

**EXPERIENCES USING VIRTUAL SYSTEMS DURING CRITICAL INCIDENTS AT
UNIVERSITIES: A PHENOMENOLOGICAL APPROACH**

by

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Abstract

This study examined the use of virtual emergency management systems within operational and tactical environments and explored the experiences of officials using these virtual systems regarding communication of information, coordination of resources, and strategic thinking throughout a critical incident at 4-year public institutions of higher education. Emergency management organizations are increasingly using virtual emergency management systems within their operations, but their effects on communication and incident management in operational and tactical environments during a critical incident is unclear. A gap in the literature has emerged in the understanding of how organizations comprehend, train, and utilize virtual emergency management systems and the possible integration of these systems with the National Incident Management System (NIMS) and the Incident Command System (ICS) standards. There was a need for this study to explore virtual emergency management systems within the operational and tactical environments prior to, during, and after a critical incident; and to answer the research question, “What are the experiences of university officials, who have utilized virtual emergency management systems, in terms of communication capability, resource coordination, and strategic thinking prior to, during, and after a critical incident involving 4-year public institutions of higher education?” This study used a transcendental phenomenological design to elicit the lived experiences of university officials who have utilized virtual emergency management systems throughout a critical incident at a 4-year public institution of higher education. The population of 10 university officials included a sample of six university emergency managers and four senior university officials who were familiar with the use of virtual systems prior to, during, and after a critical incident. The resulting data were then analyzed using open coding to identify themes and a codebook was developed to define terms associated with the themes and ascribe

meaning to the data. The software NVivo11 was utilized to assist with the organization of the resulting themes. Numerous reviews of participant interview transcripts were conducted to ensure that the essences of participants' experiences were appropriately displayed. Member checking was also conducted to ensure accuracy of the data. The findings indicated that the use of virtual emergency management systems did aid in the communication of information, the coordination, and allocation of resources, and strategic thinking prior to, during, and after a critical incident at 4-year public institutions of higher education. The study also found that these systems aid in the development of trust, leadership, and team building at these institutions. The study also indicated that these systems were not being fully utilized at many of these institutions, thereby limiting the effectiveness of these systems.

Dedication

This dissertation is dedicated to my family, Amy, Andrew, and Abigail Plummer, who all have made many sacrifices over the years to assist me in my career advancement, and with my educational pursuits. Your encouragement has always been appreciated and I hope your lives have been as enriched as mine has by the experiences that we have had together on this journey of life.

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CHAPTER 1. INTRODUCTION

Since the development of the Firefighting Resources of Southern California Organized for Potential Emergencies (FIRESCOPE) program in the early 1970's, and the progress made in recent decades following the creation of the National Incident Management System (NIMS), the central management systems of the Incident Command System (ICS) and the Multiagency Coordination System (MACS), local, state, and federal organizations across the country have worked to incorporate these standards into their preparedness, response, and recovery programs (Bogucki & Schulz, 2015; Cohen, 2015; Stambler & Barbera, 2011). Although the use of early ICS principles was successfully implemented during previous disasters experienced in the United States, coordination and communication issues arose due to the lack of understanding of MACS concepts and the use of MACS by emergency management officials (Stambler & Barbera, 2011). As the availability of technology and interoperability increased, the opportunity to enhance coordination and communication through virtual systems was at the forefront of emergency management discussions (Bogucki & Schulz, 2015; Federal Emergency Management Agency, 2016).

The research topic chosen for the following dissertation focused on the use of virtual emergency management systems within operational and tactical environments. Virtual emergency management systems are defined as web based emergency operations centers that allow for the creation and implementation of emergency plans, the communication of information (e.g., policies, procedures, maps, resource status), and the sharing of other types of data among community leadership and emergency management professionals prior to, during, and after a critical incident (Federal Emergency Management Agency, 2016; National Fire Protection Association, 2016). The following study focused on the use of virtual emergency

management systems within operational and tactical environments and explored experiences of university officials using these virtual systems regarding communication of information, coordination of resources, and strategic thinking throughout critical incidents at 4-year public institutions of higher education.

Background of the Study

Emergency management organizations are increasingly using virtual emergency management systems, but their effects on communication and incident management in the operational and tactical environments during a critical incident is unclear (Federal Emergency Management Agency, 2016). The term *critical incident* used in the present study is defined as "any human-caused or natural incident, including terrorism, that results in mass casualties and/or damage or disruption to infrastructure or the environment and overwhelms the responding jurisdiction's resources" (Federal Emergency Management Agency, 2010, p. 16).

The research literature on critical incidents indicates that it is known that the lack of effective communication prior to, during, and after a critical incident poses significant problems for organizations such as incident stabilization, resource support, strategic thinking, and coordination with other response organizations (Federal Emergency Management Agency, 2010, 2016; Kapucu, 2006, 2009; Wang & Hutchins, 2010; White, Edwards, Farrar, & Plodinec, 2015). It is also known NIMS and the ICS were developed and implemented to limit communication and coordination issues during a response to a critical incident (Federal Emergency Management Agency, 2010, 2016; Kapucu & Garayev, 2014; Stambler & Barbera, 2011). However, an issue arose in that responses utilizing NIMS and the ICS are often plagued by interface issues surrounding effective communication and coordination between incident command personnel and the emergency operations center (Federal Emergency Management Agency, 2010, 2016).

Research on virtual systems indicates the use of virtual systems increases retention of knowledge (Farra, Miller, Timm, & Schafer, 2012), communication in the training environment (Chen, 2014), and the development and maintenance of relationships among response organizations (Federal Emergency Management Agency, 2010, 2016; Nikolai, 2015; Nikolai, Johnson, Prietula, Becerra-Fernandez, & Madey, 2015).

Based on this information gathered from previous research, the use of virtual emergency management systems to aid in the communication process within higher education has broad implications for Public Service Leadership and the field of emergency management (Chen, 2014). These implications form the basis of the theoretical foundation of this study that originated from structuralism theory, situational crisis communication theory, and situated learning theory, which are further explained within the next section.

Findings of the study will explore virtual emergency management systems, as a technological platform, for communication, resource coordination, and strategic thinking prior to, during, and after a critical incident in operational and tactical environments using 4-year public institutions of higher education.

Need for the Study

Even though significant research was conducted on communication and training using virtual systems in training environments (Chen, 2014; Nathanael, Mosialos, & Vosniakos, 2016; Nikolov, 2011), it remains unknown if the use of these virtual systems affect the ability to enhance communication and coordination among stakeholders during an actual critical incident (Chen, 2014; Kapucu, 2006; Palen, Vieweg, Liu, & Hughes, 2009). It is also not known what experiences are of emergency managers and senior administrators using virtual emergency management systems within a cross disciplinary, organizational, and community structure such

as an institution of higher education, since the dearth of research involving virtual emergency management systems was limited to large urban areas (Kapucu & Garayev, 2012; Nikolai, 2015). A gap in the literature emerged in understanding how organizations comprehend, train, and utilize virtual emergency management systems, in addition to the possible integration of these systems within NIMS and ICS standards. As a result, there is a need for this study to explore virtual emergency management systems within operational and tactical environments prior to, during, and after a critical incident.

As noted above, the following research has implications on the expansion of structuralism theory within the field of emergency management that is based on relationships of individuals to, and their interactions with, an overarching structural system (Lounsbury & Ventresca, 2003). Structuralism theory in the context of emergency management explains the incident command system's (ICS) modular organizational structure and the interaction between internal and external stakeholders throughout a critical incident. There is an assumption this use of ICS during the response to a critical incident minimizes communication gaps within the command structure (Federal Emergency Management Agency, 2010, 2016). The use of virtual emergency management systems has the potential to close this gap in communications further.

In addition to structuralism theory, situational crisis communication theory examines ways an organization selects effective crisis mitigation techniques based upon the public's understanding of events and ways they ascribe blame during a critical incident, and further influenced the following research (Ulmer, 2012). The use of virtual emergency management systems are potentially utilized to expand upon situational awareness (Nikolai, 2015), are obtained by university emergency managers and senior university administrators, and may potentially increase communication capabilities during a disaster response. This situational

awareness may lead to an increase of information, thereby expanding the knowledge base of users.

This study also has implications on situated learning theory and its use in the virtual learning environment, which is based on the concept that learning occurs through the activity, context, and culture in which the learning takes place (Farra et al., 2012; Kakavelakis & Edwards, 2012). According to Cobb and Bowers (1999), individuals learn in ways similar to how they participate in their social environment. Learning does not occur by reading a book or traditional learning in the typical classroom environment; it happens when a student participates in dealing with real world situations where classroom theory becomes practice (Cobb & Bowers, 1999). The following research may be the catalyst to move from the more traditional learning environments of the classroom and online technology, into simulation based, hands-on practical learning environments.

Understanding operational and tactical environments may provide researchers an opportunity to study decisions made in the *real world* environment to assign appropriate theories or propose alternative theories regarding the management of critical incidents. In addition, research has potential implications for the academic community by providing information regarding lived experiences of utilizing virtual emergency management systems as an emergency management tool within operational and tactical environments.

Purpose of the Study

The purpose of this qualitative study is to explore experiences of university officials who utilized virtual emergency management systems as a technological platform for communication, resource coordination (i.e., personnel and equipment), and strategic thinking throughout a critical

incident in operational and tactical environments using 4-year public institutions of higher education.

Such institutions are increasingly facing critical incidents (Federal Emergency Management Agency, 2016). To assist in mitigation efforts, these organizations are adding the use of virtual emergency management systems to their operational and tactical environments; however, experiences with these systems regarding communication and incident management are unclear at best. Research literature regarding the use of virtual systems in the training environment (Chen, 2014; Nathanael et al., 2016; Nikolov, 2011) were indicated by utilizing this technology, communication, and training (Chen, 2014; Kalisch, Aebersold, McLaughlin, Tschannen, & Lane, 2014; Nathanael et al., 2016), knowledge retention (Farra et al., 2012), and relationships among response organizations are effectively developed and maintained (Federal Emergency Management Agency, 2010, 2016; Nikolai, 2015; Nikolai et al., 2015). Communication and collaboration resulted in more effective and efficient preparedness and response efforts in disasters (Federal Emergency Management Agency, 2010, 2016; Kapucu, 2006, 2009; Kapucu & Garayev, 2012).

The tragedy at Virginia Tech in 2007 and other more recent critical incidents prompted many institutions of higher education to enhance their abilities to respond to and recover from emergencies (Federal Emergency Management Agency, 2016; Kapucu & Khosa, 2013; Wang & Hutchins, 2010). These enhancements have included using expanded emergency response plans and operations (Federal Emergency Management Agency, 2016; Kapucu & Khosa, 2013; Wang & Hutchins, 2010) to minimize reputational harm and protect their communities (Narducci, 2016; Snoeijers, Poels, & Nicolay, 2014). The key to the implementation of emergency response plans during core capabilities mission areas of prevention, protection, mitigation, response, and

recovery is communication (Federal Emergency Management Agency, 2016; Kapucu & Hu, 2014). A lack of communication among administrators, both internally and externally, at 4-year public institutions of higher education throughout a critical incident poses significant problems for an organization's ability to respond to a critical incident (Federal Emergency Management Agency, 2010, 2016).

The wider problem of communication throughout a critical incident is not solved until a more narrowly focused study is conducted involving experiences of those using virtual emergency management systems as a technological platform for communication, resource coordination (i.e., personnel and equipment), and strategic thinking throughout a critical incident in operational and tactical environments. This study sought to fill these identified gaps in the literature and solve the research problem.

Significance of the Study

This study explored experiences of university officials who utilized virtual emergency management systems as a technological platform for communication, resource coordination, and strategic thinking prior to, during, and after a critical incident involving 4-year public institutions of higher education. The study explored recommendations of these university officials regarding the future use of these virtual systems. This research differed from other related studies because its focus was on the use of these virtual systems in tactical and operational environments, as compared to previous research that focused only on the use of virtual systems in training environments (Chen, 2014; Farra et al., 2012).

The intent of this study was to extend the emergency management, crisis communication, and higher education fields in several ways. The first issue was with advances in the use of virtual emergency management systems and the potential ability of these systems to close gaps

often found in communications throughout a critical incident (Federal Emergency Management Agency, 2010, 2016). In further addressing communications, the study may provide alternative methods for an organization to select effective crisis mitigation techniques based upon the public's understanding of events and the way they ascribe blame during a critical incident (Ulmer, 2012), potentially limiting confusion and lack of preparedness. Second, the research contributed to existing literature on situated learning, which can lead us to move from more traditional learning environments of the classroom and online technology into simulation based, hands-on practical learning environments (Farra et al., 2012) which use virtual systems as a low cost option for disaster training (Farra et al., 2012; Nathanael et al., 2016; Shubeck, Craig, & Hu, 2016). Third, this study of virtual systems may allow for more improved training opportunities (Farra et al., 2012; Jain & McLean, 2008; Nathanael et al., 2016) for university emergency managers and senior university administrators, and other first responders, since the use of virtual systems was proven to increase cognitive skills (Nathanael et al., 2016) and retention of information (Farra et al., 2012). Fourth, this study on the use of virtual systems may further allow university emergency managers and senior university administrators the ability to perform their duties more efficiently and effectively in implementing protective measures during a disaster response (Lui, Fraustino, & Jin, 2016), leading to a resilient community and population (Adey, Anderson, & Graham, 2015; Grove, 2014; Kaufmann, 2015, 2016; White et al., 2015).

Research Question

According to Jain and McLean (2008), the “nation's emergency responders need to work in a coordinated, well-planned manner to best mitigate the impact of an emergency incident” (p. 3). Therefore, the ability to effectively communicate through phases of emergency management and retain knowledge of emergency management concepts have the potential to save lives,

stabilize incidents, and protect property and the environment (Boucki & Schulz, 2015; Federal Emergency Management Agency, 2010, 2016). The use of virtual emergency management systems may allow for structure, approaches, information categories, and communication flow to enhance the ability to manage in all hazardous environments, regardless of the degree of severity. Therefore, the research question for this study is, what are the experiences of university officials, who have utilized virtual emergency management systems, in terms of communication capability, resource coordination, and strategic thinking prior to, during, and after a critical incident involving 4-year public institutions of higher education?

Definition of Terms

There are numerous position and emergency management terms associated with this study. These terms are defined as:

Critical Incidents. This is defined as “any human-caused or natural incident, including terrorism, that results in mass casualties and/or damage or disruption to infrastructure or the environment and overwhelms the responding jurisdiction's resources” (Federal Emergency Management Agency, 2010, p. 16).

Senior University Administrator. A member of the university’s executive policy group as defined by the institution’s emergency operations planning documentation.

University Emergency Manager. A person designated by the institution’s emergency operations planning documentation as the university emergency manager.

Virtual Emergency Management System. A web based Emergency Operations Center that allows for the creation and implementation of emergency plans, the communication of information, policies, procedures, maps, resource status, and various other types of data among community leadership and emergency management professionals prior to, during, and after a

critical incident (Federal Emergency Management Agency, 2016; National Fire Protection Association, 2016).

Research Design

The qualitative research design most appropriate for this study was the phenomenological approach, and the research model utilized was Moustakas's transcendental phenomenological model, which was grounded in the work of Husserl's descriptive phenomenological research (Moustakas, 1994; Reiners, 2012). Husserl posited phenomenology postponed all beliefs and was centered on the meaning ascribed to the individual's experience (Moustakas, 1994).

The transcendental phenomenological method was used to conduct semistructured interviews with university officials to obtain communication and training methods used within their institutions. The sample consisted of university emergency managers and senior university administrators who utilized virtual emergency management systems within their operations. The sampling strategy was nonprobability, and the sampling design was purposive. The research design is explained in more detail in the research design section of Chapter 3.

Assumptions and Limitations

Assumptions

The researcher has over 20 years of practitioner experience with six major hurricane responses, seven wildfire responses, two tornado responses, two train derailments, over 100 fatal car crashes, and numerous other critical incidents, and extensive experience with two virtual emergency management systems (i.e., Web EOC and VEOC*i*). The researcher adopted and developed virtual emergency management systems and utilized virtual emergency management systems within public safety and emergency management departments for approximately four years. Early development and continued utilization of these systems provided knowledge

regarding communication capabilities within the higher education environment, and information regarding coordination capabilities. Based on prior experience, the researcher favored the use of these systems as a tool to increase communication and training capabilities prior to, during, and after a critical incident.

Given this familiarity and preconceptions with successful and less successful implementations and operational use of these systems, the researcher focused on information gathered through the interview process and was mindful of thematic development during the coding process. The use of phenomenological data analysis as posited by Moustakas (1994) aided in the research effort as the researcher sought textural and structural descriptions obtained from transcripts of participant interviews that were unique to the phenomena experienced without making assumptions (Creswell, 2013). An assumption was made that participants provided factual and accurate descriptions of their experiences during the interview process.

The researcher's perspective of this research was also from an emergency management and public safety standpoint, as a chief of police and emergency manager and, to a lesser degree, of a senior university administrator in the researcher's role as an associate vice president. Therefore, the researcher's experiences were different from many of the participants, particularly senior university administrators who occupied the position of vice president (e.g., student affairs, academic affairs, and finance) or president. The researcher acknowledged this bias existed and incorporated safeguards to mitigate these preconceptions and biases. One such safeguard incorporated was bracketing (Moustakas, 1994). In bracketing, a researcher sets aside personal experiences regarding the phenomenon (Tufford & Newman, 2012). Another safeguard was an acknowledgment of conflicts and biases. According to Creswell and Miller (2000), it is important for a researcher to acknowledge any beliefs and biases that he or she may have early

on in the research process. This acknowledgment of beliefs and biases would allow readers to comprehend the researcher's positions fully on the subject (Tufford & Newman, 2012).

General Methodological Assumptions

When selecting an appropriate methodology for this study, the researcher addressed key assumptions within the realm of scientific inquiry. These were based on ontological, axiological, epistemological, and methodological assumptions.

The ontological assumption of this study is there should not be a difference between the use of virtual reality simulation in the training environment to increase the knowledge of student users and the use of virtual emergency management systems to increase the knowledge, communication, and situational awareness of administrators prior to, during, and after an incident. The axiological assumption of this study is the researcher would be able to ignore personal opinions and values while conducting research in an objective manner. The epistemological assumption of this study is the researcher is independent of subjects and data collected, and can study this information and draw conclusions without influencing results. The methodological assumption of this study is by collecting data and analyzing results; a conclusion is made regarding the effect of the use of virtual systems to assist an institution of higher education with communication, situational awareness, and knowledge prior to, during, and after an incident. Results are utilized to better aid emergency managers and senior administrators at institutions of higher education to increase the organization's knowledge and retention of the emergency management information.

Theoretical Assumptions

Theoretical assumptions are used for theoretical advancements in structuralism theory, situational crisis communication theory, and situated learning theory. Structuralism theory is

based on relationships of individuals to, and their interactions with an overarching structural system (Lounsbury & Ventresca, 2003). This explains the incident command system's (ICS) modular organizational structure and interactions between internal and external stakeholders prior to, during, and after an incident. There is an assumption this use of ICS during the response to an incident minimizes communication gaps within the command structure.

Situational crisis communication theory examines ways an organization selects effective crisis mitigation techniques based upon the public's understanding of events and ways they ascribe blame during an incident (Ulmer, 2012). This is utilized to expand upon situational awareness obtained through virtual emergency management systems and their effect on communication capability on disaster response.

Situated learning theory is based on the concept learning occurs through the activity, context, and culture in which learning takes place (Farra et al., 2012; Kakavelakis & Edwards, 2012). According to Cobb and Bowers (1999), individuals learn in ways similar to how they participate in their social environments. Learning does not occur by simply reading a book or traditional learning in the typical classroom environment; rather, it occurs when a student participates in dealing with real world situations where classroom theory becomes practice (Cobb & Bowers, 1999). Current research can be the catalyst to move from the traditional learning environment of the classroom into the simulation based, hands-on practical learning environment.

Topic-Specific Assumptions

The methodological stance taken by the researcher in this study involved positivist assumptions. These are based on ontological, axiological, epistemological, and methodological assumptions which were addressed earlier. Also addressed earlier were theoretical framework

assumptions involved in structuralism theory, situational crisis communication theory, and situated learning theory.

The main topical assumptions published in prior research indicated a lack of communication throughout a critical incident poses significant problems for organizations such as incident stabilization, resource support, strategic thinking, and coordination with other response organizations (Federal Emergency Management Agency, 2010, 2016; Kapucu, 2006, 2009; Wang & Hutchins, 2010; White et al., 2015). Another assumption is NIMS and the ICS were developed and implemented to limit communication and coordination issues during a response to a critical incident (Federal Emergency Management Agency, 2010, 2016; Kapucu & Garayev, 2014).

Responses to critical incidents utilizing NIMS and ICS are known to have interface issues surrounding effective communication and coordination between incident command personnel and the emergency operations center (Federal Emergency Management Agency, 2010, 2016). An assumption is made that the use of virtual systems increases retention of knowledge (Farra et al., 2012), communication in the training environment (Chen, 2014), and the development and maintenance of relationships among response organizations (Federal Emergency Management Agency, 2010, 2016; Nikolai, 2015; Nikolai et al., 2015).

Another assumption is by using the transcendental phenomenological method to gain the essence of real life experiences of participants, responses to questions will be truthful (Moustakas, 1994). According to Moustakas (1994), “from this process a structural description of the essences of the experience is derived, presenting a picture of the conditions that precipitate an experience and connect with it” (p. 35). The assumption is this depiction is unique in its

presentation and the researcher will be able to derive themes from participant depictions to elicit themes used to infer concrete meaning.

Limitations

Numerous limitations are found within the study. One limitation is the number of participants might not be large enough to draw conclusions that are generalizable to other populations and communities. A second limitation may be the time elapsed between the critical incident and the interview. This lapse in time may affect the recollection of the participant, or the loss of recollection of certain experiences. A third limitation, as discussed and addressed earlier in the assumptions section, was researcher personal bias and idiosyncrasies. A fourth limitation was by using a qualitative method, rigor was more difficult to maintain, assess, and demonstrate. A fifth limitation may be the type of large scale disaster investigated, which are influenced by the size of the jurisdiction and the number of resources available. To minimize this influence, the standard definition of a large scale disaster provided by the Federal Emergency Management Agency is utilized to classify these incidents during the initial screening process. A sixth limitation may be the prior training and experience of the emergency management official interviewed. Prior training and experience in large scale disasters could skew results of the study if participants had very little or extensive training and experience in these environments. This is controlled for by asking questions regarding prior training and experience as part of the initial screening process.

A seventh limitation may be economic factors experienced by the jurisdiction. The number of resources, both personnel and equipment, could influence types of decisions made by an emergency manager based on economic realities of the jurisdiction. A statement to this effect is declared within the limitation section of final results; however, results might still be widely

applicable to jurisdictions facing large scale disasters. An eighth limitation may be the type of jurisdiction involved in the large scale disaster. Findings of the study may not translate to all jurisdictions (e.g., rural versus urban setting). Identification of types of jurisdiction involved, and a comparative analysis of data between types of jurisdictions, would provide information on whether these results are valid across jurisdictions. All limitations found are noted and addressed at the end of the study.

Design Flaw Limitations

A design flaw limitation within this study is the use of 4-year public institutions of higher education. By limiting the study to this group, results may not be transferable to other institutions of higher education, such as 2-year institutions (i.e., community colleges) or private institutions. However, leadership structures within higher education are similar and research presented on leadership, communication, and coordination may apply to all institutions of higher education, other jurisdictions, and other emergency response organizations. Future studies are conducted on other public or private organizations to gauge transferability. A second design flaw is research may not be replicable and may be cost prohibitive; however, by using a qualitative design, in-person interviews may elicit additional information, emotion, and cues that would not be available in a quantitative design study. A third design flaw is by using a qualitative research approach; reliability and validity are compromised, limiting the generalizability of results.

Delimitations

The focus of this study is on experiences of university emergency managers and senior university administrators who utilized virtual emergency management systems with communication capability, resource coordination, and strategic thinking prior to, during, and

after a critical incident involving 4-year public institutions of higher education. An evaluation and review of specific virtual emergency management software is not provided in the study. The focus of the study is not on future trends found in emergency management training using virtual systems. Also, not evaluated in this study is the operation of virtual emergency management platforms during an actual incident from an external evaluator perspective.

Organization of the Remainder of the Study

In accordance with Capella University's PhD Dissertation Process Manual, the remainder of this study is organized into standard dissertation chapters. Chapter 2 will focus on theories associated with the study, a review of current literature on the use of virtual systems, emergency management, and the higher education environment, and a critique of previous research methods. Chapter 3 will present the research design, population, sample, and methodology used in the study. In addition, a discussion of ethical considerations is presented. Chapter 4 includes an introduction to the study, describes the sample, and presents data collected and results of the analysis. Chapter 5 will present findings, conclusions, limitations, implications, and recommendations for future research. A list of all references is contained at the end of the study.

CHAPTER 2. LITERATURE REVIEW

This study seeks to explore experiences of university officials who utilized virtual emergency management systems in operational and tactical environments of a critical incident. These experiences may provide insight into the ability to minimize communication failures and resource deployment issues, and facilitate strategic thinking and situational awareness for administrators within 4-year public institutions of higher education. These virtual systems also may provide practical solutions gained from previous experiences, which allow for users of virtual systems to gain familiarity with the jurisdiction's capabilities and response protocols to enhance community protection initiatives. Recommendations should arise from findings in this study for institutions of higher education to leverage the virtual emergency management systems technology to minimize risks associated with critical incidents at their institutions and in their communities. Results of this study may also provide information on whether the use of virtual systems in emergency management increases or decreases the retention of knowledge during all mission areas involved in emergency management, and the expansion of structuralism theory, situational crisis communication theory, and situated learning theory.

This chapter will orient the reader in methods utilized to conduct research on this topic, and lay the foundation for evaluating the three theories associated with the study. A review of the current literature on the use of virtual systems, emergency management, and aspects of the higher education environment are presented along with a synthesis of research findings. The chapter will conclude with a critique of methods utilized by previous researchers in the field.

Methods of Searching

While researching this topic, four main research techniques were employed to guide the researcher to material relevant to the phenomenon under inquiry. These techniques included

searching for keywords, bibliographic mining and searching references cited in previous research, utilizing published dissertations, and conducting searches based on selected methodology.

Keywords used in searching literature were *virtual, virtual tools, emergency management, higher education, technology, crisis, crisis management, virtual-emergency management, emergency management-higher education, technology-emergency management, crisis management-higher education, and technology-higher education*. This search produced articles related to the field of inquiry.

The search strategy employed started with a broad overview of emergency management and technology producing numerous related and unrelated articles. The field was then limited by rearranging keywords, combining the terms *higher education* and *virtual system* with *emergency management* and *technology* to narrow the field. Boolean search techniques were utilized to hone the search further and produce results that are more relevant. Numerous specialization databases were chosen to search for the topic. These databases included SAGE Journals Online; ProQuest; and SocINDEX with Full Text. Databases were employed due to large numbers of peer reviewed journals across multiple fields such as education, criminal justice, and technology. Once selected, articles were reviewed, and associated references were surveyed for additional articles, keywords, and concepts related to the topic.

These articles provided information regarding the use of virtual systems across numerous disciplines and the need for conduction of additional research to follow up on existing literature. A review of articles also identified a gap in existing literature concerning the use of these systems in the higher education setting and posed additional questions of whether these systems can assist a higher education institution in meeting federal compliance requirements put forth by

the Clery Act and applicable state laws. Articles demonstrated the topic is of interest to fields of emergency management and higher education.

Theoretical Orientation for the Study

As the literature was scrutinized, three relevant theories emerged. These theories were the situated learning theory, structuralism theory, and situational crisis communication theory. After careful consideration, it was determined these theories could form a cohesive framework and foundation from which a new theory could emerge involving the use of virtual systems within the field of emergency management.

Situated Learning

Situated learning theory was developed by Jean Lave and Etienne Wenger, and is based on the concept learning occurs through the activity, context, and culture in which the learning takes place (Farra et al., 2012; Kakavelakis & Edwards, 2012), and is tied to established social relationships (Kakavelakis & Edwards, 2012). In a traditional learning environment, participants learn in a classroom setting from lectures, notes, or books. The situated learning environment provides a participant context to the activity performed and is relatable to the participant's cultural perspective (e.g., profession, work environment). The theory assumes all participants have the same basic abilities to learn in an atmosphere of activity and participation. Situated learning theory is likened to Vygotsky's social development theory, as it is based on learning through social interaction and context brought about by shared experiences; however, Vygotsky focused on the concept of the transmission of internalized knowledge (Nezhnov, Kardanova, Vasilyeva, & Ludlow, 2014).

