analyzed data and information to determine an appropriate course of action, consider the known situation, and examine ethical and social concerns. However, the DIKW hierarchy did not account for situational awareness in the data analysis process.

The DIKW hierarchy, to be effective in the data analysis process, requires taking into account situational awareness. Yusof et al. (2018) believed that the DIKW hierarchy needed modification to include situational awareness within the data analysis process. Yusof et al. (2018) argued that individuals' knowledge of past experiences, which influences wisdom, particularly their ability to choose right from wrong or good and bad, be included when considering current situational awareness information. Rowley's (2007) definition of knowledge included using an individual's experience, but not when considering situational awareness. Yusof et al. (2018) suggested combining Endsley's (1995) situational awareness model with the DIKW hierarchy, developed by Rowely (2007) to convert the data into more purposeful and useful information.

### **DIKW Theory and Emergency Management**

The DIKW hierarchy impacts this study because it explains the data analysis process, which begins with obtaining data and concludes with wisdom. The decision-maker takes appropriate actions. During the disaster response operations, information on

the disaster situation is better than no information, even if it is limited. Weichselgartner and Pigeon (2015) argued that emergency managers should focus on current challenges and anticipated future issues to minimize disaster risk during response operations.

Emergency managers accomplish this by monitoring the response efforts, assessing and understanding gaps, and needs, through the data analysis and sharing of the information among response personnel.

### **Disaster Management and FIRESCOPE**

Disasters have occurred throughout time. Disaster management is an essential element of disaster response. The management of disasters, in the past before the establishment of the emergency management field, was the responsibility of the community. Some disasters required additional assistance, and when this happened, Congress passed laws that allowed the federal government to assist. For instance, the first law was the Congressional Act of 1803 due to an extensive fire that occurred in a New Hampshire town (National Public Safety Transportation Council, 2019). As the population and communities began to grow within the United States, there was a need to establish a non-governmental organization to work on behalf of the federal government. The American Red Cross received its first congressional charter in 1900 to provide disaster assistance within the United States and globally (Red Cross, 2019). Previously, there was not an established disaster response operations process for first responders to implement during a disaster. However, this changed in the 1970s when California experienced an increase in the number of wildland fires, which required a standardized process for managing the fire response operations.

## **FIRESCOPE**

The first standardized process for managing fire response operations occurred in the 1970s, through the Firefighting Resources of Southern California Organization for Potential Emergencies (FIRESCOPE). FIRESCOPE helped streamline fire management among multiple response agencies due to devastating wildland fires in California. The concept of FIRESCOPE included a timely commitment of multiple resources and personnel, which operated and utilized a common operating structure and procedures (Chase, 1980). The organizational structure of FIRESCOPE consisted of five system functions, incident command, planning, suppression and rescue, logistics, and finance. Associated with these system functions were organizational characteristics, which included incident command, general intelligence, planning and support, and communications. Each of the functions had specific tasks that aided in the response efforts. The general intelligence function provided the incident commander with situational assessment data. Situational assessment, within FIRESCOPE, included the number, size, and location of the incident, progress of work by response agencies, and additional pertinent information helpful in the development or modification of response strategies. The situation status unit transferred the situational assessment through the operations coordination center. Over time, FIRESCOPE evolved into a new national incident management system to standardize disaster response among first responders and all levels of government.

## **National Incident Management System**

The National Incident Management System (NIMS), developed by FEMA, nationally standardized disaster response among first responders. NIMS included principles and methods for local, state, federal governments, private-sector partners, and non-governmental organizations to respond to and recover from disasters (FEMA, 2017). The implementation of NIMS resulted from the Homeland Security Act of 2002, which Congress passed after the attacks of 9/11, aided in the development of collaboration and coordination strategies among local, state, and federal agencies for counterterrorism incidents (Homeland Security Act 2002, 2002). The attacks on 9/11 proved that coordination and collaboration among local, state, and federal response partners was an issue. The National Commission on Terrorist Attacks on the United States (2004) found that radio interoperability among the responders interfered with collaboration and coordination of the response and prevented effective communication and situational awareness during the response and recovery efforts. As a result, incident commanders were unable to develop effective response strategies to manage the response or account for the first responders and the public's safety.

To aid first responders with developing effective response strategies, FEMA released the first edition of NIMS in 2004 to encourage local, state, and federal agencies to work together before, during, and after disasters and for planned events. NIMS consisted of three components: resource management, command and coordination, and communications and information management. NIMS ensured that regardless of the disaster complexity, scope or size, first responders used the same incident response

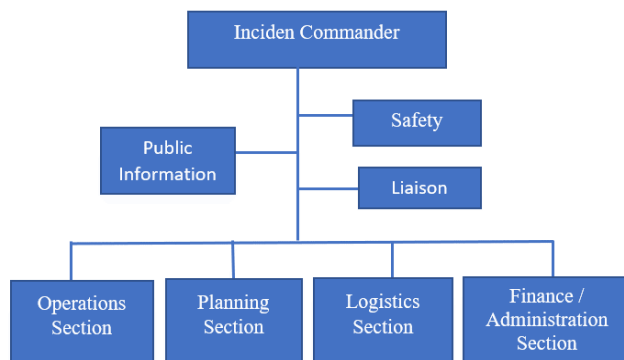


structure for managing disasters. Since its development, FEMA has updated and modified NIMS based on comments and feedback from first responders and emergency managers. FEMA modified NIMS based on changing laws, policies, and best practices from previous disasters with each update. The 2017 version of NIMS provided clarification regarding the relationship between ICS, the EOC, and local officials.

### **Incident Command System**

ICS provides a hierarchy for a standardized approach of the command, control, and coordination of on-scene responders during a disaster. ICS is designed to assist with accepting, tracking, directing, and supervising personnel representing multiple agencies and resources during a disaster response, as documented within NIMS (Stambler & Barbera, 2015). The most critical ICS component was the standardization of titles, roles, and responsibilities of the organizational structure. ICS included two functions: Command and general staff (see Figure 2).

The command staff consists of the incident commander, liaison, public information, and safety positions. The command staff provides critical support to the incident commander (Deal, De Bettencourt, Deal, Merrick, & Mills, 2010). For example, the liaison officer is the point of contact for both internal and external agency representatives that provide support for the incident. The liaison officer passes the information along to the incident commander. The public information officer (PIO)

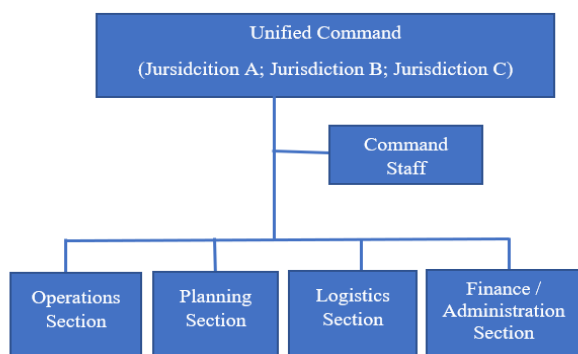


*Figure 2.* ICS command and general staff positions.

works with the incident commander and the news media to ensure that the information provided regarding the disaster is accurate and disseminated to the public. The safety officer ensures the safety of first responders and the public during response operations. The general staff consists of four sections: operations, planning, logistics, and finance/administration. The general staff tasks include ICS's functional aspects, such as coordinating response operations, collecting and documenting disaster status information, requesting additional resources, and recording personnel time and cost of the disaster (FEMA, 2017). The size, complexity, and severity of the disaster dictate the positions needed within ICS.

A small localized disaster would not require additional resources through mutual aid and require only one incident commander. For a complex disaster, in which more than one jurisdiction, organization, or agency assumes command or has the authority for the disaster response, there is a need for multiple incident commanders (Nowell, Steelman, Velez, & Yang, 2018). When this happens, the incident commanders work together to establish a unified command (see Figure 3). Under the unified command structure,

agencies designate individuals to represent them and work collectively to manage the actions and develop response strategies with the emergency manager working out of the EOC.



*Figure 3.* Unified command structure.

### **Emergency Operations Center**

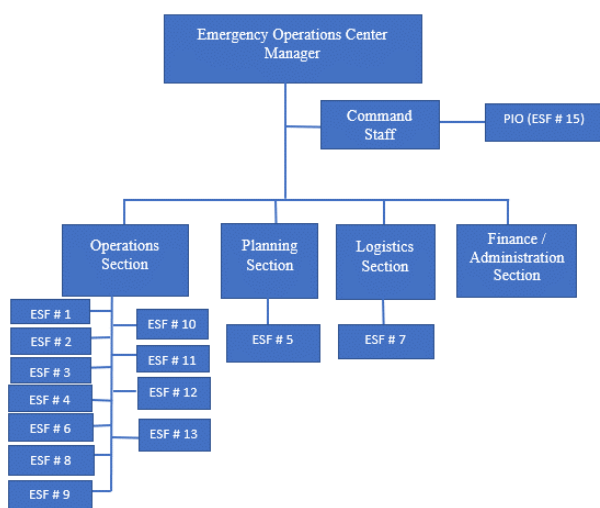
During a large-scale disaster, the incident commander provides periodic updates to the emergency manager, working out of the EOC. The EOC is a facility where emergency managers, agency representatives, and local officials work during a disaster. The EOC has the technology to aid emergency managers in coordinating disaster response efforts. With the aid of agency representatives and local officials, emergency managers set policies and objectives for the response and recovery operations (FEMA, 2017). Coordination during a disaster occurs when staff in the EOC work together to consolidate and exchange information to support the decision-making process. The decision-making process includes identifying, coordinating, and requesting resources and communicating with personnel at the disaster site. Rosland, Abdullah, and Omar (2019) documented how essential the EOC's role is during disaster response. The EOC staff is

responsible for ensuring the first responders have the resources that victims of the disaster need and the information to continue response activities. The EOC structure is either an ICS or ICS/emergency support function (ESF) hybrid. The ICS structure provides clarity of roles, similar titles and responsibilities, and clear communications between the disaster site and the EOC. The ICS/ESF hybrid structure provides another method to coordinate between the EOC and the incident command post. The agencies and resources are grouped into ESFs (FEMA, 2016). (see Figure 4). The 2017 version of NIMS provides guidance and recommendations regarding the process and procedures for the interaction between the disaster site and the EOC when collaborating, coordinating, and communicating during a disaster response.

### **EOC Process and Procedures**

The level of collaboration, coordination, and communication between the disaster site and the EOC depends on the complexity, severity, and size of the disaster. When a disaster occurs, first responders arrive on-scene to assess the situation. If the disaster is large or complex, the incident commander coordinates with the emergency manager and local officials in activating the EOC. Criteria for supporting the recommendation activation of the EOC include exhausting local resources (equipment or personnel). The disaster is large-scale or complex, the potential for loss of life to the first responders or the public. The response requires multiple operational periods (FEMA, 2019). While the first responders are busy responding to the disaster site, emergency managers begin the process of setting up and running the EOC. Emergency management staff sends out alerts and notifications to agencies and organizations, notifying them that the EOC is activated

and to provide staffing for the duration of the disaster (FEMA, 2019). Roslan et al. (2019) documented the importance of the organizational structure, leadership, and inter-agency representation within the EOC for effective and efficient disaster response. The EOC's activation and staffing provide another level in the NIMS collaboration, coordination, and communication process.



*Figure 4.* EOC ICS/ESF hybrid structure.

### **Disaster Collaboration, Coordination, and Communication**

Collaboration, coordination, and communication are essential elements of any disaster response, which is why NIMS and ICS are important for all first responders and emergency managers to understand and implement (FEMA, 2017). NIMS ensures that first responders within the United States utilize the same disaster management approach for responding to disasters. NIMS provides the guidelines on how personnel located at different geographic areas coordinate with each other and the EOC by incorporating ICS. Within ICS, there is an emphasis on having an appropriate span of control, which helps

ensure the disaster response's effectiveness and efficiency (FEMA, 2017). A manageable span of control consists of one supervisor responsible for five subordinates. Having a manageable span of control aids in the command and coordination aspects of any disaster response and provides situational awareness to the EOC.

The incident commander or unified command is responsible for the collaboration, coordination, and communication of the disaster during response operations and providing the EOC with updated situational awareness. The Nordic Societies of Public Health (2014) believed that coordination consisted of actions taken in unison. Coordination during a disaster response provides first responders with oversight of the disaster management operations and resources to meet the impacted population's needs. When there is a lack of collaboration, coordination, and communication among first responders, the results have devastating consequences to the population impacted by the disaster, leading to confusion, duplication of efforts, inefficiencies, and creating less effective response operations (Curnin et al., 2015; Jenson & Thompson, 2016; Nordic Societies of Public Health, 2014). Zade, Shah, Rangarajan, Imran, and Stabird (2018) identified that to have actionability in the disaster response, there is a need for quality information from the disaster site and other sources such as social media post to develop effective disaster response strategies. Stambler and Barbara (2015) conducted a study that documented shortcomings in the on-scene disaster ICS structure and determined that a gap existed in obtaining information necessary for future incident planning function even though the situation unit had the staff experience and knowledge to complete this task.

However, to develop future planning strategies, emergency managers and local officials require information from the disaster site to make informed decisions.

### **ICS Information Gathering and Sharing**

First responders provide information from the disaster site through appropriate channels within ICS. ICS uses a hierarchy that establishes a centralized command and control for the management of the disaster. The use of a hierarchical approach, in many cases, creates barriers and silos in terms of information gathering and sharing. For example, law enforcement during a disaster would focus on collecting evidence and conducting an investigation. Whereas fire and rescue personnel would focus on search and rescue and providing medical treatment. The incident commander, emergency manager, and local officials must align their goals and objects to have a common operating picture.

The goals of the incident commander, emergency manager, and local officials during a disaster response is to respond to the disaster efficiently, effectively and to ensure that the community has the resources it needs to recover. Successful disaster response requires sharing disaster-specific information among the agencies that have roles and responsibilities assigned to them during the disaster. Within the ICS structure, information is collected, analyzed, and shared by the situation unit. The situation unit is located at the disaster site, as well as within the EOC.

The disaster site situational unit is responsible for moving the response operations from a reactive to a proactive response while ensuring that everyone works together (Deal et al., 2010). The EOC situation unit functions at a strategic or coordinating level,

which focuses on developing or modifying plans to identify actions that would balance the strategic objectives based on current situational awareness (Sinclair, Doyle, Johnston, & Paton, 2013). The situation unit provides current disaster status and other relevant information to the emergency manager and local officials for the decision-making process. The situation unit, emergency managers, and local officials work together to identify future incident planning needs for multiple operational periods such as emergency declarations, evacuations, waivers to regulations, access to emergency funding, and establish local priorities for each operation period. The incident commander or unified command establish response priorities for actions to meet goals and objectives. However, none of this can occur without the gathering and sharing information between the disaster site and the EOC (Curnin et al., 2015). To make informed decisions, emergency managers and local officials require information from the disaster site. The process of information gathering and sharing links knowledge and fosters collaboration, coordination, and communication by encouraging response personnel to engage in interrelated actions and reevaluating their actions based on the current situational awareness (Comfort, Dunn, Johnston, Skertich, & Zagorecki, 2004). NIMS recommends establishing situational awareness and the ability to access and maintain lines of communication for this purpose.

### **Methods of Disaster Communications**

Communication during a disaster is one method of sharing disaster-specific information between the disaster site and the EOC. The National Emergency Communications Plan (FEMA, 2014) encourages emergency response personnel to



communicate and share information between all levels of government, jurisdictions, private-sector partners, and organizations by using any available means of communication. Effective communications enhance the decision-making process by stressing the need to share information and promotes collaboration, coordination and ensures the efficiency of response operations.

During a disaster, providing situational awareness requires a means to communicate with individuals that make decisions. First responders have several methods of communicating information among each other and with the EOC. The first method includes land mobile radio and wireless broadband infrastructure. Land mobile radios provide first responders with the ability to communicate time-sensitive and life-saving tasks and rapid voice call set-up, group calling capabilities, and guarantees priority access for the user (FEMA, 2014). The wireless broadband infrastructure is similar to the internet provided to the public. However, wireless broadband infrastructure provides first responders with faster speed and capacity, such as transferring large amounts of data anywhere and anytime. According to the FEMA (2014) examples of the wireless broadband applications accessible to first responders are video streaming, mapping and location-based services, and telemetry for transmitting patient vital signs.

In addition to the land mobile and wireless broadband infrastructure, some localities have access to cell or satellite phones that aids in the sharing of information between the disaster site and the EOC. Satellite phones function by using satellites to communicate. Unlike cell phones, which rely on cell towers to work, satellite phones do not require cell towers to work, nor are they impacted when the communications

infrastructure becomes damaged by a disaster. According to the Department of Homeland Security (2016) satellite phones must meet specific criteria such as communicating with other satellite communication devices and mobile phones and transmit the information either as voice or text. There are some limitations, which prevent first responders from using satellite phones, such as having clear and unobstructed line-of-sight with the sky and the inability to use them indoors unless positioned next to a window (Department of Homeland Security [DHS, 2016]). Disasters have the potential of destroying the communications infrastructure, which prevents communicating between the disaster site and the EOC.