In the research article "Live-action Mass-Casualty Training and Virtual World Training: A Comparison" (Shubeck et al., 2016), the situated learning theory was tested through virtual

systems in the facilitation of learning outcomes compared to the use of live action training environments (Shubeck et al., 2016). As mentioned previously, situated learning theory is based on the premise individuals tend to learn more by actively participating in the learning environment (Kakavelakis & Edwards, 2012). As situated learning occurs, it becomes important to maintain a social network to allow for the further distribution and attainment of knowledge (Kakavelakis & Edwards, 2012). According to Kakavelakis and Edwards (2012), this is “enabled because actors operate within a seemingly virtuous circle of cooperation, mutual benefit and shared purpose” (p. 475).

Research by Shubeck, Craig, and Hu (2016) validated the premise of the situated learning theory and relevance to the field of emergency management because it supports previous findings on the use of virtual training (Chen, 2014; Farra et al., 2012). This research further expanded upon earlier studies by increasing assessment between virtual training conditions and live action training conditions; however, previous research did conclude a lack of guidance within a virtual system could lead to participants feeling overwhelmed (Shubeck et al., 2016). This research showed an increase in learning outcomes for both conditions and validated the use of these platforms in disaster training (Shubeck et al., 2016) due to the cost effectiveness of using virtual simulation training versus the cost of a full scale live exercise.

Situated learning theory would contribute effectively to the theoretical framework for the dissertation topic of utilizing virtual emergency management systems as a technological platform for communication, resource coordination (i.e., personnel and equipment), and strategic thinking prior to, during, and after a critical incident in operational and tactical environments. The theoretical framework would illustrate the importance of utilizing a single platform for training, and the transfer of information and communications throughout a critical incident. This single

platform enables all users to facilitate the enhancement of knowledge by increasing the situational awareness maintained among active participants of the group. Additionally, each person is immersed in the virtual environment and can read, interpret, and understand the same information, and pose clarifying questions that further expands the knowledge base of users and potentially increases the speed in which decisions are made.

Structuralism

Structuralism theory was first developed by Ferdinand de Saussure in linguistics and then adapted to the field of anthropology by Claude Levi-Strauss (Rutherford, 1977), and is a methodology which states fundamentals of individual interaction are understood through their relationship to and interaction with a primary system or structure (Lounsbury & Ventresca, 2003). The assumption of the theory is all systems have a hierarchal structure and the established structure will determine an individual's position within the system.

In the research article "Situation Awareness: Context Matters! A Commentary on Endsley" (Flach, 2015), structuralism was explained as motivated by internal practices and components which formed the awareness of the situation as experienced by the individual. Structuralism theory is based on relationships of individuals to and their interactions with an overarching structural system (Lounsbury & Ventresca, 2003).

Structuralism theory can add to the emergency management knowledge base by explaining interactions between internal and external stakeholders prior to, during, and after an incident, and the impact of the incident on the affected organization's structure. These interactions increase the familiarity with various structures within the organization, maximize the effectiveness of policies and procedures, and can minimize gaps in communication and response issues regarding various affected populations within the organization. Even though these

interactions within the structure of the organization are understood, they are always changing and affected differently given the nature of risks involved in the incident. Based on this understanding, structuralism does have a significant role in the field of public safety and emergency management.

Structuralism is also characterized by the system of structures taking precedence over human needs. This was seen in the response of social systems after the events of September 11, 2001. According to research conducted by North et al. (2013) involving flight attendants affected by events of that day, many structures within everyday life continued, even though many flight attendants were severely affected by those tragic events, and events occurring in months preceding the events. These structures took priority over needs and concerns of flight attendants, with one flight attendant remarking “I don’t understand how people can just be normal,,Nothing is normal anymore” (North et al., 2013, p. 328).

Structuralism theory further serves as part of the theoretical framework for the dissertation topic because structuralism theory can explain the incident command system’s (ICS) modular organizational structure and interactions among internal and external stakeholders prior to, during, and after an incident. These interactions can increase familiarity with various structures within the community, maximize the effectiveness of policies and procedures, and minimize gaps in communication and response issues regarding various affected populations within the community. It is important emergency managers appreciate the use of structuralism to understand community needs prior to, during, and after a disaster to develop adequate support mechanisms and resources for all members of the community.

Situational Crisis Communication

Situational crisis communication theory was developed by W. Timothy Coombs and examined ways an organization selects effective crisis mitigation techniques based upon the public's understanding of events and the way they ascribe blame during an incident (Coombs, 2007; Ulmer, 2012; Yum & Jeong, 2015). Coombs (2007) recognized to have an effective response to a crisis, an assessment of the situation is necessary, along with a comparison to the potential threat to the reputation of the organization. Coombs (2007) further proposed reputational threat is swayed by the initial crisis obligation held by the organization, the historical context regarding the crisis, and the prior reputation of the organization. Coombs (2007) also characterized crises in groups where the organization is the victim (minor reputational threat), caused by accidental occurrence (medium reputational threat), or caused by intentional occurrence (major reputational threat). The theory assumes all crises are interpreted in the same manner by all populations and are categorized similarly by populations.

The research article "Increasing the Impact of Thought Leadership in Crisis Communication" (Ulmer, 2012), is a critical look at current theories, including situational crisis communication theory, and practices of *thought leadership* on crisis communication in organizations, and, the lack of positive impact these theories have on crisis communication and responses occurring within communities. According to Ulmer (2012), to move forward, "we must develop powerful normative theories of crisis communication that will improve the practice of crisis communication" (p. 524). Situational crisis communication theory includes variables considered in the selection of a response to a crisis depending on the level of threat to an organization's reputation (Coombs & Holladay, 2002; Ulmer, 2012).

Ulmer (2012) analyzed current theories, argued for the promotion of innovative ideas, devised a multidisciplinary approach to crisis communication while breaking down traditional silos, and redefined crisis to include not only addressing the threat or incident, “but also must address the opportunities inherent to crises” (p. 525). According to Ulmer (2012), communication in a crisis typically fails because those involved do not know stakeholders prior to a disaster and often lose credibility due to lack of transparency brought on by a focus on organizational reputation. This lack of previous relationship development validated Coombs’ (2007) prior relational reputation factor. To combat this unfamiliarity with stakeholders, Ulmer (2012) recommended organizations must maintain a focus on their values and build strong relationships with community stakeholders, both internal and external, before a crisis occurs. According to Coombs (2007), this development of trusting relationships begins by providing stakeholders with information. This information need is born from the crisis and can be the root of psychological stress found in stakeholders’ experiences (Coombs, 2007). To combat this, Coombs (2007) argued an organization should provide stakeholders with information regarding what occurred and what protective measures are in place. Ulmer (2012) concluded by encouraging leaders in the field of crisis communication to export these new theories and practices into organizations and communities through simulations, training, and testing during mock crisis events.

Bundy, Pfarrer, Short, and Coombs (2017) indicated there are three main components internal to an organization that affect an organization’s preparedness to deal with a crisis: (a) the organizational culture and structure; (b) the cognitive and behavioral ability of the leadership to handle a crisis; and (c) the ability to operate as a high-reliability organization reduces the likelihood of crises. Bigley and Roberts (as cited in Bundy et al., 2017) further espoused these

ideas, when they stated their research “focused on three aspects of high-reliability organizations: mechanisms that allow for the alteration of formal structures, leadership support for improvisation, and methods that allow for enhanced sensemaking” (p. 1667). Bundy et al. (2017) further indicated organizational preparedness from the external viewpoint was underscored by the importance of stakeholder relationships.

Situational crisis communication theory would augment the theoretical framework for the dissertation topic by standardizing an organization’s communication methodology to assist in providing the public accurate information regarding threats posed to the community. This could positively affect the reputation and credibility of the organization, thereby limiting damage to reputation during and after a crisis. Current research seeks to assess the use of virtual emergency management systems in the higher education environment, and if and how they might expand upon the situational awareness (Nikolai, 2015) obtained by university emergency managers and senior university administrators prior to, during, and after a critical incident. This situational awareness could lead to an increase of information, thereby expanding the knowledge base of users.

Theoretical Contributions Summary

Current research has far-reaching implications for theoretical contributions to the use of virtual emergency management systems to aid in the communication process within higher education, and has broad implications for Public Service Leadership and the emergency management field (Chen, 2014). These implications revolve around structuralism theory, situational crisis communication theory, situated learning theory, and implications for academic and research communities.

These studies have implications for current research through the expansion of structuralism theory within the field of emergency management that is based on relationships of individuals to, and their interactions with, an overarching structural system (Lounsbury & Ventresca, 2003). Structuralism theory in the context of emergency management explains the incident command system's (ICS) modular organizational structure and the interaction between internal and external stakeholders prior to, during, and after a critical incident. There is an assumption this use of ICS during the response to a critical incident minimizes communication gaps within the command structure (Federal Emergency Management Agency, 2010, 2016). The use of virtual emergency management systems has the potential to close this gap in communications further.

Situational crisis communication theory examines ways an organization selects effective crisis mitigation techniques based upon the public's understanding of events and ways they ascribe blame during a critical incident (Ulmer, 2012). A fundamental concept of NIMS is situational awareness. Situational awareness is the attainment of timely and accurate information during an incident that allows for responders and decision makers to form a common operating picture (Federal Emergency Management Agency, 2016). The use of virtual emergency management systems are a potential tool for expanding upon situational awareness (Nikolai, 2015) obtained by university emergency managers and senior university administrators, and may potentially increase communication capabilities during a disaster response. This enhancement of situational awareness may provide an increase of information obtained, thereby expanding the knowledge base of users, and allowing for more effective and timely mitigating techniques. This may enhance the ability of organizations to foster positive stakeholder relations and

appropriately structure their organizations to boost crisis preparedness and response capabilities (Bundy et al., 2017).

This study also has implications for situated learning theory and its use in the virtual learning environment, which is based on the concept that learning occurs through the activity, context, and culture in which learning takes place (Farra et al., 2012; Kakavelakis & Edwards, 2012). According to Cobb and Bowers (1999), individuals learn similar to how they participate in their social environments. Learning does not occur by reading a book or traditional learning in the typical classroom environment; it occurs when a student participates in dealing with real world situations where classroom theory becomes practice (Cobb & Bowers, 1999). The current research may lead to moving beyond the traditional learning environment of the classroom into the simulation based, hands-on practical learning environment.

Understanding operational and tactical environments may provide future researchers the opportunity to study decisions made in the *real world* environment to associate relevant theories or propose alternative theories regarding the management of critical incidents. Also, this has potential implications for the academic community by providing insight regarding experiences of utilizing virtual emergency management systems as an emergency management tool within operational and tactical environments.

Review of the Literature

This literature review is composed of seven sections: NIMS and standardization; higher education and the need for crisis leadership; information technology as a communication platform; virtual emergency management systems; communication, coordination, and strategic thinking; training and collaboration; and organizational structure and effects. These sections give an overview of current literature available on the topic of inquiry.

National Incident Management System and Standardization

After communication and coordination failures of September 11, 2001, many public safety and emergency management organizations, including the federal government, saw the need for standardization of equipment, communication, and protocols in order to achieve a successful response to critical incidents (Caruson & MacManus, 2008; Federal Emergency Management Agency, 2016). This collaborative approach was encouraged and facilitated by the development of NIMS and ICS through Homeland Security Presidential Directives 5 and 8 (Caudle, 2012; Federal Emergency Management Agency, 2016), and mandates passed on through the Federal Emergency Management Agency for compliance. Target Capabilities Lists (TCL) and Universal Task Lists (UTL) were developed through a standardization process and distributed through various training programs administered by the Federal Emergency Management Agency and other training partners. Even though standards can set a baseline for an organization (Brunsson, Rasche, & Seidl, 2012), that baseline should not be static if the organization and its personnel wish to remain relevant in their field. Standards are often dynamic (Brunsson et al., 2012) and are evaluated periodically for required changes. Given this dynamic nature, TCLs were re-evaluated and turned into new core capabilities espoused by the Department of Homeland Security (Federal Emergency Management Agency, 2017). This is partly in response to the establishment of a *whole community approach* to emergency management to increase standardization and the creation of Presidential Policy Directive 8, which grew out of Homeland Security Presidential Directive 8 (Caudle, 2012).

This process of standardization allowed emergency management and public safety organizations the ability to shift resources amongst various organizations during an incident (Federal Emergency Management Agency, 2016). This further allowed for the establishment of

integrated and interoperable communications between organizations and across disciplines (Federal Emergency Management Agency, 2016). Since the basis for any successful risk and disaster management framework approach often comes from having existing planning in place for the continuity of operations for an organization (McKnight & Linnenluecke, 2016), standardization also led to planning efforts that produced numerous emergency and business continuity documents across multiple jurisdictions. Research conducted by Herbane (2010) indicated participants viewed the loss of key personnel within their continuity of operations was more critical to their operations than other loss factors. According to Grothe-Hammer and Berthod (2016), to be effective these continuity plans need flexibility, regular use, and to have an appropriate level of situational awareness in their implementation, and to be compatible with other organizations and jurisdictions.

Benefits of standardization and integrating emergency management and business continuity in the same program across various jurisdictions often results in the building of community resilience and reduces the community's vulnerability to disasters (McKnight & Linnenluecke, 2016). According to McKnight and Linnenluecke (2016), resilience describes "the characteristics of [organizations] that are able to respond quicker, recover faster, or develop better ways of doing business under duress than others" (p. 292). This approach further allows an organization to obtain new business, build its reputational status, and strengthen relationships with current stakeholders (McKnight & Linnenluecke, 2016).

A problem often found with standardization and the integration of emergency management and business continuity into the same program across various jurisdictions is the lack of support from senior leadership due to costs and commitment. Oftentimes, a lack of understanding occurs of regarding all dependencies and possible inconsistencies associated with

emergency management planning, approaches utilized in setting up the process, and assumptions made in developing the disaster plan (Satyanarayana-Tammineedi, 2012). If the business continuity process is the basis for emergency management efforts across multiple organizations, then any errors in the business continuity process in one organization will likely doom the entire collection of emergency management initiatives across all organizations and jurisdictions involved.

Higher Education and the Need for Crisis Leadership

The 10-year anniversary of the shootings at Virginia Polytechnic Institute and State University (Virginia Tech) recently passed on April 16, 2017. This tragedy and several others that have since occurred led universities to develop robust emergency management plans, delve into enterprise risk management solutions, conduct active shooter training programs, and develop cross disciplinary teams to assess threats from internal and external actors (Federal Emergency Management Agency, 2016). A study conducted by Caro (2015) pointed to the significance of effective leadership in the implementation and use of emergency management systems. This crisis leadership included the ability to think outside the box in stressful time sensitive conditions; the capacity to adapt to ever-changing situations; the ability to gather information and become *situationally aware* of the threat environment; the capability to make decisions with little information; and the capacity to delegate authority when needed (Caro, 2015). This crisis leadership was not part of the higher education administrator's training and experience. However, since research indicated, "the college educated are more open-minded, more understanding of human behavior, and more sensitive to community concerns" (Chappell & Gibson, 2009, p. 339), there is an opportunity to train higher education administrators in

emergency management leadership practices effectively. Caro (2015) further indicated effective leadership in emergency management is obtained through the transformational leadership model.

This leadership theory pushes leader and follower interaction through the lens of what is morally right and asks leaders and followers to look beyond their own needs and instead focus on needs of the organization, or the community they serve (Northouse, 2013). Transformational leadership requires leaders to establish a vision for the organization, and by doing so, they inspire followers with passionate leadership to meet the mission of the organization (Alina, 2013), and to work together to establish advances within emergency management (Caro, 2015). The symbiotic relationship provided by transformational leadership builds trust internally and externally to the organization by providing a roadmap for members of the organization, and a guide for which the community can judge the organization's effectiveness. Transformational leadership principles produce movement in an organization by pushing followers to go above and beyond their normal capabilities by "raising followers' levels of consciousness about the importance and value of specified and idealized goals...getting followers to transcend their own self-interest for the sake of the team or organization, and...moving followers to address higher-level needs" (Northouse, 2013, p. 190). By enhancing levels of consciousness in followers, leaders can move organizational change forward with significant buy in from their followers. This is an important aspect of the relationship needed between leadership at institutions of higher education, the local community, and the academic environment due to the changing threat landscape.

As threats increased globally, educational institutions were viewed as *soft target* locations, leading many university officials to enhance their capabilities in responding to and recovering from emergencies using expanded emergency response plans and operations

(Doherty, 2004; Kapucu & Khosa, 2013; Wang & Hutchins, 2010). These preparedness activities are achieved through the support of senior administrators and the prioritization of plan development (Doherty, 2004). These enhancements were done to minimize reputational harm, protect their communities (Snoeijers et al., 2014), and comply with state and federal laws (Drysdale, Modzeleski, & Simons, 2010). The key to the implementation of these types of plans during core capabilities mission areas of prevention, protection, mitigation, response, and recovery (Federal Emergency Management Agency, 2016; Kapucu & Hu, 2014) has been communication.

Information Technology as a Communication Platform

According to Daft (2013), “when structure and communication characteristics did not reflect technology, departments tended to be less effective” (p. 287). Therefore, the ability of an organization to utilize technology to increase structure and communication can increase the effectiveness of that organization. Research conducted by Kapucu and Garayev (2012) indicated by using information technology, communication among response organizations is significantly increased. This is important because critical incidents are often characterized by a lack of control and limited time to respond (Federal Emergency Management Agency, 2010, 2016; Herbane, 2010). However, prior studies involving information technology platforms such as virtual emergency management systems were limited to the use of these virtual systems in the training platform and not during actual critical incidents (Chen, 2014; Nikolov, 2011). Participants in a study conducted by Caro (2015) indicated advancements in technology are increasingly utilized in the field of emergency management. However, due to costs of technology, implementation is slow and protracted as was the experience with implementations of radio interoperability projects (Caro, 2015). Results of the following study may ascertain

whether virtual emergency management systems, as technological platforms, are effective in increasing communication, resource coordination, and strategic thinking throughout a critical incident in operational and tactical environments within 4-year public institutions of higher education. Findings of this study may further enhance the discussion of *multiagency coordination center* concepts that have not advanced at the same rate as *incident command system* concepts (Stambler & Barbera, 2011). Further implications of the study exist on training and collaboration using technological platforms, such as virtual systems, and organizational structures found within NIMS, ICS, MACS, and institutions of higher education.

In research conducted by Kapucu and Van Wart (2006), large scale disasters such as the September 11th terrorist attacks were compared to relatively repetitive type disasters experienced during the four 2004 Florida hurricanes. Kapucu and Van Wart (2006) provided a definition of these types of events, compared and contrasted response efforts, and discussed expectations of the general public during a disaster. Kapucu and Van Wart (2006) further discussed the importance of having interoperability, coordination, and support among agencies during a disaster event due to the need for rapid assessments and flexible decision making. Kapucu and Van Wart (2006) further suggested the proper use of information technology can aid in these response efforts by providing a communication platform from which to operate.

Virtual Emergency Management Systems

Virtual emergency management systems are a web based emergency operations center that allows the creation and implementation of emergency plans; the communication of information (e.g., policies, procedures, maps, resource status); and the sharing of other types of data among community leadership and emergency management professionals prior to, during, and after a critical incident (Federal Emergency Management Agency, 2016; National Fire

Protection Association, 2016). Chen (2014) provided basic research into the topic of using virtual systems to facilitate learning outcomes in conducting responses to emergencies in a more cost effective manner. The virtual system used to cultivate the development of decision making skills in this study was the On-line Interactive Virtual Environment (OLIVE) platform (Chen, 2014). The three main objectives of Chen's (2014) study were:

1. To ascertain whether the use of the virtual environment contributes to the understanding of emergency response;
2. To utilize a case study to assess the outcome of a flood response exercise; and
3. To propose the use of the virtual environment in a large scale response to an emergency. (Chen, 2014)

Preliminarily, the study found the use of these systems could increase learning outcomes (Chen, 2014). Data for this study were collected using a qualitative case study to examine the effectiveness of virtual systems in a training environment. The case study was conducted utilizing exercise ATLANTIS, a scenario based on the 2007 flood that occurred in the United Kingdom (Chen, 2014). The exercise consisted of two parts with associated injects, the preincident warning phase and the height of the flood incident (Chen, 2014). After the exercise, participants responded to a pre debriefing questionnaire, and a debriefing questionnaire (Chen, 2014). A 3-hour pre-exercise practice session was conducted to familiarize participants with the technology and platform (Chen, 2014). Participants then moved on to the actual 3-hour exercise. The exercise consisted of a briefing session, the exercise, and the debriefing session (Chen, 2014). Chen's (2014) research showed most participants found the virtual system was easy to utilize and felt comfortable using the system. The study also found most participants stated collaboration was easily facilitated using the platform (Chen, 2014). Chen's (2014) study also

indicated most participants communicated person-to-person to discuss issues instead of through the virtual system. Chen's (2014) research on virtual emergency management training sessions concluded virtual systems need exploration and development for "enhancing communication and coordination skills among strategic, tactic, and the general public in order to respond to emergencies or disasters more effectively" (Chen, 2014, p. 748).

In research conducted by Shubeck et al. (2016), the use of virtual systems was examined to gauge their effectiveness in facilitating learning outcomes compared to the use of live action training environments. The virtual system used in this study was the Virtual Civilian Aeromedical Evacuation Sustainment Training (VCAEST). The objective of the study was to evaluate the VCAEST environment compared to an expert led live action training environment involving civilian medical personnel ($n = 36$). An experimental design (quantitative) was used in the study, employing a virtual training group composed of 16 randomly assigned participants trained through VCAEST and a live action training group composed of 20 randomly assigned participants trained through live action (Shubeck et al., 2016). Each participant completed a demographics survey, and the average experience level was 7 years with one-third having received prior mass casualty training (Shubeck et al., 2016).

This study was relevant to emergency management because it supported previous findings on the use of virtual training and expanded upon previous research by increasing assessment between virtual training conditions and live action training conditions. This research showed increases in learning outcomes for both conditions and validated the use of these platforms in disaster training (Shubeck et al., 2016) due to the cost effectiveness of using virtual simulation training versus the cost of a full scale live exercise.

A study conducted by Farra et al. (2012) addressed the use of virtual simulation training in the clinical environment by measuring the knowledge of nursing students prior to simulation training, immediately after the simulation training, and 2 months after the training. This differed from other studies because it focused on the clinical environment as compared to previous research that focused on in-field disaster triage. Also presented in the study, was a more extended post training assessment of 2-months compared to a previous study which conducted a 6-week assessment (Farra et al., 2012), and results showed an increase in learning outcomes (Farra et al., 2012). According to Farra et al. (2012), the use of virtual reality simulation “had a strong positive effect on retention of disaster training” (p. 665) and could result in training emergency managers more effectively and efficiently.

A longitudinal experimental design was used in Farra et al.’s (2012) study, similar to the panel survey (Remler & Van Ryzin, 2015). The pre- and post knowledge assessment tool involved in this study consisted of a 20 question, multiple-choice exam. The Farra et al. (2012) study collected data by using an intervention group and a standard care group. The intervention group received instruction through the web based teaching method only, while the standard care group received both web based and virtual simulation instruction (Farra et al., 2012). Both groups were given the 20-question knowledge assessment before completing the web based training. The standard care group received additional training using virtual simulation. After completing all required training, both groups were administered the same 20-question knowledge assessment (Farra et al., 2012). After 2 months, both groups were administered a final knowledge assessment to measure learning retention. The study provided adequate information on the background and basis for studies; however, results of the study did not contain an assessment of the sample, questions, or data for validity and reliability.

Farra et al. (2012) utilized the situated learning theory as the basis for their hypothesis. As mentioned earlier, situated learning theory is based on the concept learning occurs through the activity, context, and culture in which the learning takes place (Farra et al., 2012; Kakavelakis & Edwards, 2012). Results of the study confirmed through the combination of web based instruction and the use of hands-on virtual learning participants were able to retain more information for a longer period, than learners who used the traditional web based learning platform.

A study conducted by Kalisch, Aebersold, McLaughlin, Tschannen, and Lane (2014) used a quasi-experimental design on nursing staff to gauge the effectiveness of using virtual systems to increase teamwork. The Second Life system was utilized to provide a virtual simulation environment of an eight-bed hospital (Kalisch et al., 2014). Each participant was provided with pod-casts regarding fundamentals of teamwork and information on how to utilize the virtual training system (Kalisch et al., 2014). The study lasted 1-hour and involved three scenarios that included debriefing sessions (Kalisch et al., 2014). Two surveys were used to gather information regarding teamwork. The pre- and post assessment tools were administered 3 weeks prior to involvement in the study and 3 weeks after involvement in the training simulation (Kalisch et al., 2014). The preassessment tool not only included questions regarding teamwork but also provided five questions regarding participants' experiences utilizing virtual systems (Kalisch et al., 2014). Results indicated utilizing the virtual system had a significantly higher effect on teamwork behavior, but not on teamwork knowledge (Kalisch et al., 2014).

Further discussed within the study was the finding that the level of computer or virtual simulation experience prior to the study did not have an impact on teamwork behavior or teamwork knowledge scores (Kalisch et al., 2014). According to Kalisch et al. (2014),

significant improvement was seen in areas of “trust, team orientation, back up, and team leadership” (p. 176). These characteristics are also important to the management of critical incidents, and emergency planning and response teams. Results of this study indicated the use of virtual simulation systems might have positive effects on how teams communicate, coordinate, and operate in emergencies, such as those found in a hospital setting.

Research conducted by Aebersold, Tschannen, and Bathish (2012) used a convenience sample of senior nursing students to evaluate the virtual learning environment’s effects on performance. The virtual system utilized for the study was the Second Life system and the measurement tool used was the Emergency Medicine Crisis Resource Management (EMCRM) (Aebersold et al., 2012). Aebersold et al. (2012) indicated by using virtual simulation systems in the training environment the ability to enhance communication, professionalism, and performance increases. Results of the study also revealed participants’ abilities to perform leadership functions increased between scenarios, but this finding was not significant (Aebersold et al., 2012). The Aebersold et al. (2012) study indicated the use of virtual systems could improve performance while offering a low cost method of instruction to impart leadership, teamwork, communication, and judgment skills within users of the platform. Findings of the current research study have implications for the emergency management and crisis leadership field because these traits are often required to manage in a disaster setting effectively (Federal Emergency Management Agency, 2010, 2016).

Research conducted by Ahmed (2011) described the use of *visual Cell - Discrete Event System Specification (VCELL)*, which is a computer based modeling system within the emergency management training environment. The theory used in this dissertation is the discrete event systems specification (DEVS) and is a modeling and simulation theory based on concepts

from systems theory (Ahmed, 2011). Information contained within this study provided additional information regarding the use of virtual tools within the training context of emergency management. Further implications of the study are on the use of these tools to simulate a real world disaster, and associated actions taken are tested through modeling to prevent poor decisions from further destabilizing the incident. According to Ahmed (2011), the “proposed system is intended not only to train emergency response personnel, but also to be used as a core real-time strategy and response system” (p. 104).

Prior research addressed information management and the communication process as critical to the flow of information in an effective and prompt manner prior to, during, and after a critical incident (Caruson & MacManus, 2011; Kapucu & Khosa, 2013; Wang & Hutchins, 2010). According to Bogucki and Schulz (2015), to manage a volatile situation, a dependable and flexible structure needs to be in place. This flexible structure is inherent in the basic formation of ICS, and the use of virtual systems provides a highly dependable platform in which to operate (Bogucki & Schulz, 2015). These systems are increasingly used by public safety organizations to manage incidents (Bogucki & Schulz, 2015). However, to be effective, users of these systems must understand ICS and its implementation or they will become ineffective (Bogucki & Schulz, 2015). The use of virtual emergency management systems further allows organizations, such as institutions of higher education, to comply with federal regulations by providing immediate mass notifications to their community members regarding impending or occurring incidents (Drysdale et al., 2010). The use of virtual systems also proved to increase cognitive skills (Nathanael et al., 2016) and retention of information (Farra et al., 2012). However, these studies did not assess the effect of virtual emergency management systems on communication and information capabilities, even though other research showed technology has

a strong effect on various facets of emergency management (Ha & Park, 2014). This absence of analysis most likely was due to the limited utilization of virtual emergency management systems within the emergency management field at the time of these studies.