Since 2000, several disasters have destroyed the communication infrastructure, which emergency managers and first responders relied on to communicate with each other. Notable disasters such as Hurricanes Katrina in 2005, Harvey in 2017, Maria in 2017, as well as the attacks on 9/11 are perfect examples of how vulnerable the communications infrastructure is to disasters, as well as the devastating impacts the lack of communications has on first responders and the impacted population. During 9/11, due to the nature of the incident, there was an increase in public safety demands and communications needs, which put a strain on the communications infrastructure (Kapucu & Haupt, 2016). Hurricane Katrina was so powerful that not only did it destroy thirty-eight 911 emergency call centers and disrupted local emergency services, but almost three million customers lost telephone service, as well as radio and television broadcast communications providers (White House, 2006). Robertson, Johnson, Murthy, Smith, and Stephens (2019) reported that Hurricane Harvey overloaded 911 systems in the areas

that it made landfall. Hurricane Maria damaged radars, weather stations, and cell towers in Puerto Rico when it made landfall on September 20, 2017 (De Arzola, 2018). The destruction of the communications infrastructure that first responders and emergency managers rely on hampers their ability to gather and share disaster-specific information that aids in the decision-making process. As a result, emergency managers are unable to obtain the much-needed situational awareness regarding the disaster.

### **Situational Awareness**

When a disaster occurs, the goal is to obtain situational awareness quickly so that first responders have an idea of what is happening. However, before the first responders can obtain situational awareness, they must deal with the chaos associated with the disaster by attempting to establish incident command. First responders face unfamiliar and hazardous work environment due to the scale of the disaster, size of the footprint of the area impacted, unpredictable work demands, all the while working under pressure to gather real time information about the disaster (Son, Aziz, & Peña-Mora, 2007). To respond effectively requires a quick and coordinated disaster response when there is little information available regarding the disaster. Bjerger, Clark, Fisker, and Raju (2016) argued that there would be a significant delay in the response's effectiveness due to a lack of information-sharing among the responders. A lack of situational awareness leads to mismanagement of resources, goals and objectives, and contributes to the loss of life of the impacted population.

A lack of situational awareness can have devastating consequences to first responders, the public and can lead to delays in obtaining the necessary resources to

respond to the disaster appropriately. Most importantly, a lack of situational awareness leads to the likelihood that the disaster response is uncoordinated with conflicted actions (Flin & Arbuthnot, 2017). The first responders' focus during the first 72-hours of a large-scale disaster includes responding to the disaster and providing services such as search and rescue, medical treatment, and evacuation of the area (Bjerge et al., 2016). Situational awareness is an understanding of what is happening to take an appropriate course of action (Pogrebnyakov & Maldonado, 2018). However, situational awareness is much more than understanding what is happening; it is also anticipating the needs of the first responders for the disaster response phase and for the community to recover from the disaster. First responders, through the incident commander and the EOC, work collectively to meet these needs. The purpose of situational awareness is to ensure a common operating picture exists among first responders and emergency managers that aids in the decision-making process.

For first responders and emergency managers to make appropriate decisions during a disaster, they need to have a common operating picture of the disaster. To obtain a common operating picture requires that first responders and emergency managers share situational awareness of the disaster (Sophronides, Papadopoulou, Giaoutzi, & Scholten, 2017). Individual situational awareness is paramount to ensure that decisions are made based on the disaster and in a timely manner. Team situational awareness is necessary for a team to work effectively during a disaster and requires that the members have the situational awareness they need to complete tasks assigned to them, which is why the sharing of information is essential (Waring, Alison, Carter, Barrett-Pink, Humann, Swan,

& Zilinsky, 2018). The information provided must meet the needs of first responders, emergency managers, and local officials. However, the sharing of information does not mean that everyone needs the information. Instead, the individuals that need the information to complete their tasks should have access to it. Seppänen and Virrantaus (2015) argued that inadequate or missing information hampers first responders' activities and put their lives in harm's way. More importantly, the potential exists for the failure in the disaster response's effectiveness and efficiency and the decision-making process during the disaster. Wukich (2015) identified that limited research is available, which documents social media use and its impact on reducing information silos among response agencies during disasters. Having a high level of situational awareness regarding the disaster allows for better inter and intra-organizational coordination and communication. Without situational awareness, the needs of the first responders, public, and community go unmet.

### **Disaster Response Impacts**

A disaster can have a devastating impact on the first responders and the public. When the need for effective or efficient response goes unmet, there is a potential of putting the lives of the first responders and public in danger. A challenge to any disaster response is obtaining accurate information regarding the disaster to identify the first responder and the public's needs. The gathering and sharing of situational awareness aids in determining the needs and the decision-making process when developing disaster response policies and strategies. When disaster-specific information is available, disaster response functions such as collaboration, coordination, and communication occur

effectively and efficiently. Son et al. (2007) believed that it is critical for coordination to provide information to first responders at the disaster site and those in position to make decisions. Coordinating and setting priorities is the responsibility of the incident commander, emergency manager, and local officials. The incident commander and staff in the EOC also must be aware of indicators at the disaster site that might affect or cause issues with the disaster response operations. For example, the incident commander's focus is establishing a common operating picture among first responders and the EOC, identifying the area with the most severe impacts, the impacted population and how many are affected, and the critical needs for response operations which includes providing life-saving measures.

When a disaster occurs, the public expects the first responders to provide life-saving measures, such as searching for missing family members and evacuating almost immediately following a disaster. Harris, McCarthy, Liu, Klein, Swienton, Prins, and Waltz (2018) found that the public viewed disaster response as a stand-alone obligation of local, state, and federal governments. However, disaster response involves collaboration, coordination, and communication, requesting additional resources from all levels of government, the private sector, and non-governmental organizations and developing response strategies. As a result, the disaster response operation becomes complex, requiring substantial planning to include in-depth strategies over multiple operational periods and reliable and redundant communications for the sharing of situational awareness (Cruz, Burger, & Keim, 2007). Without up-to-date situational

awareness, the disaster response has the potential to impact the community negatively, as well as delay the recovery process.

Situational awareness is essential for a community to recover from a disaster. However, there are instances when first responders and emergency managers face challenges that prevent the gathering and sharing of situational awareness during a disaster. Donahue and Tuohy (2006) argued that first responders and emergency managers had faced challenges from previous disasters regarding communications, impacting the effectiveness of collaboration, coordination, and communication. First responders and emergency managers rely on the communications infrastructure during a large-scale catastrophic disaster (Simon et al., 2015). However, disasters such as 9/11, Hurricanes Katrina, Sandy, Matthew, Harvey, Irma, and Maria have shown how susceptible the communications infrastructure is to disasters (The Heritage Foundation, 2018). As a result, first responders are unable to share information through standard communications methods.

Failure in sharing information among first responders and those in the EOC leads to uncertainty and a delay in the decision-making process (Waring et al., 2018). Disaster response requires first responders and the incident commander to collaborate, coordinate, and communicate their efforts with the emergency manager in the EOC. A lack of situational awareness creates problems for first responders and staff in the EOC when developing disaster response policies and strategies. Without accurate and timely situational awareness information, there are assumptions that decision-makers are required to make that might be incorrect in order to make decisions quickly.

## **United States Decision-Making and Disaster Policies**

Decisions during a disaster, in many cases, are made based on little to no information due to time restraints, which can limit the effectiveness of the disaster response. The problem is that disasters occur and evolve quickly. Conditions of a large-scale disaster are unpredictable. The demands on first responders create a stressful and dynamic work environment. Information collected by the first responders, in some cases, may not be the information needed to develop policies and strategic goals and objectives. Kapucu and Gatayev (2016) argued that decision-making in emergency management depended on the first responders' information through the appropriate chain of command. When the information fails to be useful during periods of time-sensitivity, improvisation and seeking alternative sources of information might not be an option for emergency managers. Failure to achieve situational awareness leads to poor decision-making and inadequate projection of future needs of the first responders and the community. Life-saving decisions, based on false or incomplete information, cause more harm than is necessary. Instead, the information provided should be credible (Haataja et al., 2016). Individuals that make decisions cannot delay the process.

Decisions, during response operations, are made in real time and as quickly as possible. Son et al. (2007) believed that first responders obtained situational awareness from direct observation based on past experiences and knowledge. However, not all first responders possess the same knowledge or experience necessary to provide helpful situational awareness to the incident commander (Curnin et al., 2015). For example, specialized responders possess specific skills and training that may lead to a



predetermined idea of the situation upon arrival at the disaster site, which unfortunately causes them to have blinders when obtaining a holistic overview of a disaster. According to NIMS (FEMA, 2017) the incident commander ensures that the information gathered by the first responders is available to the decision-makers. If situational awareness is not available from the disaster site, there is a likelihood that the disaster response will fail or fall short when developing policies or providing the level of response needed by the community.

Situational awareness is an essential element for any disaster response and is necessary for decision-makers to have when there is a need to develop plans, policies, or procedures. Roslan et al. (2019) documented the importance of sharing information between the EOC and the incident. When policies do not include new or emerging tools for situational awareness, the policies and procedures need to be updated. Nordic Societies of Public Health (2014) argued that the incident commander, emergency manager, and local officials made decisions based not only on the information provided to them by the first responders but also from 911 calls and the mainstream media.

During disaster response, the incident commander focuses on ensuring the needs of the first responders are met for life-saving measures, as well as gathering information regarding the disaster scene, such identifying if any hazards exist, directing first responders, and the status of the impacted population (Son et al., 2007). Emergency managers focus on understanding the severity of the situation, potential cascading impacts as a result of the disaster, immediate needs of not only the first responders, but also the community, and developing future planning policies and strategies (Bharosa,

Lee, & Janssen, 2010; Mirbabaie & Fromm, 2019; Roslan et al., 2019). The concern of the local officials is with the economic impacts of the disaster, the safety of the public, the rebuilding process, and political ramifications (Klomp, 2019). The information provided by the first responders helps the incident commander, emergency managers, local officials with the development of goals and objectives during a disaster response. However, having situational awareness strategies in place prior to a disaster is crucial for the initial stage of any disaster response and the decision-making process.

### **Current Situational Awareness Strategies**

Pre-identified situational awareness strategies that are in place prior to a disaster aids in the decision-making process. Developing situational awareness strategies depends on several key factors such as the type of disaster, demands of the response, choosing which response procedures to implement, and the community impacted. According to Flin and Arbuthnot (2017) standardized policies and procedures provide the best method for collecting, analyzing, and evaluating the best course of action. There are instances where predetermined situational cues, such as specific triggers or patterns related to disasters, are necessary for the decision-making process. However, some disasters require that the decision-maker use creativity when there are no other solutions that would successfully contain the disaster, and when time is of an essence. As a result, effective decision making requires that the decision-maker possess the ability to conduct a full situation assessment and comparison of previous disasters to determine an appropriate course of action.

**Disaster Site**

For decision-makers to make effective decisions, a full situation assessment needs to be conducted immediately once first responders arrive on the scene of a disaster.

Utilizing their ICS training, first responders assess the disaster situation based on initial perception, comprehension, and projection of what is currently occurring and provide an update through their chain of command (Pogrebnyakov & Maldonado, 2018). Flin and Arbuthnot (2017) believed that it is not the responsibility of the incident commander to work alone, but as a team. As a result, the incident commander must rely on the knowledge and experience of the first responders at the disaster site to evaluate the situation of the disaster correctly based on the first responders' observation.

First responders quickly assess the disaster situation and identify hazards associated with the disaster and resources (equipment and personnel) necessary for disaster response. The quality of the information gathered by the first responders may not meet the needs of the decision-makers. However, any information from the disaster site is better than missing or inadequate information (Seppänen & Virrantaus, 2015).

Information sharing during a disaster is necessary when the disaster includes multiple agencies involved in the response operations. The incident commander is responsible for ensuring that the situational awareness is shared among other first responders and with the EOC staff through the standard methods of communicating such as portable radios, cell phones, and through the 911 call center. If the critical infrastructure needed for communicating is damaged or overwhelmed, there will be a delay in the communications between the disaster site and the EOC (Curnin et al., 2015). Based on the disaster

situation, the incident commander and the emergency manager working with staff in the EOC begin determining resource gaps, the needs of the impacted population, and goals and objectives for the initial response operations. However, the most immediate role and responsibilities of the incident commander and the first responders during a disaster are saving lives, protecting property, and the environment.

### **Mainstream Media**

The immediate focus of the first responders during a disaster response is to save lives, protect property, and the environment. The role of the mainstream media during a disaster is to disseminate information regarding the disaster to the public. The mainstream media, before the age of social media, had been the primary source of disaster information that the public had available to them (Lowrey, Evans, Gower, Robinson, Ginter, McCormick, & Abdolrasulnia, 2007). During a disaster, the public immediately seeks information regarding what has happened, where, who is impacted, and will this disaster impact them (Greenberg & Scanlon, 2016). The mainstream media competes with competitors to air a disaster first and provide the public with information. Reporters attempt to exploit the situation to sensationalize the chaos associated with the disaster (Fernando, 2010). However, in many cases, the disaster scene is chaotic. For safety reasons, the reporter is not allowed to be close to the scene; because of this, the information provided by reports may not be as accurate.

For safety reasons, reporters are not allowed to be close to the disaster scene; they do not have specific information about the disasters. As a result, there are also times in which the mainstream media purposefully provides inaccurate and incomplete

information in a rush to beat competitors (Lowrey et al., 2007). The PIO provides the mainstream media with an approved briefing of the disaster and provides answers to the reporters' questions. (Ewart & McLean, 2018). At the same time, emergency managers working in the EOC are monitoring the media coverage in an attempt to obtain additional information that had not been provided by the incident commander. The focus of the media, on the other hand, is to report the news by interrupting and presenting the disaster event and phenomena based on the reporter's perception and comprehension of the situation and not necessarily from the experience, knowledge, and training perspectives of the first responders (Fernando, 2010). There are times in which news managers encourage journalists and reporters to generalize their coverage. In other cases, mainstream news sees their role as providing information to the public and a watchdog, in which the reporting is no longer passive (Lowrey et al., 2007). Unlike the first responders, the news media does not have the training to provide the level of situational awareness needed by emergency managers and local officials.

Disaster reporting from the mainstream media does not contain the same level of situational awareness that emergency managers and local official receive from first responders. However, the information provided by the mainstream media impacts the public perception of the disaster response. Because of this, the locality is forced to significantly change their level of response (Yan & Bissell, 2018). The information provided by the mainstream media also determines how the public process the information provided to them, which in many cases includes inaccurate and incomplete information. The mainstream media often sensationalize the disaster in an attempt to

attract viewers (Lowrey et al., (2007). Meanwhile, the public is forced to analyze the disaster information, determine if it is accurate and relevant to them, seek other methods of obtaining additional information, and request immediate emergency assistance.

### **911 Emergency Call Center**

The public analyzes the information they receive from the mainstream media to determine if the information is accurate, relevant to them, need additional information, and request immediate emergency assistance. 911 emergency call centers are a nationally instituted system that the public has access to during an emergency or disaster to seek assistance (Whalen & Zimmerman, 1998). The 911 dispatcher collects and codes the information provided by the caller to determine the nature of the emergency to dispatch the most appropriate first responder. There are specific procedures in place that the dispatcher must follow to obtain situational awareness of the emergency. Unlike first responders that obtain situational awareness once arriving on-scene of an emergency, 911 dispatchers obtain their situational awareness based on the information provided by the caller. Whalen and Zimmerman (1998) explained the importance of gathering as much information as possible from the caller because the information provided is passed along to the first responders. During a disaster, 911 emergency call centers are the first call that the public makes when seeking help (Cannuscio, Davis, Kermis, Khan, Dupuis, & Taylor, 2016). However, when a disaster occurs, 911 emergency call centers can quickly become overwhelmed, which prevents the public from getting the help they need.

911 emergency call centers are quickly overwhelmed or damaged when a disaster occurs; because of this, the public cannot get the help they need, which in some cases,

puts the public lives in harm's way. Not only does a disaster overwhelm 911 call centers' capability, but some disasters, such as hurricanes, severe flooding, and earthquakes have damaged the communications infrastructure that the 911 call centers depend on to operate (El Khaled & Mcheick, 2019; Kishorbhai & Vasantbhai, 2017; Timmons, 2007). The first responders working at the disaster site rely on information provided by 911 dispatchers to help with the disaster response. However, when there is damage to communications infrastructure, which prevents first responders and the public from gather and sharing information regarding the disaster, the disaster response is severely hampered. El Khaled and Mcheick (2019) argued that the communication infrastructure is essential for the disaster response activities and the public to obtain the help they need. When the public cannot get through to a 911 emergency call center, the public seeks another form of communicating their needs to first responders. Social media provides another method of communicating that the public utilizes during disasters.

### **Social Media**

When a disaster occurs that damages the communications infrastructure that prevents the public from reaching 911, the public seeks alternative methods of communicating their needs. One of the alternatives is social media. Social media is a computer-mediated communications tool, which is internet-based that allows users to create, share, and exchange information in real time (Hornmoen & Backholm, 2018). Many applications make up social media, such as Facebook, Instagram, Snapchat, Twitter, and YouTube (Hornmoen & Backholm, 2018; White, 2012). Each application has unique capabilities and functions. According to McIntyre (2014) social media first

evolved in 1969 when dial-up internet was still in its infancy, which created a need for online communication. In 1997, the first social networking site, SixDegrees.com, was created, which led to new social media sites such as MySpace, Facebook, and Twitter (McIntyre, 2014). Facebook, founded in 2004, allows people to create a community that brings people together. According to Facebook (2019) as of June 2019, there are an estimated 2.1 billion people that use Facebook, Instagram, WhatsApp, or Messenger. Twitter, founded in 2006, has 326 million users that, on average, create or share 500 million tweets daily, of which 80% of the users utilize the mobile app (Omnicores, 2019). The public, media, organizations, and all levels of government utilize social media as a form of providing and sharing information. Social media has become a vital tool in the emergency management field, especially related to disasters.

### **Public Use of Social Media**

Social media is a vital tool that emergency management utilizes in disasters. Natural disasters have occurred throughout history, and catastrophic disasters continue to occur with devastating impacts on not only the community and first responders but also the communications infrastructure. As a result, during disasters, the public seeks information from any communications method that is operational. During Hurricane Katrina, the communications infrastructure, such as 911 emergency call centers, first responders' portable mobile radios, cell towers, and landline phones, were inoperable, which prevented the public from successfully reaching out for assistance during the disaster (Cooper & Block, 2006). Although social media was still in its infancy during the time, approximately 8% of the population used social media during Hurricane Katrina



(Cohen, 2015). Social media, during disasters, allow users to find information out about family members, let others know that they are safe, request help from first responders, and to share information about the disaster (Bennett, 2014; King, 2018; Reuter & Kaufhold, 2018). Since Hurricane Katrina, the expectation is that the public will utilize social media during disasters when they are unable to get through to 911.

In many cases, during a disaster, 911 emergency call centers cannot handle the large call volumes associated with disasters. As a result, the public seeks other methods, such as Facebook or Twitter, to request help. During Hurricanes Harvey and Irma, the public turned to social media as a means to coordinate rescue for those trapped by floodwaters (King, 2018). Another example is the 2013 Boston bombing in which social media played a critical role in identifying and tracking the suspects (Davis, Alves, Sklansky, 2014). Turnoff, Hiltz, Bañuls, and Van Den Eede (2013) argued that social media posts would not be as useful in the collaborated effects in disaster planning or response. Instead, Turnoff et al. (2013), believed that for disasters related to riots or criminal activities, social media post would be more effective. Facebook and Twitter provided the public with another method of communicating their needs when the standard route of requesting assistance fails. Facebook realized that the public relied on their system during disasters, and in 2014, Facebook launched its safety-check tool (Seetharaman & Wells, 2017). The safety-check tool allows users to mark themselves safe during emergencies. The reliance of the public on social media in disaster situations encouraged the emergency management field to utilize social media, where in the past, there was not a need.

## **Emergency Management**

The emergency management field adopted social media as a means of reaching out to the public due to its popularity in disaster situations. According to Simon et al. (2015) the fact that the public used social media in previous disasters forced the emergency management field to evaluate the benefit of social media within their operations. The incorporation of social media by emergency managers for disaster has been a slow process. It depends on the jurisdiction's capabilities, staffing, and policies that determine the level of usage by the emergency management agency (Hiltz, Kushma, & Plotnick, 2014; Plotnick & Hiltz, 2016; Plotnick et al., 2015). Haataja et al. (2016), argued that emergency managers encountered difficulties when trying to adopt social media, which resulted in their inability to exploit the capabilities of social media fully as recommended by Plotnick et al. (2015). Emergency managers are reluctant to incorporate a new concept into their operations unless there is a benefit for them to do so, which is the main reason why the emergency management field had been slow in adopting social media despite the acceptance, popularity, and continued use of social media by the public.

## **Emergency Management Acceptance of Social Media**

The acceptance of social media by the emergency management field is slow even though the public continued to utilize it in disaster situations. Lindsay (2016) found that for the past ten years, social media had played a significant role in emergencies and disasters for both the public and private sectors. Despite this, not all emergency management agencies have a social media presence. Several factors that prevented

immediate acceptance of social media by emergency managers. The two most significant factors include lack of experience with social media, which creates issues with trustworthiness and information overload and limitations in staffing (Hiltz et al., 2014; Plotnick & Hiltz, 2016; Plotnick et al., 2015). Hiltz et al. (2014) documented that emergency managers felt that the lack of training and familiarity with social media was a generational issue. The majority of emergency managers were at the end of their careers. However, the perspectives of emergency managers regarding social media specifically as a tool for situational awareness was not addressed in the research conducted by Hiltz et al., 2014; Plotnick & Hiltz, 2016; Plotnick et al., 2015; Simon et al., 2015; Wukich, 2015. When there is a lack of understanding in terms of social media, there is a potential of mishandling the disaster or, worse, cause harm to the organization (Roshan et al., 2016). The issue with trustworthiness is a concern for emergency managers because missing or inaccurate information has the potential of doing more harm than good (Plotnick & Hiltz, 2016; Hiltz et al., 2014). According to Hiltz et al. (2014) governments prohibited the use of social media due to concerns related to the trustworthiness of the information.

The lack of trust occurs when the information on social media is not validated, which can cause more harm than good during disasters and is why formal policies and procedures are necessary when it comes to the use of social media (Lindsay, 2016). Roslan et al. (2019) argued that when an EOC used standard operating procedures or had established policies that contained the recommended methods of sharing information, the disaster response was more effective. There are some jurisdictions in which the policy for social media prohibits employees from using social media, and in others, provide specific

guidelines as to when employees may access social media and what constitutes as acceptable content for sharing with the public (Plotnick & Hiltz, 2016). However, Plotnick et al. (2015) noted that most of the policies established by jurisdictions prohibited emergency managers from collecting data from social media for situational awareness, especially during disasters. The ability to validate the information on social media requires resources such as trained staffing and time, which not all jurisdictions have the personnel available or time to analyze the data when responding to a large-scale catastrophic disaster. During a catastrophic disaster, the information available on social media would be quite extensive. Even if jurisdictions had had enough staff to cover social media, there would be too much data to handle when time is of the essence. However, due to the public's insistence on utilizing social media, there is an expectation that emergency response agencies use social media as well.

### **Emergency Management Social Media Benefits**

Because the public continues to utilize social media during disasters, there is an expectation that emergency managers should also have an active social media account. There are several benefits for emergency managers to utilize social media. One of the benefits is to assess the needs of the public when immediate life-saving situations occur during a disaster. Timely and essential disaster-specific information, such as current response activities, is much-needed and vital when it comes to the life-safety of the first responders, public, and the community. Wukich (2015) argued that such information provided to the public quickly is the difference between life and death. Social media allows emergency managers the opportunity for the rapid dissemination of critical

information. However, an untapped benefit that social media could offer emergency managers is achieving and maintaining situational awareness.

Social media provide emergency managers with the ability to search and solicit information from the public and, in particular, the population that is directly impacted by a disaster (DHS, 2014). Real time information while the incident is still unfolding aids in assessing the disaster situation and the needs of the public. Panagiotopoulos, Barnett, Bigdeli, and Sams (2016) documented that a need existed in understanding how the utilization of social media in conjunction with other established processes for planning is useful during disaster response. Lindsay (2016) agreed that in previous disasters, the information provided on social media aided in assessing victims and alerted the public and first responders of what had happened. In addition, social media could provide first responders and emergency managers with newly discovered threats and condition changes associated with the disaster. Social media provide users with access to open-source tools for searches using keywords, geographical locations, content, and trending topics, and popular hashtags (DHS, 2014). Using situational awareness would impact the overall effectiveness of the disaster response. Whereas, improved situational awareness enhances not only the quality of the information but the analysis and sharing of the information with those in a position of authority to make timely decisions are critical for local governments to maintain the health and safety of the community during a disaster (Brandy, Brookes, Brown, Brown, Perry, & White, 2013). The use of situational awareness for decision-making is significant for a successful response during a catastrophic disaster.

The use of situational awareness data by decision-makers during disasters is immensely beneficial to the success of the disaster response, for not only the first responders but for the public and community. Eismann et al. (2018) argued that social media provided emergency managers with content that had not been available before that included geographical information, pictures and videos, details of the disasters, as well as requests for help. Ernst, Mladenow, and Strauss (2017) argued that crowdsourcing and the use of information and communication technology, such as social media, provided emergency managers with another tool when seeking to validate disaster-specific information. Another benefit of utilizing social media for decision-making is the ability to use the information for generating predictions regarding resources, response strategies, as well as cascading impacts associated with the disaster (Castillo, 2016). Monitoring social media could provide emergency managers with additional information to create or modify existing goals and objectives. Intelligence gathering from the data available on social media could provide emergency managers with information that aids in the quick resolution of the disaster (DHS, 2014). Social media is not just about knowing what has happened or the population impacted. Instead, the emphasis is on the information available on social media to facilitate the decision-making process for efficient and effective disaster response (Brady et al., 2013). Wukich (2015) argued that the use of social media supported the sense-making process, which is vital to not only emergency managers but also first responders and local officials. Despite recent research that documented the usefulness of social media for situational awareness during disasters,

emergency managers have strong feelings and views regarding incorporating social media into their current situational awareness strategies.

### **Emergency Management Social Media Disadvantages**

Emergency managers have strong feelings and views on social media and its role in current situational awareness strategies. These opinions and views are the reasons why the emergency management field is slow in utilizing social media. Emergency managers believe social media is full of rumors with little to no opportunity to correct them during disasters. As a result, emergency managers do not trust the information posted by anyone other than official government social media entities. Social media does contain fake news; however, in many cases, it is not intentional. Plotnick, Hiltz, Grandhi, and Dugdale (2019) wrote that fake news posted by the public occurred because the user thought that the information was accurate. Fake news or incorrect information posted on social media is often the result of the jurisdiction's inability to meet the demand for information by the public. Inaccurate information on social media can exacerbate the disaster's impact on the public and disaster response (Luna & Pennock, 2018). DHS (2018) contributed false information to situations in which there is limited information available regarding the disaster, which causes rumors to begin rapidly. Besides emergency managers' concerns with rumors on social media, they still see social media as a useful tool for one-way communication during disasters.

### **Social Media Tool**

Emergency managers view social media as a one-way tool for them to utilize during disasters to provide emergency messages to the public quickly. Emergency

managers have used social media as a tool to disseminate disaster specific information before, during, and after a disaster (Lindsay, 2016). Social media is also a tool for community outreach and receiving concerns from the public concerning public safety and disaster preparedness topics. Eismann et al. (2016) documented that governments used social media to disseminate information. Most certainly not to engage in a dialogue with the public. For example, when there is a life-safety threat to the public from a disaster, emergency managers will provide alerts and notification using several alerting systems available to them and other methods such as social media. Neely and Collins (2018) documented that during a disaster, social media helped reduced the workload of first responders and emergency managers because social media allowed for immediate information available to the public and reduced the number of requests to the emergency management agency by the media and public. The position responsible for updating social media during a disaster is the PIO.

The PIO is responsible for gathering details regarding the disaster and disseminating the information to the media and the public. Correcting rumors and providing updates is also the responsibility of the PIO. According to NIMS and within the ICS structure, the PIO is not responsible for monitoring social media for situational awareness. Instead, it is the responsibility of the PIO to ensure that the public is kept informed regarding the disaster and response activities (Deal et al., 2010). Emergency managers have embraced social media as a tool for disseminating information to the public. However, the process for utilization of social media for situational awareness and



the position responsible for monitoring social media during a disaster continues to be an area in which emergency managers have been slow to adopt.

### **Potential Places for Social Media During Disasters**

Emergency managers have been slow to adopt social media because they are unsure of the best process of utilizing social media for situational awareness during a disaster or the appropriate position within the ICS structure that is the most qualified to do this. There are several possible positions within ICS that emergency managers could use for monitoring social media for situational awareness. Curnin et al. (2015) believed that the liaison officer would be an appropriate choice based on their roles and responsibilities assigned to this position within ICS. The liaison officer role is a go-between for the incident commander and interacts with agency representatives. Deal et al. (2010) wrote that the task of the liaison officer included management of concerns and issues raised by first responders and agency representatives during the response. Because the liaison officer has the role of gathering information from agency representatives, using the information for situational awareness purposes would not be an additional burden. However, a burden would exist in terms of monitoring social media for situational awareness in addition to the liaison officer's role of coordinating among first responders and agency representatives. The second position that could monitor social media for situational awareness during a disaster is the PIO.

#### **Public Information Officer**

The PIO is another position that could monitor social media for situational awareness during a disaster. Generally, the primary role of the PIO is to coordinate with

the media to provide information to the public (Lefever, Walter-Garcia, Hanson, & Smith-Easley 2018). To accomplish this, staff working in the joint information center gathers, verifies, and disseminates disaster-specific information in a timely manner. The purpose of the information provided by the PIO is to ensure that the public has the most current situational awareness of the disaster so that the public could make life-safety decisions. In addition to providing the media and public with up-to-date information, the PIO is also responsible for monitoring social media for inaccurate information and rumors that might be harmful to the public or first responders. Social media monitoring by the PIO is one method that helps prevent the sharing of false or inaccurate information (Eriksson 2018). Although the monitoring of social media is useful for rumor control, it does not mean that the PIO is an appropriate position to monitor social media for situational awareness. A PIO could monitor social media for situational awareness for a small-scale disaster, in which the data available on social media is minimal (Seppänen & Virrantaus, 2015). However, when the information available on social media is significant, and the disaster response requires a fast-pace resolution to meet the demands of the community, the PIO is not the appropriate position. As a result, the capability to successfully manage the gathering, analyzing, and predicting future planning needs of the first responders and the public from social media for situational awareness, requires a dedicated position within the ICS structure.

### **Situation Unit**

Within the ICS structure, the position that could successfully obtain situational awareness from the information available on social media is the situation unit. Within the

ICS structure, the location of the situation unit is under the planning section. During a disaster, accurate and timely information is critical for the success of the disaster response. Although first responders are required to provide situational updates through their chain of command, this does not mean that they have time to collect and analyze the data aggressively (Deal et al., 2010). The responsibility of the situation unit is to manage data received from multiple sources and analyze the data into useful information for decision-makers (FEMA, 2018). In addition to gathering information, the situation unit is also responsible for sharing the information with internal and external stakeholders. However, the role of the situation unit is more than just gathering and analyzing information. The situation unit is also responsible for the preparations of situational awareness summaries, development of projections and forecasts related to the disasters, and using geospatial information systems to produce maps and other visual documentation (FEMA, 2017; Lefevre et al., 2018). Disaster response operations require that decision-makers have the most current situational awareness in order to provide effective disaster response, which is rapid and coordinates life-safety activities.

Effective disaster response is critical for life-safety. As a result, the situational awareness information obtained needs to be of the highest quality, which is why the analysis and interpretation of the data received from outside sources require thorough vetting and verification from staff that has the knowledge and experience to perform this task (DHS, 2014; Pogrebnyakov & Maldonado, 2018; Seppänen & Virranatus, 2015; Wukich, 2015). Staff within the situation unit not only possess the knowledge and

experience but also receive additional training specific to their role within the ICS structure.

One training that the situation unit staff could have is the all-hazard position-specific situation unit leader, which is a five-day training course and was developed by FEMA. The training intends to ensure that staff in the role of situation unit leader have the essential core competencies required to complete the tasks assigned to this position (FEMA, n.d-a.). There are additional courses that would aid staff working in the situation unit, such as a course on situational awareness and another on the common operating picture (FEMA, n.d-b.; FEMA, n.d-c). Both of these courses provide individuals with the knowledge necessary to determine where and how to use reliable information for disaster response efforts and analyze the information to understand its usefulness for the decision-making process (FEMA, n.d-b; FEMA, n.d.-c). These courses play an essential role in the ability of situation unit staff, within the EOC, to obtain situational awareness during a large-scale catastrophic disaster where lines of communications and the ability to get disaster-specific information from the disaster site are not available.

### **Gaps Identified in Research**

The topic of social media in emergency management is a popular topic among researchers. The focus ranges from social media use before, during, and after disasters. In particular, the role emergency management has on providing alerts, notifications, and warnings to the public of an imminent threat from a disaster. Gaps in research exist in terms of emergency managers' perspectives on the use of social media for situational awareness, current situational awareness strategies, and identifying the best method of

incorporating social media into current situational awareness strategies for the decision-making process during a catastrophic disaster.