Research indicated the use of information technology facilitates and enhances the ability of response organizations to communicate (Kapucu & Garayev, 2012; Wang & Hutchins, 2010). However, limitations of the Kapucu and Garayev (2012) study included ignoring specific information technology platforms, such as virtual emergency management systems during their research. Research conducted by Ge, Meng, Cao, Qiu, and Huang (2014) on virtual city development and modeling indicated using the virtual environment can aid in the planning and response to emergency incidents. Further, a study conducted by Chen (2014) on virtual emergency management training sessions concluded virtual systems needed exploration and development for their ability to enhance communication among stakeholders. The use and influence of social media to communicate during an incident is enhanced by linking social media and other forums to virtual emergency management systems because they function in a similar way to online forums. According to Narducci (2016), social media and forums have “become an important medium, and can be integral in communications plans, specifically with regards to crisis communication” (p. v.).

This conclusion is beneficial for organizations because research showed these virtual systems provide inexpensive and effective educational platforms (Ahmed, 2011; Hewitt, Spencer, Ramloll, & Thomas, 2008; Hosang & Wainer, 2015; Nathanael et al., 2016; Nikolai, 2015; Nikolai et al., 2015; Shubeck et al., 2016). However, studies on the use of virtual systems were limited to the use of virtual tools in the training platform (Ahmed, 2011; Chen, 2014; Hewitt et al., 2008; Nathanael et al., 2016; Nikolai, 2015; Nikolov, 2011), and were not included

in operational and tactical environments involved in an actual critical incident. Further, research on virtual emergency management training sessions concluded virtual systems need exploration and development to enhance communication among stakeholders (Chen, 2014; Kapucu, 2006; Palen et al., 2009). The use of the virtual emergency management system is an effective way to gather information for those in decision making roles to gather and maintain situational awareness of an incident (Kapucu, 2006). These studies illustrated the opportunity for virtual systems to be an alternative to current communication techniques for decision makers and other personnel (Chen 2014; Kapucu, 2006). Additionally, neither study conducted by Chen (2014) nor Kapucu (2006) utilized an organizational and community structure such as an institution of higher education.

To maintain communication flow internally and externally prior to, during, and after an incident, university administrators should develop a communication strategy where they proactively disseminate information about the crisis incident (Claeys & Cauberghe, 2012). In research conducted by Wang and Hutchins (2010), they indicated these institutions should employ communication instruments in order to manage a critical incident effectively. Chen's (2014) study also identified possible opportunities for alternative communication techniques among decision makers and other personnel utilizing a methodology such as virtual systems. A clear indication exists for a study that explores the use of virtual emergency management systems and its effect in the operational and tactical environments on communication, coordination, and strategic thinking within institutions of higher education.

Communication, Coordination and Strategic Thinking

The problem most response organizations have is they are interdependent on other response agencies for resources to mitigate any type of incident (Daft, 2013). Within this

interdependence, communication and coordination become extremely important, but most response organizations operate under interdependence that is pooled (Daft, 2013). In this type of classification, communication is often low, and coordination is governed by standard rules and regulations (Daft, 2013). While this type of interdependence might work well for a localized, highly technical emergency, a widespread emergency requiring greater support from multiple partners would necessitate reciprocal interdependence (Daft, 2013). Since all disasters start local and end local (Federal Emergency Management Agency, 2016), the success of disaster preparedness and planning activities rely on communication and coordination efforts which vary between jurisdictions at local, county, state, and federal levels (Gooden, Jones, Martin, & Boyd, 2009).

According to Caruson and MacManus (2008), the absence of coordination and communication among agencies and jurisdictions are often seen as a weakness of emergency management systems. This lack of coordination and cooperation reduces the ability to prepare for and respond to incidents (Caruson & MacManus, 2008). Major incidents often require resources and support from outside jurisdictions and agencies (Caruson & MacManus, 2008; Federal Emergency Management Agency, 2016). Many affected jurisdictions find it is often challenging to attempt to integrate these responding jurisdictions and organizations into a single cohesive response structure (Caruson & MacManus, 2008; Kapucu & Garayev, 2014) as found within the Incident Command System (ICS).

Following tenants of the Incident Command System (ICS), at the onset of a critical incident an incident commander must “assume command; focus on the mission and ‘get it done’; establish priorities; determine objectives; define expectations; maintain situational awareness; trust subordinates; constantly evaluate and readjust; at the right time, develop incident

organization (ICS); and be decisive” (Renaud, 2012, p. 9). According to Hillman (as cited in Renaud, 2012), the inability of an incident commander to react in a chaotic environment often stems from confusing, ambiguous, and conflicting information received during initial phases of a critical incident, leading to poor management of the scene and lack of strategic thinking. Most stakeholders also judge the credibility and trustworthiness of administrators at institutions of higher education based on how they communicate information to their community (Omillion-Hodges & Rodriguez, 2014) involving a crisis, further adding to the importance of communication capabilities prior to, during, and after an incident. These efforts to increase communication help to reduce “chaos, media pressure, stress, and inaccurate information” (Boin & Hart, 2003, p. 545) often brought on by various changes associated with the fluid nature of a crisis. Communication is key to building long-term, trusting relationships among communities; and according to Gaiter (2013), “good communication skills can also enhance the image of an organization” (p. 325), and in the event of a crisis, can save lives. The ability to communicate crisis information effectively and efficiently is an important part of protecting our communities. Therefore, communication and collaboration must be factors considered within the planning phases of emergency management (AlBattat & Mat Som, 2013).

Research conducted by AlBattat and Mat Som (2013), indicated leaders within an organization are committed to the development and implementation of emergency plans in order to ensure strong communication efforts before, during, and after a critical incident. Planning and collaboration are required by senior administrators and are conducted in accordance with other national standards in emergency preparedness to minimize the impact of the incident on the community (AlBattat & Mat Som, 2013; Federal Emergency Management Agency, 2016). Senior administrators also must be knowledgeable in disaster preparedness and make available

appropriate training and resources to manage risks associated with various threats, thereby lessening the impact on the organization (AlBattat & Mat Som, 2013). This funding of training and resources must be sustainable if the goal of the organization is to meet the needs of the institution in the event of a critical incident that overwhelms the entire community (Caudle, 2012).

Critical incident management has been plagued by problems regarding disruption of communication and coordination (Caruson & MacManus, 2011; Kapucu, 2006, 2009; Kapucu & Van Wart, 2006). These problems are evident in critical incidents where emergency management offices suffered physical damage (Waugh, 2010), leaving communities with little ability to coordinate resources effectively (Federal Emergency Management Agency, 2016). Further research indicated communication and coordination are “crucial aspects of emergency management” (Hu & Kapucu, 2016, p. 323), and the use of information technology is essential in obtaining critical information to make effective decisions (Hu & Kapucu, 2016). A further study by Ahmed (2011), indicated utilizing a virtual simulator assists in facilitating decision making capabilities of the user. A study conducted by Dove (2007) on the use of an emergency management information systems within one municipality, showed these types of systems can increase the amount of information shared. This had a positive effect on the situational awareness or common operating picture found during each phase of the incident lifecycle (Dove, 2007).

In a study conducted by Hamilton and Mohammed (2010), participants experienced an emergency simulation using the NeoCITIES 1.0 system. The basis of the study was to determine whether team performance was affected by cross training or team coordination training (Hamilton & Mohammed, 2010). Within this study, cross training was defined by Volpe et al.

(as cited in Hamilton & Mohammed, 2010) as “an instructional strategy in which each team member is trained in the duties of his or her teammates” (p. 1640). According to Hamilton and Mohammed (2010), team coordination training seeks to enhance efforts to coordinate between members of the team. This team building eventually leads to situational awareness and a common operating picture among the team (Hamilton & Mohammed, 2010). Results of the study indicated cross training benefited team performance more than utilizing team coordination training. Findings of the study have implications on the use of continuity of operations’ planning efforts used by institutions of higher education. By identifying and training multiple team members in emergency planning, response, and recovery efforts, an institution can build resiliency, minimizing costs and damage (Hayat, 2016). However, by utilizing virtual systems, there is an opportunity to merge the cross training team effectiveness with the situational awareness and common operating picture capabilities provided by team coordination training. This may allow an institution or organization the ability to enhance and expand upon the knowledge capacity held by the institution or organization.

Research conducted by Hewitt et al. (2008) examined the use of the Crisis Emergency and Risk Communication (CERC) training model by studying a group of graduate students performing a crisis management exercise within a virtual training platform called Play2Train. Participants managed an incident as members of a local hospital and as community support resources based on specific roles assigned (Hewitt et al., 2008). Concluding the scenario, many participants were satisfied with training outcomes and expressed confidence in the ability to transfer skills learned in communication and decision making to other circumstances (Hewitt et al., 2008).

During a critical incident at an institution of higher education, the need for fast and effective communication is even more crucial (Kennedy, 2009). The ability to conduct emergency management operations in a virtual environment can limit disruptions in these coordination efforts by providing a systematic ability to share information with relevant stakeholders (Caruson & MacManus, 2011). Administrators at institutions of higher education must be able to maintain access to beneficiary stakeholder groups on campus (i.e., students) (Mainardes, Alves, & Raposo, 2010), to make informed decisions regarding the operation of the institution prior to, during, and after an incident. This integrated communication further increases comprehension of the emergency situation, thereby allowing a leader to obtain a situational awareness of the incident and development of a common operating picture (Federal Emergency Management Agency, 2016) which facilitates the prevention of duplication of efforts and the reduction of community vulnerability to critical incidents (Caruson & MacManus, 2011). This integrated communication also has the potential in aiding the development and maintenance of strategic thinking throughout the organization. For this study, strategic thinking was defined as deliberate actions undertaken by an organization to move in a new direction that will set itself apart from others in an attempt to accomplish its set goals and objectives (Pattinson, 2016). When working a critical incident, those at senior levels often must make decisions based on information and intelligence possessed by and obtained through those working close to the scene. According to Kapucu and Garayev (2014), when this occurs the “flow of information and decision making...may be negatively impacted by systems favoring strict command-and-control rules, which offer little room for improvisation and alternative sources of support” (p. 24).

According to Boin and Hart (2003), “successful crisis leaders restore political confidence in the effectiveness of pre-existing policies and institutions” (p. 550). This transparency

provides an ethical base for rebuilding trust with community partners, allowing the community to set realistic expectations for a crisis response. Providing the higher education community with appropriate situational awareness of threats faced and capabilities of the institution to respond to and recover from a crisis will ensure the initial political support gained early in the crisis (Boin & Hart, 2003) will remain through the recovery and rebuilding of the community.

Training and Collaboration

Emergency management is a growing field of study, particularly in higher education (Federal Emergency Management Agency, 2016; Kapucu & Khosa, 2013). As higher education establishes a larger footprint within their communities, and critical incidents become too complicated for one organization (Federal Emergency Management Agency, 2016; Kapucu & Garayev, 2012), higher education administrators must involve themselves in the management of these critical incidents. As leaders on campuses, higher education administrators are looked upon to provide effective leadership during any critical incident involving their community. They must gain experience handling these incidents and in understanding their roles and responsibilities to provide context to their decisions (Renaud, 2012).

Studies on the use of virtual emergency management systems within the context of training simulations and as a research tool for upper level emergency managers were conducted and found to be successful (Nikolai, 2015). Nikolai (2015) further explored the use of systems theory with respect to the design of crisis information management systems, but these systems remain unimplemented and not yet researched (Nikolai, 2015). The use of exercises assists administrators in learning how to utilize resources during an incident, and allows them to understand and use their emergency management plans more effectively (Allen, Will, Brennon, & Poirier, 2010), leading to a building of resiliency within their community (Adey et al., 2015;

Grove, 2014; Kaufmann, 2015, 2016; White et al., 2015). According to Adey and Anderson (2012), exercises are defined as “techniques that stage events in order to make it possible to practise and address particular scenarios – the what-ifs – by rehearsing response to emergencies” (p. 100). Emergency planning and training efforts such as exercises cannot prevent incidents from occurring, but they can reduce the likelihood of a poor incident response through effective management (Adey & Anderson, 2012). Prior studies indicated using virtual systems is effective (Ahmed, 2011; Benjamin, 2014) and can increase training outcomes (Chen, 2014; Farra et al., 2012). The understanding, training, and use of virtual emergency management systems becomes vital for collaboration (Wang & Hutchins, 2010), education, and leadership (Renaud, 2012). The field of emergency response training tends to be problematic due to limited training time, limited resources available, and costs associated with real world training exercises (Chen, 2014). As the field of computer technology expands, opportunities to use e-learning techniques within emergency response situations will increase (Chen, 2014). According to Asan (as cited in Chen, 2014), e-learning is “more effective than traditional learning” (p. 733). These e-learning techniques found within virtual systems enable lifelong learning opportunities, access to training anytime and anywhere, and cost benefits for organizations (Chen, 2014). The use of e-learning techniques translated into the development of virtual tools and training scenarios for emergency responders. Although there are benefits to the use of these systems, Chen (2014) indicated “current computer-based simulations have not maximized the potential usage of the game...participants are still required to travel to an appointed place to take part in the computer-based exercise...it is time-consuming, and...opposite to the ideal of e-learning” (p. 735).

According to the Intergovernmental Studies Program (as cited in MacManus & Caruson, 2011), taking advantage of collective knowledge possessed by individuals from different

organizations yields a more complete and comprehensive understanding of issues faced. This multiagency collaborative approach (Carlson, Poole, Lambert, & Lammers, 2016; Caruson & MacManus, 2011; Federal Emergency Management Agency, 2016; Jain & McLean, 2008; Kapucu & Garayev, 2012; Kapucu & Van Wart, 2006; MacManus & Caruson, 2011) is developed in order to manage the critical incident effectively because most organizations are not equally trained or proficient in the use of NIMS (Kapucu & Garayev, 2012). Research conducted by MacManus and Caruson (2011) supported these findings by indicating the need to conduct further research on the use of collaborative governance within numerous sectors.

The use and understanding of a collaborative governance model is important in the area of emergency management, because information is often shared among various stakeholders with varying degrees of knowledge and training within emergency management. The dearth of research in this area is typically limited to large urban areas (Kapucu & Garayev, 2012), relationships with secondary schools (Hull, 2012; Kapucu & Garayev, 2012), or focused on the relationship between county emergency managers and the private sector (MacManus & Caruson, 2011). A gap in the literature emerged in the understanding of how organizations, such as institutions of higher education, comprehend, train, and utilize virtual emergency management systems and the possible integration of these systems with NIMS and Incident Command System (ICS) standards.

Organizational Structure and Effects

One challenge often found within critical incident response is the establishment of an organizational structure that is flexible enough to manage an unpredictable incident in the ever changing environment of a disaster (Grothe-Hammer & Berthod, 2016). Because of the increasing threat posed to institutions of higher education, many senior leaders and others within

institutions of higher education are placed into situations that may require them to act as first responders to a critical incident (Doherty, 2004). They are also placed in situations that they are unprepared for, and often will be operating within a structure that is unfamiliar (Doherty, 2004) and unlike anything found within a traditional higher education environment. To compound problems, many institutions of higher education often operate in *silos* among various departments, divisions, and disciplines across the campus community (Benn & Rusinko, 2011). This segmented approach produces gaps in planning, response, and recovery operations, often leading an institution of higher education to an inefficient and ineffective emergency management effort. Further, critical incidents at institutions of higher education experienced increased scrutiny over the past decade (Wang & Hutchins, 2010). This scrutiny increased the need for institutions of higher education to have effective collaboration, internally and externally, regarding potential threats affecting the institution and the local community (Kapucu & Khosa, 2013; Wang & Hutchins, 2010). NIMS and ICS components offer modular and structural systems in which the institution can operate within an environment influenced by a critical incident (Bogucki & Schulz, 2015; Federal Emergency Management Agency, 2016; Stambler & Barbera, 2011). The definition of the term *critical incidents* used in the present study is "any human-caused or natural incident, including terrorism that results in mass casualties and/or damage or disruption to infrastructure or the environment and overwhelms the responding jurisdiction's resources" (Federal Emergency Management Agency, 2010, p. 16).

NIMS and ICS are technical and tactical systems, which are trained and implemented at universities (Kapucu & Khosa, 2013). Most organizations implemented ICS into their emergency planning efforts because of its basic design, and the ability to integrate with other local response efforts seamlessly (Bogucki & Schulz, 2015). These NIMS and ICS systems only

function effectively in responding to critical incidents when goals in a situation are consistent, clearly prioritized, and coherent (Federal Emergency Management Agency, 2010, 2016). A clear consistent prioritized goal rarely occurs at the onset of a critical incident, where NIMS lacks training and guidance in this area (Renaud, 2012). A further limitation found within NIMS and ICS is when situations, or critical incidents, present complex value conflicts or trade-offs (Federal Emergency Management Agency, 2010). Research conducted by Wang and Hutchins (2010) indicated the response to the tragedy at Virginia Tech was ineffective, because workers in the Emergency Operations Center were untrained and lacked a clear understanding of organizational structure, roles, and responsibilities in the response among organizations. Research conducted by Stambler and Barbera (2011) further indicated an examination was needed on the ICS and its relationship to the “Operations Coordination Center and the concept of a Multi-Agency Coordination System” (p. 17) in a tactical and operational environment.

The utilization of virtual emergency management systems, NIMS, and ICS would allow an institution of higher education a significantly enhanced ability to establish a structured and collaborative process in which to coordinate across disciplines and jurisdictions (Kapucu & Khosa, 2013). Research conducted by Siciliano and Wukich (2016) demonstrated the importance of external communication with other agencies at different levels of government to ensure those disaster response capabilities, and resources are transitioned between jurisdictions in times of crisis. Virtual emergency management systems can aid with this cross jurisdictional coordination while allowing for complete documentation. These collaborative processes would enable institutions to provide an effective and efficient response to a critical incident. Due to the lack of research in this area, Wang and Hutchins (2010) recommended additional research on emergency management in the higher education arena using methods such as surveys and case

studies. A study by Norlander (2010) further supported this research by suggesting surveying individuals is an effective way to probe organizational effectiveness performed within a fluid environment, as found in a critical incident.

Synthesis of the Research Findings

Emergency management is a growing field of study, particularly in higher education administration (Federal Emergency Management Agency, 2016; Kapucu & Khosa, 2013). As critical incidents became more complex and garnered more media attention (Federal Emergency Management Agency, 2016; Kapucu & Garayev, 2012), higher education administrators began to implement emergency management plans and procedures into their operations (Kapucu & Khosa, 2013) to minimize reputational harm and protect their communities (Narducci, 2016; Snoeijers et al., 2014). Higher education officials must involve themselves in the management of critical incidents and become knowledgeable regarding challenges found within the management of these incidents.

Critical incident management was plagued by problems regarding disruption of communication and coordination (Caruson & MacManus, 2011; Kapucu, 2006, 2009; Kapucu & Van Wart, 2006). These problems were evident in critical incidents where emergency management offices have suffered physical damage (Waugh, 2010), leaving communities incapable of effectively allocating and coordinating resources (Federal Emergency Management Agency, 2016). Coordination and communication function effectively in critical incident responses when goals in a situation are consistent, clearly prioritized, and coherent (Federal Emergency Management Agency, 2010, 2016). The understanding, training, and use of virtual emergency management systems became vital for collaboration (Wang & Hutchins, 2010),

because this type of technology proved successful in increasing communication and knowledge in the training environment (Chen, 2014; Farra et al., 2012; Kalisch et al., 2014).

A virtual emergency management system is a web based emergency operations center that allows the creation and implementation of emergency plans, the communication of information (e.g., policies, procedures, maps, resource status), and the sharing of other types of data among community leadership and emergency management professionals prior to, during, and after a critical incident (Federal Emergency Management Agency, 2016; National Fire Protection Association, 2016). Research showed these types of virtual systems provide an inexpensive and effective educational platform (Ahmed, 2011; Hewitt et al., 2008; Hosang & Wainer, 2015; Nathanael et al., 2016; Nikolai, 2015; Nikolai et al., 2015; Shubeck et al., 2016). However, studies on the use of virtual systems were limited to the use of virtual tools in the training platform (Chen, 2014; Nathanael et al., 2016; Nikolai, 2015; Nikolov, 2011) and not in operational and tactical environments of a critical incident. Further, research on virtual emergency management training sessions concluded virtual systems need exploration and development to enhance communication among stakeholders (Chen, 2014; Kapucu, 2006; Palen et al., 2009). Studies illustrate the opportunity for virtual systems used as an alternative to current communication techniques for decision makers and other personnel (Chen, 2014; Kapucu, 2006). A study that explores the use of virtual emergency management systems, as a technological platform for communication, resource coordination, and strategic thinking throughout a critical incident in operational and tactical environments using 4-year public institutions of higher education is clearly indicated.

As referenced above, a multiagency collaborative approach (Carlson et al., 2016; Caruson & MacManus, 2011; Federal Emergency Management Agency, 2016; Jain & McLean, 2008;

Kapucu, 2006, 2009; Kapucu & Garayev, 2012; Kapucu & Van Wart, 2006; MacManus & Caruson, 2011) needs developing for effective management of the critical incident. This collaboration is highlighted in training because most organizations are not equally trained or proficient in the use of NIMS (Kapucu & Garayev, 2012). NIMS and the ICS are technical and tactical systems trained and implemented at universities (Kapucu & Khosa, 2013). The utilization of virtual emergency management systems, NIMS, and ICS may allow an institution of higher education the ability to collaborate and coordinate across disciplines and jurisdictions (Kapucu & Garayev, 2014; Kapucu & Khosa, 2013). Cross coordination might enable the institution to provide an effective and efficient response to a critical incident (Kapucu, 2006).

Given the inequality of training provided and lack of proficiency, the ability to conduct emergency management operations in a virtual environment may limit disruptions in coordination efforts by providing a systematic ability to share information with relevant stakeholders (Caruson & MacManus, 2011). Virtual emergency management systems are able to integrate communication to provide timely incident management understanding and the reduction of the duplication of efforts that may reduce the community's vulnerability to the critical incident (Caruson & MacManus, 2011). A gap in the literature emerged in the understanding of how organizations, such as institutions of higher education, comprehend, train, and utilize virtual emergency management systems. Additionally, the possibility to integrate virtual emergency management systems with NIMS and ICS standards remains unexplored. This study focuses on the use of virtual emergency management systems within operational and tactical environments and explores their uses regarding communication of information, coordination of resources, and strategic thinking of university officials throughout a critical incident.

Critique of Previous Research Methods

Many studies involved in this topic were conducted using a quantitative research design that used various survey instruments to obtain numerical data. According to Remler and Van Ryzin (2015), there are multiple ways to gain information through surveys. These survey methods are composed of intercept interview surveys; telephone interview surveys; household interview surveys; group self-administered surveys; mail self-administered surveys; internet (social media) surveys; organizational (departmental) surveys; and panel or longitudinal surveys which occur over time (Remler & Van Ryzin, 2015). Characteristics of the population the researcher is sampling will influence the most appropriate type of survey method. Researchers in cited studies selected the most appropriate methods based on the educational level of participants and the environment in which surveys were conducted.

There are several strengths involved with quantitative research. These strengths include the ability of the researcher to control the sample. However, in the Farra et al. (2012) and Chen (2014) studies convenience sampling was used, which limited control of the sample. Farra et al. (2012) did randomize their selection, which would improve the extent to which the sample was representative of the population (Remler & Van Ryzin, 2015). This would allow for generalization of the study to other populations, providing external validity for results (Peck, Kim, & Lucio, 2012; Remler & Van Ryzin, 2015). The Farra et al. (2012) study also used a power analysis to calculate an appropriate sample size, which provided for a sufficiently large sample. This power analysis was not applied in the Chen (2014) or Shubeck et al. (2016) studies, limiting their validity due to smaller sample sizes (Remler & Van Ryzin, 2015; Steventon, Grieve, & Bardsley, 2015; Van Lankveld, Sehic, Lo, & Meijer, 2017). However, in the Shubeck et al. (2016) study, participants did come from a larger geographical area, which

may aid in their generalizability (Remler & Van Ryzin, 2015). Each of these studies was conducted with human subjects, and possibly influenced by external variables, experience, and conscious effort or lack of effort, which potentially weakened study results (Remler & Van Ryzin, 2015; Van Lankveld et al., 2017). Participants possibly modified their behavior to please the researcher based on the knowledge they were under observation (Remler & Van Ryzin, 2015).

The studies provided adequate information on the background and basis for the studies; however, detailed information on exact questions asked, and profiles of participants, would have assisted in finding possible intervening variables, which could explain variations found within the studies (Remler & Van Ryzin, 2015). Chen's (2014) study did not mention the treatment of data after collection, whereas Farra et al. (2012) did discuss the assessment of the sample, questions, and data for validity and reliability. To understand the essence of lived experiences of university emergency managers and senior university administrators, a study that utilizes a qualitative research design seems more appropriate.

Summary

Discussed in Chapter 3, is that current research seeks to expand upon previous research in the emergency management field, the crisis communication field, and the higher education field in several ways. The first is with advances in the use of virtual emergency management systems and the potential ability of these systems to close gaps often found in communications prior to, during, and after a critical incident (Federal Emergency Management Agency, 2010, 2016). In further addressing communications, findings from the study may provide alternative methods for an organization to select effective crisis mitigation techniques based upon the public's understanding of events and the way they ascribe blame during a critical incident

(Ulmer, 2012), potentially limiting confusion and lack of preparedness. Second, results of the current research may add to the existing literature on situated learning by moving beyond the traditional learning environment of the classroom into the simulation based, hands-on practical learning environment (Farra et al., 2012) which uses virtual systems as a low cost option for disaster training (Farra et al., 2012; Nathanael et al., 2016; Shubeck et al., 2016). Third, this study of virtual systems may allow for improved training opportunities (Farra et al., 2012; Jain & McLean, 2008; Nathanael et al., 2016) for university emergency managers and senior university administrators, and other first responders, since the use of virtual systems proved to increase cognitive skills (Nathanael et al., 2016) and retention of information (Farra et al., 2012). Fourth, the following study on the use of virtual systems may further allow university emergency managers and senior university administrators the ability to perform their duties more efficiently and effectively while implementing protective measures during a disaster response (Lui et al., 2016), leading to a resilient community and population (Adey et al., 2015; Grove, 2014; Kaufmann, 2015, 2016; White et al., 2015).

CHAPTER 3. METHODOLOGY

Utilized in this study is a qualitative phenomenological research design to describe experiences of university officials at 4-year institutions of higher education who utilized virtual emergency management systems in operational and tactical environments of a critical incident. This chapter will reorientate the reader in the purpose of the study, and familiarize the reader with the research question and with the research design used to study this topic. The population and sample chosen for inclusion into this study are discussed, as are procedures used in participant selection and methods used for participant protection. Further, a description of data collection and analysis procedures is provided for an understanding of methods used to assemble data and draw conclusions from information provided. A review of the role of the researcher and guiding interview questions is explained. The chapter will conclude with a discussion of ethical considerations brought about in this study.

Purpose of the Study

The focus of the current research addresses the use of virtual emergency management systems in the operational and tactical environments within higher education by measuring experiences of university officials who utilized these systems during critical incidents at 4-year public institutions of higher education. As stated in Chapter 2, this research sought to provide data based on real world experiences to generate new methodologies for the emergency management field, the crisis communication field, and the higher education field. These new methodologies may provide a better understanding of and advances in structuralism theory, situational crisis communication theory, and situated learning theory.

Structuralism theory is based on relationships of individuals to and their interactions with an overarching structural system (Lounsbury & Ventresca, 2003). This concept explains the

incident command system's (ICS) modular organizational structure and the interaction between internal and external stakeholders prior to, during, and after a critical incident. There is an assumption this use of ICS during the response to a critical incident minimizes communication gaps within the command structure (Federal Emergency Management Agency, 2010, 2016). The use of virtual emergency management systems has the potential to close this gap in communications further.

In further addressing communications, situational crisis communication theory examines ways an organization selects effective crisis mitigation techniques based upon the public's understanding of events and ways they ascribe blame during a critical incident (Ulmer, 2012). The use of virtual emergency management systems may potentially be utilized to expand upon the situational awareness obtained by university emergency managers and senior university administrators, and can potentially increase communication capabilities during a disaster response. This situational awareness can lead to an increase of information, thereby expanding the knowledge base of users.

Situated learning theory is based on the concept that learning occurs through the activity, context, and the culture in which the learning takes place (Farra et al., 2012; Kakavelakis & Edwards, 2012). According to Cobb and Bowers (1999), individuals learn similar to how they participate in their social environment. Learning does not occur by reading a book or traditional learning in the typical classroom environment; it occurs when a student participates in dealing with real world situations where classroom theory becomes practice (Cobb & Bowers, 1999). Findings from the current research can lead to the movement from the traditional learning environment of the classroom into the simulation based hands-on practical learning environment.