A current situational awareness strategy aids in the effectiveness and efficiency of the disaster response. Takeda et al. (2017) identified the need to develop strategies for sense-making to include resources and tools that would aid in the decision-making process to include current disaster situation, needs assessment, and contain relevant information. Lefevre et al. (2019) identified a need in which during a disaster, emergency managers should monitor social media as a means to obtain insights not available through standard procedures. Plotnick et al. (2015) agreed that emergency managers lacked official guidance in analyzing, evaluating, and identifying useful information available on social media during disasters. Whereas, Kim, Bae, and Hastak (2018) documented the need that emergency managers should monitor social media during disaster response to quickly gather information due to how rapidly a disaster situation changes. Stieglitz et al. (2017) stated that there is a need to understand better how social media could be effectively analyzed, adapted, and incorporated into the decision-making process. In terms of the decision-making process, Eismann et al. (2018) identified that emergency managers would benefit from the utilization of social media information but should make sense of the information available on social media during disasters. Panagiotopoulos et al. (2016) confirmed a need to integrate social media into future planning needs during a disaster. The gaps identified by the researchers mentioned above have also identified that the emergency management field acknowledges that social media is a tool available to them.

This qualitative explanatory case study attempts to document standard operating procedures for the collaboration, coordination, and communication required to obtain situational awareness during a disaster and the benefit of social media as a tool in developing response strategies and determining future response needs. Luna and Pennock (2018) reported a gap that strategies fail to leverage social media content for decision-makers to utilize during disaster response. Whereas, Simon et al. (2015) reported that a need existed to utilize social media during disasters to obtain critical information when there is a need for a rapid assessment of the situation is necessary. Haataja et al. (2016) agreed that social media would be beneficial in terms of situational awareness and to develop efficient strategies for saving lives, protecting property, and the environment. This study documents various situational awareness strategies available to emergency managers during a disaster and the benefit of social media as a tool that would provide emergency managers with additional information regarding the disaster when information is limited or unavailable from the disaster site.

### **Summary**

Emergency managers working in the EOC during a disaster rely on first responders to provide them with situational awareness information from the disaster site. This literature review included an analysis of the theories of situational awareness and the decision-making process (Achoff, 1989; Endsley, 2019; Rowely, 2007; Yusof et al., 2018). The literature review consisted of three sections that included a synthesis of the processes and procedures that first responders and emergency managers use in obtaining situational awareness during a disaster (Deal et al., 2010; FEMA, 2017; Pogrebnyakov &

Maldonado, 2018; Seppänen & Virantaus, 2015). The literature review also focused on social media as a tool the public uses to obtain disaster-specific information during response operations (Benett, 2014; Davis et al., 2014; King, 2018). Lastly, the literature review also included social media situational awareness strategies for emergency managers to integrate into disaster response operations (Curnin et al., 2015; Lefevre et al., 2018; Seppänen & Virantaus, 2015). The results of the current study would address gaps in the literature by examining emergency managers' perspectives regarding social media as a tool for obtaining situational awareness that would aid in the decision-making process during a disaster.

In Chapter 2, I conducted a literature review of disaster response operations, social media use, and situational awareness role in the decision-making process. I also addressed the gap in the literature regarding the lack of policies, procedures that incorporate social media into current situational awareness strategies. In addition, this qualitative explanatory case study also addressed why emergency managers do not use social media for situational awareness because official guidance does not exist that identified the best method of incorporating social media into current situational awareness strategies. The implication of this study on social change was emergency managers' ability to obtain disaster-specific situational awareness information quickly that enabled them to make an informed decision during disasters to respond effectively and efficiently to ensure life-safety, protection of property, and the environment when catastrophic no-notice disaster occurs. Chapter 3 provides an overview of the research methodology, rationale for using the explanatory case study approach, participants, data

collection procedures, and instruments. The last section of Chapter 3 includes an overview of the data analysis, ethical considerations, trustworthiness, credibility, and research bias for this study.



## Chapter 3: Research Method

The purpose of this qualitative explanatory case study was to understand the perspectives of emergency managers regarding the use of social media and its role in obtaining situational awareness, as well as identifying disaster-specific information necessary for emergency managers to make informed decisions during disasters. Eismann et al. (2018), Plotnick and Hiltz (2016), and Plotnick et al. (2015) documented that emergency managers are slow to incorporate social media and have not used the information provided through situational awareness during disasters as part of emergency managers' decision-making process. Eismann et al. (2018), Luna and Pennock (2018), Martínez-Rojas et al. (2018), and Takeda et al. (2017) identified the need to understand emergency managers' perspective regarding the use of social media as a tool in obtaining situational awareness that aids in the decision-making process during disasters.

Chapter 3 includes an overview of the qualitative research design and rationale, methodology for the explanatory case study, appropriateness of the design, and role of the researcher. Chapter 3 also contains an overview of the participants, data collection instruments, instrument reliability and validity, and data analysis strategy. Lastly, Chapter 3 addresses trustworthiness and ethical concerns in the study.

### **Research Design and Rationale**

#### **Research Design**

The research design provided the methods and procedures that I followed when conducting this study. Moser and Korstjens (2017) described qualitative research as an investigation of a phenomenon to provide in-depth data that explain the phenomenon

from the participants' point of view. Qualitative research is an appropriate research method when the information is needed to understand the attitudes, preferences, or opinions of the participants (Hammarberg, Kirkman, & De Lacey, 2016). A case study is a research design that focuses on a group, organization, or phenomenon. A researcher uses a case study design when the purpose is to seek descriptive-rich data including direct quotes from the participants (Hancock & Algozzine, 2017). Grounded theory is another qualitative research design I considered for this study. Martin, Scott, Brennen, and Durham (2018) argued that the grounded theory approach begins with identifying concepts from the data. Once the concepts are identified, the researcher develop a theory based on the concepts (Tie, Birks, & Francis, 2019). For this current study, the focus was gathering the perspectives of emergency managers. An explanatory case study is a common research approach in which the goal is to obtain multiple perspectives, as was the case in the current study. An explanatory case study is useful when conducting a comparative study with a small group and there is a need to explain and describe a phenomenon in detail (Hancock & Algozzine, 2017). To understand emergency managers' perspectives regarding the use of social media as a tool for situational awareness during a disaster, I used an explanatory case study approach. The research questions for this explanatory case study were the following:

RQ1: What are emergency managers' perspectives of social media as a tool for obtaining situational awareness during disasters?

RQ2: How does disaster-specific information required by emergency managers improve the ability to make informed decisions during disasters?

RQ3: How, if at all, does social media provide the information that emergency managers need during disasters?

### **Rationale**

Emergency management research depends on qualitative studies that include semistructured interviews consisting of open-ended and follow-up questions to identify strategies and best practices rather than relying on disaster after-action reports that document areas of improvement (Arain, 2015; Sobelson, Wigington, Harp, & Bronson, 2015). Al Balushi (2018) argued that the benefits of semistructured interviews include data consisting of experiences and perceptions from the participants' point of view. To understand the perspective of emergency managers and why the emergency management field is slow to incorporate social media into situational awareness strategies during disasters required interviewing and collecting data from emergency managers who have a similar role but different levels of experiences working in an EOC.

To answer the research questions for this study, I developed an interview guide based on the gaps identified in the literature review. Semistructured interviews allow the participant to provide detailed answers to the questions and provide examples of past experiences (Manzano, 2016). The interviews, which are considered the standard form of collecting data from participants (Rahman, 2015) were conducted over the telephone instead of face-to-face. Drabble, Trocki, Salcedo, Walker, and Korcha (2016) pointed out that telephone interviews have challenges such as establishing a rapport with the participant and the inability to respond appropriately to visual cues. However, there are benefits in choosing to conduct interviews over the telephone, such as lower cost in terms

of travel time and expense and limiting response bias on the part of the interviewer (Rahman, 2015). Telephone interviews provide the participants with the flexibility to schedule a date and time convenient to them.

### **Role of the Researcher**

The role of the researcher is to identify and address a gap in the literature when conducting a study. The process of designing and developing a study allows the researcher to gather descriptive-rich data. For the current study, my role was to collect data by interviewing emergency managers who currently or had previously worked at the local or state government level in an office of emergency management within the Commonwealth of Virginia. I belong to two professional emergency management associations. I intended to recruit participants from one of the organizations. Many of the members I know as regional colleagues and peers and from attending training opportunities and professional conferences. Some of the members I worked with in my previous position with the Virginia Department of Emergency Management and in my current position as a deputy emergency management coordinator for an organization located in the Commonwealth of Virginia. However, in my current role, I was not in a position of authority and did not expect to have a conflict of interest when interviewing participants whom I knew or had worked with previously. I determined that interviewing individuals I knew would help because of an established relationship, making the participant feel comfortable to speak freely during the interview.

A concern with interviewing individuals within the field that I currently work was the potential for researcher bias, which was something that I wanted to limit. One

technique that I used was bracketing. Bracketing occurs when the researcher ignores personal beliefs, assumptions, or theories during the research process (Baksh, 2018). The bracketing technique I used in this study included bracketing in descriptive research. Bracketing in descriptive research requires the researcher to eliminate personal assumptions to capture the participants' descriptive meaning during the interview (Sorsa, Kiikkala, & Astedt-Kurki, 2015). During the interview, the focus was on the participants' data rather than imposing my beliefs to obtain a preconceived desired outcome of the results.

As an emergency management professional, I was interested in the benefits that social media would offer emergency managers during disasters. However, the emergency management field has not fully embraced social media for various reasons, such as outdated infrastructure, staffing, and training (Plotnick & Hiltz, 2016; Plotnick et al., 2015). Emergency managers have embraced social media use before and after a disaster. This has occurred because FEMA has provided guidance to emergency managers regarding how to write preparedness messages and encourage the use of social media to provide recovery information to the public (DHS, 2013). I believe there is an opportunity to use social media that aids in disaster response, especially when the communications infrastructures are down during a disaster. I have 9 years of experience working in the emergency management field for state and local governments. As a result, I explained the disaster response operations so that those unfamiliar with the emergency management field could understand the process. However, I refrained from pressuring the participants to agree with my opinion or judgment to prevent any researcher bias.

## **Methodology**

I used qualitative methodology to focus on the phenomenon, which was understanding emergency managers' perspectives regarding the use of social media and its role in obtaining situational awareness during disasters. The use of an explanatory case study design helps researchers describe and explain a phenomenon and identify common patterns and themes from the perspectives of the participants (Thomas, 2016; Yin, 2018). The participants in this study were emergency management professionals. I used a purposeful sample to conduct interviews that facilitated the gathering of in-depth data from emergency managers' perspectives. I selected participants who worked in the Commonwealth of Virginia and had at least 5 years of experience working in the emergency management field. I used a self-developed interview guide to conduct semistructured interviews, which consisted of open-ended, follow-up, and demographic questions. Hancock and Algozzine (2017) noted that semistructured interviews are the best choice when conducting case study research. I recorded the interviews, took notes, transcribed the interviews, and conducted data analysis to identify common patterns and themes.

### **Participation Selection Logic**

In a qualitative study, it is important to select appropriate participants to obtain descriptive-rich data results. The targeted population for the current study included emergency management professionals located in the Commonwealth of Virginia with positions in local or state government. Prospective participants had or previously held a position with the title of emergency manager, assistant emergency manager, deputy

emergency management coordinator, emergency management specialist, or emergency preparedness specialist. I reached out to an emergency management professional organization that promotes the emergency management field. The president of the organization and the board leadership provided me with a letter of cooperation (see Appendix A). The emergency management organization sent a recruitment email invitation on my behalf to its members seeking participants for this study. The recruitment email was an invitation to prospective participants (see Appendix B). The email included the topic of the study, the method of data collection, and the interview process. Individuals interested in participating in this study contacted me through email to schedule a time for the interview. On the day of the interview, I emailed the participants the informed consent form. The informed consent form explained to the participants that participation in this study was voluntary, and at any time in the process participants could cease participating in the study. Each participant was required to read the informed consent form and indicate consent to participate in the study by emailing the words “I consent” to me before I conducted the interview.

The sample method and size depend on the research design and methodology. Lobo, Moeyaert, Cunha, and Babik (2017) explained that for a robust internal validity of the outcome and external validity of the results, a case study should include “purposeful replication, randomization, and multiple participants” (p. 187). Using the purposeful sampling method increases the study's credibility and makes the sample size manageable (Patton, 2015). Another possible sampling method is convenience sampling, which consists of accessing the targeted population in terms of geographical location,

availability, or other cost-effective methods (Etikan, Musa, & Alkassim, 2016).

Convenience sampling was not an appropriate sampling method for the current study because the targeted population needed to have specific skill sets and experiences, which required the participation of emergency managers from multiple jurisdictions and representing local and state governments. I used the purposeful sampling method to meet the objectives of the study.

Purposeful is a sampling technique most often used in qualitative research. I identified and selected participants based on experience and knowledge to provide descriptive-rich data results related to participants' perspectives regarding the research phenomenon (Palinkas, Horwitz, Green, Wisdom, Duan, & Hoagwood, 2015). There were specific criteria that participants needed to meet to participate in this study, such as having worked in the emergency management field for a minimum of 5 years, which is enough time for an individual to gain enough experience and knowledge. If the participant did not possess a minimum of 5 years of working experience in the emergency management field, the participant must be a certified emergency manager (CEM) (IAEM 2019) an internationally recognizable certification or possess a state-sponsored emergency manager certification such as the Virginia Professional Emergency Management (VaPEM) (Virginia Emergency Management Association, n.d.). To obtain either the CEM or state-sponsored emergency management certification required that an individual have a minimum of 3 years of working experience within the emergency management field, have a baccalaureate degree, and attended 200-hours of emergency



management and general management training (IAEM, 2019; VEMA, n.d.). The sample size depends on the type of case study and how quickly data saturation occurs.

### **Sample Size**

For an explanatory case study, the sample size for participants depends on saturation. Researchers who rely on data collection interviews may have challenges reaching data saturation (Fusch & Ness, 2015). Data saturation occurs when no new data, patterns, or themes are obtained during the interview process (Moser & Korstjens, 2018). Fusch and Ness (2015) explained that data saturation occurred when sufficient information is available for another researcher to replicate the study when the researcher cannot attain additional information, and when the feasibility for new themes, patterns, and codes are not possible. Merriam and Tisdell (2006) explained that the number is irrelevant for purposeful sampling and is based more on when saturation has occurred. A small sample size fails to provide enough data to reach saturation. At the same time, a larger sample size provides an extensive amount of data that becomes too burdensome for one researcher to analyze. Patton (2015) recommended for a purposeful sampling; the size should include 15 participants, while Yin (2018) did not suggest a sample size. Fusch and Ness (2015) believed that the number of interviews is not a magical number, and to reach saturation requires that the researcher utilize the same interview questions on multiple participants. For this case study, I had a sample size of 11 participants. This size was manageable but also helped ensure that data saturation occurred.

## **Instrumentation**

In a qualitative study, the researcher is the primary instrument to conduct semistructured telephone interviews that will provide emergency managers' perspectives on social media and its role in obtaining situational awareness during disasters. I used a self-developed interview guide consisting of open-ended, follow-up, and demographic questions to answer the research questions (see Appendix D). Conducting semistructured interviews was the appropriate method of data collection for a qualitative explanatory case study because it provided an opportunity to ask specific open-ended questions while allowing for follow-up questions during the interview.

For this study, I conducted interviews over the telephone. Conducting telephone interviews requires that the researcher have the ability to pick up non-verbal cues that would be recognizable during an in-person interview through the art of active listening and observation (Farooq & de Villiers, 2017). Active listening is critical when the interviewer does not have visual cues to respond to appropriately. Farooq and de Villiers (2017) mentioned that a lack of visual cues might hinder the researcher's ability to collect descriptive-rich data. However, Farooq and de Villiers (2017) argued that the use of the telephone for interviews could be successful when the participants have experience and confidence with conversing on the telephone regularly. Drabble et al. (2016) mentioned that non-verbal cues include responding to the participant's tone of voice when providing narrative content. The non-verbal cues may also include pauses and hesitance in providing in-depth information. To ensure the data results' accuracy, I used a digital

recorder to record the telephone interview, took notes, and transcribed the interview for data analysis once the interview concluded.

### **Researcher-Developed Instrument**

For this study, I used a self-developed interview guide that aided in the data collection and analysis of emergency managers' perspectives regarding social media and its use for obtaining situational awareness during disasters. The self-developed interview guide was developed based on the gaps identified in the literature review. I asked three subject matter experts to evaluate the research and interview questions for the validity and reliability of the self-developed interview guide (see Appendix E).

The use of a subject matter expert panel established the validity and reliability of the instrument through the process of vetting the research questions and the semistructured, open-ended, follow-up, and demographics questions that I used during the interview. The subject matter expert panel included individuals with experience and knowledge of the emergency management field and the qualitative research methodology. The subject matter experts evaluated and determined the appropriateness of the research questions along with the semistructured, open-ended, follow-up, and demographics interview questions. Bolarinwa (2015) suggested that experts on the research topic should analyze the researcher-developed interview guide for content validity. However, Yin (2018) stated that internal validity is the appropriate design test for an explanatory case study and is conducted during the data analysis phase because it allows for pattern matching and explanation building. The three subject matter experts provided constructive feedback and recommendations for the self-developed interview

guide to obtain in-depth data from the participants. Reliability ensured that another researcher could replicate the study by following similar procedures (Marques, Camacho, & De Alcantara, 2015). However, with a case study, replicability is not possible. As a result, reliability will be demonstrated through the process of data triangulation (Yin, 2018). Triangulation occurs when the results are similar to previous research studies such as those identified by Eismann et al. (2018); Plotnick and Hiltz (2016); and Plotnick et al. (2015).