According to Farra et al. (2012), the use of virtual reality simulation in disaster training has a positive effect on participant retention of information. Implications of the proposed research include the use of virtual systems as a low cost option for disaster training that are easily accessible for users, as opposed to full scale drills (Farra et al., 2012). This use of virtual systems may allow for more improved training opportunities (Farra et al., 2012; Jain & McLean, 2008) for university emergency managers and senior university administrators, and other first responders, and are also proven to increase their retention of information (Farra et al., 2012). This ability to retain information may allow them to perform their duties more efficiently and effectively in a disaster response.

The wider problem of communication throughout a critical incident will not be solved until a more narrowly focused study is conducted involving experiences of those using virtual emergency management systems as a technological platform for communication, resource coordination (i.e., personnel and equipment), and strategic thinking throughout a critical incident in operational and tactical environments. This study sought to fill these identified gaps in the literature and shed light on the research problem.

Research Question

According to Jain and McLean (2008), the “nation's emergency responders need to work in a coordinated, well-planned manner to best mitigate the impact of an emergency incident” (p. 3). Therefore, the ability to effectively communicate through phases of emergency management and retain knowledge of emergency management concepts has the potential to save lives, stabilize incidents, protect property, and address environmental concerns (Boucki & Schulz, 2015; Federal Emergency Management Agency, 2010, 2016). The use of virtual emergency management systems may allow for structure, approaches, information categories, and

communication flow to enhance the ability to manage in all hazardous environments, regardless of the degree of severity. Therefore, the research question for this study is, what are the experiences of university officials, who have utilized virtual emergency management systems, in terms of communication capability, resource coordination, and strategic thinking prior to, during, and after a critical incident involving 4-year public institutions of higher education?

Research Design

The qualitative research design most appropriate for this study is the phenomenological approach, and the research model used is Moustakas's transcendental phenomenological model, which is grounded in the work of Husserl's descriptive phenomenological research (Moustakas, 1994; Reiners, 2012). Husserl posited phenomenology postponed all beliefs and was centered on the meaning ascribed to the individual's experience (Moustakas, 1994).

The use of the transcendental phenomenological approach in this research allowed for the study of lived experiences (Creswell, 2013; Gill, 2014; Patton, 2015) of a group of university emergency managers and senior university administrators prior to, during, and after a critical incident and their use of virtual emergency management systems. Transcendental phenomenology is beneficial in the field of emergency management because a researcher may be able to gain a fuller understanding of how the individual or group internalized the experience and converted it into awareness (Patton, 2015).

These experiences are by their distinct nature unique and internalized individually and, therefore, are those individuals' truths related to the experience (Creswell, 2013; Patton, 2015). Phenomenology is one method of qualitative inquiry that gives an opportunity for a researcher to elicit various perspectives of a phenomenon from different individuals. These individuals from various backgrounds often experience incidents differently, both internally and externally.

Research can derive similar themes from individual responses, which are shared to develop theories to further scientific inquiries.

Creswell (2013) noted there are several challenges to descriptive phenomenology that could affect the research. These challenges include the researcher having an “understanding of the broader philosophical assumptions” (Creswell, 2013, p. 83), which are identified in their studies (Creswell, 2013); individuals in the study are selected based on their experiences with the phenomenon involved in order for the researcher to gain an understanding of themes (Creswell, 2013); and the development of themes through *bracketing* due to the personal interpretation of data by the researcher (Creswell, 2013; Reiners, 2012).

The transcendental phenomenological method was the foundation of semistructured interviews with university officials to explore experiences of university officials using virtual systems, with communication of information, coordination of resources, and strategic thinking prior to, during, and after critical incidents at 4-year public institutions of higher education. Each interview lasted no more than 1 hour and consisted of open-ended global questions, which were developed from general categories relevant to the research topic, and presented by the researcher. All interviews conducted were recorded, logged, and transcribed. This process aided in the evaluation and assessment of data.

Target Population and Sample

This study focused on the use of virtual emergency management systems within operational and tactical environments within the bounded system of 4-year public institutions of higher education. Explored in the study were experiences of university officials using virtual systems regarding communication of information, coordination of resources, and strategic

thinking throughout a critical incident. Cases consisted of individuals who fell within the population and the sample of these university officials as defined within this section.

Population

The population of this study comprised university officials who utilized virtual emergency management systems prior to, during, and after a critical incident at 4-year public institutions of higher education. The term *university officials* comprised university emergency managers, defined as a person designated by the institution's emergency operations planning documentation as the university emergency manager, and senior university administrators, defined as a member of the university's executive policy group as specified by the institution's emergency operations planning documentation.

Sample

The sampling strategy was nonprobability, and the sampling design was purposive. Purposive sampling appeared to be the most appropriate for the design strategy because it pulled together a sample of individuals with proven experience in the studied topic (Schulenberg & Warren, 2009). The sample was a subset of the population, composed of university emergency managers and senior university administrators with at least 2 years of experience in these roles at 4-year public institutions of higher education; who experienced at least one critical incident at the public institution of higher education; and having experience utilizing a virtual emergency management system prior to, during, and after the critical incident. Participants who met the inclusion criteria were excluded if they were not between 24 and 70 years of age.

According to Trotter, Needle, Goosby, Bates, and Singer (2001), appropriate qualitative samples are obtained by interviewing 15 to 30 professionals chosen based on their knowledge regarding a particular subject studied. However, research conducted by Malterud, Siersma, and

Guassora (2016) indicated a qualitative study sample size might be as small as six to 10 individuals under specific conditions. These conditions included if the aim of the study was narrow, the specificity was dense, a theoretical base was applied to the study, the dialogue between the interviewer and the participant was strong, and there was sufficient case analysis (Malterud et al., 2016). All conditions are present in this study. The sample size in this study included a minimum of eight participants in accordance with Capella University's School of Public Service Leadership guidelines; however, a requisite number of participants were interviewed until saturation was met and there were enough themes developed to answer the research question satisfactorily (Creswell, 2013).

Procedures

The research topic chosen is the use of virtual emergency management systems within the operational and tactical environments. The recruitment strategy for this research study was purposive and utilized two professional organizations to solicit potential participants. Once participants were selected, the researcher inquired whether any additional potential participants were present at their institutions of higher education for this study in a snowball sampling strategy.

Participant Selection

The professional organizations, the International Association of Emergency Managers' (IAEM) University and College Caucus (UCC) and the Disaster Resilient Universities (DRU) network, were contacted via letter to obtain site permission. These letters noted the name of the research study, the purpose of the research study, the organization conducting the research, and the name of the researcher. The researcher worked with gatekeepers belonging to these organizations (i.e., executive director of IAEM, the director of UCC, and the site administrator of

DRU) and gained permission to recruit potential participants for this study in a purposive sampling strategy (Creswell, 2013). These contacts occurred through phone and email requests for site approval. These conversations limited challenges that otherwise may have occurred during interactions with the gatekeeper by providing an explanation of the research and methods utilized during the study.

Site permissions were granted for the study and emails about the study were posted on the Listserv of the International Association of Emergency Managers' University and College Caucus and the Listserv of the Disaster Resilient Universities network soliciting potential participants after Capella University Institutional Review Board (IRB) approval was obtained. These email posts provided the contact information for the researcher, a description of the study, and a definition of terms associated with the study. Any interested potential participants were directed to contact the researcher via phone or email.

When a potential participant contacted the researcher regarding the study, the researcher set up an initial phone interview at the potential participant's convenience in order to screen for eligibility (i.e., the following three criteria needed to be met: at least 2 years of experience as a university emergency manager or senior university administrator at a 4-year public institution of higher education; experience with at least one critical incident at the public institution of higher education; and utilization of a virtual emergency management system prior to, during, and after the critical incident). Once a potential participant was screened and accepted into the study, the researcher inquired whether any additional potential participants were present at their institutions of higher education for inclusion into the study in a snowball sampling strategy. Names were not provided by participants to the researcher. Any potential participant was directed to contact the researcher directly if he or she wanted to participate in the study. If potential participants did not

qualify for the study, they were thanked for their time and willingness to participate in the screening process and were excluded from the study. If the potential participant qualified for the study, the researcher then described the research to the potential participant (by script) and answered any questions they had regarding the study. If a potential participant was interested in joining the study, informed consent forms were prepared and sent to potential participants.

The researcher then contacted participants to establish convenient interview times and locations. Participants were instructed to bring informed consent forms with them prior to interviews, or were provided with another informed consent form by the researcher. Consent was obtained at that time by participants placing their signatures on informed consent forms. Consent was not audio recorded.

Protection of Participants

According to the Belmont Report, three basic principles are necessary when conducting research with human subjects. These principles are respect for persons, beneficence, and justice (Department of Health and Human Services, 2017). These principles are particularly important when conducting research with vulnerable populations, such as workers, because they may have limited or compromised autonomy (Department of Health and Human Services, 2017).

As stated, all participants, both university emergency managers and senior university administrators, were provided with informed consent forms indicating their voluntary participation in the study after the screening process. Signed informed consent forms were collected prior to conducting the interviews. To maintain confidentiality and address the vulnerable population of workers, interviews were conducted at a location away from the participant's institution, if requested, and an alphanumeric code was utilized to mask participant identity.

Even though an informed consent form will not always be enough to protect participants in a study from harm, the informed consent provided participants had “been fully informed about the research, have understood its risks and benefits, and freely agree to participate” (Remler & Van Ryzin, 2015, p. 521). To protect participants from possible harm in the research study, the researcher ascribed to ethical research practices based on procedures set forth by Capella University.

Emotional triggers were potentially present due to the nature of the interview topic and the research method employed. These emotional triggers were related to participants’ experiences with critical incidents, interaction with internal or external partners, or other related situations. In the event of emotional triggers manifesting during interviews, information on free, local resources for counseling services were on hand for participants to address their concerns. Additional information regarding protective measures taken for participants during the study is provided at the end of this chapter in the *Ethical Considerations* section.

Expert Review

Global questions were field tested by experts consisting of two university emergency managers and two senior university administrators to allow for the examination of the quality of test questions contained in the study. Field tests were conducted to aid in addressing the validity and reliability of data. Original global questions were modified based on feedback received to address any concerns found during this field test administration. Experts approved the final version of global interview questions.

The two university emergency manager examiners have extensive experience within the higher education environment. One university emergency manager has over 40 years of experience in various roles and responsibilities at institutions of higher education, including roles

as a university professor, department chair, dean, and emergency manager. The other university emergency manager has over 30 years of experience within university public safety, including roles as an assistant chief of police and emergency manager.

The two senior university administrator examiners also have extensive experience within the higher education environment. One senior university administrator has over 35 years of experience in various roles and responsibilities at institutions of higher education; positions held included roles as an associate professor, dean, director, and vice president for student affairs. The other senior university administrator has over 22 years of experience working within the higher education environment with 10 years' experience at the executive staff level. The latter senior university administrator had experience as a dean of students, vice chancellor for student affairs, and as vice chancellor for student affairs and finance.

Feedback received from expert reviewers indicated several modifications were needed to the global research questions. Changes included expanding upon how much experience each participant had in using virtual systems and how many systems each participant employed within his or her operations; whether the critical incident occurred at his or her current institution of higher education, or whether the incident occurred at a previous institution; delving further into whether the critical incident occurred on campus or whether its effect was due to campus proximity; the nature of the critical incident; expanding upon communication aspects of virtual systems the participant experienced; and strengths and weaknesses of virtual systems the participant experienced. Experts further provided recommendations regarding the order of the presentation of questions. All recommendations were incorporated into the final global interview questions and related subquestions that arose during the interview process.

Data Collection

Times and locations of interviews were agreed upon by each participant and the researcher with certain conditions (i.e., private room or office). If requested, interviews took place at a neutral public location away from the participant's workplace to ensure confidentiality. As mentioned earlier, the population consisted of university officials who utilized virtual emergency management systems prior to, during, and after a critical incident at 4-year public institutions of higher education. Once at the interview location, the researcher read a script from the interview guide. The interview guide is provided in Appendix A.

As outlined in the interview guide script, each interview began with a demographics questionnaire presented to the participant seeking information regarding gender, age, educational level, profession, and prior experience. Prior to questioning, the researcher engaged in a brief social conversation to create a more comfortable environment (Moustakas, 1994). The researcher allowed each participant an opportunity to concentrate on the critical incident(s) and their experiences (Moustakas, 1994). The researcher then presented open-ended, global questions, which were developed from general categories relevant to the research topic in a one-on-one interview session. Each question had the potential to elicit subquestions developed as needed to follow up on information provided by participants. These subquestions were recorded on the interview form. The researcher utilized field notes to sketch ideas and call attention to information gathered during interviews (Creswell, 2013). Any clarification of comments made by a participant was requested prior to the end of the interview. Concluding each interview, the participant was thanked for his or her time and asked whether subsequent contact was allowed to ensure the validity of data obtained (Moustakas, 1994). All interviews conducted were recorded, logged, and transcribed. The interview guide, demographics questionnaire, recording, and all

notes were collected and secured in a locked briefcase for transportation to the researcher's office, where these items were secured in a locked filing cabinet until data analysis commenced.

Data Analysis

A paid transcription service, provided by Transcribe Me, was utilized to assist in the transcribing of interviews conducted in the study. A confidentiality agreement was obtained from Transcribe Me and submitted to Capella University's IRB. Once the transcript was obtained from the transcription service, a thorough review of recordings was conducted by the researcher to ensure accuracy of transcripts. Any inaccuracies found were corrected by the transcription service, and new transcripts were reviewed until 100% accuracy was obtained.

Once accuracy of transcripts was verified, the researcher started by reading transcripts to understand the totality of experiences presented (Kleiman, 2004). The tool of open coding was used to identify any themes (Creswell, 2013; Driscoll, Appiah-Yeboah, Salib, & Rupert, 2007) associated to gain a textural description (Creswell, 2013; Moustakas, 1994). A draft codebook, consistent with phenomenological data analysis, was initiated to label data found within experiences relayed by participants (Saldaña, 2016). This codebook defined themes from labels and provided inclusion and exclusion criteria along with examples (Saldaña, 2016). Codebook themes were developed using data provided by the interview analysis (Moustakas, 1994). The researcher then more methodically read approximately 25% of interview transcripts and noted any labels and themes, which were added to the codebook. Transcripts were then revisited to reaffirm the accuracy of findings. The codebook was then revised in the same manner with the three remaining 25% sections of raw data transcripts. The codebook was then updated and finalized with this information, and the entire transcript was reviewed again.

The researcher also used the software NVivo11, a computer assisted qualitative data analysis software, to assist in the organization of various themes that were present (De Angelis & Wolf, 2013). A second review of transcripts was conducted to ensure thorough descriptions were obtained, and essential meanings were ascribed (Moustakas, 1994), and a structure was produced for identification of themes (Kleiman, 2004). This thematic development was substantiated by raw data (Kleiman, 2004). Member checking was completed by reviewing themes developed in the analysis process with each participant for clarification, or to gain additional information (Morse, 2015). If the researcher correctly understood or interpreted the participant, then data are more likely to produce reliable results (Morse, 2015). The researcher had an external reviewer examine data and documents relevant to the study to obtain an unbiased view of data.

Instruments

Instruments utilized in this study were developed to gather appropriate information to answer the research question consistent with traditions associated with the qualitative approach (Creswell, 2013). These instruments were composed of demographics questionnaire, the interview guide, recording devices, the interviewer, and a notepad to capture field notes mentioned earlier to sketch ideas and call attention to information gathered during interviews (Creswell, 2013). Many types of instruments were used in previous studies; however, the demographics questionnaire and the interview guide were created by the researcher to elicit responses based on the essence of participants' lived experiences (Moustakas, 1994).

The Role of the Researcher

The researcher has more than 20 years of practitioner experience with six major hurricane responses, seven wildfire responses, two tornado responses, two train derailments, over 100 fatal car crashes, and numerous other critical incidents, and extensive experience with two virtual emergency management systems (i.e., Web EOC and VEOCⁱ). The researcher adopted and developed virtual emergency management systems and utilized these systems within public safety and emergency management departments for approximately four years. This early development and utilization of these systems provided knowledge regarding communication capabilities within the higher education environment and information regarding coordination capabilities. Based on prior experience, the researcher favors the use of these systems as a tool to increase communication and training capabilities prior to, during, and after a critical incident. Given this familiarity and preconceptions with the successful and less successful implementation and operational use of these systems, the researcher focused on information gathered through the interview process and was mindful of thematic development during the coding process. The use of the phenomenological data analysis as posited by Moustakas (1994), aided in the research effort because the researcher sought textural and structural descriptions obtained from transcripts of participant interviews that were unique to the phenomena experienced without making assumptions (Creswell, 2013).

Also, the researcher's perspective of this research was from an emergency management and public safety standpoint, as a chief of police and emergency manager and, to a lesser degree, of a senior university administrator in the researcher's role as an associate vice president. Therefore, the researcher's experiences were different from many participants, particularly senior university administrators occupying the position of vice president (e.g., student affairs, academic

affairs, finance) or president. The researcher acknowledged this bias existed and put in place safeguards to mitigate these preconceptions and biases. One of these safeguards was bracketing (Moustakas, 1994). As mentioned earlier and as part of bracketing, an acknowledgment of conflicts and biases was presented in the study. According to Creswell and Miller (2000), it is important for a researcher to acknowledge any beliefs and biases he or she may have early on in the research process. This allows for readers to fully comprehend the researcher's positions on the subject (Tufford & Newman, 2012).

Guiding Interview Questions

The qualitative interview method was used to facilitate data collection within the study. The qualitative interview method appeared to be the most appropriate to address the primary research question because the qualitative interview collects descriptions of real world experiences held by participants with the main goal of obtaining an overall understanding of the meaning of their words (Valenzuela & Shrivastava, 2002). As mentioned earlier, prior to questioning, the researcher engaged in a brief social conversation to create a more comfortable environment (Moustakas, 1994). The researcher allowed each participant an opportunity to concentrate on the critical incident(s) and their experiences (Moustakas, 1994). The researcher then presented the following open-ended global questions, which were developed from three categories (critical incident; communication and coordination; virtual systems) relevant to the research topic, in a one-on-one interview session:

Critical incident

1. As a university official, what are your experiences involving critical incidents at your institution of higher education?

2. What is needed to effectively prepare for, respond to, and recover from a critical incident?
3. What are your experiences working within the incident command system and multiagency coordination systems (i.e., EOCs)?
4. What emergency management training for emergency management staff and senior university administrators did you utilize prior to the critical incident?

Communication and coordination

1. What have you experienced with communication between university emergency managers and senior university administrators prior to a critical incident at your institution?
2. What have you experienced with communication between university emergency managers and senior university administrators during a critical incident at your institution?
3. What have you experienced with communication between university emergency managers and senior university administrators after a critical incident at your institution?
4. What was your experience with resource allocation and coordination prior to, during, and after the critical incident?

Virtual systems

1. What are your experiences using virtual emergency management systems within your operations?

Each global question elicited subquestions developed as needed to follow up on information provided by participants. These subquestions were recorded on the interview form.

Ethical Considerations

Potential ethical challenges revolve around emotional triggers, confidentiality, and bias from researcher conflict of interest. This study was reviewed and received approval by the Capella University Institutional Review Board (IRB) prior to the collection of data.

Since this study consisted of interviews regarding lived experiences participants prior to, during, and after an actual critical incident, the potential for emotional triggers existed. These emotional triggers could relate to the experience participants had with the critical incident or with the interaction with internal or external partners. Should the need have manifested, information on free, local resources for counseling services was on hand for participants, to address these concerns.

Confidentiality assists in the protection of participants during the study from psychological, social, and financial harm. To protect the confidentiality of participants, a risk or harm statement was included with the acknowledgment that their participation in the study was voluntary and could cease at any time. This statement also indicated interviews were audio recorded. Participant information is kept private by removing identifiers from interview material. To reduce biased responses, a confidentiality notice was provided to detail information collected and outline how data collected were utilized, securely stored in a locked filing cabinet, and destroyed after 7 years. Access to data was limited to the researcher, transcriber, and appropriate university personnel. Data are kept on a password protected computer and backed up on an external hard drive accessed only by the researcher. Copies of questionnaires, interviews, and transcripts are also kept in a locked filing cabinet and destroyed after 7 years. Participants were provided with a link to study results, when available.

To mitigate bias from researcher's conflict of interest, the researcher provided participants with information regarding the name of the study, the organization conducting the study, and the name of the principal investigator. Any conflict of interest was disclosed, and those participants removed from the research.

Summary

As previously discussed, this study utilized Moustakas's transcendental phenomenological model to answer the research question involving experiences of university officials at 4-year institutions of higher education. University officials consisted of university emergency managers and senior university administrators who utilized virtual emergency management systems in operational and tactical environments of a critical incident. Participants were selected based on inclusion and exclusion criteria necessary to gain an acceptable sample for reliability and generalizability of data. Participants were protected through effective research techniques and ethical considerations including informed consent, reviews through the IRB, and protective measures. Guiding interview questions were reviewed and approved by experts in the field of emergency management and higher education administration to provide usable data. Data were collected and analyzed to assemble information provided through one-on-one interviews, and conclusions were drawn by the researcher from material provided.

In Chapter 4, information obtained through methods described earlier are presented along with a description of the sample utilized in the study. The role of the researcher is explored to discover the methodology used to analyze data to draw conclusions in order to advance the scientific knowledge in areas of emergency management and higher education.

CHAPTER 4. PRESENTATION OF THE DATA

Introduction: The Study and the Researcher

As stated previously, the purpose of this qualitative study is to explore experiences of university officials who utilized virtual emergency management systems as a technological platform, for communication, resource coordination (i.e., personnel and equipment), and strategic thinking prior to, during, and after a critical incident in operational and tactical environments using 4-year public institutions of higher education. This chapter will present the reader with a description of the sample utilized in the study, and a general description of results of the study. The methodological approach used in data collection and analysis is described, and the chapter will conclude with the presentation of data and results.

The researcher became interested in the topic of virtual emergency management systems in disaster response and recovery through experiences responding to and recovering from natural and human-caused disasters over a 20-year career. The researcher's duties and responsibilities as a public safety and law enforcement professional, and his role in teaching emergency management courses, furthered interest in the topic because most incidents involved communication and coordination failures.

As the researcher moved from state law enforcement supervision to the higher education environment in the role of a public safety administrator, the lack of communication among various administrators during incidents was also observed to be prevalent at institutions of higher education. These communication failures began to pose significant problems for the safe, effective, and efficient operation of the organizations. This was evident in the tragedy of Virginia Tech in 2007, which occurred 2 weeks after the researcher began leading a public safety organization within the higher education environment. This tragedy led the researcher and many

other institutions of higher education to attempt enhancements in their capabilities in areas of planning and crisis communication. The researcher then began to implement and test various technological platforms to mitigate the impact of communication failures on organizations and communities. Virtual systems were some of those technologies used.

Once research commenced during his doctoral studies, and to understand experiences of university emergency managers and senior university administrators, the phenomenological approach appeared to be the most appropriate for answering the research question. A qualitative methods course was completed, and further research was conducted utilizing material authored by Creswell (2013). The researcher further immersed himself in writings of Husserl and Moustakas (1994) to understand underpinnings of the foundation and development of the transcendental phenomenological approach. The researcher also engaged in various Federal Emergency Management Agency courses on communication, coordination, the incident command system, and the multiagency coordination system to understand tactical- and coordination based decision approaches found within the critical incident environment.

This knowledge, coupled with the real world response experience of the researcher to major federally declared disaster areas, provided ample experience to give context to lived experiences of university officials who participated in the study. The researcher also has 4 years of experience in developing, operating, and maintaining a virtual emergency management system for a large sized research institution, and has previous experience in using these systems in a large state agency. The researcher has training and experience as a law enforcement investigator in conducting interviews; this knowledge and experience of milieus and mannerisms assisted in identifying cues, both verbal and psychological, in participants during the interview process. This allowed for additional follow up questions and opportunities for participants to provide any

necessary clarification needed for responses given. The researcher further obtained reference materials on thematic analysis and qualitative coding to gain an understanding of concepts and methods used. The researcher then engaged in a course on using the NVivo11 software to assist in the thematic development and the organization of collected data. Research on data collection protocols and procedures were reviewed to assist in obtaining clean data for inclusion in the study.

Description of the Sample

The sample was composed of university officials ($n = 10$) who met the inclusion criteria of having at least 2 years of experience as a university emergency manager or senior university administrator at a 4-year public institution of higher education; having experienced at least one critical incident at the public institution of higher education; and having utilized a virtual emergency management system prior to, during, and after the critical incident. These 10 officials consisted of six university emergency managers and four senior university administrators with various degrees of experience with virtual systems and critical incidents. Participants were located across the United States at various-sized institutions of higher education in both urban and rural areas. Participants' demographic information are presented in Table 1.

Participant A-01 is an emergency manager at a small-sized institution of higher education in the Northwest. Participant A-01 has more than 21 years of experience in the field, including previous experience at a large-sized research institution and a small-sized institution of higher education within the public safety and emergency management fields. Participant A-01 has between 16–20 years of experience with virtual emergency management systems and was involved with more than eight critical incidents using virtual systems.

Table 1

*Sample Demographics for All University Officials (n = 10),
University Emergency Managers (n = 6), and Senior University Administrators (n = 4)*

University Officials Characteristics	All	University Emergency Managers	Senior University Administrators
Age Group			
25–34	2	2	0
35–44	1	0	1
45–54	2	1	1
55–64	3	1	2
65 and older	2	2	0
Sex			
Male	5	3	2
Female	5	3	2
Experience in Field (Years)			
2–5	1	1	0
6–10	3	3	0
11–15	0	0	0
16–20	2	1	1
21+	4	1	3
Critical Incidents Experienced			
<2	0	0	0
3	1	1	0
4	1	1	0
5–7	0	0	0
8+	8	4	4
Experience with Virtual EM Systems (Years)			
2–5	5	1	4
6–10	3	3	0
11–15	1	1	0
16–20	1	1	0
21+	0	0	0
Critical Incidents Experienced Using Virtual EM Systems			
<2	1	0	1
3	1	1	0
4	3	1	2
5	1	1	0
6–7	0	0	0
8+	4	3	1

Participant B-01 is an emergency manager at a large-sized research institution of higher education in the Northeast. Participant B-01 has between 16–20 years of experience in the field, including previous experience within the emergency management field at a public-sector agency. Participant B-01 has between 11–15 years of experience with virtual emergency management systems and was involved with more than eight critical incidents using virtual systems.

Participant C-01 is an emergency manager at a large-sized research institution of higher education in the Northeast. Participant C-01 has between 6 to 10 years of experience in the field. Participant C-01 has between 6 to 10 years of experience with virtual emergency management systems and used virtual systems in three critical incidents.

Participant D-01 is a senior university administrator at a large-sized research institution of higher education in the Southwest. Participant D-01 has more than 21 years of experience in the field including previous experience within the public safety and emergency management fields. Participant D-01 has between 2 to 5 years of experience with virtual emergency management systems and was involved with more than eight critical incidents. Participant D-01 used virtual emergency management systems in four critical incidents.

Participant E-01 is an emergency manager at a large-sized research institution of higher education in the Southwest. Participant E-01 has between 6 to 10 years of experience in the field. Participant E-01 has between 6 to 10 years of experience with virtual emergency management systems and has used virtual systems in four critical incidents.

Participant F-01 is an emergency manager at a large-sized research institution of higher education in the Southwest. Participant F-01 has between 6 to 10 years of experience in the field. Participant F-01 has between 6 to 10 years of experience with virtual emergency management systems and has used virtual systems in five critical incidents.

Participant G-01 is an emergency manager at a large-sized research institution of higher education in the Midwest. Participant G-01 had between 2 to 5 years of experience in the emergency management field, and had more than 21 years of previous experience at several large research and several mid-sized institutions of higher education within the academic field. Participant G-01 has between 2 to 5 years of experience with virtual emergency management systems and used virtual systems in over eight critical incidents.

Participant H-01 is a senior university administrator at a large-sized research institution of higher education in the Midwest. Participant H-01 has more than 21 years of experience in the field. Participant H-01 has experienced more than eight critical incidents at the current institution of higher education. Participant H-01 has between 2 to 5 years of experience with virtual emergency management systems and used virtual systems in over eight critical incidents.

Participant I-01 is a senior university administrator at a large-sized research institution of higher education in the Midwest. Participant I-01 has between 16 and 20 years of experience in the field at multiple large-sized liberal arts and research institutions. Participant I-01 experienced more than eight critical incidents at institutions of higher education. Participant I-01 has between 2 to 5 years of experience with virtual emergency management systems and used virtual systems in four critical incidents.

Participant J-01 is a senior university administrator at a large-sized research institution of higher education in the Southeast. Participant J-01 had previous experience at a mid-sized institution of higher education within the public safety field. Participant J-01 has between 2 to 5 years of experience with virtual emergency management systems and used virtual systems in two critical incidents.

Research Methodology Applied to data Analysis

Based on Moustakas's (1994) transcendental phenomenological approach, the researcher sought to obtain the essence of lived experiences of university officials who used virtual systems throughout a critical incident. To obtain these descriptive accounts, the researcher traveled to various locations across the United States. These face-to-face interviews provided an opportunity for the researcher to observe not only verbal cues but also emotional and physical cues, which were elicited by participants to develop a more robust response to global interview questions presented. Sites selected for the face-to-face interviews were geographically separated across the United States. This separation and distribution across a large geographical area aided in the generalizability of the sample to the larger population of university emergency managers and senior university officials. This aided in adding external validity to the study, while the use of a single coder harmed the internal validity of the study (Gheondea-Eladi, 2014). However, to address this harm to internal validity, the researcher provided their experiences and backgrounds regarding the phenomenon studied, and member checking and a detailed audit trail regarding information obtained during the study (Lub, 2015).

The call for participants was posted on the listserv of the International Association of Emergency Managers University and College Caucus and the listserv of the Disaster Resilient Universities network. Snowball sampling was used to capture additional participants from institutions. Once the researcher was contacted by participants regarding the study, participants were screened by the researcher reading a script to them and asking qualifying questions for inclusion in the study. All potential participants met inclusion criteria and were screened into the study. Participants and the researcher agreed upon times and locations for interviews.

Prior to interviews, the researcher engaged in brief social conversation to provide a more relaxed environment for each participant. Once each interview began, the researcher read the interview script and obtained information from the demographics questionnaire. After obtaining the completed questionnaire, the researcher asked the participant take a moment to recall his or her experiences with the critical incident or incidents. The researcher then started asking global interview questions. These questions did prompt subquestions, which were posed to each participant to provide additional context to their experiences. The researcher took detailed field notes to capture highlights of experiences expressed to call attention to earlier statements or to pose additional follow up questions to clarify responses that were potentially misconceived or were contradicted by later statements.

After interviews were concluded, audio recordings were submitted to Transcribe Me for transcription. Once transcriptions were received, the researcher carefully listened to audio files in order to verify transcripts were completely accurate. Any errors in accuracy were corrected, and transcripts were then submitted to each participant for clarification and verification, also referred to as member checking. Once feedback was received from participants, any clarification was noted on the transcript and coding began.

The researcher began by reading transcripts in their entirety to understand experiences of participants fully. Initial themes developed from textural descriptions were noted and logged into the codebook. Themes were defined to ascribe meaning to a code and to provide inclusion and exclusion criteria (Saldaña, 2016). Notes were also taken to call attention to prominent discussion points made by participants relevant to their experiences with critical incident(s) and use of virtual systems.

The researcher used the software platform NVivo11 to aid in the organization, development, and documentation of themes present in interviews. The researcher uploaded interview transcripts into NVivo11 as sources with masked participant information. The researcher then created codes as nodes within the software and placed demographic information with case classifications for display and analysis. Once initial codes were entered into the software, the researcher then more methodically read approximately 25% of each interview transcript and noted any additional labels and themes present. These additional labels and themes were added to the codebook and the NVivo11 software. Interview transcripts then were reexamined to confirm the accuracy of findings. The codebook and the NVivo11 software were revised in the same manner, in 25% increments, with the remaining 75% of the interview transcripts. The codebook and the NVivo11 software were then updated and finalized with this additional information, and entire transcripts were reviewed again.

After interviewing 10 participants, data saturation was reached because no additional information, insights, or new themes were present that changed the coding structure established (Guest, MacQueen, & Namey, 2012). In accordance with procedures espoused by Moustakas (1994) and Kleiman (2004), additional reviews of interview transcripts were conducted to ensure thorough descriptions were obtained, essential meanings were ascribed, and a structure was produced for identification of codes from themes that emerged. To ensure developed themes were confirmed by raw data (Kleiman, 2004), the researcher had an external reviewer examine data and documents relevant to the study in order to obtain an unbiased view of data and verify results.

Presentation of Data and Results of the Analysis

As mentioned earlier, the transcendental phenomenological approach analysis within this study started with the *Epoche*, where the researcher set aside any predetermined notions regarding the study to elicit a bias-free state for an objective analysis of data (Moustakas, 1994). The researcher then used phenomenological reduction by bracketing the background and experiences of the researcher to gain textural descriptions in compiling lived experiences of participants into themes (Moustakas, 1994). The researcher used imaginative variation to provide structure to descriptions through the examination and interpretation of possible meanings of participants' lived experiences (Moustakas, 1994). These meanings were then synthesized into the essence of the experience to develop context. The main overarching theme was *Information Technology* and its development and use over the years within the emergency management field. This theme mainly incorporated all items of technology; however, the main concept revolved around the technology and term *Virtual Emergency Management System*.

The overarching theme was followed by seven broad themes produced through the examination of participants' lived experiences: information, coordination, communication, organizational structure, situational awareness, leadership, and training. The distribution of themes among participants is presented in Table 2.

Data are presented to address the research question, what are the experiences of university officials, who have utilized virtual emergency management systems, in terms of communication capability, resources coordination, and strategic thinking prior to, during, and after a critical incident involving 4-year public institutions of higher education?

Table 2

Distribution of Themes by Participants

Overarching Theme	Participant
Information Technology	A-01; B-01; C-01; D-01; E-01; F-01; G-01; H-01; I-01; J-01
Broad Theme	Participant
Information	A-01; B-01; C-01; D-01; E-01; F-01; G-01; H-01; I-01; J-01
Coordination	A-01; B-01; C-01; D-01; E-01; F-01; G-01; H-01; I-01; J-01
Communication	A-01; B-01; C-01; D-01; E-01; F-01; G-01; H-01; I-01; J-01
Organizational Structure	A-01; B-01; C-01; D-01; E-01; F-01; G-01; H-01; I-01; J-01
Situational Awareness	A-01; B-01; C-01; D-01; E-01; F-01; G-01; H-01; I-01; J-01
Leadership	A-01; B-01; C-01; D-01; E-01; F-01; G-01; H-01; I-01; J-01
Training	A-01; B-01; C-01; D-01; E-01; F-01; G-01; H-01; I-01; J-01

Overarching Theme: Information Technology

The use of information technology and its rapidly evolving platforms were extremely beneficial to the field of emergency management. Information technology is defined by March and Smith (1995) as “technology used to acquire and process information in support of human purposes” (p. 252). Participant B-01 believed since “we’re all supposed to be on the same page [that] the more we can integrate use...of [not only] our [current] technology, but any kind of technology like...[virtual]...systems...it is gonna make you better prepared when the real event

happens.” Information technology allowed for the rapid dissemination of information to a widely dispersed population and enabled flexibility at the onset of critical incidents.

Participant H-01 has experienced the evolving nature of information technology in his career in responding to emergencies:

When you start comparing time over time you go back 25 years, was pretty much the time period before cell phones. My very first cell phone, official cell phone, for the [institution], I got the day before the [critical incident]...and I got it because I thought I needed to be in as constant contact as I could that weekend. Not so much because I thought the [incident was going to happen]...but because the question was whether or not we were gonna have class on Monday or whether we were gonna have that as a day off because people might need to still be helping out with the [attempt at mitigating the incident]...so anyway there was a question about what we were gonna do as an institution. And then how quickly we were gonna need to communicate that. [It] turned out the cell phone became...extremely valuable for other reasons, not the least of which the communications in the town. The telephone lines went down. The telephone system was headquartered down by the river, and once that got inundated the land lines were out. But, my point is that it's a little tough to think back 25 years about how we communicate with each other. And now, because of the advent of...the other technology that's in place and the fact that if you got a smartphone, you're carrying your office with you wherever you go. You're in sort of constant contact, and you can be in constant contact. And you can communicate things much more rapidly than you could at one point in time. But, I think that...we've all used those...those technological advances to our advantage.

According to Participant A-01, the evolution of information technology allows senior university administrators and emergency management staff the ability to remain connected even if they are away from their campuses:

Another critical part of this that we've found is that we have decided to forego physically coming together in the first few moments of the incident...and we have converted to a virtual executive policy group and a virtual operations group where we can communicate and get things moving wherever we are in the world as long as we have cell phone service.

This notion of remaining connected during a critical incident was further reinforced by participant B-01 when he stated "we've been able to share information and have meetings on conference calls, some in person...using this virtual EOC...[where] the old paradigm was everybody had to get into one room even if you're using the same computer system." During a major critical incident, participant B-01 found that often:

You can't get everybody there [to campus]...we found that during the [critical incident]...the first couple of days, especially day one of the [incident] people responded, it was a holiday...and to spread that information and make decisions, people were not getting into [the city] that day. So, the beauty of this [virtual] system was it allowed us to go through all our ICS functions, share information, and make decisions virtually, in a virtual EOC.

Participant C-01 thought virtual emergency management systems were "a nice tool to have so that we could, across all the different campuses, see what everybody was doing." Especially since the state would "send out tons of situation reports, and it's fabulous and great to

get that via email, but we can also log into [virtual systems] and access those situation reports, and we can see more critical information, more local information.”

The use of a virtual emergency management system as a way to centralize into one technology platform was also seen as important to participant D-01 because she felt the:

Ability to send you an email is great. But then, if you wanna share that with someone, you have to forward it to someone else. And if it has an attachment, is that the same version of the attachment that I'm sending to somebody else? I mean, it's hard to manage versions. It's hard to make sure that whatever you're communicating becomes standard among all the people that need access to it. If you utilize something like [a virtual emergency management system] or something like that, I've got one place, and so all documents are in that one place...threads of communications are in one place. And if suddenly I need to bring other people in, which is what typically happens with incidents...I mean, you don't usually start with a core group of people, and that's the only people that ever work the incident. You're always bringing somebody in. I need to catch you up to speed. Well, I don't wanna have to send you...forwards of 15 emails and hope that I got the right ones so that now you're kinda up to speed. And if I BCC'd somebody, then you don't even know that they've been in the loop the whole time. Whereas, if we're using some type of application, you know who is being communicated with, you know what they're, you know, receiving communications on. And if you need to bring somebody in, they've got access to everything that you've already seen. So, you're not...individually having to catch them up.

Although participants found the use of virtual emergency management systems were effective in providing a platform to gather quickly and provide information, there is a drawback to using only this type of system, as mentioned by participant H-01:

I think there's a danger in only going to a [virtual emergency management system] type situation, and only communicating through [the system]. And the danger is that...it would presuppose that, first of all, that you're reading everything and that all the information that is parked there, you're taking in, and you're integrating into your thinking. And the reality is that's almost impossible to do really...so you cannot beat in the communication world, you cannot beat first, a face-to-face interaction like we're having right now where I can see you nodding your head. Or I can see you looking at me with a question in your eyes, or whatever. You cannot beat that face-to-face interaction. The next best is voice-to-voice interaction. Where you can actually share things back-and-forth. And you can tell by the tone whether somebody understands maybe what you're saying or not quite buying what you're saying. And that's much tougher to do through email for example or through the written kinds of blog-like type of interactions that you can have through something like [a virtual system]. It's much more difficult to have those kinds of nuances. But it's also if what you're putting out there is gonna be shared by everybody under the tent; sometimes you don't want that.

Participant F-01 also stated overreliance on a virtual emergency management system for communication could be problematic because she thinks:

People want virtual systems to be the only form of communication in an incident, and I don't think that they ever can be. You know, they want it to be, "Oh, well, I'm sitting at this desk and you're sitting across from me, but the only way I can communicate with you

is through this system.” That's not to me, that's not the intended purpose, and that's not the way I want to utilize it in my EOC operations. I don't want it to circumvent normal communication chains, but I want it to be a way to capture what you're doing so that, one, if you have to leave and somebody else has to come and take your place in the next operational period, they know what you were doing. They know what steps we're taking, what phone calls were followed up on, whatever. And for the after action, we can go back and look and see all the things that everybody was doing and the types of issues that they were dealing with.

Out of the six university emergency managers, only two gave access to their senior university administrators. According to participant A-01, “They [senior administrators] wouldn't have appreciated it...it would have confused the hell out of them, and it would have done them no good. Like I said...you had to speak emergency response geek language, or it was useless to you.” Participant C-01 echoed the sentiment by stating:

I wouldn't have the nerve to go and tell them that they [senior administrators] need to be on it [virtual systems]...I think it's very common to find people at the executive level, especially in a big city, to...say “you go do that”...they need to conserve their time and focus for the higher-level decisions. They're not looking to run down any rabbit holes.

Participant F-01 also stated their senior administrators do not use virtual systems because she believes:

The challenge is that the types of decisions that they [senior administrators] are making are at a different level than the type of information that we're putting into [the virtual system] so I think that they could easily become overwhelmed with the finite details of the operation...it might be easy for them to get lost in the details. And I think that we

need for them to focus on the big picture. And I think if they saw every missing child that was put in there, every minor detail that was put into [the virtual system], then they might get overwhelmed with the small details of the response when they need to be focused on not tactical level operations but big picture operations.

Even though senior university administration is not currently using the virtual system, participant E-01 stated she believes “they [senior administration] would really like and benefit from having...their own user accounts on [the virtual system].” However, participant E-01 went on to indicate:

We had some issues with our last system...and...to be honest...I thought the last tool we had would be more cumbersome...and frustrate them...to use, but...I think [the current virtual system] is user-friendly enough that [it] will really be a useful tool for them.

Participant G-01 provides access to their virtual emergency management system to senior administrators because it “gives them access to more detail if they want it. But, I find that the big picture, the 30,000 feet picture on [the virtual system] is the most important. And that...just keep everyone on the same page...situational awareness.” This was further highlighted when discussing the duplication of efforts at their institutions; senior university administrator participant D-01 stated: “Truthfully, it would have been helpful even if we would’ve had the ability to log in [to the virtual system].”

When discussing various technological advancements over the years, senior university administrator participant H-01 stated prior to the implementation of the virtual emergency management system, “we really did not have that capability for everyone who needed to be part of an emergency situation to go to a single site and get access to parked information that they

really needed to have access to.” According to participant H-01, senior administrators used to gather in a specific physical room during an emergency to gather information, but now they:

Can gather [in the virtual system]. So, it doesn't matter where you physically are as long as you've got access to that...the technology has really enhanced our ability to communicate with each other...I think at this university there's always been a very collegial approach that faculty and staff have had with each other. And the folks who know that they're gonna to work together have...almost always been on very good relationship terms anyway. But the technology [virtual system] just really enhances that. So, you can make a phone call at the middle of the night and, and it doesn't really matter whether the person you're trying to reach is at home or not the way it did 25 years ago. If you got that person's cell phone and everything's working right, you can reach that person. That's huge in terms-- when you have limited amounts of time to respond.

This was also highlighted by participant G-01, who stated:

Communication interoperability is important...especially when you have multiple agencies which tend to be siloed. [The use of] virtual systems really helps. I think one of the biggest advantages of a virtual system is when you do have multiple agencies involved because it puts you on the same picture and, and you can communicate more effectively. It's also very good for strategic planning, in my opinion. The other thing to prepare for, and respond to, and recover, is you need to have an EOC, whether it's a physical or a virtual system.

This was also experienced by participant J-01, who stated the virtual system allows for greater participation during an incident, since:

Someone can be at home in bed, and on a laptop or on their cellphone, log into the system and be able to see what is...happening without having to physically come to the facility or to the emergency operations center or anything of that nature. So, from that perspective, we...envision that that's where this software system is gonna be very useful for us because sometimes we can't all come together. And so with them being able to log into the system and see some of the...decisions that have been made when we set up teleconferencing, because they physically can't be where we are making decisions, they can clearly see in a visual way what's happening and be able to offer, hopefully... good input so we have a successful response to any incident that might occur.

When discussing the overall use of virtual systems and its use within emergency management operations, participant B-01 stated he would "...be lost without [the virtual system]. When I need it, it's there and...I just find it to be one of the best tools I've seen and experienced."

This use of virtual systems as an information technology platform was identified by participants as an effective way to develop and disseminate information. This dissemination of information throughout an organization, and to external partners prior to, during, and after a critical incident was acknowledged as being crucial to the successful resolution of the incident.

Broad Theme One: Information

The first broad theme developed during discussions with participants was information. Farradane (1979) defined information as "a physical surrogate of knowledge (i.e., a spoken or written record), its relation to the originator, and its transformations on communication to a recipient, and the recipient's mental state and possibly physical (social) reactions to it" (p. 13). According to participant A-01, "the need to control the flow of information is an issue" for some

senior administrators during a critical incident where “[senior administrators] tend to jump in at inappropriate times and places and try to...grasp what’s going on and gain control of the situation.” This need to obtain information was also experienced by participant H-01:

As the president and vice presidents, we thought of ourselves as being hunkered down in the bunker and making decisions and when in fact there's no possible way [we] could have the right information to make the decisions that would need to be made...for immediate response.

Based on his involvement in numerous critical incidents, participant A-01 indicated emergency managers need to:

Assure [senior administrators] that you do have control of the situation and that you’re gonna tell them everything they need to know as quickly as you can get it to them, and that by them...jumping into things, it actually delays things, so they need to go to their arena and be ready to do their part in the emergency management process.

This was also the experience of participant C-01 with the senior administration because she experienced that:

They want information about the emergency, they wanna know about potential impacts, they wanna know...if it's something that...goes beyond the borders of the campus. They wanna know...what...others doing? What is the governor saying? What's the mayor saying? And all that stuff is information that's potentially in [the virtual system], especially the way we have it configured here where we can see our fellow higher ed people...and we can also see information from the state and the city if the Fusion [center] is set up correctly.

Participant F-01 also indicated:

The types of decisions that were being made at the incident command post or at the EOC level are not necessarily types of decisions he [the senior administrator] needs to be taking charge of. He needs to know what's going on and he needs to provide policy direction but not tactical direction. And so, I think if you gave him this information and all these issues, raw data, he might feel the need to organize that data and come up with solutions. Whereas, instead, if you say...these are the trends that we're seeing in the response and this is what we're doing about it, that's a different approach than saying these are all the problems we're having right now.

Participant F-01 also viewed their use of virtual systems as “an opportunity to capture information because incidents are so fast moving, sometimes it’s hard to go back and recreate what was happening at different moments in time in the incident,” and their system provides an avenue for documentation and centralization of this information. Participant F-01 further indicated this reaches beyond internal dissemination of information, but that:

Public information is absolutely critical...it does not matter what type of response you have if you didn’t get the right information out to the population as to what they needed to do, emergency procedures or whatever, you failed. You didn’t let the public know...you were handling the situation, and this is what you are doing, you failed...it is very much a challenge...to keep up with.

According to participant H-01:

You have to get out and provide information because the media and the community will create the story if you don’t help them understand what’s going on. There will be an information vacuum which will be filled immediately with erroneous information.

This was reinforced by participant B-01, who stated:

The three things you want to do if you have a situation, you want to notify people something's going on; you want to give them information to protect themselves either...shelter in place or evacuate or do something, and then you want to...recover and be back in business again. I don't think it gets any more dangerous than that.

Participant B-01 further indicated:

The beauty of this [virtual system is that]...people can take the right action if they need to. But without information, and without good, clear information...people may tend to make the wrong [decisions]...we've seen too many...instances of people making what they thought were good decisions based upon erroneous data that had bad consequences.

Participant I-01, as a senior administrator, had similar experiences with digesting information as “you've got to work on data that you know...on facts that are real...speculation about what things are, and acting on speculation just gets people hurt, or at least creates conditions where people can be hurt.” Participant B-01 further indicated as you go through an incident “if you give our incident commanders and our command staff the right information that you have, the best information you have, they make decisions that are outstanding.” Participant B-01 recounted during one critical incident, which was a planned event that exceeded the jurisdiction's resources, the utilization of the virtual system provided the area command with a seamless platform and “when something happened, and someone hit send, everybody got the information, the same information at the same time. That was very impressive.”

This type of information sharing was problematic in the past for participant B-01, because prior to using virtual systems, the incident command posts would:

Look like elephants at the circus, just, you know, cheek to jowl, all the way down the street...the fire department would be in one; the police department would be in another, these people would be in another one...and if you really wanted to communicate some info, “Hey, this is just what happened.” You go down to the next door. “Hey, this just happened.”

Participant B-01 stated with virtual systems you can have “them all on the same page where they’re in the room reading the same information and see it up on the main screen at the same time.” Participant C-01 explained even though they do not physically have a seat in the city emergency operations center, she could still go onto the virtual emergency management system and pull out information. Participant B-01 further indicated, “being able to share information is critical...with our resource allocation if you will. There’s a lot of things people take for granted in this small city [university], and if we don’t maintain that environment, we hear about it.” To ensure the continual flow of information, participant B-01 began to “create file libraries within...our [virtual] system so that we’re posting information there on a regular basis.” Participant A-01 also shared his experience with the sheer volume of information involved in an incident response specifically in a research environment:

I had an emergency management type come to me and say, “Can you give me a list of all the hazardous materials you have on campus?” Well, this was a campus with 1,100-plus laboratories spread out over 600 acres...so I handed him the Merck Index and said, “There you go. That's about half”...I mean, when you work for a research institution, there are no applicable standard reference materials for many things...and I'm not just talking chemical hazards. I'm talking the physical hazards. I'm talking about procedural

things. Because by definition, we're in the business of inventing things. We come up with new ideas, and we play with them and try them here.

According to participant A-01, within institutions of higher education, “you’re talking about managing perceptions for the institution, it’s also about getting a system together...being fed information, and really intelligence, because you’re vetting that information and having somebody to push...it out.” Participant B-01 made a similar statement in his finding that emergency managers need the ability “to take the information in and assess it and don’t go running down the hall and start grabbing the senior officials if [the incident] may not pan out.” Participant B-01 further explained:

There's a number of times where you...get this information, and you say, “Nah, this is not gonna affect us here in [the city],” so, you...don't worry about it too much...but when...I step up to action to let people know something's going on; they have that trust in me now.

Participant F-01 also indicated the amount of information within the system could be overwhelming for senior administrators:

Not to say that we want to shield them from exactly what's going on, but I think that...it might be easy for them to get lost in the details...I think that we need for them to focus on the big picture and I think if they saw every missing child that was put in there, every, you know, minor detail that was put into [the virtual system], then they might get overwhelmed with the small details of the response when they need to be focused on not tactical level operations but big picture operations...Not to say that they couldn’t come in and look at it, but I don’t know that we would want them to use that as their source of information.

However, participant A-01 found updates to senior administrators were important because “if anything big changes, they wanna know about it immediately so they can talk about it and not be surprised by it...it’s the old ‘never have your boss find out about a bad thing from somebody else.’” Participant I-01 stated that as a senior administrator she was “a firm believer in give me everything and let me sort through it.” She acknowledged that:

Not everybody is of that same mindset...but I think that is critical from the standpoint of so many times these cases, you think you’re dealing with A, and really there are issues B, C, and D that are floating around out there that might not be included in [the virtual system], but yet, are strongly connected to what has happened.

Participant I-01 further recounted her experience with the:

Old game of telephone, and, you know, [how] things get passed down. How does it impact things? Well, for me, as I have gotten older and more involved...my greater tendency is to say, “Stop.” And a lot of my colleagues will hear me say, “That doesn’t make sense to me. I don’t understand this. This doesn’t make sense.” Which is typically the clue that says, “Okay. You need to go back and get me more information because I’m not acting on what you just told me.” I’m not challenging what you told me as being inaccurate. I’m just saying I don’t have enough information to act on...so I think...people do the best they can, but sometimes it’s just inevitable that when the information goes through a couple of different layers that it might be a bit skewed...But again, I think that’s where having great systems of logging information...is really important because, again, then everybody is working off the same set of facts.

Participant A-01 created a virtual emergency management system “because I could push information into it and then my director could cull [information] out of it what I needed him to

get out of it.” This ability to have real time information was beneficial; however, according to participant A-01:

The human is the limiting factor. It’s...getting the useful information in a timely manner, getting it processed, getting it back out in a timely manner so that it’s useful to the [incident commander] to the on scene people. And if that’s not happening in real time or very...near real time, I’m three blocks away already, sorry.

This limiting factor was also experienced by participant J-01, who indicated many times as a public safety senior administrator he could not make a decision with other senior administrators because “sometimes the information they're [other senior administrators] receiving conflicts with information that we know to be true because we're [the police department] at the scene, better yet working [the] incident.” This creates confusion in the process of vetting information into intelligence, and can delay the response. Moreover, there are states with broad open record laws with respect to governmental agencies such as public institutions of higher education, as experienced by participant I-01:

I think part of the challenge is that folks are still probably, and maybe it's just me, but...we have some of the...greatest open records laws in the state, and we haven't challenged this yet with [the virtual system]. And so, I think...it's a great way to send out information and I think it's a great way to communicate. I think there's still the issue of...here people work really hard just not to put things in email.

The need to gather, process, and disseminate information throughout an organization, such as an institution of higher education, is crucial as experienced by participants. Once this information is turned into intelligence, it is used more effectively and efficiently to coordinate resources to respond to the critical incident and aid in the recovery process.

Broad Theme Two: Coordination

The second broad theme that emerged from interviews with participants was coordination. Coordination was defined by the Federal Emergency Management Agency (2008) as “the process of systematically analyzing a situation, developing relevant information, and informing appropriate command authority of viable alternatives for selection of the most effective combination of available resources to meet specific objectives” (p. 3). In participant E-01’s experience:

The most important thing, more important than having all the best plans in place, I think we all know we can't possibly plan for every situation and scenario, so the most important thing, in my mind, that you can have is an idea of who needs to be involved in the response and how you're gonna coordinate with those people...and communicate with them. So, it's basically who are the people and the things...your resources, and what mechanism do you have to all come to the table and work together on whatever your response objectives are. Because that way, it doesn't matter what incident or emergency it is, you at least have the right people at the table and the right tools to work together.

Participant F-01 described “communication and coordination with critical stakeholders” as one of the most important things needed to prepare for, respond to, and recover from a critical incident effectively. This importance of coordination was evident for participant B-01 in using virtual systems at an operational level so that “our incident commanders get to see the same thing. If...they’re bringing a second shift in somewhere ahead of time or keeping them over, then that’s gonna be posted on [the virtual system], and our incident commanders can see that.” Concerning resource coordination prior to a critical incident, participant A-01 experienced:

Everything from outrageously wasteful stockpiling of resources that go bad without ever being used, to...minimalistic approaches where they don't even have a plan, let alone any critical...plan of how to get resources in a hurry let alone have any critical resources on hand to address the most demanding things.

Participant D-01 described benefits of preplanning efforts for coordination of resources across the institution because “some of the things were predetermined so, obviously...going into [the critical incident] we already knew who the ride out teams were. We already knew who was responsible for different things.” However, since their department did not use the virtual system for the critical incident, there was:

Some miscommunication on our part as far as what [the EOC] was providing versus what we were keeping in house. There was also the problem that came up during [the critical incident] that we couldn't actually get to campus to the dining facilities to be able to get the stuff because the streets were flooded. So, we always make provisions within [the department] that within the...center, they can be totally self-sufficient if they have to. So as far as our people knowing that other people were taking care of it, we were also having regular status calls within our command to say, “This is what's going on,” because I was the liaison with the EOC but we have...my counterpart...in the data center responsible for the ride out teams. And then we have other senior managers that were engaging their staff remotely as they needed to do stuff.

Participant D-01 went on to explain:

So, we had the senior leadership of [the department] was having calls twice a day as far as this is what we see going on from a [departmental] perspective. It was during one of those calls that it came up, “Oh, yeah. So, and so has food.” Oh, wait a second. [The]

other person has food. And so, it was like, “Time out, people. You know? [He] is the one that's supposed to have the food. Why is anyone else messing with this?” And one of the guys that was one the call was actually standing in the checkout line at [the store], and so that's when I was like, “Why are you there?” “Well, I'm getting food.” “Why are you getting food?” And so, it was like, “Get out of the checkout line. We don't need more food.” So, it was through our calls that we figured out that we had multiple people getting food.

Participant D-01 felt the virtual system “might also have helped things at [the emergency managers] level to see, ‘I've got 10 ride out teams that everybody's getting their own food. Maybe we need to do it at a more central level.’”