### **Data Collection**

The data collection included conducting interviews over the telephone that focuses on the phenomenon. I asked the participants open-ended questions to gather emergency managers' perspectives on social media, disaster-specific information needed for situational awareness, current situational strategies, and follow-up and demographics questions. Aspers and Corte (2019) argued that the focus of a qualitative research study is the interpretation, which relies on multiple data collection methods to obtain data results. The data collection included peer-reviewed scholarly articles, governmental recommend guidelines, and reports.

### **Procedures for Recruitment, Participation, and Data Collection**

I selected emergency manager participants using a purposeful sampling strategy to obtain a sample size of 11. The emergency management professional organization that I am a member of sent out a recruitment email on my behalf to seek participants for this study from its members. Individuals that were interested in participating in this study, and meet the criteria of having a minimum of 5 years of work experience in the emergency

management field or possess a CEM or a state-sponsored professional emergency manager certification, contacted me via email to obtain more information and to schedule a telephone interview. When a prospective participant reaches out to me, I provided them with a brief overview of the research topic, answered any questions the participant had, and found out if the participant was interested in participating in the study before scheduling the interview.

On the day of the interview, I sent each participant by email a copy of an informed consent form that contained information regarding participants' voluntary consent to participate in this study. Before starting the interview, the participant had to email the informed consent form back to me and the words "I consent" to the interview instead of a required signature. I conducted interviews with the participants over the telephone, which lasted no longer than 60 minutes. I took notes and digitally recorded the telephone interview. At the interview conclusion, I provided the participants with a debriefing that includes ensuring the confidentiality of the participants and steps for keeping the data and the data collection tools in a locked box. Immediately after the interview, I transferred the digital recording file to an encrypted external hard-drive and transcribed the interview. I uploaded the transcript of the interview and my notes into NVivo to conduct data analysis. NVivo provided me the ability to document word frequencies and detecting themes. Jackson and Bazeley (2019) mentioned that NVivo had the capability to conduct both a word frequency and a text search query. The digital recorder files, my interview notes (scanned into a pdf document), and transcripts were copied to an encrypted external hard-drive. I store the external hard-drive, digital

recorder, and hard-copies of my notes from the interviews in a lockbox at an undisclosed location. The use of the semistructured, open-ended interview questions allows for follow-up questions during the interview. However, I do not anticipate the need to have an additional follow-up with the participants once the interview is over.

### **Data Analysis Plan**

Once I completed the telephone interviews, I began the process of data analysis. The purpose of the qualitative data analysis is to examine, categorize, and draw a conclusion so that the data results are descriptive and provide in-depth perspectives from the participants (Twining, Heller, Nussbaum, & Tsai, 2017). Avenier and Thomas (2015) believed the data analysis must include the steps the researcher took so that another researcher may replicate the research study and obtain similar data results in the future. Yin (2018) argued that interviews enable the researcher to identify the how and why of the phenomenon and obtain perspectives from the participants. During the data collection process, I used a self-developed interview guide and the use of a digital recorder when I interviewed participants over the telephone. The use of a digital recording ensured the integrity, clarity, and credibility of the information during the transcribing process. Yin (2018) argued that the unit of analysis for a case study depends on the research design and the data collection process. Therefore, my qualitative explanatory case study strived to understand multiple emergency managers' perspectives on social media and its role in obtaining situational awareness during disasters. Yin (2018) and Thomas (2018) believed that the research questions must align with the case study design and methodology. The

focus of a qualitative research study is to understand the experience and perspectives of a population as it relates to a phenomenon.

For my study, I used NVivo software to upload, transcribe digital interview recordings, and conduct a thematic analysis to determine patterns and themes (Jackson & Bazeley, 2019). NVivo helped me organize and manage the data from the telephone interviews. I conducted the thematic data analysis manually within NVivo because the software does not reduce, identify groups or categories automatically (Jackson & Bazeley, 2019). NVivo is useful with identifying patterns, linking codes across a large amount of data, and creating graphical displays (Castleberry & Nolen, 2018). The use of a qualitative data analysis software, such as NVivo, will reduce the time it takes to analyze the data manually and entering into either Microsoft Excel or Word. NVivo is a useful tool when conducting a thematic analysis of qualitative data.

The thematic analysis allows the researcher to identify patterns and themes. The benefit of utilizing thematic analysis is the ability to identify patterns derived from the data, separating the data into themes, which helps with interpreting and making sense of the data (Maguire & Delahunt, 2017). The process to conduct a thematic analysis includes thoroughly reviewing the interview transcripts to become familiar with the data and allows me to take notes on my initial impression of the data. Once I was familiar with the data, I generated codes using the initial (open) coding process. Saldaña (2016) stated that for qualitative research data, initial coding is an appropriate first step in the data analysis process because it provides the researcher with a starting point to explore further. Theron (2015) explained that during the initial coding process, the researcher “breaks

down the data into distinctive parts” (p. 5). Once I completed the initial coding, I began the process of searching for themes among the identified codes. Nowell, Norris, White, and Moules (2017) noted that identifying themes occurs when the researcher combines the participants' ideas and experiences. Once completed, I incorporated the codes into much broader themes, which corresponds to the research questions (Maguire & Delahunt, 2017). The coding process stopped when I could not identify new codes, which was another step towards achieving data saturation. The final steps of the thematic analysis included reviewing and providing a definition for each of the themes. The writeup included the identification of the patterns and themes and an explanation of the data results.

I compared the patterns and themes from my study to those in previous similar studies for the purpose of data triangulation. If there were discrepancies between the results that I found and those in similar studies, I documented the findings. DiLoreto and Gaines (2016) recommended interpreting the discrepant findings because doing so might identify flaws in either the current or previous studies. Identifying and analyzing any discrepancies in the results provided readers with the ability to draw a conclusion regarding the discrepancies.

### **Trustworthiness Concerns and Issues**

The trustworthiness of the data results in this study was a concern for me as the researcher. Trustworthiness is associated with credibility, transferability, dependability, and confirmability (Kostjens & Moser, 2018). Hadi and Closs (2016) documented that for a qualitative research study, two specific strategies could be utilized to determine the



trustworthiness of the data results and include peer debriefing for credibility and providing descriptive-rich data results for transferability. Credibility is the assurance of the researcher that the results are truthful. Conducting peer debriefings was a strategy that I intend to use to increase the internal validity of findings and interpret my study's data results. Transferability refers to the researcher's ability to transfer the results to other contexts within the population of the study (Connelly, 2016). Tong and Dew (2016) argued that transferability occurs when other researchers utilize the results to develop theories or apply the results in other contexts. The hope was that the results of this current study would be useful in future studies related to emergency management coordination practices and situational awareness during disaster response. Dependability is a trustworthy strategy in which the researcher provides descriptive-rich data results of the findings to ensure the consistency and replication of the data results (Forero, Nahidi, De Costa, Mohsin, Fitzgerald, Gibson, McCarthy, & Aboagye-Sarfo, 2018). I provided descriptive-rich data results that aided in the explanation of the phenomenon. I kept an audit trail. The audit trail included a step by step process taken for this current study, such as the decision-making process, the development of the study, and the reporting of the data results. Confirmability is another step to test the trustworthiness of a study. It occurs when another researcher confirms the results of a study. Korstjens and Mose (2018) explained that the concern associated with confirmability is establishing and interpreting that the results originated from the data. I ensured that the results are from the participants and that I did not influence the results by inflicting personal bias by

spending a sufficient amount of time with the participants to document in detail the participants' experiences during the interview.

To ensure the trustworthiness of this current study, I conducted semistructured interviews by asking open-ended, follow-up, and demographics questions. I interpreted the results while maintaining neutrality without imposing my personal or professional views during the data analysis process. I provided descriptive-rich data that supported the transferability of the results. For this study, I kept a reflective journal that documents my decision-making process in terms of why I am conducting a qualitative explanatory case study, the sample size, and the data analysis process. The use of the reflective journal also provided me an opportunity to validate the decision-making process.

### **Ethical Considerations**

For this current study, I adhered to and complied with Walden University's Institutional Review Board (IRB) rules and requirements. Walden University IRB approval for the study was 03-25-20-0659103. The IRB ensured that the research met and adhered to federal regulations and ethical standards set forth by Walden University (Walden University, n.d-a). For this current study, I took precautions to follow the guidelines established by the IRB regarding the masking of partner organizations. The participants interviewed were over the age of 18 and not a member of a vulnerable population, as identified by Walden University IRB (Walden University, n.d.-b). Each participant received a copy of the informed consent form that identifies the intent of this study. Participation was voluntary. The participant may refuse to answer questions asked during the interview, and may stop participating in the interview at any time. I used a

lockbox to store the digital recording device, external hard-drive, transcribed notes, and hard copies of any additional documentation relating to this study to preserve the data results' confidentiality and integrity.

### **Ethical Concerns**

For this qualitative explanatory case study, the participants were emergency managers that work in local, state, or federal government level equivalent of an office of emergency management. The participants' position title included emergency manager, assistant emergency manager, deputy emergency management coordinator, emergency management specialist, or emergency preparedness specialist. I worked with a professional emergency management organization that promotes the emergency management field within the Commonwealth of Virginia. I am a member of the organization and know many of the members due to my previous position with the Virginia Department of Emergency Management and my current position as a deputy emergency management coordinator in a locality's emergency management office. However, in my current position, I am not in a position of authority. The participants were my peers within the emergency management field. A possibility exists that we may work together if a disaster impacts the whole state in which we work. However, I did not anticipate that there would be an ethical concern regarding my role and that of the participants.

My study does not contain identifiable or demographically recognizable information regarding the participants. I identified each participant as participant 1, participant 2, participant 3, and so forth. The data collection for this study would be in the

form of a semistructured interview over the telephone. Conducting telephone interviews allowed the participants to schedule a date and time that was convenient and in an environment that feels safe to the participant. If any of the participants decided not to continue with the interview, I would shut off the digital recorder and erase the file, deleting electronic files, and shred any hard copies of notes. I would also notify Walden's IRB office when this happens.

### **Confidential Data Protection**

I was responsible for ensuring the confidentiality and anonymity for each of the participants that I interviewed for this study. Thomas (2016) noted that confidentiality is respecting the wishes of the participants, being honest with them on the intent of the research, and minimizing the risk that might cause harm. The informed consent form documents the process of ensuring the confidentiality of each participant, as well as the procedures for safeguarding the data collected during the interview process, along with other files associated with this study in a locked box. I stored all digital and audio files on an encrypted external hard drive. I kept the hard drive in a locked box and housed the locked box in an undisclosed location. I ensured that the identity, location of employment, and other identifiable information provided by the participants would be protected. Once this study was completed, I scanned all documents that were not in a digital format into a file onto the encrypted external hard drive and kept it for a period of five years. All hard copies from the study would be shredded. Once the required record keeping for a period of five years is over, I would reevaluate the need to keep the files. If

I feel that the files might be needed in the future, I will continue to keep the encrypted external hard drive in a locked box.

### **Summary**

Chapter 3 contained an overview of the research design, rationale, and methodology for using a qualitative explanatory case study to understand the perceptions of emergency managers on the use of social media and its role in obtaining situational awareness during disasters. Chapter 3 contained the research questions, the targeted population, and the sample plan. Chapter 3 also included a description of the self-developed interview guide that I used for this study, the data collection and data analysis process, issues associated with trustworthiness, and ethical concerns of the participants. I provided an explanation as to why the use of a self-developed interview guide was an appropriate method of collecting data to obtain the perceptions of emergency managers to determine patterns and themes. Chapter 4 includes a comprehensive description of the data analysis process based on the information provided by the participants. Chapter 4 also includes the demographic characteristics of the participants, along with the patterns and themes that emerge during the coding process.

## Chapter 4: Results

Previous researchers identified barriers that prevent emergency managers from utilizing social media. The purpose of the current qualitative explanatory case study was to understand the perspectives of emergency managers regarding the use of social media and its role in obtaining situational awareness and identifying disaster-specific information necessary for emergency managers to make informed decisions during disasters. This study addressed the gap in the literature regarding emergency managers' perspectives on social media and its potential to facilitate acquisition of situational awareness during disasters.

This chapter contains the results of the qualitative explanatory case study conducted to answer the following research questions:

RQ1: What are emergency managers' perspectives of social media as a tool for obtaining situational awareness during disasters?

RQ2: How does disaster-specific information required by emergency managers improve the ability to make informed decisions?

RQ3: How, if at all, does social media provide the information that emergency managers need during disasters?

This chapter includes the research setting and demographics of the participants and the guidelines for data collection and analysis. The chapter also addresses the trustworthiness, results, and summary of the findings.

### **Research Setting**

Participants for this study were emergency managers who belong to an emergency management professional organization. The emergency management professional organization agreed to send out a recruitment email to its members on my behalf. Individuals had to meet specific criteria, including a minimum of 5 years of work experience in the emergency management field or either a CEM or state-sponsored emergency management certification. Individuals interested in participating in the study contacted me for additional information. Data were collected from participants through semistructured interviews.

The interviews were conducted over the telephone. Participants provided me with a date, time, and phone number for each interview. Interviews conducted over the phone gave the participants the ability to choose time and location, which promoted the participants' in-depth sharing of experiences and perspectives. Although face-to-face interviews would have provided me with nonverbal social cues, I used participants' tones and voice inflection for obtaining social cues when analyzing the data. The interview questions came from a self-developed interview guide that consisted of semistructured, open-ended, follow-up, and demographic questions and took 30-60 minutes to complete.

### **Demographics**

I interviewed 11 participants for this study. The participants included seven (64%) males and four (36%) females whose ages were one (9%) 21-30, three (27%) 31-40, four (37%) 41-50, one (9%) 51-60, and two (18%) 61-70. The level of education among the

participants varied; one (9%) had a doctorate, six (55%) had a master's, three (27%) had a bachelor's, and one (9%) had no degree.

The total years of experience in the emergency management field varied among the 11 participants. Participants with 25 or more years of experience represented 9% of the sample size. Participants with 11-20 years of experience represented 36%, those with 6-10 years of experience represented 46%, and one (9%) had less than 5 years of experience. All participants had experience working in the EOC for disasters that included natural and human-caused disasters. The demographics of the participants are displayed in Table 1.

Table 1

*Participant Demographics*

Demographic	Category	Number
Gender	Male	7
	Female	4
Age	21-30	1
	31-40	3
	31-50	4
	51-60	1
	61-70	2
Level of education	Doctorate	1
	Master's	6
	Bachelor's	3
	No degree	1
Years of experience	5 years or fewer	1
	6-10 years	5
	11-20 years	4
	25 years or more	1



### **Data Collection**

After Walden University's IRB approval was granted, I recruited participants and collected data from 11 participants who met the inclusion criteria. The primary source of data collection was 11 in-depth, semistructured interviews with individuals who were emergency management professionals. Members of the professional emergency management organization interested in participating in this study contacted me via email to schedule individual interviews. Before the interview, all participants reviewed the informed consent form and consented to participate in the study. I conducted in-depth, semistructured telephone interviews for each participant using a self-developed interview guide. At the time of the interview, I called the participant with the number provided by the participant. Before the start of the interview, each participant consented to the interview to be recorded. The interviews were recorded through the use of a digital recorder. The length of the interview was 30 to 60 minutes. The interviews were conducted over 4 weeks. There was no deviation from the data collection plan presented in Chapter 3. Additionally, there were no unusual circumstances in the data collection process.

### **Data Analysis**

After each interview was conducted, I used NVivo Transcription to perform a verbatim transcription of the data. I then compared the transcript with the audio-recorded interview to ensure accuracy and to become engaged with the data. According to Nasheeda, Abdullah, Krauss, and Ahmend (2019) a researcher becomes familiarized with the data by listening to the audio recording of the interview and reading the transcript

multiple times. After I transcribed the interviews, I imported them into a Word document to create a data set. A data set consists of data that helps the researcher answer the research question identified within a study (Zahle, 2020). The data set was uploaded into NVivo, where I coded by interview questions, case, and participants. Table 2 includes each interview question.

I used thematic analysis to analyze the data. There were six steps in the thematic analysis process. The first step required that I read and reread the interview transcripts to become familiarized with the data before coding them.

The coding process began when I conducted a cross-case analysis seeking commonalities in participants' responses. A cross-case analysis is used in a case study to identify comparisons of commonalities (Khan & VanWynsberghe, 2008; Ryan, 2012). From the raw data, I used open coding to identify initial codes. I identified phrases and sentences, which I labeled with a meaningful topic and placed them into parent and child nodes in NVivo, which became subthemes. I identified five themes and provided a definition for each theme. I compared the themes against the data to ensure that I captured the meaningful aspects of the data.