This duplication of resources was also experienced by participant J-01, who stated during an ice storm:

The coordination...did not go well and we really didn't exercise...this sort of thing. The coordination...there was not...I would say there was not good communication because we had individual departments making decisions. We didn't come together at a command post to where we had unified decision making. We had one department making decisions about what resources were needed [and] another...department making similar decisions about what resources were needed. So, you had duplication of effort. You had situations where some tasks were already accomplished, some were not. And I think it was summed up...it was a situation where the right hand didn't know what the left hand was doing.

Participant B-01 explained coordination internally and externally for information and resources was vital when faced with a multioperational period critical incident because he discovered during:

Snowstorms we've had...[in the past], every weekend, we were getting whacked with a snowstorm and once [the city] shut down...our public transit system, which they have done, getting those folks into work, that prepare food that maintain facilities, that repair things when...they're broken, can be a problem.

Participant E-01 described the need to safely get residents back into their facilities during the recovery process in which they found not only the virtual emergency management system effective in the coordination of efforts, but also a virtual joint information system that aided in the coordination of information to the public:

We had a multidisciplinary damage assessment team go out there with our fire marshals, our facilities folks, electricians, and so on, and...do assessments just to determine [if the facilities were safe]. And then we coordinated buses to drive [the residents] from one residence hall over there, and said, "This is the time period you have to come in, grab your stuff, and, you know, get out." So, that virtual [Joint Information Center] was great because I'm not really sure otherwise how we would've been able to hear all those requests and concerns and what the needs of our campus community was without a communication that was coming in from them. And it gave them a central point to send all those requests so that model worked, worked really well.

When attempting to coordinate during a critical incident, participant I-01 stated:

I spend more of my time going back and forth between folks, "What do you know? What did you do? What was your response?" And so, again, there are sometimes, when the

most efficient thing to do is, you bring everybody to the table to kind of hash it out and figure out what you know and what the plan of action is.

In the transition to recovery, participant E-01 had to really consider resource allocation, and coordination, since characteristics of the critical incident left the institution stranded a *literal island*:

We might not be having classes, or...some research operations might be temporarily on hold, but there's other things that we have to continue doing, which is still...part of life safety if you're caring for our residential students. But, I think the difference is that you go into skeleton crew mode, so you have very few staff and staff is a resource. And even if you had lots of, say, equipment and things, you only have so many staff to utilize the equipment. So, your resource constraints become apparent very, very quickly. And at least with [the critical incident]...[it] was...interesting incident because pretty much everyone was stranded in place, not just the university but all over the city. So even when things started to improve on campus, there was no one who could get in to relieve the folks who were here. Likewise, the people who were here could not leave campus, because everything was flooded.

Participant A-01 also explained a virtual system could aid in coordination of resources in the area of documentation and logistics. He further noted:

If you got a system that can predictively look at inventory and see, okay, I've hit a reorder point for this consumable supply, or I'm hitting an hour's limit on this kind of equipment or I'm hitting an hour's limit on personnel. Do those things...because there, I'm all over what the machine tells me because I know I'm going to forget. I'm gonna lose track out in the field. Okay. But if your automation system is trying to tell me how to do

operational things, I'm probably gonna go, "Thanks, but, you know, we'll talk about that tomorrow at Denny's." So, yeah, logistics and documentation and especially if it can demand as inputs if it's smart enough to demand the things that lead to reimbursement.

Participant E-01 explained the virtual system is used within their jurisdiction as a standard to coordinate among various levels of government:

[The virtual system] is the state...standard for...resource request. So, any resource request that comes from city, county...our disaster district coordinator...that's gonna be submitted into the state, into the state operations center. They wanna see that coming through [the virtual system]. That's the system that all the local jurisdictions are using. So, for that reason, we have an instance on [the virtual system] on the regional server...that's what we utilize to communicate with city...county...the region, or the state...because we are a state agency as well.

Participant B-01 and C-01 also explained their institutions utilize virtual systems to coordinate resources and information not only among various levels of government but also amongst area institutions of higher education. Participant C-01 thought the use of the virtual system aided in coordination with city emergency management, since they did not have a seat in the city emergency operations center because of a large number of institutions of higher education within the city. Participant C-01 further stated, "There's a huge value in us plugging into [the city] and especially the state."

Participant F-01 maintained relationships developed in training prior to a critical incident, or a planned event, make a big difference in the ability to coordinate across multiple agencies and jurisdictions:

I would say they're coordinated fairly well only because, again, for example, home football games, we operate in the command post every year. Everybody's got the same seat. Everybody [has] a phone number in there. Everybody knows everyone in that room. So, we have a structure in place, familiarity, if I can say that, with everyone around the room, that when we have to create that command post structure in a different setting for an incident, we already know all of those...pieces, all those partners. So, it makes it really easy to then coordinate. So, for [a large planned event], we utilized the same command post. We had a few extra players in there, but for the most part, it's all the same people, and we all knew exactly who was in charge at what time [and] how to mobilize resources, how to activate resources. So, I would say that we work fairly well together in that respect, and resources are coordinated fairly well together.

This was further evident in participant G-01's description of resource allocation and coordination with departments internal to the institution and external public safety agencies "even though it's a small community; I think our agencies work relatively well together, for being pretty well siloed."

According to participant D-01, since emergency management is the coordinating body for resources, she found the virtual system very helpful because the system is:

Where we maintain the [incident action plans and it] also has a chat type function that we use real time in incidents. So as the police are seeing something, they'll put something in there. [The emergency manager] logs the stuff as it's coming into the EOC as far as what's going on, so you can look at it and you can see basically a transcript of events as they're occurring. It's not the official dispatch log that's handled by police dispatch, but

this is from an EOC perspective, what do we see going on and what are the things that we're working.

Even when effective virtual systems are in place in participant A-01's experience, emergency managers must be able to keep their senior leadership engaged because:

Typically, as soon as the senior administrators feel that the danger has passed, their time suddenly becomes much more precious to them again. So, it's figuring out how to keep them in the loop and saying the right things without placing so much demand on their time that they start ignoring you.

As a senior administrator, participant I-01 indicated to remain engaged "I think it's making sure that we're coordinated through an agency who does this work consistently and well and can help us do this work in the way that's most safe."

As mentioned, coordination is developed by pulling available information into the structure, having it vetted into intelligence, and then disseminated to the command staff of the incident and the institution for the allocation of resources to meet objectives of the institution. This intelligence and resource allocation is communicated effectively for it to aid in the stabilization and recovery from an incident.

Broad Theme Three: Communication

The third broad theme emerged from discussions with participants was communication. Communication is often seen in after action reports of critical incidents as one of the most significant problems that arose during the particular incident (Federal Emergency Management Agency, 2016). This was also the experience of many participants in this study. Participant C-01 thought to effectively prepare for, respond to, and recover from a critical incident, "you need a team and clear communications, clear roles and responsibilities, chain of command, which is

tough in [the] higher education [environment].” This was noted by participant C-01 because “higher [education] is very different...we have different time frames...we have grant cycles, we have semesters...we have time to confer and talk and research...in an emergency, there isn’t time for that...consultative meetings upon meetings.” This was further espoused by participant E-01, who stated “I think the most important thing, more important than having all the best plans in place...is an idea of who needs to be involved in the response and how they are going to coordinate with those people...and communicate with them.” Participant F-01 also indicated “coordination and communication with critical stakeholders” was an important factor in effectively preparing for, responding to, and recovering from a critical incident.

Many university emergency manager participants felt the organizational structure often limited their communications with the senior university administration prior to, during, and after a critical incident. Even though structure may limit direct access at times, participant F-01 thought when in front of their senior administration the communication was positive since the:

Executive administration has been very proactive in wanting to get training, wanting to get exposure. I think they understand the importance because we've dealt with so many incidences...together that they are very receptive to information and communication coming from emergency management. They know that we don't bombard them with every piece of information that we...get. But that when it's critical or building, then we'll communicate with them. And I think, as emergency managers, we have to be very cognizant of their time and their...busy schedules. And so, again, when I do get in front of them, which [is] at least quarterly...for a tabletop exercise, I keep it short, sweet. I touch the objectives. I keep it on time. I get them out in a timely manner so that they understand...I'm appreciative of their time, and they're gonna give me what they can

while they're in front of me...[So] I do feel that we have good communication with our executive administration.

This was also the experience of participant G-01, who stated the communication between the senior administration and emergency management was “good because we work on a very frequent and common basis.” Participant H-01 felt “the communication with the senior administration [from emergency management] has gotten better and better and better over time. And I think that’s the result of a more thoughtful approach to emergency management.”

Participant J-01 experienced communication issues involving multiple channels not consolidated into one platform:

I would say we experienced some issues with communication when we are in the midst of an incident, and not necessarily the communication in letting them know that we have an incident, but they receive information from various sources...and so that becomes somewhat what's...actually accurate and what's not.

Participant D-01 believed communication gaps within higher education are easily accounted for during an incident by consolidating communications:

Anytime that you have a central place to manage communications, it’s a good thing, whether it’s through an application or whether through a share point or something like that because, number one, it has everyone focused on one location...and we’re not relying on individual communications.

Participant D-01 further explained:

It also provides a record and a tracking so that after the fact, when you want to go back and say, “Okay. What worked and what didn't,” you have a more accurate transcript of what happened than, “Well, let me make sure I’ve checked all those five emails that we

got on this and make sure I've got the timeline right.” It's all right there. So, I think...standard communication is extremely important, especially in an incident that can be very dynamic...therefore, you need to rely on some type of structure to manage that.

This was also mentioned by participant B-01 in speaking of communications across various groups:

The beauty of [communicating with virtual systems] is you share [communications] very quickly and more importantly; you don't have to say it 15 times and lose the message along the way. Once you put that message out, everybody gets the same message, at the same time. I love hitting enter and making that thing happen.

Participant D-01 found this communication amongst various groups was aided by information technology during the last critical incident when the emergency manager “established...status calls twice a day during the major part of the incident. As the incident got resolved and as things started to get back to normal, those tapered down to once a day.”

Participant D-01 further stated the emergency manager “had instant ability to communicate out through different channels depending on what she saw as the emergent need.” This was seen not only in the communication with internal partners but also with the external community when participant D-01's institution put up a site for resources “so the communication really worked both ways...they identified to us what they needed, and we communicated to them...what we needed or what we could offer them.”

However, according to participant D-01, the communication within internal departments was only one-way, which inadvertently caused miscommunication and duplication of resources. This one-way communication gap was addressed by participant E-01 through the implementation of a new virtual system, to replace their previous system, noting at the time of the critical

incident they were “still really onboarding a lot of features [and had not]...fully rolled out all of the communications aspects that we would [have had] with our [internal departments].”

Even though communication is a reoccurring issue, participant A-01 found “prior to incidents, the communication issue is...getting the [senior] administrator’s time to practice, and familiarity with the communication channels.” Participant A-01 expanded on this by indicating:

So, if you do use anything other than their desk phone or their cell phone to communicate with them...they need to be habituated to using those other means of communication.

And they also need the practice...to be habituated to the language that’s used in emergency response and emergency management so that they’re not sitting there feeling like they’re left out of the equation as you speak a foreign language to others in the room.

Participant A-01 thought in “designing a system to support emergency response...I would focus it on logistics, communication, documentation...so that everybody’s speaking the same language.” Participant E-01 did caution communication interruptions were possible based on power and connectivity issues, which could arise during a critical incident. This was evident during a critical incident experienced by participant E-01 when communicating with an external EOC:

They were so inundated with all the calls that [they] were getting...it was pretty obvious, at least during the height of the [critical incident]...for 48 hours, that calling the EOC on the phone [was] really not gonna be a dependable way of communicating with them...so we relied on [our virtual system and] people’s cellphones...to reach some of those folks.

Participant H-01 further cautioned:

Sometimes you want to have a more direct conversation, and sometimes you want to reinforce some piece of information that may be out there...that you want to make sure

that somebody really understands what this is and what this means. So, I think there has to always be that...combination of [technology as] a tool. It's not a panacea...those types of tools are not intended to be the [only] communication function. It's a tool. It's [an] important tool in the communication process...[and] there are some things that I want to communicate that I don't want to put in [a virtual system]. I don't want to put in writing...[things that may] need to be communicated at times directly to the president, or to the incident commander, or to a vice president, whatever it is. So, I think that there are limitations in using a tool like [a virtual system for communications]. I think the benefits, you know, are enormous. But I think as I said there needs to be an understanding that there are...limitations...sometimes you need to be able to communicate something to everybody involved, and that is gonna be the best way of doing that. When you can't get everybody together in a room.

These statements from participants regarding communication further led into discussions revolving around internal and external grouping, silos, and structures. The common subject evolved from the theme of communication was the need to communicate effectively within the organizational structure prior to, during, and after a critical incident.

Broad Theme Four: Organizational Structure

The fourth broad theme that emerged from interviews was organizational structure. According to Fredrickson (as cited in Pérez-Valls, Céspedes-Lorente, Martínez-del-Río, & Antolín-López, 2017), “a firm’s organizational structure determines how employees from different levels interact, exchange information, and participate in decision making” (p. 2). All participants within the study had clear delineations between the senior administrators, which were often referred to as the executive policy group, the emergency operations center (EOC), and

the incident command personnel. All discussed working within a clear chain of command, although participant C-01 noted within institutions of higher education “chain of command [as an organizational structure] is...somewhat [of a] controversial topic and what we do around training [with senior administrators]...here is...explain...higher education is very different.”

Participant H-01 stated:

Universities are strangely hierarchical for, for an entity that prides itself on being sort of the protector of democracy. We're actually surprisingly hierarchical structures. And there is the potential for individuals to get caught up in that hierarchy....Get caught up in having to go up through a chain of command....When you have an incident commander, that individual...maybe...somebody who doesn't spend a lot of time working with the leadership of the institution....It's really important I think for the incident commander, or whoever's in charge of the emergency situations at the time, to be able to have full access to the upper administration including and particularly the president. And feel like he or she can gain that access and...not have to worry about there's this hierarchy and that...I have a boss that's gonna be upset that I leap-frogged over that boss. I'm not saying that's happened here. But I'm saying that is always a potential when you have a hierarchical kind of a situation.

However, participant E-01 explained in her experience, the chain of command could limit access to the executive policy group:

I think one of the other challenges is where your office or your function is housed in the actual org chart because I do think that sometimes, and this has changed a lot over the last...little over 6 years now, and I've seen this change drastically over that time period. But, you know, sometimes when you're a little more buried in the organization, it's more

difficult to kinda work through all the channels to have the access to the executive leadership group that you need.

According to participant A-01, within the organizational structure of institutions of higher education, senior administrators feel “the need to control the flow of information is an issue...at that level, they feel, and rightly so, that...the world is on their shoulders to keep the campus safe and going.” Participant C-01 indicated:

The policy group is going to look for information from the incident commander...in the moment. This is how our plans go, and they're going to be concerned with policy decisions like campus closure and continuity...activity and continuity plans. But they're also going to be...looking to the PIOs [Public Information Officers] for outward messaging or, you know, responding to any media inquiries.

For senior administrators to maintain continuity of operations and receive information that allows them to address policy level decisions appropriately, participant A-01 indicated senior administrators need someone, such as an internal information officer, within their organization who can move:

The information and translates for them into their language that they understand, from the EOC and from the field to the place where they're sitting and making their decisions about how they're gonna talk to the public...that's a supercritical point.

Within organizations participant A-01 was involved with, the person who fills this role was:

The director [who] was that link to the executive group. He was that go-between, the operations group and the executive group, for that part of it. And then separately we had a PIO who did that same function, who would communicate [with] the...fire department,

police department kind of [the] same level of information, the management level of information, and help the administrators craft...messages with the...executive team so that the president had something to work off of. So that the provost had something to work off of internally to communicate with students and faculty.

Participant B-01 shared what he experienced with his organization: “My job as the emergency manager in...this case, when we have an event...is to make sure my decision makers [senior administrators] have the best possible information as quickly as I can get it to them.”

Participant D-01 has experienced:

From a physical perspective, in addition to having...a plan for what we're gonna do, we also need to make sure that we have the people available to be able to step in to do what needs to be done. So ahead of time, we're documenting...the processes that we have in place, we're making sure that the people are aware of what goes on.

When speaking with participant F-01, she mentioned her supervisor would be the liaison between the executive policy group and the emergency operations center:

He would either be here, or he would be with them [the executive policy group], and I would be in direct contact with him, advising him on that information...It's more likely because most of them are all officed in the same building that they would meet in the president's conference room. And that's where we met during [the critical incident].

Participant A-01 further explained another area in which the senior administrators needed to have an established structure was:

Having people who have division labor straightened out at the executive level who's gonna talk to the press, who's gonna talk to the parents, who's gonna update the website, who's gonna talk to the students, who's gonna talk to the faculty. And it has to be faces

that those people know and accept...they need to be responsive and responsible to [the community]...there needs to be that clear delineation of authority, and if you're gonna trust a guy to run a scene you got to trust that he can...command his...communicator and use his communicator adequately.

As a senior administrator, participant H-01 experienced the need:

To have a cohesive type of a team approach. The incident command system I think does an excellent job in helping to create an organizational structure that makes sense and that individual folks can buy into. I don't think it's always initially...intuitive. So, I think sometimes, I think the people have to sort of be lead through that incident command system process...and realize that individuals who sometimes are used to making decisions will end up playing different kinds of roles in an emergency. But once...you go through that and once you sort of embrace that process and the team comes to understand it...then I think there's a collective...understanding about how that works and how it should work. So...what seems maybe initially to not be intuitive becomes intuitive.

According to a majority of the participants, continuity of operations need establishment across the institution and within the executive policy group. Participant F-01 stated:

The challenge is you've got usually one person deep for each of these [roles]. And so, when you're trying to answer press releases, or phone calls, write press releases, stand to do press interviews, and manage social media, it can be a challenge.

According to participant G-01, his institution has "identified people to take those positions, and we drill down about three deep depending on who's available." Participant G-01 further indicated the use of virtual systems allowed for streamlined structure in passing

information throughout the executive policy group, the emergency operations center group, and the support group on their campus. Participant G-01 believed this decreased “miscommunication or missteps in that area...both of those groups [executive policy group and emergency operations center group] here work very well together.”

However, participant C-01 experienced a stumbling block within her organization when attempting to integrate a virtual emergency management system into the existing structure:

I wanna say 10 years ago. Maybe a little bit less than that, when we started being on [the virtual system]...we had an effort, somebody from public safety, the deputy chief and I, tried to get folks...we tried to think of, you know...facilities, we're gonna get all these different departments into [the virtual system]...we're gonna have people posting in there. And that just did not work out. We had...a fair amount of people saying, “Well what we do now works. We don't need that.”

The way in which the structure of an organization is developed and maintained can affect the amount of information flowing from the incident command post in the field to the emergency operations center and the executive policy group. This may limit the understanding, or situational awareness, of complexities of an incident by members of the executive policy group and inhibit their abilities to make decisions affecting the health and wellbeing of the institution. As reported, the lack of situational awareness may have a lasting impact on operations and the reputation of the community.

Broad Theme Five: Situational Awareness

The fifth broad theme that emerged from participant interviews was situational awareness. Situational awareness was defined by the Federal Emergency Management Agency (2016) as “the ability to identify, process, and comprehend the critical information about an

incident- knowing what is going on around you- (requiring) continuous monitoring of relevant sources of information regarding actual incidents and developing hazards” (p. A-6). The establishment of a platform, such as a virtual system that would provide an awareness of what is going on real time with an incident was determined to be valuable to participants. Participant A-01 thought situational awareness allowed an institution to get “a handle on recognizing the things that will shut you down based on perception alone.” This was echoed by participant B-01, who stated, “we’re sharing information continually about injuries, transports, things that are happening.” Participant D-01 also found the sharing of information to be extremely important because “it really helped give us an understanding, not just the information that was discussed on the calls, but also [a] written report [of] this is what’s going on”, while participant G-01 felt situational awareness was a key component to have in effectively preparing for, responding to, and recovering from a critical incident.

Participant C-01 further explained:

So we have a lot of reason to consult with each other across the higher [education institutions] in the city..., which is why we're so grateful for our shared instance of [the virtual system]...because whether it's something as unexpected and unwelcome as [a planned event which turned into a critical incident] or a run of the mill...snowstorm, we end up reaching out to each other via [the virtual system]. It's a fast way. It's much better than email chains or...what's everybody doing, kind of emails because once the email stack up, it becomes unwieldy, but the [virtual system] allows us to go into the significant events board and see what everybody's doing.

Participant E-01 described her experience utilizing a virtual system to allow for situational awareness of an evacuation of a residential facility for a recent critical incident:

For example, during [the critical incident] we had to evacuate one of our residence halls, which is right on the [marsh], pretty much during the height of the storm. So, we had to evacuate 200 students from there, and it was a high-water rescue...so we utilized the resources we had here on campus. At that point in time, this was during the height of the storm so [the] city and county 911 was totally overwhelmed and ...resources were really scarce, especially high-water resources were very scarce in the city at that time, so...we made our entries on [the virtual system] as it related to the evacuation, kinda letting them know we're about to do this, this is the address...if this goes south, we're gonna be doing a huge SOS here, so...here's the address, here's the information, here's how many students, this is the address of where they're going [to], which was another residence hall on our campus. Then we kept them apprised of the status of that evacuation through [the virtual system]. And...in the big...county EOC, they have these huge screens that display [information], and so...here we are...at the top of the [board], saying we're evacuating our residence hall. So...it's very critical for us that when we do need outside assistance that we still have that instance of [the virtual system] even though it seems like somewhat of a duplication.

Participant B-01 stated during a weather related incident, the continuous use of a virtual emergency management system allowed for an increase in situational awareness at the tactical and operational level since “we had been sending information out through the [virtual] system during the course of the week, the incident commander knew what to expect that day.” This situational awareness allowed for expedited decision making by the executive policy group as noted by participant B-01, “and when the time came to make a decision, the decision was made very quickly and, I think, appropriately.” Participant B-01 also stated, “That’s exactly what

situational awareness is. That's where the common operational picture is. So...you can see that, and then...someone can pick up the phone and say, 'What's going on?' ...you do the quick follow up with that...and...that, to me, is critical.”

Participant B-01 further explained the use of the virtual system to track a recent major storm system provided great situational awareness that might have required massive resource coordination and support:

[We] let people know that we have this incident we're tracking and it's on [the virtual system] and let them look at the information as we receive it, so we're all on the same page as far as good intel on the situation and when it started tracking a little...it was an interesting storm. And I think it was a good test...for any kind of emergency manager. It's better if you get the test when it's going somewhere else. You know? But you do all the same things you normally do, you know? You get people ready; you get them prepared, we did briefings with our emergency management planning committee...every department, every school that we have across the university on both campuses, gave them a briefing about what we could expect. And it was interesting because when I had my first briefing in the morning, that storm was going to [the south of Florida]. By the time I got here on this campus...it had shifted to the East Coast. And by the time I went to my 1 o'clock briefing, it was in the middle of the state [Florida]. So, I mean, this...just showed the importance of having to continuously update people on where the storm was tracking...Well, I mean, that was something we tracked for a week.

Participant C-01 felt as a commuter campus, it was important for her to have situational awareness of roadways and other critical infrastructure that would affect her campus community:

So, flooding of roadways is critical for us in terms of our...students and faculty and staff ability to get here [to campus]. Also [the ability] to look at...those situation reports provide...[information on]...power outages, etc., and that gives us a sense of whether or not our people are gonna be coming in....if most people are without power and all these public schools are closed...we can figure out whether we're open or closed, a lot of our folks might not be able to come in because they might have...lack of power at home, if there are a lot of down trees...and etc., damage...that kind of stuff, it's helpful for us just to get a sense of...the situation, situational awareness.

Participant D-01 also described the value of situational awareness in the use of situation reports shared among various departments during a recent critical incident:

We also had sit-rep [situation report] reports that had to be turned in twice a day, and then she [the emergency manager] would compile those into...the report that goes to senior leadership. It would also get redistributed to us. So, while I submitted the IT report, the sit-rep that I would get back from her had everybody's so I'd be able to see, okay, Animal Care is working this issue and, you know, Facilities is working this issue. And so, it really helped give an understanding, not just the information that was discussed on the calls but also written report, this is what's going on. I could also share that written report with the rest of IT senior leadership to say, "Hey, you know, this is what we discussed on the call, but here's the report that says what's actively being worked." So...it also provided some tracking in that sense.

Participant D-01 felt since they do not use their virtual system across various departments that situational awareness is somewhat limited and "if she [the emergency manager] had that on

the campus level, not only would she have some visibility as to where people are, but if they need to utilize something.”

Participant F-01 explained benefits of using a virtual system in maintaining a common operating picture by stating:

It's also important to maintain situational awareness, not within the operations center that you're operating in but when you're not located together. So, for example, for football games, we have the incident command post at [the football field] then we have the EOC. Well, I'm not at the command post but I'm looking at [the virtual system], and so I see, “Oh, wow. They just had a missing child, or they just had this arrest, or they just had this.” So, it gives me the opportunity to maintain situational awareness without constantly bothering the incident command post. I know if there's something that I see up there that I need, well then, I can always call and get more follow up information or vice versa. But, um, it just gives me the operational picture of what's going on.

However, participant F-01 did not currently provide access to the virtual system to senior administrators. The senior administrators rely on “the liaison that we have between the executive policy group, a.k.a. executive administration, and emergency management.” However, as a senior administrator participant I-01 stated:

Sometimes things happen, and the executive group doesn't know about them for a while. And the longer, depending on the circumstances, if there's a long period of times that elapses from the time the institution knows about it versus the time the policy group knows about it and is acting on it, that puts...the institution at risk.

Participant G-01 described a key component to situational awareness in a leader as “someone with experience...to be able to take in the big picture and not to get too excited and

caught up in any kind of emotional thing if they can avoid it, and that just, I think that comes with experience.” Participant G-01 further explained:

Senior administrators, they're human beings. And they have...professional priorities and thresholds for action in...kind of emotional excitement. And...so their...level of involvement is...all different. If you have...extremely...seasoned administrators...they're usually pretty...professional...at communicating and communicating very effectively and efficiently. And then there's others that...maybe might be even less seasoned and they tend to get a little emotional. But, uh, you know, but that's what training's for. You know, it's to give them confidence so...they can...base their decisions on situational awareness.

As mentioned above, the need for situational awareness throughout a critical incident allowed tactical operators the ability to manage the scene and provided emergency operations center personnel and the executive policy group the opportunity to have enough information to manage the impact of the critical incident on the institution. As indicated, decisions made on all levels are managed through thoughtful and effective leadership techniques that include experience and capabilities possessed by individuals occupying these roles.

Broad Theme Six: Leadership

The sixth broad theme that emerged from interviews was leadership. According to Northouse (2013), leadership is defined as “a process whereby an individual influences a group of individuals to achieve a common goal” (p. 5). Leadership is often seen as playing an important role within institutions for establishing confidence in the organizational structure, particularly during crisis and other times of uncertainty (Northouse, 2013). Many participants discussed the constant turnover in leadership positions within their institutions, and often

emergency management agendas are not typically at the top of the new executive's priority list.

Participant D-01 felt any employee who had to take charge of an incident had to:

Be a leader in the normal course of your duties. I don't think that it is fair or even reasonable to take someone that's only ever answered the phone and now, suddenly, say, "You're in charge now," because they don't have the background. They haven't built the trust among the people that are gonna be following them that they know what they're doing. And in many cases, they don't have the confidence to know what they're doing.

Among various participants, the leadership quality of trust was most often mentioned as necessary to instill confidence and build a structure needed to mitigate critical incidents.

Participant C-01 described her senior administrators often found trust and confidence within experience:

So, the policy group...concerns itself with...and needs to be satisfied that operationally we have what we need lined up. But then on the communication side, they have to have confidence in the communications PIO office...because what if something does go wrong, you know, there's the operations folks and the public safety and facilities, etc., but then there's also the messaging component. We have...four people in our communications office right now. There's a director, and then there's...[an] assistant director, a social media guy, and a web person. And three of them have been to...PIO training and two of them have been down to EMI [Emergency Management Institute] for advance PIO....One of them came out of [a large] city...mayor's office, and the other was a reporter up on the [east coast], and they're...very good and they're very...talented, and sort of weatherworn. They've been through a lot, so they're...a trusted...entity that the policy group will look to.