There were five themes identified: (a) informed decision, (b) situational awareness, (c) emergency operations center, (d) social media, and (e) training. Informed decision is the disaster-specific information that emergency managers take into consideration when making decisions. Situational awareness is the ability to identify, process, and comprehend critical information during a disaster. Emergency operations center is its role during disaster response and the coordination and data analysis process

Table 2

*Interview Questions*

Number	Question
Q1	What is your sex?
Q2	What is your age?
Q3	What is your highest level of education?
Q4	How many years of experience do you have working in the emergency management field?
Q5	What is your current position and title? What does that entail?
Q6	Do you have experience working in an emergency operations center (EOC)?
Q7	How many times have you worked in an EOC?
Q8	What type of disasters?
Q9	What position did you have in the EOC? What did that entail?
Q10	How does your department use social media during disasters and in what capacity? Why or why not?
Q11	What policies and procedures does your department have for the use of social media during disasters? Can you tell me about them?
Q12	How would you define situational awareness as it relates to disasters? Why is situational awareness important to emergency managers during disasters?
Q13	What specific information can be gleaned from social media to help improve situational awareness?
Q14	What type of disaster-specific information factor into your emergency manager decision-making process? Why are these types of disaster-specific information critical to the decision-making process?
Q15	How does your department's current situational awareness strategies during disasters enhance response operations? How are your department's situational awareness strategies different when there are disasters in which an on-scene incident command is utilized?
Q16	What do you think of the sufficiency of your department's current situational awareness strategies for obtaining information during a disaster?
Q17	If your department's standard operating protocol for obtaining situational awareness becomes unavailable, how does your department gather disaster-specific information?
Q18	In the EOC, what specific positions are responsible for obtaining situational awareness?
Q19	What are your department's processes for analyzing and validating the information you receive?
Q20	How, if at all, does social media access improve the quality of information that emergency managers need during disasters to make informed decisions?
Q21	What disaster specific information could emergency managers access using social media during disasters?
Q22	How does your department analyze and validate information data-mined from social media?
Q23	How does the information about situational awareness accessed from social media compared to the traditional method of fact-gathering information that your department gets through its standard methods of obtaining situational awareness?
Q24	What kind of skills, knowledge, and training would help emergency managers to utilize social media for situational awareness during disasters?

of the information received during a disaster. Social media is the issue with and its role during a disaster. Training is the available training for emergency managers and the type of courses emergency managers would like to have available. According to Saldaña (2016), the second coding cycle occurs when similar codes are grouped to create themes. I identified 16 subthemes. There were no discrepant cases. Table 3 details the themes and subthemes for emergency managers' perspectives on social media use as a tool for situational awareness during disasters.

### **Evidence of Trustworthiness**

Trustworthiness of the research study is important. Trustworthiness was developed at the start of the study and was maintained throughout the study. There are four requirements associated with trustworthiness: credibility, transferability, dependability, and confirmability. Credibility was established through the process of reflexivity, member checking, and peer examination. I kept a reflective journal in which I documented and validated my decision-making process regarding the research design and methodology, sampling size, and the data analysis process. I also used peer debriefing to validate the findings and interpretation of the data results.

Transferability of this study was established from the beginning by including a detailed description of the research process. I documented the research purpose, methodology, and process for data collection and analysis. I used purposive sampling to ensure participants provided relevant, valuable, and adequate information regarding the phenomenon. Dependability was established when I provided descriptive-rich data to explain the phenomenon and ensure the consistency and replication of the results. I

Table 3

*Summary of Themes and Subthemes*

Themes	Subthemes	Description	Sources (data sets)	References
Informed decision	Response priorities	The focus of response operations	1	9
	Disaster updates	Information from response personnel to assess the effectiveness of response efforts	1	19
Situational awareness	Resources	Identifying resource gaps and requesting necessary resources	1	10
	Importance	Updated information aids in the decision-making process	1	16
	Perception	The difference between perceptions of first responders and personnel working in the EOC	1	10
	Common operating picture	Obtaining a common operating picture helps to determine objectives and future actions	1	13
Emergency operations center	Sources	Who is responsible for providing disaster information	1	15
	Coordination	Ability to get information from response partners	1	20
	Data analysis	Use of trusted sources to validate the information	1	15
Social media	Role	EOC impacts the effectiveness of the response operations	1	19
	Policies	Current use of social media by emergency managers	1	11
	Strategic role	Ways social media could help enhance disaster response operations	1	16
	Concerns	Lack of social media implementation in disaster response operations	1	16
Training	Perception	Conflicting reports of disaster effectiveness and what the public posts	1	18
	Courses	Training available for emergency managers	1	7
	Gaps	Topics in which there are no training currently available	1	14

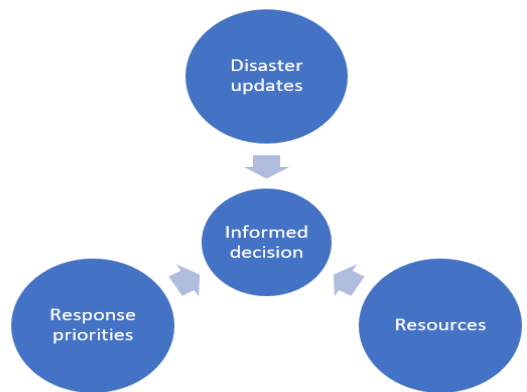
maintained an audit trail in my reflective journal, which documented the steps I took during the study. Confirmability was established when I ensured the results were from the participants without researcher bias by spending a considerable amount of time during the interviews to document in detail the participants' experiences.

## **Study Results**

### **Informed Decision**

Informed decision is an umbrella term used for this dissertation to describe the issues primarily related to emergency managers' decision-making process for disaster response operations. Although emergency managers would like to have the most current situational awareness information for a disaster to make informed decisions, there are times when emergency managers must make decisions based on little to no disaster-specific information. Therefore, to make informed decisions, emergency managers require disaster-specific information. There were four subthemes assigned to the umbrella term of informed decision (see Figure 5).

**Response priorities.** Response priorities refer to the focus of the first responders and emergency managers during disaster response. One participant mentioned that response priorities include "Life safety, protection of property, and the environment." Disasters, depending on the severity, have the potential of causing catastrophic impacts on a locality. When a disaster happens, the first 12 to 24 hours of the response operation is critical, as are the response priorities. One participant said, "We will look at the hours as critical for life safety because if we can't get in there to rescue them, they may lose their lives or their family's whole life." Another participant said, "We want to save as



*Figure 5.* Informed decision code.

many lives as we can, as much property as we can in the most appropriate, effective, and efficient manner.”

**Disaster updates.** Emergency managers identified that in many cases, the only information provided is the reports from first responders. Because emergency managers work from the EOC, they do not have the opportunity to see firsthand what is occurring at the disaster site. Any disaster update from first responders is important when developing and updating response plans and strategies. One participant said, “The type of information coming in from the disaster, that is the data you’re putting together for your objectives for the Incident Action Plan.”

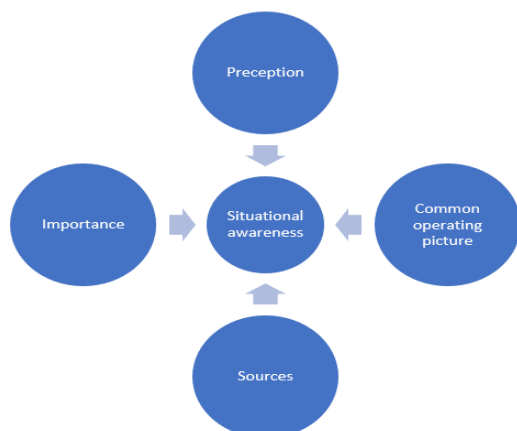
Emergency Managers share the disaster updates with senior officials and why this is important for the public to see that the government is reacting to the latest disaster update. One participant said, “Showing people there are leadership in place that decisions are being made at the highest level and that there is a continuity of operations with what we are doing.” Another participant said, “It’s a decision tool for senior leadership to make the most informed decision.”

**Resources.** Emergency managers have identified that resources, such as availability and requests, are also considered when making informed decisions. Responding to disasters is the responsibility of the locality. First responders provide emergency managers with current resource status. One participant provided in detail why resource status is an important element when making informed decisions. “Part of the strategy in the incident command element in the situation is if there are insufficient resources. Incident command has to change their strategies and objectives based on resource availability.” Other participants provided a further explanation of why information about resources is important to emergency managers. One participant said, “It allows you to direct resources that may be needed in areas that need more than others.” Another participant said, “You need information on what resources you have available, what resources the region has available, and what resources the state has available.”

### **Situational Awareness**

Situational awareness is an umbrella term to describe the ability to identify, process, and comprehend critical information during a disaster. Emergency managers identified the need to obtain continuous situational awareness reports, which provides emergency managers with an understanding of the disaster. There were four subthemes assigned to the umbrella term of situational awareness (see Figure 6).





*Figure 6.* Situational awareness.

**Importance.** Importance refers to the reason why emergency managers need continual updated situational awareness reports during a disaster. Emergency managers use the information provided to know the type of disaster, population impacted, location, and what resources might be needed. One participant said, “Well, the short answer is if you don’t have situational awareness, first of all, you don’t know what is going on, and then you don’t have any way to determine what might go on.” Another participant said, “It’s huge because if we don’t know what’s going on or know the magnitude of what’s going on, we’re operating in a vacuum.” According to another participant, “Specific information is extremely important in the decision-making process to actually make good, sound and justified decisions.”

One participant shared why situational awareness is important in the decision-making process.

I cannot make an accurate or solid decision if I don’t understand how my residents and my community is being impacted. So the more awareness that I can

have on what's going on in all of my neighborhoods, the better and the more confident I feel and being able to make a decision whether or not that's a decision for them, an evacuation or resource decision like relaying the need for public safety, resources or other resources needs.

**Perception.** Emergency Managers rely on situational awareness from first responders, emergency managers, and the public. However, the situational awareness provided to the emergency managers contains different perceptions of the disaster. Gathering multiple situational awareness reports provides emergency managers with information directly from the disaster site from the perspective of the response personnel and the public perception of the disaster response efforts. One participant said, "So having that information available at the EOC level gives us the ability to make future decisions while those that are on the ground are making the immediate decisions and asking for resources they need right now." Another participant mentioned that understanding what the public is thinking is also important to emergency managers said, "How the public is seeing the government response and the effect of the disaster."

**Common operating picture.** Common operating picture is real time situational awareness among disaster response personnel. Emergency managers have identified that obtaining situational awareness is one way of maintaining a common operating picture among disaster response personnel, ensuring continual coordination during the disaster. Emergency managers continually seek information to maintain a common operating picture. One participant said, "We're trying to take in information, so you get that operating picture to get that situational awareness." Another participant elaborated even

further said, “We would just work with whatever the command structure is being used at the scene. Try to gather information from them as well as sharing situational awareness information with them.” Another participant said, “So we do have regional personnel who work with the localities as a first response to the localities, and then those regional teams have direct access to us.”

One participant mentioned that the use of field observers to maintain a common operating picture between the EOC and the response personnel:

We will send out field observers that work for a situation to gather the truth. They work very closely with our resource unit, safety, and ops to make sure that those in the command post or EOC bring factual information, everything from numbers of resources and types of resources.

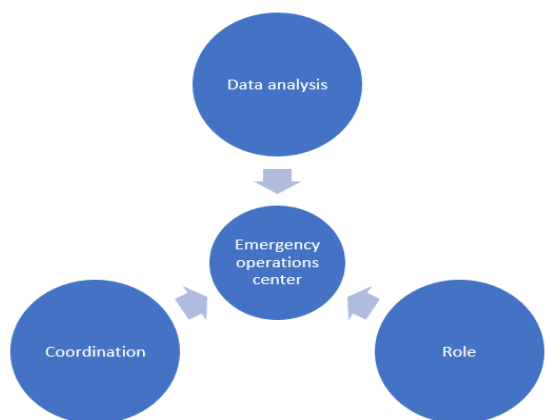
**Sources.** Emergency Managers in the EOC rely on integrating multiple sources to obtain situational awareness for coordination efforts. These sources provide specific information that emergency managers share with other response personnel. The more information obtained from multiple trusted sources, the better information emergency managers have to contribute to the disaster response efforts. One participant said, “They’re telling us what the public is experiencing through the goals or their own employees.” Another participant said, “Then I will have to go out and request information from different entities whether we establish the physical EOC or go to the dispatch center, which I have access to, getting the dispatcher to determine what and where the calls are coming in and what types of calls and what field units are reporting back.”

Another participant explained why trusted sources are important when seeking information.

So, it's really important to vet your information. And so, for instance, things that come out with the media or from our PR or things that are more official, we consider those more vetted obviously with the media and with reports and stuff like that.

### **Emergency Operations Center**

Emergency operations center is an umbrella term to describe its role during disaster response and the coordination and data analysis process of the information received during a disaster. The emergency operations center is a physical location where emergency managers and staff work together to support disaster response efforts. There are three subthemes assigned to the umbrella term of emergency operations center (see Figure 7).



*Figure 7.* Emergency operations center.

**Coordination.** Emergency managers are responsible for coordinating disaster response operations between local and state agencies. Emergency managers are not responsible for responding to the disaster; instead, emergency managers work with all

internal and external response personnel to coordinate the response operations by providing responders with the resources needed for disaster operations without interfering with the response. One participant said, “Everything that’s going on here supports what’s going on out in the field without interfering. And I think that is the biggest challenge because you usually have quite a lot of type a personality who doesn’t want to be interfered with, if they ask for it, they want it.”

One participant felt that better communications could enhance coordination. One of the things I think that needs improvement in the emergency operations center is definitely communications and making sure the reason why we follow the chain of command is because that way, everyone’s in the loop that needs to know what’s going on.

Another participant mentioned why coordination was important for future planning efforts.

It’s important for us to continue to partner with different agencies that have agencies that have access to the information so that we gather that information and shift through what is pertaining to the incident. We’re always looking ahead of the incident; our planning is typically 12 hours ahead.

**Data analysis.** Data analysis is an important component of the function of emergency managers and staff working in the EOC. When disaster-specific information is received from sources, the information needs to be vetted and analyzed to determine if the information is accurate. Data analysis is important when seeking to verify the information received in the EOC. One participant said, “So with information, any and all

information can be good, it can be fed. It depends on how it's interpreted and read."

Another participant spoke about reading the data to identify false information.

There's all sorts of information that is false information out there. So, you can kind of have to weed through what's real, what's not real, and make the decision. And that takes experience, and it takes time.

Emergency managers rely on staff to do the data analysis of the information received from sources. One participant said:

So, I use a multitude of people to double-check. I also know my team that I know who is very detailed oriented. I know who can look at numbers consistently and maintain patterns of change. I would utilize those people to really dig in to make sure that the numbers are coming outright.

Another participant went into further detail on the data vetting process:

We will typically bring that information back in to get it presented to our command staff. We'll see what information we can, you know, what we can vet through that if it's something that we got multiple news sites reporting this information. Or is this just a person on Facebook reporting this information? And then from there, it's really our validating process. We'll go to, you know, what agencies can we communicate with, and we get law enforcement involved to validate.

**Role.** The role of the EOC was identified as an important element of the disaster response efforts. The staff working in the EOC is responsible for information flow and communicating it with response partners.

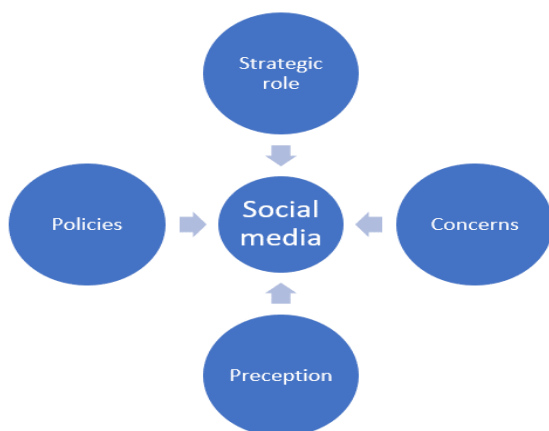
All pieces and parts of the EOC are required to have situational awareness.

Divisions within the US are going to be different. Different types of information, different information from different sources. It goes back to making sure we communicate because there are so many different types of situational awareness and information coming in.

One participant elaborated on how the staff in various positions within the EOC work together said, “You may have operations in the EOC communicating with operations in the field, but the situation unit really needs to be on top of the situation.” Another person provided more information on the situation unit said, “The situation unit, which is our dispatch, will be running operations and information sometimes through that scenario.” While another participant believed that everyone in the EOC plays a vital role during the disaster response said, “Everybody in the EOC will be able to get situational awareness through their chain of command or through standard communications.”

### **Social Media**

Social media is an umbrella term to describe specific issues, concerns, and limitations that prevent emergency managers from using social media during disasters. This theme recognizes the difference in perception of social media from the public and emergency managers and potential roles in which social media could aid in the disaster response efforts. There were four subthemes assigned to this theme (see Figure 8).



*Figure 8.* Social media.

**Policies.** Emergency managers mentioned that social media usage is determined based on either the policy of the locality or the Office of Public Affairs (OPA). The policies provided explicit detail on who, when, and how local officials could utilize social media.

Some localities did not have a policy specifically for social media.