In moving up through the ranks of an institution of higher education and having to respond to multiple crises, participant I-01 experienced the need to:

Have support from...the top levels of the institution...president, senior staff...um, because, again, typically there are a lot of people involved in these incidents, and you have to have trust that your folks at all levels are doing the jobs that they need to do to address things...you can't micromanage. You can't...control all factors. And so, again, it takes...a level of trust and understanding at the highest level so that the training happens and that the groups are able to perform the duties that they need to perform.

Participant C-01 agreed the message has to come from the top of the institution when it comes to preparedness:

Our...president overseeing the...campuses is very forward thinking when it comes to emergency preparedness and very...aware of the need to control...risks, you know, to manage risks and...the big push now is enterprise risk management, which includes emergency management, but it's much broader. So...I'm very grateful because it helps to have the president's office...saying this is important.

Participant I-01 further stated with the turnover of senior administrators in institutions of higher education:

It's about trust. But you've got to earn that trust. It doesn't just...it's not just given to people. It's got to be cultivated. And every time you have a new senior person who enters the mix, you cultivate that sense of trust for the group all over again.

Participant D-01 further indicated trust is also important in developing an atmosphere where people are comfortable admitting they do not have all of the answers:

Oh, I'll add one other thing to that. And I think it's also...helping people understand what they need to know, it's also helping them feel comfortable that you're not gonna know everything in an incident. So here are the people that you go to and it's okay to say, "I don't know what to do. Can you help me?" So, you know, [She] is our emergency manager. If something were to happen, I'm okay picking up the phone and saying, "...we need to make a decision on that, and I don't know what to do. Can you help me?" But I have to build that trust ahead of time and a lot of people, if they're not used to being in that role, "Well, I don't want someone to know that I don't know how, you know, the answer to that because then I'll feel stupid. Everybody else, I'm sure, already knows that." So, it's building that level of trust to say, "I don't know the answer to this. I'm okay saying I don't know the answer. But I know who to go to [in order] to get the answer." And so building that type...of team....building a safe environment for people to admit what they don't know and where to go to get information.

In this atmosphere, participant J-01 felt that "the ability to be flexible and adaptable" were important leadership traits because there are many moving parts within institutions. Participant I-01 indicated the other leadership qualities that made for a successful leader in a critical incident were:

I think you have to have...a strong sense of confidence without being cocky. The confidence is about, again, the ability and willingness to do the right thing even when...it may be less clear what the right thing is at that moment to do. You have to have faith, again, in yourself, in your abilities. You have to have, again, good training. It doesn't matter if you're committed to doing the right thing. If you don't have training and expertise as to what the right thing is, you get into some of these situations, and being

nice isn't enough; you have to have the skill set to back it up. The other things that I think you have to have, I think you have to have...again, when you're working at the senior levels, I think you have to have the respect of the people that you work with, and again, that includes all levels of the institution. They have to; they have to know you, or at least to some degree. They have to trust you. Because, again, while you may be providing a vision for what needs to happen, their willingness to carry that vision out means everything...and again, you have a better opportunity for all of that to...go the way it's supposed to if people...have confidence and trust and faith, and know that...you are working in the best interest of...them and other people involved. The other thing is that you can't be a drama queen.

Participant F-01 stated in her experience working with various emergency managers and senior administrators:

One of the qualities of a leader is understanding when you need to defer to subject matter expertise...and so one of the things that I think we've been very fortunate of with our executive administration, and when I say executive administration, I mean...the president, the provost, the vice presidents...that executive policy group level for the university...is that they understand their role is not to dictate the emergency response....The other thing for a leader is understanding what their role and their responsibilities are. So, in the EOC, I understand that my role is not to dictate the tactical level response of an emergency. I'm not there to tell the police department how to stop the bad guy or the fire department how to put out the fire. I'm there to help coordinate resources and get them what they need to be able to do their job. And so I think that's really the critical piece from university administration is, you know, them understanding

what their role is, and understanding that the people that they have in place underneath that [in] emergency management...the police chief, etc.....They know what they're doing, they have confidence in their abilities to get those jobs done.

Participant A-01 also believed confidence from senior administrators comes from “faces that those people know and accept.” Participant G-01 believed, based on his unique experiences as an emergency manager and former senior administrator, senior administrators need to have:

Have a high level of, of emotional maturity, I mean, they're...confident and...they think with their feet...squarely planted on the ground. And I think that's what you need to have a good foundation....if you have emotionally intelligent individuals it'll continue to be calm. But I found that after the incident, the...emergency managers and that staff, they continue to be calm, but the senior administrators tend to get a little emotional and excited about making sure that any mistakes or something doesn't happen again. And so, they...in my opinion, they overreact a little bit in...instead of just making...solid decisions...they tend to be a little more excitable.

This need for a leader to remain calm in the face of critical incidents or crises was also described by participant H-01:

I think...the ability to...remain calm is huge. The ability to isolate away...perhaps...maybe a better way of saying that than isolate away, the ability to laser focus on whatever the situation is at hand and isolate away the other kinds of things that may be swirling around..., you know, in the head or swirling around. And sort of to say, “Okay. Well, now this has happened, how [are] we gonna deal with it?” So...not everybody has that ability to remain calm, to not start wringing hands.

Participant H-01 felt the ability to remain calm as a leader came from experiences an individual brings to the job:

But I do think that there are...you bring all your experiences to any point in your life. And so those individuals who have gone through their lives and experiences of which they've lived in that kind of an environment where...they sort of routinely focus on whatever needs to be done and not let themselves get sidetracked. I think probably end up tending to be better at emergency managers...or leaders in emergency situations. Uh, an ability to...try to see the bigger picture and not get caught up in whatever is happening immediately. So, you have to understand the immediate situation. But you have to be able to look beyond that and see what's gonna happen in 24 hours? What do we think is gonna happen in 48 hours? Where are things gonna be at the end of the week? Or where do you want them to be at? How do you get to that point where you, you say, "Here's a reasonable goal to get to whatever it is."

Participant G-01 indicated among senior administrators in institutions of higher education there are two distinct types:

One is you're gonna have the types that try and take charge. And then you're gonna have the type that are part of the group and follows the incident commander. And I think our university administrators mostly fall into the latter group. Because they're going to follow the incident commander...and be a support group to them. Now, that doesn't mean that they don't make critical decisions too...but their critical decisions, I would classify more as strategic, whereas the incident commander's decisions are more tactical in...the environment there. And then you have the administrators, and their job really is strategy, which is long term. In other words, what's gonna be happening days, weeks, or

months from now? I think it's very easy to keep them focused on those long term because I think they're naturally focused on it.

This focus on the long term was also mentioned by participant H-01 in his experience with a president after a critical incident:

I think that's an example of a leader who is able to deal with what was going on but also project ahead and say, "We want to be ready for the summer. Now, here's the things we've gotta do to get that ready." These are the buildings we've gotta...have places to have classes. Some of our buildings took on water to such a degree that they are not gonna be ready. So, we're going to relocate where those classes...would've been in those buildings where they're gonna be. We're gonna have some students who are gonna come and stay in our residence halls. We're using those resident halls for other things. So, we gotta make sure that we have space for those students. All those...whatever those things that need to be done to be able to look beyond the edge of the immediate problems, to whatever goals are that you need to reach. And again, I don't think that's always something that is intuitive. I think...good leaders have that ability...to see the local/current environment but also see beyond that environment.

Participant H-01 further stated a good leader also has:

The ability to listen...to what they're hearing and to be able to assess what they're hearing. And...you would hope that by the time that there's some kind of emergencies when the best of all possible worlds, that the leaders would have the faith in the individuals who are helping with whatever the processes are and...will realize that so-and-so...that's where this individual lives. That's the world this person lives in...I have to have confidence that they can do whatever needs to be done in that world to get us to

the point that we need to get to. But I suppose, also the ability to identify when that isn't the case and perhaps to make some hard decisions and say, "I need somebody else playing this role."

During interviews, it quickly became apparent that qualities of trust and familiarity went beyond the pursuit of these qualities in any one individual or leader, but trust and familiarity were also needed in the location and equipment utilized. Participant A-01 believed emergency managers and senior administrators, as leaders, needed to:

Be where you're familiar and comfortable working. Be where you can control the situation when you're talking to outside constituencies....Be where your support group is used to supporting you. Failing that, the closest thing that you can get to it...you know, having this fantasy...in colleges and universities that we're gonna staff an EOC and have it...sitting there hot and ready to run over to.

The need for a virtual system to function in place of a traditional physical emergency operations center was viewed as beneficial by all participants; however, according to participant C-01, full implementation in an institution required:

It would take somebody...at the executive level...to understand why it would make sense for facilities or public safety, etc., to participate in this [virtual] system. Or, you know, at the end of the day, they may say, "You know, emergency management, you're doing the EOC events log. You do it. You're listening to the radios; you make a note of this stuff, you put the stuff into...[the virtual system]." Which kind of...you know, it would be better to be getting stuff from the departments themselves, but, you know, staffing is what it is. If it were another...you know, [the current virtual system] is very challenging. But as long as the city...uses it and as long as the state uses it...I don't see us going

chasing after something else because so much of the value is getting access to that authoritative information.

Participant C-01 further indicated at her current institution, the expansion of the virtual system is unlikely to happen:

The size of this campus...in terms of staffing, etc., we just don't...if we had a multiday event, we might be able to have an opportunity for it to show its...utility. But until people see...in terms of leadership until people see the utility of it at that higher level, I don't...the leadership qualities they're gonna look at, especially here with the budget situation that we have...anything that is an additional task for someone is gonna, you know, be viewed with suspicion.

Qualities of a leader and the ability of that individual to exhibit leadership during an emergency play a large role in crisis management and the capacity of an institution to organize a response to a critical incident. However, the development of these qualities begins in the prevention and protection phases of emergency management with training.

Broad Theme Seven: Training

The seventh broad theme to emerge from participant interviews was training. Training is defined by the Department of Homeland Security (2007) as “planned activities which support and improve individual and organizational performance and effectiveness, such as on-the-job training, career development programs, professional development activities or developmental assignments” (p. 62). All participants utilized various training programs provided by the Federal Emergency Management Agency and found them to be beneficial to their institutions.

Participant B-01 indicated in his experience “having a trained staff and being able to distribute that information in creating that common operational picture across the whole spectrum of

decision makers” aids in effectively preparing for, responding to, and recovering from a critical incident.

Participant I-01 also indicated effective preparedness, response, and recovery is aided by actual training:

Well, for me, the first thing is that we have personnel that are...trained and prepared to respond. No snowstorm or winter issue is ever the same. There is no incident involving a student [that] is ever the same, and so you have to have people who are well-trained and prepared to deal with what's in front of them. And so, I think that that's probably the most important thing. Then here, I would go back to we have strong systems in place. So, you have well-trained individuals. You have strong systems in place where those individuals fit and know both their individual responsibilities and the collective responsibility of the group to address an issue...because, again, we know that no one person has...the responsibility of dealing with these incidents. It's...by far a larger team effort.

Participant A-01 believed for training to be effective at an institution of higher education, it “must include executive-level players as active participants.” He continued by stating the participation of senior administrators is crucial because:

They've got to be...in that so they know what to expect, and so they know that you're, you know, appropriately looking out for the type of institution you actually work for and that you're not the little boy that cried wolf.

However, in his experience participant A-01 indicated, “especially at larger institutions, it is very difficult to get top-level executives to participate and take seriously the training and exercises.” Participant A-01 further explained a few causes of this are from:

Time pressures, and quite frankly, colleges and universities are for the most part in everyone's mind happy valley. No bad things happen. So being normal people, they sail down the road, assuming, you know, extrapolating that to mean no bad things will happen. And so, there's, you know, well, it's never happened here before. What's the likelihood it will...in the future? And so...it's basically the normal human mindset of we enjoy our nice life at the university and the college, and we don't like to ever entertain the thought that it won't be a nice life.

Participant B-01 also experienced time constraints with his senior administrators, and the executive nature of their positions and priorities found within their schedules:

I'd like to get some of my other folks to that level, but...at the university level....give them some ICS training. It's ICS for executives. We even...developed a module...in higher [education] to make it ICS for execs...in a college setting. And that's, whether we like it or not, that's the best we may be able to get some days. I mean, these are all established executives. They know how to make decisions...and I find that that's...really enough of what they need to do.

As a senior administrator, participant J-01 believed other senior administrators feel that: They just want to know the very basics of what's expected of them. And I think, in their minds, for...many...at least from my experience, they find...find it to be sufficient. And I also find that the time constraints are...very huge to them. Unquestionably, they always ask, "How long is this going to take?" So sometimes it seems like they're more interested in the time taken to train to understand the full scope of, say, like the incident command system and what's going to happen when you respond to an incident...weighs heavier than actually the content of what they're learning. But if you can deliver the training in a

way that you are taking their...feelings about time into consideration, understanding they want the abbreviated version, not the full version, then I think you're making good headway.

This access to the senior administration was also mentioned by participant E-01, who indicated she was not able to train with the executive policy group as often as she would prefer, stating:

I think its two things. I mean...the obvious is that there's conflicting priorities, right? So, it's always challenging...when the skies are blue to be the person saying, "Ah...but we still need to prepare for this," and so on and so forth. So, I mean, I think, obviously, that's just one thing. And...I do think we have a very good culture at the university that they value...that. They know it's important...and obviously, the more...folks you have in between you and your executive leadership, depending on the personalities that are there, if they don't...think that preparedness is a priority, then it can sometimes be a roadblock, quite frankly.

Participant F-01 also indicated in her experience:

Part of the challenge is with the executive administrations for universities is they're often times changing. You know, every couple of years, you get a new administration. It takes some time to get them...built up on your university's policies and procedures. So, I think that's part of the challenge with that.

Participant B-01 also experienced turnover at the institution to be a factor on training and preparedness of senior administrators:

We'll do drills and tests on it...just to make sure they're...up to speed on it. We have a, I don't say we have a huge turnover, but you do have turnover. So, you're always in the process of...training and...drilling folks. We do a drill probably once a year.

Participant G-01 described his experience with senior administrators and training as:

Some are more actively involved than others...but that's understandable because...they tend to be pretty busy. And...so...we try to accommodate everyone...and I think involvement hinges on the senior administrator's professional priorities. In other words, some of our senior administrators, such as...our own vice president is very involved with the...communication...and the training.

As a senior administrator, participant I-01 shared:

Not all of my colleagues would agree with me on this. But...I am a firm believer. If we could have tabletop scheduled on a regular, monthly basis, and what happens is that those are the first things that get taken off the calendar. I mean, all...of the other meetings are more important. What I find is that the more tabletops and the more training you do, the more efficient you become at responding to things that happen...But...if you don't spend a lot of time doing this work, again...it's easy to...take this stuff off your calendar...and assume it's not important. But for me, it makes...my responses better.

Participant G-01 further indicated when it comes to training, senior administrators at his institution are:

Very receptive. In fact, they're...receptive when they come into the training. But almost...unanimously when they leave, they want more training. So that's what's good about the training is it really gets them thinking, and it gets them prepared to actually be receptive to additional training. So, it's kind of a snowball effect.

Participant A-01 also believed training is beneficial and for “those who practice together, for them it works. And practice once a year is not enough. For those who don't, it falls flat on its face as soon as the first ego contest starts up.” For participant H-01:

Training is absolutely essential, to go through various scenarios. It's this; these are tough kinds of things to learn on the job. Humans make mistakes. We're always gonna make mistakes. The object here is to make as few mistakes as possible. And the training helps you identify vulnerabilities...and...helps you sharpen...thought processes that you need to start to employ. Because you do need, I think, in an emergency situation to go into a different frame of mind than...most people are usually in. And so, I think the...training sessions help develop that capacity to enter into that frame of mind.

These mistakes often lead to larger questions about preparedness and response. Because of this, participant C-01 stated this is why “training and exercises are so important. Not only do we do emergency exercises, we try to challenge people to think about these questions.”

Participant I-01 made a similar comment when she stated “tabletops give us an idea or an opportunity to talk about some things in more in-depth ways. I always...learn something...because, again, I don't see things in the same way that everybody else does.” When training does occur, participant A-01 believed it should be appropriately structured for the academic environment:

First and foremost, exercises, realistic exercises aimed at the academic and research environment scale of problem. So, it's appropriately scaled and realistic exercises...it's the pushing away from the FEMA...big agency mindset of overturned tanker trucks and things like that to what we actually face in...academia. Which is typically a lab scale or a

single building incident that has the potential to do wider harm but typically...is limited in likelihood...and is limited in quantity.

This concern regarding the academic environment was also confirmed by participant C-01, who stated:

If you take FEMA entry level...ICS classes that doesn't really speak to the academy, and that's where...the NCBRT class and the...TEEX and the other higher [education] focus classes are so important because...you have people who really don't have to learn this stuff but really should. Maybe...we need to help our folks understand how things change in an emergency and what...the plan is. So, what do you need? You need an emergency operations plan...and people trained in it, and people trained in incident command system because...we have fabulous first responders here in [the city]....All these folks use incident command system, and so...just to...get enough training so that they understand what the game plan is.

Participant A-01 further explained the current training emphasized the wrong types of threats:

Well, unfortunately a huge amount of the training that's available out there is focused on the wrong things because the training industry and the cadre of local, state, and federal trainers that work for government agencies have zero experience to almost zero experience in the academic world managing emergencies....there just aren't groups of people out there focused on the academic and research environment in the world of emergency management and emergency response as training providers. We get trained how to patch a...rail car. Well, I don't have any railroad tracks on my campus. How

does that do me any good? Why do I need to know how to do [that]? [I need to know] how to deal with an actual bottle of chlorine.

Participant A-01 felt this type of training leads to serious errors in judgment and confidence:

So, it's...we get trained on the wrong scale of things. And then for the most part...because we are a somewhat incestuous breed, we come back, and we propagate those errors because now the guy that's trained is the expert. And how did he get to... be the expert? From getting the training at the wrong scale. And that...error propagates down through and so the...people he...or she mentors and brings up come up thinking the wrong way.

Participant A-01 believed this occurs due to costs of training that lies outside of the federal government:

It's tough because quite frankly, a lot of places cannot afford to, you know if you're not a big institution and you can't afford to have people with those individual [expertise]...on staff...you're kind of at the mercy of what's commercially available out there.

Participant C-01 thought the sheer amount of time federal emergency management training takes affected the participation of senior administrators:

I think the problem is...some of these trainings are...3 days long, 4 days. Nobody's letting their people go to that; it cost money...and especially if the sense is that it's not a good use of time. Like some of the...materials created by FEMA are...intentionally broad because so many people need this training. And it's great...for municipalities and...state organizations. You can just say all these people are going to training for a week. Higher [education] is very different. You know, people are very quick...a very

sophisticated audience, and if you ask them to sit for a week...through material that's not really focused to their needs, that can be a problem...The challenge, I think, for any emergency manager is convincing people it's a good use of their time when the last bad thing was two or 3 years ago, and we did fine, so what do we need to do this for? So, I think that that's definitely a challenge.

As a senior administrator, participant H-01 felt:

So, for a good chunk of the time that I was at the university, I don't know that there was a whole lot of training that happened to be honest, in...trying to help us prepare as an institution for emergencies. What did happen was pretty sporadic. At some point...the incident command system...notion really took hold. And...the...institutional leadership at many levels went through a number of...opportunities to have incident command systems [training]. So, it was not a continual, necessarily logical...escalation of opportunities. It was sort of fits and starts...but I remember for example...all of the upper administration...including deans and...directors of various kinds participating in a multiday training session...probably...about a decade ago. And that for a lot of those folks was the first time that they really heard about the notion of an incident command system...and...if you got people who are trained properly then that communication flows pretty rapidly....And the better training, and it's sort of ongoing training...and creating that mindset through that training for individuals who need to be part of that communication cycle/circle...So I think we, as an institution, we do a very good job, of, of, anticipating...which I don't think we did quite so good at I'd say 15 years ago. I think we do a much better job of...keeping people in the loop...once there's a need to communicate things...much more rapidly doing that.

According to participant I-01 training, especially among the senior administrators, allowed for the building of trust within the team:

So I, again, I think it's critical that...the senior administration trusts those people who are leading the way to resolving whatever the critical incident is. And, again, that is where I go back to the table tops [trainings] and whatever, I think you build trust by having conversations about some of these things, where you can talk honestly about what you would do, what are...our opportunities, what are our greatest fears, what are our greatest threats.

Participant B-01 advocated for the use of virtual systems in response operations due to the ease of operations found when he initially explored this type of technology:

They liked it because they said, "You can train a state trooper in 15 minutes for an incident. Bring him in off the field, train him, put him in front of the screen for 2 days...and when the incident's over, put him back in the car driving the pike. And if you need him again in 6 months, comes back in, the system...he still remembers what he learned." Oh, I found that to be very functionally, a good thing.

Participant G-01 explained the use of virtual systems has been "effective because...we train the people...when the people walk in they're not clueless...but they might be a little rusty. But we have mechanisms in place to...bring them up to speed very...quickly." Although many of these virtual systems are easy to use, some participants found the most popular virtual system currently used by many states was, according to participant C-01 "not...super user friendly and it seems a little bit dated."

Training was seen as an effective way to boost collaboration and cooperation during a critical incident. Many of these training opportunities occurred before an actual incident and

were used by many participants to build and maintain relationships within their institutions. Training in the virtual systems was seen by a few participants as a way to gain familiarity with operations of these systems and as a way to foster teamwork in prevention and protection phases.

Summary

The current research study evaluated experiences of university officials who utilized virtual emergency management systems during a response to a critical incident involving 4-year public institutions of higher education. Face-to-face interviews were conducted to elicit lived experiences of these university officials in utilizing these systems. After analyzing data, one overarching theme *information technology* and seven broad themes emerged: information; coordination; communication; organizational structure; situational awareness; leadership; and training.

These themes followed a natural progression from the overarching theme of information technology in the form of virtual emergency management systems to the ability of these systems to provide a venue to assemble and display information regarding an incident. The theme of information fed into the theme of coordination and the process involved in using information gathered in the system to inform decision makers on the identification and selection of available resources. The theme of communication described the ability to use the virtual system to communicate information, intelligence, and decisions to a wider audience both internally and externally to the institution. The theme of organization structure identified areas in which the communication of information was a challenge within institutions and the ability of virtual systems to mitigate these roadblocks to achieve the theme of situational awareness. Participants also reported situational awareness is often required for tactical level decision makers at these institutions to manage incidents effectively and for the executive policy group to manage the

impact of the incident on their institutions. For decision makers to be effective, participants indicated they needed to have certain qualities of leadership that were discussed within this theme and are enhanced through virtual systems. Most participants also identified trust as a major trait needed by institutional leadership and this trust was often developed through training, the last theme.

Results of this data analysis are further discussed, critically analyzed, and interpreted within Chapter 5. Conclusions based on results are drawn, and limitations of the study are acknowledged. Implications for professional and academic fields are identified, as are recommendations for future research.

CHAPTER 5. DISCUSSION, IMPLICATIONS, RECOMMENDATIONS

The final chapter will summarize results of the study, and provide a discussion of results of data provided in Chapter 4. Conclusions are then drawn and compared with findings of previous research and theoretical foundations that were laid out in the previous chapter. Further, a description of various limitations, and implications of the study are explored. The chapter will then conclude with a description of recommendations for future research and parting comments regarding conclusions of the study.

Summary of Results

Since the creation of NIMS and the ICS, many levels of government, including institutions of higher education, expanded their capabilities to prepare for, respond to, and recover from various critical incidents. This capabilities expansion saw a significant increase in higher education since the tragedy at Virginia Tech in 2007.

Previous research involving the study of critical incidents indicated the lack of effective communication before, during, and after a critical incident posed substantial problems for communities and governmental organizations such as incident stabilization, resource support, strategic thinking, and coordination with other response organizations (Federal Emergency Management Agency, 2010, 2016; Kapucu, 2006, 2009; Wang & Hutchins, 2010; White et al., 2015). To combat these issues in the aftermath of the September 11, 2001, terrorist attacks, NIMS and the ICS were developed and implemented to limit communication and coordination issues during a response to a critical incident (Federal Emergency Management Agency, 2010, 2016; Kapucu & Garayev, 2014; Stambler & Barbera, 2011). However, responses which utilized NIMS and the ICS were often plagued by interface issues surrounding effective communication

and coordination between incident command personnel and the emergency operations center (Federal Emergency Management Agency, 2010, 2016).

Prior research on virtual systems indicated their use increased retention of knowledge (Farra et al., 2012), communication in the training environment (Chen, 2014), and the development and maintenance of relationships among response organizations (Federal Emergency Management Agency, 2010, 2016; Nikolai, 2015; Nikolai et al., 2015). However, it is not known whether the use of these virtual systems can affect the ability to enhance communication and coordination among all stakeholders (Chen, 2014; Kapucu, 2006; Palen et al., 2009) during an actual critical incident. Prior research was not conducted on experiences of emergency managers and senior administrators using virtual emergency management systems within a cross disciplinary, organizational, and community structure such as an institution of higher education, since the dearth of research involving virtual emergency management systems was limited to large urban areas (Kapucu & Garayev, 2012; Nikolai, 2015). Before this research, a gap in literature emerged in the understanding of how organizations comprehend, train, and utilize virtual emergency management systems and the possible integration of these systems with NIMS and ICS standards. Therefore, a need for a study to explore virtual emergency management systems within operational and tactical environments prior to, during, and after a critical incident was clearly indicated.

As stated earlier, the use of virtual emergency management systems to aid in the communication process within higher education has broad implications for Public Service Leadership and the field of emergency management (Chen, 2014). These implications involve structuralism theory, situational crisis communication theory, situated learning theory, and implications for academic and research communities.

In the present research, phenomenology was the qualitative methodological design utilized to study lived experiences of university officials using virtual systems throughout a critical incident. After researching various types of phenomenological designs, the most appropriate phenomenological model for this study was the transcendental phenomenological model as espoused by Moustakas (1994).

Findings in the study disclosed the use of virtual emergency management systems aided in the ability to communicate to organizations and personnel internally and externally to institutions of higher education. The use of virtual systems further allowed for the efficient identification and coordination of resources prior to, during, and after a critical incident. Virtual systems further allowed for emergency managers and senior university administrators to consider how to respond strategically to coordination and policy level issues resulting from critical incidents by having information and intelligence gained from the operational and tactical level response. Moreover, the study identified potential gaps in assumptions made by university emergency managers regarding the type and amount of access senior university administrators would need to have in using these virtual systems during a critical incident.

Discussion of the Results

In answering the research question, what are the experiences of university officials, who have utilized virtual emergency management systems, in terms of communication capability, resource coordination, and strategic thinking prior to, during, and after a critical incident involving 4-year public institutions of higher education?, university emergency managers and senior university administrators provided a wealth of information regarding their use of these systems and their experiences involving critical incidents. These results are discussed in the

context of communication of information, resource allocation and coordination, strategic thinking, and leadership.

Communication of Information

Results of this study indicated there are many different uses of these virtual systems by university emergency managers and senior university administrators at institutions of higher education. All university emergency managers interviewed found virtual systems to be helpful in organizing information, providing documentation, and aiding in communication of response personnel through the chain of command to the emergency operations center, and ultimately with the executive policy group. Every senior university administrators interviewed felt coordination was improved, and information obtained from the system enhanced the vetting process, turning the information into intelligence, which aided in the strategic thinking needed to make decisions at the executive policy group level. However, four of the university emergency managers limited the use of virtual emergency management systems to incident command personnel who were operating in tactical and operational environments, and emergency operations center staff. They did not feel the need to grant access to virtual systems to senior university administrators comprising the executive policy groups at their institutions. However, each senior university administrators felt they did not always have the type of information they needed in order to make decisions that could affect their institutions, and this often led to potential and real operational and reputational risks.

A discrepancy emerged between what senior university administrators and university emergency managers believed was appropriate information for senior university administrators to have in the event of a critical incident. A further disagreement was also found regarding the need to access information within a virtual system. A majority of university emergency

managers felt they should shield senior university administrators from minute details or clutter often available in virtual emergency management systems. However, the majority (three out of four) of senior university administrators thought they needed to have access to that level of information in order to gain full situational awareness and a common operating picture when making a decision that could affect the reputational, the operational, and financial status of the institution.

On the other hand, all senior university administrators felt they should be able to have instant access to highly detailed information and intelligence for them to do their jobs effectively. Again, this was countered by some university emergency managers who believed senior university administrators did not need to have that level of access, and believed senior administrators would feel bogged down by the sheer volume of information available in virtual emergency management systems. Likewise, some university emergency managers believed this would cripple senior university administrators and would make them inefficient and less effective in making decisions needed at their level.

The use of these systems for the documentation of information seemed to be very effective. This documentation was valuable in providing after action or recovery compliance-level decision making capability that often fed into the planning and preparation for future incidents.