We do not have any direct at this particular point policies or procedures. It is done as a cooperative, you know, discuss things or just simply goes directly to the information that is passed along from, say, the state or weather service or things of that nature.

Another participant said, “When I was a local, I did not have a social media policy since I was the only person in the department.” One participant mentioned having a social media policy. “They had a couple of rules for using social media officially. We have a general order or whatever that kind of spells it out. But to me, it seems loosely defined.” Another participant explained how the policy for social media provided in-depth instruction for emergency management.



We actually have a social media policy that is driven by OPA. They have some direct rules because they're actually the managers for all of the accounts. So, for me to run my social media account as an emergency manager. I am directed kind of under their guidance, and so I have to take a certain training. I have to do the approval process to be able to even post on the emergency management account, and so they have all of that already lined up for us. We do have record retention, which is a big deal. So, they actually have it set up as a county to retain all of our posts, comments, and private messaging. So, in the event that someone was to want to do a public information request, we would have that, but that would all go through OPA. They also have policies on deleting comments. We have a whole procedure on reviewing it if there is a comment that might not be appropriate. We have a policy where we send that to OPA, they say yes that's good or know what's bad, and then we make the decision on that from a legal standpoint.

**Strategic role.** Emergency managers mentioned using social media to provide preparedness information or immediate actions that would aid the public. However, the use of social media during disasters is inconsistent. Emergency managers mentioned that social media could have a strategic role during disasters. Several participants provided examples of when it would aid with disaster response efforts.

A lot of trends come from it, such as help requests, equipment requests, you know, photos. You know you can track if a tornado runs through you can see the track of where the tornado comes through by where pictures are taken. You can

get a quick view of devastation before you can actually get on the ground so you can get an idea of what resources may need to go in there.

Another participant believed that social media is useful for getting real time situational awareness information.

You're getting real time reports from them as soon as they are posted. So that kind of helps speeds up some of your situational awareness. So, I think that social media adds a faster way to get situational awareness, which in my head, gives us a faster ability actually to pump out resources. In another way that it differs is I think it adds a level of closeness and relationship building with our community and our residents.

Another participant mentioned how having social media changes how first responders react to a disaster.

When I was living in Florida in the 2004 timeframe, I went through three hurricanes as a firefighter, and we didn't have social media to really track. As soon as the storm was finished, we jump into the fire engine and start heading in that direction, basically street by street. Driving up and driving down to see what the damage was and start doing the address, letting headquarters know the different addresses and damage lines down and the trees down where we could get to where we could not. But, nowadays, I mean, there are different programs out there that'll sit there and say ok. We have damage here, here, and here. We can start building on those trends and start heading towards those areas. Because

social media is such a high use item now and it helps us to build the, you know, it helps us to respond faster to those different events versus going street by street.

**Concerns.** Emergency managers identified there are areas of concern with social media. These concerns are the reasons why emergency managers are hesitant to incorporate social media into disaster response operations. One participant said, “The difference is social media is quick and immediate. But at the same time, it is unfiltered and validated. It is quick. However, it is also steeped very deeply in emotion.”

Emergency managers mentioned that the process for analyzing and validating the data on social media is also a concern.

How quickly can I validate it? Because information is great, but I still have to make sure it's valid information before I can act on it. So, I don't think it's helpful, but I think it also has some limitations in that unless your people are specifically reporting on it.

Another participant explained why the information on social media would not be beneficial to emergency managers.

So, see, the social media we know is subjective, and it's very hard during an emergency to find objective information. We consider objective information to be credible sources like the weather service or people that we know are going to report out the best they have. Social media is subjective, meaning it is somebody's perception. A lot of times, it's an opinion, and it hasn't been vetted. It's not necessarily credible.

**Perception.** The public and emergency managers use social media for different reasons. Emergency managers are more likely to use social media to provide preparedness information to the public. One participant said, “We use it primarily to communicate with our community to let them know what we’re doing, what things they need to be aware of the prepared information.” Another participant said, “I think it’s also helpful for us to utilize that information to get people to be prepared, even if it’s during an actual event.” Several emergency managers mentioned that the public post on social media provides first responders with a different perspective of the disaster response operations.

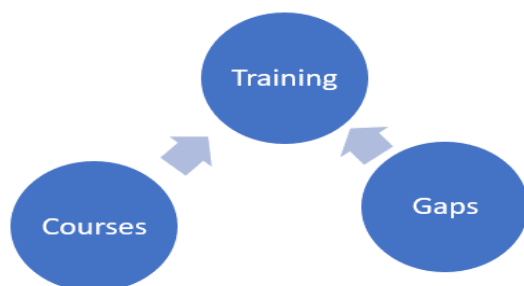
The thing is, it helps in gathering what the public perceptions are. First of all, the way things are now, people do not keep secrets anymore. So, they post what they think and feel, and that assists with rumor control, and that’s how rumors get started, and if you don’t address them quickly and definitively, then obviously, they become people’s realities. Social media is a good way to get information out, and however, it is good to get information in.

Social media post from the public includes pictures of the disaster, which is helpful to emergency managers. One participant said, “You can see where people are posting pictures of what areas you get, you can get a good feel of the extent of the flooding.”

### **Training**

Training is an umbrella term to describe specific training available for emergency managers and the type of courses emergency managers would like to have available.

Emergency managers rely on training to obtain specific knowledge and skills to support disaster response efforts effectively. Emergency managers also identified some aspects of training that were missing. There were two subthemes assigned to the umbrella term of training (see Figure 9).



*Figure 9.* Training.

**Courses.** Courses refer to the training emergency managers attended. There are courses offered at the federal, state, or local level in which the instructors are considered subject matter experts on the course topic. Many emergency managers mentioned taking a PIO course, which provided them with some knowledge of social media. One participant said, “There is a basic, intermediate, advanced PIO course we offer. And that’s one of the classes that addressed using social media. Obviously, the advanced has a little more into it.” Another participant mentioned taking online courses offered FEMA, “There is from FEMA independent study site. I know because I’ve taken them two three-hour courses online on using social media in emergency situations.” Another participant mentioned taking a course on social media. But it was so long ago that the training is outdated with the current capability of social media. “I know years ago; I took a class on

social media in disasters. It was a great class, so much of what I learned there doesn't apply to the way social media is used now."

**Gaps.** Emergency managers identified gaps in training as an issue that still needs to be addressed, especially in terms of situational awareness and social media. Gaps in training prevent emergency managers from staying current with new trends and emerging capabilities within the emergency management field. Unaddressed gaps in training were identified as challenges that emergency managers face when integrating social media into response operations.

I think the biggest thing is having people that are lack of a better term illiterate using technology and using social media and not just Facebook or not just Twitter, but all of them. That could be a challenge because a lot of it is generational. Older folks are now comfortable with Facebook. Younger people are using Snapchat and Instagram, and Twitter. So, for me is you have to have people that understand the system and also understand all the other systems are traditional systems. How to interface with the other people in the EOC, the situation unit leader, or the planning section and operations, all of that is understanding how it works and where they sit.

Another participant explained why experience with social media is important for emergency managers to possess. "I would love to see a comparison between Instagram, Facebook, Twitter, and what is the common trends, who are using them, what information can be shared, and can't be shared." One participant mentioned that just knowing the difference between the social media platforms would be helpful said, "I

think for emergency managers if we could get access to those same types of platforms and learn how to monitor certain things. I think that would be really really helpful.”

### **Summary**

This chapter contained the results of the analysis, connected the analysis back to the research questions, and demonstrated the consistency of the thematic analysis with the qualitative explanatory case study methodology. I interviewed 11 participants for this qualitative explanatory case study. I used a self-developed interview guide to understand emergency managers’ perspectives of the use of social media and its role in obtaining situational awareness and provide the disaster-specific information necessary for emergency managers to make informed decisions during disasters.

For this qualitative explanatory case study, there were three levels of analysis, which consisted of cross-interview, opening coding, and thematic. One hundred forty-four codes emerged from open coding. I conducted a cross-interview analysis to identify commonalities among the participants’ responses. I used NVivo to group codes into emerging categories and then into 16 subthemes. From the subthemes, I identified five themes that resulted from this study summarized emergency managers’ perspectives on social media use for situational awareness during disasters: (a) informed decisions, (b) situational awareness, (c) emergency operations center, (d) social media, and (e) training.

Chapter 5 explores emergency managers’ perspectives on the use of social media as a tool to obtain situational awareness during disasters. I analyze and interpret the findings, compare the data with the information presented in Chapter 2, and recommendations based on the information provided by the participants.

## Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this qualitative explanatory case study was to obtain the perspective of emergency managers regarding the use of social media as a tool for situational awareness during disasters. I used the explanatory case study design to explain a phenomenon and identify common patterns and themes from the participants' perspective (Yin, 2018). The interview questions provided detail on current situational awareness strategies, uses for social media, reasons why emergency managers are slow to adopt social media into disaster response operations, and training gaps. I used a self-developed interview guide to obtain qualitative data through in-depth, semistructured individual interviews.

The results of the data from 11 emergency managers supported previous research (Eismann et al., 2018; Plotnick & Hiltz, 2016; Plotnick et al., 2015) that barriers prevent emergency managers from utilizing social media during disasters. However, the results of the study also indicated current situational awareness strategies emergency managers use during disasters, which were not identified in previous research (see Eismann et al., 2018; Luna & Pennock, 2018; Martínez-Rojas et al., 2018; Plotnick & Hiltz, 2016; Plotnick et al., Takeda et al., 2017). The theoretical frameworks were confirmed in the results, which indicated emergency managers rely on updated information gathered from the disaster site in situational awareness reports and conduct thorough data analysis and validation of the information based on knowledge and experience to make informed decisions to protect lives, property, and the environment. During certain disasters, emergency managers mentioned using social media to determine damages and resource needs. The



results of the study provided an opportunity to understand emergency managers' perspectives regarding the use of social media for situational awareness during disasters. The emergency managers participating in this study were familiar with current situational awareness strategies used by response personnel working in the field and the EOC. The participants' knowledge and experience added to the existing literature regarding the use of social media by emergency managers. The results of the study provided new perspectives on how emergency managers see social media's role during disasters, current situational awareness strategies, and disaster-specific information needed to make informed decisions.

### **Summary of Key Findings**

The key findings from the study revealed five themes that describe the perspectives of emergency managers regarding social media and its usefulness as a tool for obtaining situational awareness during disasters. The five themes included informed decisions, situational awareness, emergency operations center, social media, and training. These five themes were used to develop an analysis of the findings on the disaster-specific information emergency managers need to make informed decisions and whether social media is a tool that could provide the information emergency managers need during disasters.

### **Interpretation of the Findings**

#### **Informed Decision**

Emergency managers rely on disaster-specific information to make informed decisions. The first 72 hours of a disaster is critical to the disaster response efforts. The

disaster-specific information emergency managers seek immediately following a disaster includes how the disaster impacts the locality, why the disaster occurred, who is involved, when the disaster happened, where the disaster occurred, and what resources are needed that would aid in disaster response operations. Answers to these questions allow emergency managers to make informed decisions based on response priorities. Emergency managers' response priorities during disasters are the protection of lives, property, and the environment, which was identified by Eismann et al. (2018) as information needed to understand the data emergency managers could obtain from social media. To ensure response priorities are met, emergency managers rely on continual updates from first responders and other response personnel. Takeda et al. (2017) identified how essential it is for emergency managers to have disaster updates to minimize the impacts of the disaster on the community. The disaster updates help emergency managers understand what is happening for the decision-making process among government officials and request resources that aid first responders and the public.

Emergency managers identified the need for disaster-specific information and how important it is for the decision-making process. However, when emergency managers do not have disaster-specific information, several issues arise. The issues include resources needed by response personnel go unmet, duplication of efforts, the safety of responders and the public are at risk, and an overall less effective disaster response operation. Roslan et al. (2019) identified these issues when there are several agencies involved. Consistent with findings from previous studies (Curnin et al., 2015; Jensen & Thompson, 2016; Roslan et al., 2019) my study's findings indicated that

emergency managers rely on updated disaster-specific information to make informed decisions regarding response priorities and resources needs during disasters. Aligned with the situational awareness model (Endsley, 2019) emergency managers have developed processes and procedures in which disaster updates are utilized during the decision-making process that meets response priorities and resource needs.

### **Situational Awareness**

One of the important aspects of disaster response operations identified by the emergency managers was maintaining situational awareness throughout the disaster for a common operating picture among disaster response personnel. Response personnel operating from the disaster site provide emergency managers and staff working in the EOC with disaster-specific information in situational awareness updates. The response personnel's background, knowledge, perspectives, and experience will vary. However, continual information sharing and coordination between the disaster site and the EOC are essential for developing and maintaining a common operating picture. Similar to findings of Sophronides et al. (2017) and Waring et al. (2018) the common operating picture is important among response personnel because it allows the responders located at the disaster site and the EOC staff to coordinate, set priorities, and determine the effectiveness of the response operation.

Emergency managers in the current study noted there are information silos when the lines of communication are disrupted. Information silos prevent the sharing of disaster-specific information and hinder the coordination among response personnel. The situational awareness information provided by first responders and other response

personnel allows emergency managers to see the disaster from different perspectives. Emergency managers rely on situational awareness reports when developing planning objectives and operational strategies (Reynold et al., 2017; Roslan et al., 2019). Without having the most updated situational awareness, emergency managers identified that their planning efforts are negatively impacted. Waring et al. (2018) noted the importance of situational awareness when working as a team for an effective response. Emergency managers in the current study mentioned using the aid of other sources when situational awareness updates are not available.

Emergency managers' strategy for obtaining situational awareness consisted of sending personnel to the disaster site as a liaison between the incident commander and the EOC staff. In addition, emergency managers assign field staff in strategic locations to provide situational awareness updates to the EOC. Curnin et al. (2015) identified the use of the liaison officer within ICS to gather and share situational awareness information among the response personnel at the disaster site and the EOC. However, this is not the standard role of the liaison officer within the ICS structure during a large disaster, which is to communicate with agencies in support of the disaster response. The findings from the current study are inconsistent with previous studies, which emphasized the importance of relying on the ICS to gather situational awareness (Curnin et al., 2015; Roslan et al., 2019). Emergency managers in the current study mentioned using trusted sources such as field observers, regional staff, and response agency representatives to obtain additional disaster-specific information.

One surprising finding in my study was that emergency managers did not identify the use of social media as a source for obtaining situational awareness information. Although the public uses social media for seeking, posting, and sharing disaster-specific information (Eismann et al., 2018; Pogrebnyakov & Maldonado, 2018; Tapia & Moore, 2014), emergency managers expressed concerns related to using social media. The first concern was verifying the information on social media. Emergency managers did not want to use information that had not been analyzed or validated. Using information that had not been analyzed or validated may put the first responders and public lives at risk. There was a trust concern regarding the source. Emergency managers mentioned that the source for the information was important when using the data found on social media. Emergency managers reported that unless the information comes from trusted sources through normal communications methods, it is not considered trustworthy. Analysis of the data found on social media is another concern for emergency managers. Emergency managers mentioned that a data-mining process for social media does not exist because emergency managers are unfamiliar with how to conduct data analysis for the data from social media.

The other concern that emergency managers mentioned was a large amount of information available on social media. Emergency managers felt that during a large-scale disaster, there are time constraints that prevent response personnel from utilizing social media information for situational awareness. Consistent with findings from previous studies (Eismann et al., 2018; Haataja et al., 2016; Plotnick & Hiltz, 2016; Plotnick et al., 2015; Wukich, 2015), my study's conclusions indicated that situational awareness is

important to emergency managers for an effective disaster response operation.

Emergency managers reported that they prefer to use trusted sources rather than social media to obtain situational awareness for evolving disasters.

### **Emergency Operations Center**

The EOC is a physical location where emergency managers coordinate disaster response efforts with first responders located at the disaster site and other internal and external stakeholders. Disaster response operations are continually evolving. The primary role of the EOC is coordination between the incident commander and the emergency manager. Coordination is necessary for maintaining situational awareness of the disaster response status, which directly impacts the overall effectiveness and efficiency of the disaster response operations. Emergency managers identified an issue with communications between response personnel and the personnel working in the EOC as an aspect of the response operations requiring continual improvement. Without consistent communication between responders and the chain of command, the coordination process is negatively impacted (Roslan et al., 2019; Stambler & Barbara, 2015). Consistent with findings from previous studies (Curnin et al., 2015; Pogrebnyakov & Maldonado, 2018; Roslan et al., 2019), my study's findings indicated the importance of continuous communication between the response personnel located at the disaster site and the EOC personnel. Aligned with the situational awareness model (Endsley, 2019) and the DIKW hierarchy (Rowley, 2007; Yusof et al., 2018), emergency managers rely on continuous communication to obtain situational awareness information to support the collaboration, communication, and coordination of the disaster response efforts.

The EOC is important to the disaster response efforts because it is where EOC personnel gather documentation to track the effectiveness of the disaster response, and also analyze, validate, and share situational awareness reports and disaster-specific updates. The EOC personnel utilize the disaster-specific information when evaluating the effectiveness of the disaster response and modify response strategies when developing incident action plans for each disaster response operational period. The data analysis process was not identified as an important role for the EOC in previous studies (Curnin et al., 2015; Roslan et al., 2019). The data analysis process varied among emergency managers. Some emergency managers relied on the planning section to conduct the data analysis; some had staff assigned to a situational unit, separate from the planning section staff. Other emergency managers mentioned using whatever positions were available for data analysis. The results of my study are consistent with previous studies (Roslan et al., 2019; Curnin et al., 2015). However, the data analysis process was not identified by Roslan et al. (2019). My study emphasized the role of the EOC in the data analysis process. The process of data analysis was consistent among emergency managers, which consisted of gathering, compiling, reviewing, validating, and distributing the data.

### **Social Media**

One of the noticeable difference in my study's results compared to previous research was the emphasis on social media and its role in disaster response versus the emphasis on the ability of emergency managers to utilize social media during a large catastrophic disaster, as previously discussed in the literature (Eismann et al., 2018; Hiltz, Kushma, & Plotnick, 2014; Pogrebnyakov & Maldonado, 2018). The ability of

emergency managers to utilize social media depended significantly on the policies set forth by the locality. A few of the emergency managers mentioned having a policy specifically for the use of social media. In contrast, the rest of the emergency managers mentioned that a policy did not exist that discussed the use of social media.

Consistent with the findings of Plotnick and Hiltz (2016) emergency managers that had a policy on social media were more likely to utilize social media to assess damages, access real time disaster information, locations where the public needs assistance, and anticipate resource needs. Emergency managers that did not have a policy were less likely to use social media during a disaster except to provide the public with preparedness information and immediate life-safety actions. My study's results emphasize the need for emergency managers to have a policy that includes the use of social media during disasters. Policies provide emergency managers with guidance on who, when, where, and how to utilize social media, which protects not only the emergency managers but also the locality.

Emergency managers mentioned that there is a place within the disaster response operations where social media would be beneficial to not only disaster response personnel, but also the public. Emergency managers mentioned real time disaster information was one benefit associated with social media, especially when the disaster can potentially have large catastrophic impacts on the public and locality. Tornadoes and flooding were the types of disasters in which emergency managers mentioned that social media would have the most benefit to the disaster response efforts. However, emergency managers mentioned a hesitance to incorporate social media into current situational



awareness strategies. Emergency managers mentioned several concerns regarding social media, such as the trustworthiness of the data obtained from social media, limited staffing, and an overwhelming amount of data available on social media. The results of my studies are consistent with the findings of Hiltz et al. (2014); Plotnick and Hiltz (2016); and Plotnick et al. (2015) that emergency managers are slow to adopt social media during disaster response operations. However, emergency managers mentioned lacking a data analysis process that included social media information, which was not identified in previous literature (Plotnick et al., 2015). Emergency managers felt a lack of understanding regarding the information available on social media, the best method to analyze and validate the information, and positions within the EOC that possessed the appropriate training to gather and conduct a data analysis of the information from social media.

### **Training**

One of the noticeable difference in my study's results compared to previous research is the emphasis on training for emergency managers and disaster response personnel versus the emphasis on limited guidance on incorporating social media into disaster response operations as previously discussed in the literature (Plotnick & Hiltz, 2016; Plotnick et al., 2015). The availability of training from the federal or state government regarding social media and data analysis is limited. Emergency managers mentioned that social media is rapidly evolving based on the technology available. Current social media training fails to address newer social media platforms or capabilities. As a result, emergency managers are slow to adopt social media into disaster

response operations for situational awareness. Emergency managers also mentioned that a course specifically for emergency managers on incorporating social media into disaster response operations and the data analysis process associated with situational awareness would be beneficial.

Some emergency managers mentioned taking multiple PIO courses, which addressed social media, but not all emergency managers had this training. Several emergency managers mentioned taking a social media-specific course online from FEMA, but the training was released in 2013 (FEMA, 2013) and contains outdated information on social media. Some emergency managers felt that training for social media should be the responsibility of the state emergency management agency and updated regularly since the state already provides various emergency management training. Therefore, as previously mentioned, social media training should be considered when addressing emergency managers' concerns with incorporating social media into current situational awareness strategies.

### **Limitations of the Study**

There were several identified potential limitations to the trustworthiness of the study. The first limitation was the study's methodology. Therefore, the results were limited to the sample included in the study. While I still agree that a qualitative explanatory case study was the appropriate methodology for my study, qualitative research cannot be generalized.

The second limitation was the small sample size. There were 11 participants included in my study. According to Patton (2015) a sample size of 15 participants is

sufficient to reach data saturation. Even though I reached the desired sample size, the data collection process took longer than expected due to the COVID-19, which directly impacted emergency managers' availability to participate in my study.

The third limitation was the self-developed interview guide I used for data collection. I had subject matter experts vet the self-developed interview guide. However, at the conclusion of the data collection, I felt I had too much data with some of the data outside the perimeters of the focus of this study.

### **Recommendations**

The findings brought up several instances as to why emergency managers are slow to incorporate social media into disaster response operations and particularly to utilize it to obtain situational awareness. Three key areas need further examination by scholars. One area includes comparing social media policies to determine if emergency managers were more likely to utilize social media during disaster response because a policy exists. The second is an effective method to conduct data analysis of the information obtained through social media. The third is the specific type of social media training that would encourage emergency managers to incorporate social media into current situational awareness strategies.

Plotnick and Hiltz (2016) suggested that emergency managers develop social media policies that encourage emergency managers to utilize social media during disasters. My study identified that this is still an area in which the emergency management field is lacking. However, in the case where a social media policy existed, emergency managers were more likely to use it during disaster response when assessing

damages, determining areas of flooding, and the impact of the disaster on the public.

Future studies should compare emergency management social media policies to identify a position within the EOC to monitor social media posts, a list of specific social media training required, and the role social media will have during disaster response. As indicated by the participants, localities with social media policies were more likely to use social media during disasters than emergency managers that did not have a social media policy.

Data analysis is another area in which emergency managers mentioned was an issue associated with the use of social media because of the large amount of data available in real time. Emergency managers are comfortable conducting data analysis with the information received from response personnel because a process exists that allows emergency managers to gather, analyze, and validate the information. Eismann et al. (2018) suggested that social media can provide emergency managers with digital content that aids in the decision-making process. However, the process of data analysis of the information available on social media does not currently exist. Future studies should focus on the most effective method to conduct data analysis, including gathering, analyzing, and validating the information obtained through social media.

Training is very important to the emergency management field. Emergency managers felt a gap in training existed regarding social media platforms, capabilities, and how to incorporate social media into disaster response efforts. There are several in-person courses such as Public Information Officer and Situation Unit that discuss social media. However, social media is not the main focus of the courses. Social media training was not

identified as a gap in previous literature for emergency managers. Currently, the only FEMA course available online is IS 42: Social Media in Emergency Management, released in 2013 and has not been updated since. Technology is constantly evolving, and training regarding social media should reflect this. Training available on FEMA's Independent Study site should be reviewed and updated regularly for its content. Another method of providing emergency managers with social media training is for the state emergency management agency to develop a social media and technology course. The social media course should include comparing the different social media platforms, capabilities and limitations, and incorporating social media into all phases of emergency management. Another option is for professional emergency management organizations to provide social media presentations or training during annual meetings. Emergency managers interested in learning more about social media would have the opportunity to attend.

### **Implications**

The results of my qualitative explanatory case study provided original contributions to the emergency management field. The findings of my study may further validate the perspectives of emergency managers on social media and its usefulness as a tool for obtaining situational during a disaster. In addition, the findings may influence social change by providing emergency managers with the knowledge and skills to incorporate social media into disaster response operations, which will ensure that emergency managers meet response priorities such as the protection of life, property, and environment during a disaster. The combined components of my recommendations and

suggestions provided the resources and support for the study's implication of social change regarding the use of social media as a tool for situational awareness during disasters by emergency managers.

### **Conclusion**

Emergency managers are responsible for protecting lives, property, and the environment during disasters. To accomplish this, emergency managers working in the EOC collaborate, communicate, coordinate, and maintain situational awareness during disaster response operations with first responders located at the disaster site and internal and external stakeholders to make informed decisions. However, there are times in which emergency managers are unable to obtain disaster-specific information from response personnel. As a result, emergency managers are unable to maintain current situational awareness. During disasters, the public turns to social media to stay informed, post, and share information about the disaster. Social media is a tool that emergency managers have to communicate with the public before and after a disaster. However, emergency managers have been slow to incorporate social media into disaster response operations to obtain situational awareness during disasters. The purpose of my study established the answers to the research questions concerning the perspective of emergency managers on the use of social media and its role in obtaining situational awareness, as well as the disaster-specific information needed for emergency managers to make informed decisions.

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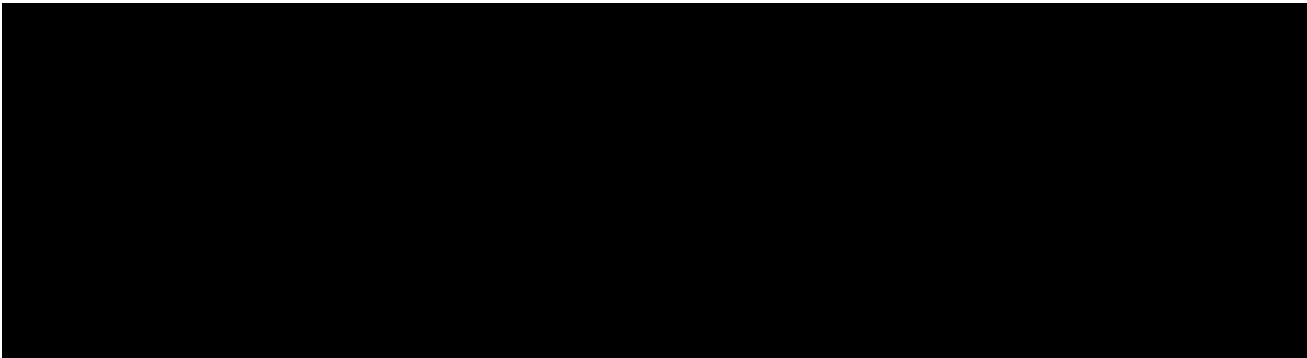
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Appendix A: Qualitative IRB Letter of Cooperation From Agency



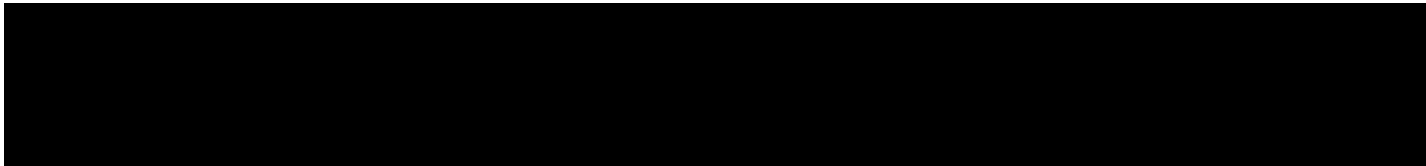
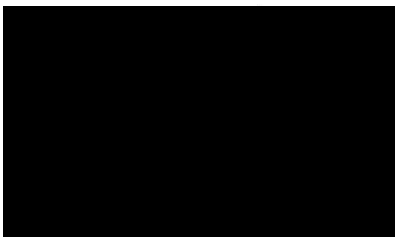
October 30, 2019

Re: Letter of Participation

Dear Teresa,

This letter confirms that I, as an authorized representative of the [REDACTED], allow Teresa Scott Hoggard to conduct telephone interviews of [REDACTED] membership regarding the perspectives of emergency managers on the use of social media and its role in obtaining situational awareness during disasters. Interviews must be conducted between January and December 2020. I acknowledge that all participants will be asked to sign an informed consent agreement prior to taking the interview and that [REDACTED] members may choose not to participate or may withdrawal at any time. All responses will be kept confidential.

Regards,





## Appendix B: Invitation to Study Participation

Dear Emergency Management Professional,

I am conducting telephone interviews as part of a research study to understand the perspectives of emergency managers on the use of social media and its role in obtaining situational awareness during disasters. I am a doctoral candidate at Walden University in the Public Policy and Administration Program, specializing in Emergency Management. I am seeking emergency management professionals that have a minimum of 5 years of working experience within the emergency management fields or possess either a certified emergency manager or a state-sponsored professional emergency manager certification. As an emergency management professional, you are in an ideal position to give me valuable firsthand information from your own perspective. The interview takes around 60 minutes. I am trying to capture your thoughts and perspectives about social media and situational awareness. Your responses to the questions will be kept confidential. Each interview will be assigned a number code to help ensure that personal identifiers are not revealed during the analysis and write up of findings. There is no compensation for participating in this study. However, your participation will be a valuable addition to this research, and the findings could lead to a greater public understanding of the perspectives of emergency managers on the use of social media and its role in obtaining situational awareness during disasters. If you are interested in participating in this study or have any questions, please do not hesitate to reach out to me.

A copy of the dissertation will be made available to those seeking to review the document.

Thank you in advance for your consideration to participate in this study.

Sincerely,

Teresa Scott Hoggard, B.S., M.A., Doctoral Student, Walden University  
Public Policy and Administration: Emergency Management

## Appendix D: Self-Develop Interview Guide

### Opening Statement:

Thank you for participating in my research study on the perspectives of emergency managers and the use of social media as a tool for situational awareness. There are no right or wrong answers. I am interested in learning about your experiences. Do you have any questions before we begin? As a reminder, I will be making an audio recording of the interview, and all the information will be kept private without identifying you or the name of your department or the City and State in which you work. The information you share will only be shared with my dissertation committee. If at any time you do not want to continue, or you do not want to answer a question, please let me know. The interview is anticipated to take 45 to 60 minutes.

I would like to begin with a few background questions:

1. Sex:
2. Age:
3. What is your highest level of Education?
4. How many years' experience do you have working in the emergency management field?
5. What is your current position and title? What does that entail?
6. Do you have experience working in an emergency operations center (EOC) during disasters?
7. How many times have you worked in an EOC?

8. What type of disasters?
9. What position did you have in the EOC? What did that entail?
10. How does your department use social media during disasters, and in what capacity? Why or why not?
11. What policies and procedures does your department have for the use of social media during disasters? Can you tell me about them?
12. How would you define situational awareness as it relates to disasters?
- 12A. Why is situational awareness important to emergency managers during disasters?
13. What specific information can be gleaned from social media to help improve situational awareness?
14. What type of disaster-specific information factor into your emergency manager decision-making process?
- 14A. Why are these types of disaster-specific information critical to the decision-making process?
15. How does your department's current situational awareness strategies during disasters enhance response operations?
- 15A. How are your department's situational awareness strategies different when there are disasters in which an on-scene incident command is utilized?
16. What do you think of the sufficiency of your department's current situational awareness strategies for obtaining information during a disaster?

17. If your department's standard protocol for obtaining situational awareness becomes unavailable, how does your department gather disaster-specific information?
18. In the EOC, what specific positions are responsible for obtaining situational awareness during disasters?
19. What are your department's processes for analyzing and validating the information you receive?
20. How, if at all, does social media access improve the quality of information that emergency managers need during disasters to make informed decisions?
21. What disaster-specific information could emergency managers access using social media during disasters?
22. How does your department analyze and validate the information data-mined from social media?
23. How does the information about situational awareness accessed from social media compared to the traditional method of fact-gathering information that your department gets through its standard methods of obtaining situational awareness?
24. What kind of skills, knowledge, and training would help emergency managers to utilize social media for situational awareness during disasters?

Conclusion:

I would like to thank you for allowing me to interview you for this study. The next step is for me to create a transcript of this interview and analyze the data to determine if there are any emerging themes or categories on this topic. Do you have any questions for me?

If you have any follow up questions or other questions, later on, you can call me or send me an email.

## Appendix E: Expert Panel Invitation Letter

October 2, 2019,

Dear Dr.:

I am a doctoral student at Walden University's PhD Public Policy and Administration with a concentration in emergency management. I am completing my qualitative dissertation regarding the perspectives of emergency managers on social media as a tool for obtaining situational awareness during disasters.

I am in the process of completing my proposal and would appreciate it if you would be a "one-time member" of an expert panel to review my Research Questions and accompanying interview questions.

The study will utilize semistructured interview questions and is anticipated to take about 45 to 60 minutes to complete. I have separated the interview questions to correspond to three Research Questions.

I would greatly appreciate it if you would be on my expert panel and review the interview questions via-à-vis the Research Questions. I am asking both content experts and methodology experts for their feedback. I take your role seriously, and modifications to the interview will be made using your recommendations for changes (additions, subtractions changes in wording). This important activity will validate my interview instrument.

I am attaching to this email, the specific Research Questions and interview questions that I would like for you to review. If you would be so kind as to return your comments to me by **October 9, 2019**, I would be appreciative.

If you have any questions, please do not hesitate to send me an email. If you have any questions about the study, you may also contact my chair, [REDACTED].

Thank you very much for your assistance.

Sincerely,

Teresa Scott Hoggard  
[REDACTED]