Resource Allocation and Coordination

Resource allocation and coordination are important to the regular operating and functioning of an organization or institution and become even more critical in the occurrence of a critical incident. Participants believed resource allocation and coordination was aided by the use of virtual systems in operational and tactical environments, and in fact, resource allocation and

coordination were some of the most important items required to effectively prepare for, respond to, and recover from a critical incident. However, not all participants fully utilized their virtual emergency management systems for resource allocation and coordination during a critical incident, which often caused duplication of efforts and wasted resources. During these critical incidents where virtual emergency management systems were not fully utilized, senior administrators and emergency managers stated, in retrospect, virtual emergency management systems would have been helpful in mitigating these resource allocation and coordination missteps.

Most participants of this study (eight of 10) found the use of virtual emergency management systems for preplanning efforts aided in the identification of resources prior to an incident, and could often limit communication issues both internal to and external to the organization with other jurisdictions when multijurisdictional responses were required. Results of this study agreed with outcomes of the Caruson and MacManus (2008), and Kapucu and Garayev (2014) studies, which discovered many affected jurisdictions found it challenging to integrate into a single response structure. This integration into a single structure is often required under NIMS and ICS doctrines. However, results of this study indicated the use of virtual systems did in fact aid in resource allocation and coordination across multiple jurisdictions. This was particularly true in cases where many institutions of higher education did not have seats within local or state emergency operations centers.

Strategic Thinking

As mentioned previously, strategic thinking was defined as deliberate actions undertaken by an organization to move in a new direction that will set itself apart from others in an attempt to accomplish its goals and objectives (Pattinson, 2016). Results of this study indicated the use

of virtual emergency management systems provides a *virtual space* for university emergency managers and senior university administrators to communicate and obtain information regarding critical incidents at their institutions. Not only is this ability to communicate and obtain information beneficial to the institution during response and recovery phases, but also has further implications for planning and preparedness efforts at institutions. These planning efforts were viewed by participants to include continuity of operations planning, training, risk and vulnerability assessments, and emergency operations planning to name just a few.

Continuity of operations planning perspectives espoused by participants within this study aligned with previous research. A study conducted by Hamilton and Mohammed (2010) with a virtual simulator found cross-training benefitted team performance more than team coordination training. As stated earlier, Hamilton and Mohammed (2010) indicated team coordination training sought to enhance efforts to coordinate among members of the team. This team building eventually led to the formation of situational awareness and produced a common operating picture among the team (Hamilton & Mohammed, 2010). Results of this study further indicated by identifying and training multiple team members in emergency planning, response, and recovery efforts, institutions of higher education could build resiliency. By utilizing virtual systems there is an opportunity to merge the cross training team effectiveness with situational awareness and common operating picture capabilities provided by team coordination training. Current research indicated the use of virtual systems to cross train and coordinate among various users allowed an institution or organization the ability to enhance and expand upon the knowledge capacity held by various members of the institution.

Leadership

Leadership is often referred to as one of the most important foundational characteristics of an organization, because many decisions made through the organizational structure affect internal and external stakeholders and how they interact with the organization. This is particularly true of institutions of higher education who tend to inspire loyalty from various stakeholders based on reputational factors.

Several participants believed leadership for emergency management and planning at an institution of higher education must come from the top. This institutional leadership often included the president or chancellor of the institution and members of the executive policy group (e.g., vice presidents, associate vice presidents). Participants described an effective leader as one who has the ability to remain calm in the face of crisis; is flexible and adaptable to various situations; is a strategic thinker; knows how to effectively listen and digest appropriate information; can think strategically about fluid situations; and can trust in abilities of others to handle their responsibilities.

Because of the fluid nature of crises, many Federal Emergency Management Agency courses taught situational leadership, which includes democratic (participatory) and autocratic (authoritarian) leadership styles, as the dominant theoretical foundation for leadership understanding of required behavior prior to, during, and after a crisis (Federal Emergency Management Agency, 2010). This study challenges that theoretical premise and concluded that to be effective, a leader must have traits associated with the transformational leadership style.

Participants further indicated many times the senior leadership team suffers from constant turnover, particularly at smaller institutions. This constant turnover prevents many executive teams from developing bonds often formed when managing a crisis faced by their institutions.

This lack of executive confidence in the overall team tended to creep down into operational and tactical levels of an organization, affecting planning and preparedness efforts and leading to ineffective responses to critical incidents. Training was often mentioned by participants as important to effectively prepare for, respond to, and recover from a critical incident. This training typically allows leaders the opportunity to build confidence in the team's abilities to mitigate crises effectively. However, according to participants, the amount of training for the executive leadership was lacking due to time constraints and other responsibilities, even though executives viewed crisis training as important.

According to a previous study by AlBattat and Mat Som (2013), leaders of an organization should commit to training, be knowledgeable in disaster preparedness, and have appropriate training and resources available to manage risks associated with various threats, thereby lessening the impact on the organization. According to research by Aebersold et al. (2012), virtual systems were used to impart leadership skills and improve performance. Results of this study also align with previous research conducted by Hamilton and Mohammed (2010), who indicated team coordination training sought to enhance efforts to coordinate between members of the team. Hamilton and Mohammed (2010) further held team building eventually led to situational awareness and a common operating picture among the executive team. This situational awareness and common operating picture allows an institution or organization the ability to enhance and expand upon the knowledge capacity held by the institution or organization. Results of this study also align with research conducted by Kalisch et al. (2014), who found the use of virtual systems increased trust, leadership, and team building. Therefore, an appropriate leadership style and executive training needs reinforcement within the emergency management field to assist institutions in prioritizing crisis training.

One key issue in using virtual emergency management systems as described by both groups of university officials was the lack of daily use and familiarity with these types of systems. This lack of regular use caused some officials to be unfamiliar with the full functionality of systems and often required brief train ups when a response occurred, thereby limiting the ability to take swift actions and make informed decisions.

Methodological Explanation

The transcendental phenomenological method employed by the researcher accounted for many of the study's findings because lived experiences of participants were probed by the researcher using follow up subquestions. These questions were elicited through social and physiological interactions between researcher and participant, and provided a more profound exploration into uses of virtual systems. Descriptions of experiences provided by participants answered many aspects of the research question. However, accounts left a void concerning the culture fostered by the leadership at the institutions. To lessen this fissure, the researcher looked to theoretical foundations of the study for a solution, as articulated in the next section.

Conclusions Based on the Results

Conclusions of this study were derived from literature of previous research conducted in emergency management and virtual systems, and current training materials provided by the Federal Emergency Management Agency. These materials, along with data provided through participant interviews, allowed for conclusions, comparisons, and interpretations. Results are provided in the following sections.

Comparison of Findings with Theoretical Framework and Previous Literature

As stated previously, the use of virtual emergency management systems to aid in the communication process within higher education has broad implications for Public Service

Leadership and the emergency management field (Chen, 2014). These implications involve structuralism theory, situational crisis communication theory, situated learning theory, and implications for academic and research communities.

Structuralism theory. As discussed in Chapter 2, structuralism theory is based on relationships of individuals to and their interactions with an overarching structural system (Lounsbury & Ventresca, 2003). Structuralism theory in the context of emergency management explains the incident command system's (ICS) modular organizational structure and the interaction between internal and external stakeholders prior to, during, and after a critical incident. There is an assumption that this use of ICS during the response to a critical incident minimizes communication gaps within the command structure (Federal Emergency Management Agency, 2010, 2016). The use of virtual emergency management systems has the potential to further close this gap in communications.

Not only could structuralism theory explain the structure found within the Incident Command System's modular organization, but based on experiences of participants it can also explain the hierarchical structure of an institution of higher education, as noted by participant H-01:

Universities are strangely hierarchical for, for an entity that prides itself on being sort of the protector of democracy. We're actually surprisingly hierarchical structures. And there is the potential for individuals to get caught up in that hierarchy....Get caught up in having to go up through a chain of command....When you have an incident commander, that individual...maybe...somebody who doesn't spend a lot of time working with the leadership of the institution....It's really important, I think, for the incident commander, or whoever's in charge of the emergency situations at the time, to be able to have full

access to the upper administration including and particularly the president. And feel like he or she can gain that access and...not have to worry about there's this hierarchy and that...I have a boss that's gonna be upset that I leap-frogged over that boss. I'm not saying that's happened here. But I'm saying that is always a potential when you have a hierarchical kind of a situation.

This *closed structure* often limits the flow of information from the response level personnel through the chain of command to the senior administrators. If one recalls, many participants did not allow senior administrators to have access to the use of virtual emergency management systems, thereby limiting the amount of information that can flow through the structure of the institution. This lack of information flow is mitigated by allowing greater access to virtual emergency management systems throughout the organizational structure. Increased information flow throughout the organizational structure can significantly improve situational awareness by senior administrators, who often are tasked with providing institutional statements or communications to the university community. Therefore, the theoretical foundation of structuralism impinges on the realm of situational crisis communications theory.

Situational crisis communication theory. Situational crisis communication theory examines ways an organization selects effective crisis mitigation techniques based upon the public's understanding of events and the way they ascribe blame during a critical incident (Ulmer, 2012). The use of virtual emergency management systems is utilized to expand upon situational awareness (Nikolai, 2015) obtained by university emergency managers and senior university administrators, and can increase communication capabilities of the institution during a disaster response. This situational awareness can lead to an increase of information, thereby

expanding the knowledge base of users. This was clearly indicated in the experience of participant F-01, who stated:

Public information is absolutely critical...it does not matter what type of response you have if you didn't get the right information out to the population as to what they needed to do, emergency procedures or whatever, you failed. You didn't let the public know...you were handling the situation, and this is what you are doing, you failed...it is very much a challenge...to keep up with.

Participant H-01 further indicated:

You have to get out and provide information because the media and the community will create the story if you don't help them understand what's going on. There will be an information vacuum which will be filled immediately with erroneous information.

Erroneous information can lead to a lack of confidence in the institution's response to the critical incident and the institution as a whole.

In crisis situations, communicating with internal and external stakeholders becomes more difficult because traditional modes of communication (e.g., television, computers, social media) often are nonfunctional due to loss of power and infrastructure. In these cases, interoperable radios, in-car computers, and other forms of communication played a vital role in maintaining internal public safety communications; however, communicating with a diverse public can become even more difficult. Once buy in from the community is established, expectations for future events and partnerships with the community are developed and maintained.

Not only are internal and external relationships important for crisis communications, but the organizational structure plays a key role in establishing the culture of preparedness (Bundy et al., 2017). Further, as evidenced by Bundy et al. (2017), organizational learning plays an

important role in how an organization prepares for, responds to, and recovers from a critical incident. Therefore, internal foundations of situational crisis communication theory are incumbent upon ways in which leaders within the organization learn and develop their skills.

Situated learning theory. Situated learning theory is based on the concept knowledge transpires through the activity, context and culture in which learning takes place (Farra et al., 2012; Kakavelakis, & Edwards, 2012). According to Cobb and Bowers (1999), individuals learn in ways similar to how they participate in their social environment. Learning does not occur by simply reading a book or traditional learning in the typical classroom environment; learning occurs when a student participates in dealing with real world situations where classroom theory becomes practice (Cobb & Bowers, 1999). Learning in this realistic context allows the student to become part of this *community of practice* (e.g., emergency management, executive policy group), thereby instilling appropriate principles and norms associated with actions of the community. According to Kakavelakis and Edwards (2012), the student eventually becomes more engaged in the community, or culture, and becomes proficient in procedures and processes of the community of practice. As mentioned earlier, a study by Shubeck et al. (2016) showed an increase in learning outcomes and validated the use of these virtual platforms in disaster training due to the cost effectiveness of using virtual simulation training versus the cost of a full scale live exercise. Research by Shubeck et al. (2016) validated the premise of situated learning theory and is relevant to the field of emergency management because it supports previous findings on the use of virtual training (Chen, 2014; Farra et al., 2012). The increase in learning, participation, and situational awareness by leadership was experienced by participant B-01, who stated:

Like at commencement... which is probably our biggest one... we'll have... a briefing in the morning. I think it's interesting that over the years... we have seen an increase in the number of people participating in those 7:00 AM briefings... and that's management of the... event, that's our leadership. Um, and for the most part, it goes pretty smooth. Um, but... it's like any other operational briefing you do... in ICS. We had some weather briefings... about 2 years ago where we had... heavy winds all week and we had to take some... actions on the morning of... our outdoor commencement. But because we had been sending information out through the system... during the course of the week, the incident commander knew what to expect that day. And when the time came to make a decision, the decision was made very quickly and, I think, appropriately.

Results of the current research indicated the need to move from traditional learning and operational environments of the classroom and physical emergency operations center into the simulation based, hands-on practical learning environment offered by virtual systems. Virtual emergency management systems as described by participants in this study provide a platform for the establishment and maintenance of a social network needed to distribute and attain knowledge as posited by Kakavelakis and Edwards (2012). This social network allows for movement from operational and tactical environments of the on scene incident command through the emergency operations center to the executive policy group. As a result, networking opportunities provided to the executive policy group allow for the increased development of skills needed for them to be effective in making crisis-level decisions.

Interpretation of the Findings

Findings of this study are interpreted in many ways based on previous literature and associated theories. This study discusses the synthesization of findings within the context of the foundational research by Chen (2014) and the three foundational theories discussed earlier.

Synthesis with previous research. Findings of this study indicated the use of virtual emergency management systems prior to, during, and after a critical incident aid in the communication of information, the development of intelligence, the coordination of various resources needed, and aids in the strategic thinking of the executive policy group of a critical incident involving 4-year public institutions of higher education. Findings also complement previous research conducted by Chen (2014) on virtual systems in the training environment. Chen's (2014) research on the use of the virtual platform OLIVE during an emergency response training exercise discussed benefits of the e-learning environment with respect to crisis management. Chen's (2014) study also discovered the use of these virtual tools was successful and recommended the expanded use of these systems to offer communication capabilities among decision makers in the event of an incident. Chen (2014) recommended further development of the use of these training platforms to assist in response and recovery capabilities within the emergency response community. This study validated Chen's (2014) study and provided information indicating there is an increase in the ability for emergency managers and senior administrators to communicate prior to, during, and after a critical incident using virtual systems at institutions of higher education.

The indication from this study points to the need for universities to foster the development of virtual emergency management systems for use prior to, during, and after a critical incident. Prior to a critical incident, these systems are utilized to share daily report

information with senior university administrators (i.e., executive policy group) regarding life safety issues such as police activity, alarm calls, building automation concerns, facilities related concerns, critical infrastructure failures or down times, and cyber-related concerns, breaches, or threats. Further information is provided regarding local, regional, national, or international concerns related to institutions of higher education. This information would allow for the development of a more comprehensive operating picture, and would provide a broader look at the current threat landscape, thereby providing an opportunity for the executive policy group to train on these issues and learn from others. This would limit the probability senior university administrators would be unaware when incidents start to materialize at their institutions.

After the critical incident, these virtual emergency management systems also would provide an accurate timeline for an after action report. These after action reports allow an institution to review what they accomplished in the planning, response, and recovery, and what the institution can improve upon to prepare for, respond to, and recover from future incidents.

These virtual systems also foster the opportunity to provide an effective training platform, which is consistent with Chen's (2014) study. The use of these virtual systems can lead to increased knowledge of university officials and the ability to retain information over a longer period of time, which was demonstrated in Farra et al.'s (2012) study.

Synthesis of the theories. Figure 1 demonstrates the synthesis of the three foundational theories previously discussed. The combination of these three theories allows for the fostering of a positive culture of protective measures to form within institutions of higher education. As experienced by participants, the use of virtual systems as a technological platform is a tool which can bring about situational awareness, coordination of resources, effective training, and organizational structure. These key concepts are brought together in the protective measures

mission area, as espoused by the Federal Emergency Management Agency (Federal Emergency Management Agency, 2016). In turn, this leads to a more prepared community to respond to and recover from critical incidents.

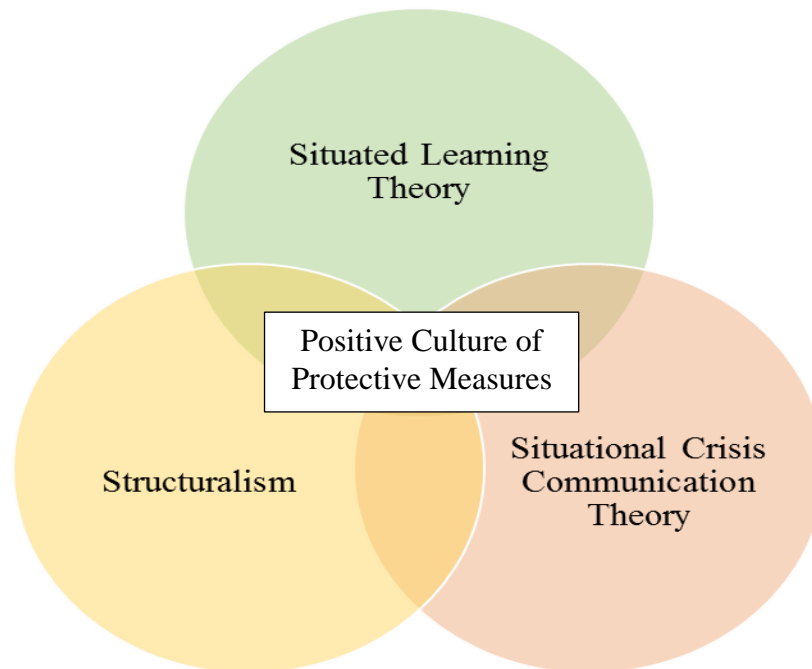


Figure 1. Fostering a Culture of Protective Measures.

A positive culture of protective measures is found in an institution in which the leadership utilizes its organizational structure to encourage learning, communication, and stakeholder relationships. This type of institutional leadership is modeled by and from the executive level which has a duty to encourage education at all levels, starting at the top. Executive education will not only foster appropriate learning outcomes, but will enhance internal communications and lead to improved external communications. Subsequently, these improved communication channels will be visible as the institution moves to implement their crisis communication plans.

Limitations

One limitation found in this study involved the small sample size. The small number of participants was adequate based on research conducted by Malterud et al. (2016), which indicated a qualitative study sample size might be as small as six to 10 individuals. However, a larger sample size would allow for the ability to draw generalizable conclusions for various-sized populations, and rural and urban communities. Another limitation was the sole use of 4-year public institutions of higher education. The use of such institutions limited the perspective of the study, thereby omitting challenges faced by 2-year institutions (i.e., community college) that often are more commuter based and have other types of concerns in critical incidents. Although this perspective was largely absent, one participant was from a 4-year institution, which was largely commuter based. Another limitation was by using a qualitative method, rigor was more difficult to maintain, assess, and demonstrate. An additional limitation was the population used for the study. The population was limited to university emergency managers and senior university administrators who used virtual systems during a critical incident. This neglected other potential users of these systems such as incident commanders, first responders, student health officials, and facilities personnel. A final limitation was economic factors experienced by the jurisdiction, as discussed in Chapter 1. The number of resources, both personnel and equipment, could influence types of decisions made by an emergency manager based on economic realities of the jurisdiction. However, results are still widely applicable to jurisdictions facing large scale disasters.

Implications of the Study

Implications of the study are defined in this section based on theoretical and knowledge based implications of the study, and implications of the study for the practice of emergency

management. These implications are based on data presented in this study and with the alignment of previous research.

Implications for Theory and Knowledge Base

As discussed in the Comparison of Findings with Theoretical Framework and Previous Literature section, the synthesis of structuralism theory, situational crisis communication theory, and situated learning theory provided for an increased understanding of protective measures. Each one of these theories was defined within the context of the emergency management field, and then seamlessly blended to achieve a higher understanding of concepts. Moreover, this synthesis provided for a perspective on the topic of the fostering of a culture of protective measures within institutions of higher education. This knowledge, combined with the broader use of virtual emergency management systems, can permit institutions and even other jurisdictions the ability to deepen their comprehension of emergency management processes, procedures, and capabilities.

Implications for Practice

Experiences of university officials documented in this study provided knowledge regarding the effect of the use of virtual emergency management systems on crisis acumen. These systems showed the capability to minimize communication failures (Chen, 2014) and aid in minimizing resource deployment issues (Federal Emergency Management Agency, 2016). These virtual emergency management systems facilitated strategic thinking and situational awareness by senior university administrators at 4-year public institutions of higher education. The use of these virtual systems provided users with the opportunity to become familiar with the institution's preparedness and response capabilities, which enhanced the community's protective initiatives. Based on previous research, these systems can further increase the retention of

knowledge (Farra et al., 2012) regarding emergency planning procedures, and response and recovery processes. Familiarity with planning, response, and recovery efforts became one of the main components of the culture of protective measures identified within the theoretical framework. Findings from this study further contributed recommendations for institutions of higher education to consider in order to leverage the use of virtual emergency management systems as technological platforms for the minimization of risks associated with critical incidents at their institutions and in their communities. Based on participant experiences, these technological platforms are customizable for university emergency managers and senior university administrators, and are able to be placed into a more user friendly, accessible system based on a mobile smartphone application.

Recommendations for Further Research

Recommendations for further research are outlined in this section and traditionally come from three main areas: recommendations developed directly from data; recommendations derived from methodological, research design, or other limitations of the study; and recommendations based on delimitations. These recommendations are not presented to discount or undermine information provided throughout this study, rather they are given to strengthen future studies related to this topic.

Recommendations Developed Directly from the Data

It is recommended institutions of higher education invest in virtual systems utilized internally to share information and intelligence among all stakeholders, from the on scene incident command post, to the emergency operations center, and to the executive policy group to provide a common operating picture. Second, it is recommended university emergency managers provide senior university administrators with access to virtual systems in order for

these decision makers to acquire greater situational awareness which may ameliorate transition into recovery efforts. This access may also minimize policy-level roadblocks often found with political, social, legal, and regulatory issues surrounding the critical incident. Therefore, future research should examine how and why users of virtual systems are selected within their organizations. This issue became apparent with the inconsistency of selection and participation criteria. A third recommendation would be for senior administrators to schedule and participate in more tabletop training scenarios which can aid in identifying gaps in continuity planning, response and recovery policies and procedures of the institution, and may limit damage to operational, financial, and reputational risk areas. A fourth recommendation is for institutions of higher education to affiliate themselves with private sector and government sector organizations which utilized virtual systems or similar type systems in their organizational operations for a longer period of time. The fifth recommendation for future research is to examine the most effective types of training for various users. This recommendation derives from inconsistent levels of training provided to senior university administrators among all participating organizations.

Recommendations Derived from Methodological, Research Design, or Other Limitations

As discussed in the limitations section, it is recommended conduction of future research occur with a larger sample size to increase the reliability and generalizability of data. Future, larger sample sizes would possibly contribute to a more comprehensive and robust sample. Another recommendation for a future study design involves the use of a mixed methods study, because it would allow for an opportunity to gauge the current environment through the cross-sectional survey. This survey would possibly provide significant data on the current use of virtual systems to manage critical incidents in the higher education environment and their effect

on communication. Also, future researchers could utilize a case study design, which is often used within the field of emergency management to gain lessons learned and an understanding of systems and methods employed during the incident (Federal Emergency Management Agency, 2016); however, the case study design can reduce generalizability and the depth that is explored in a single case when multiple cases are utilized (Creswell, 2013).

Recommendations Based on Delimitations

This study did not intend to provide an evaluation and review of specific virtual emergency management software. However, during some interviews with participants, it was discovered that a virtual emergency management system (i.e., WebEOC) was not user friendly and seemed obsolete. Future research conducted on various virtual emergency management system software packages may determine whether more intuitive systems would increase usage by a broader group of stakeholders. The focus of this study was not on future trends found in emergency management training using virtual systems. Based on participant experiences with virtual systems and the desire for continual and consistent training among university officials, future researchers could focus on the ability of virtual systems to increase training among university officials.

Conclusion

Since the tragedy at Virginia Tech in 2007 and numerous other high-profile incidents, higher education institutions developed and expanded emergency response plans and operations, including the use of virtual emergency management systems. Within early stages of an incident, communication (both internal and external to the organization) is often viewed as the main cause for failure of the effectiveness of an emergency management system. Prior research indicated utilizing information technology, communication and relationships between response

organizations are effectively developed and maintained. Since this information technology (or virtual system) has only been in existence for a short period of time, research was needed to gauge their effectiveness within the higher education setting, which was increasingly scrutinized over the past decade.

This study examined the use of virtual emergency management systems as a technological platform for communication of information, coordination of resources, and strategic thinking throughout a critical incident in tactical and operational environments. Current research findings indicated the use of virtual emergency management systems can increase communication prior to, during, and after a critical incident. Virtual emergency management systems can assist in the mitigation of negative effects these incidents can have on students, faculty, staff, and other stakeholders.

Findings further showed virtual emergency management systems aided in the coordination of resources prior to, during, and after a critical incident at institutions of higher education, and provided for increased situational awareness and a common operating picture for university emergency managers and senior university administrators. These virtual systems also allowed for an effective training platform for senior administrators which could build effective team cohesion and trust, while allowing for flexibility and adaptability of participation based on location.

Findings of the current research also indicated the lack of communication, coordination of resources, and strategic thinking among higher education leaders both internally and externally prior to, during, and after an incident caused substantial issues for the integrity and continued operations of these institutions. Prior research efforts did not examine the use of these virtual emergency management systems and their effect on the management of incidents within a

higher education environment. This current research adds to the literature on the use of virtual systems, and will assist institutions of higher education in more efficiently responding to and recovering from disasters affecting their communities.

Based on this study, the researcher developed a deeper understanding of the use of virtual emergency management systems at institutions of higher education. Further, the researcher also gained a more profound respect for the fostering of trusting relationships among university emergency managers and senior university administrators.

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STATEMENT OF ORIGINAL WORK

Academic Honesty Policy

Capella University's Academic Honesty Policy ([3.01.01](#)) holds learners accountable for the integrity of work they submit, which includes but is not limited to discussion postings, assignments, comprehensive exams, and the dissertation or capstone project.

Established in the Policy are the expectations for original work, rationale for the policy, definition of terms that pertain to academic honesty and original work, and disciplinary consequences of academic dishonesty. Also stated in the Policy is the expectation that learners will follow APA rules for citing another person's ideas or works.

The following standards for original work and definition of *plagiarism* are discussed in the Policy:

Learners are expected to be the sole authors of their work and to acknowledge the authorship of others' work through proper citation and reference. Use of another person's ideas, including another learner's, without proper reference or citation constitutes plagiarism and academic dishonesty and is prohibited conduct. (p. 1)

Plagiarism is one example of academic dishonesty. Plagiarism is presenting someone else's ideas or work as your own. Plagiarism also includes copying verbatim or rephrasing ideas without properly acknowledging the source by author, date, and publication medium. (p. 2)

Capella University's Research Misconduct Policy ([3.03.06](#)) holds learners accountable for research integrity. What constitutes research misconduct is discussed in the Policy:

Research misconduct includes but is not limited to falsification, fabrication, plagiarism, misappropriation, or other practices that seriously deviate from those that are commonly accepted within the academic community for proposing, conducting, or reviewing research, or in reporting research results. (p. 1)

Learners failing to abide by these policies are subject to consequences, including but not limited to dismissal or revocation of the degree.

Statement of Original Work and Signature

I have read, understood, and abided by Capella University's Academic Honesty Policy ([3.01.01](#)) and Research Misconduct Policy ([3.03.06](#)), including Policy Statements, Rationale, and Definitions.

I attest that this dissertation or capstone project is my own work. Where I have used the ideas or words of others, I have paraphrased, summarized, or used direct quotes following the guidelines set forth in the *APA Publication Manual*.

Learner name
and date



Eric S. Plummer 03/14/2018

APPENDIX A. PARTICIPANT INTERVIEW GUIDE

Participant Masking Number: _____

Date: ____ / ____ / ____

Time: _____ AM / PM

INTERVIEW PROTOCOL

Interview Script: (To be read in its entirety before each interview)

Thank you for your participation in this research study today. My name is Eric Plummer and I am a doctoral candidate at Capella University conducting research in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Public Safety with a specialization in Emergency Management.

This interview will take approximately 60 minutes and will include nine questions regarding your experiences using virtual emergency management systems prior to, during, and after a critical incident at a 4-year public institution of higher education. As noted in the screening process, this interview will be audio-recorded to accurately document the information that you provide regarding your experiences. Written consent was previously obtained from you for inclusion into this study. As included in the risk statement, the interview is completely voluntary and can be stopped at any time, just let me know. As indicated, all of your responses are confidential and will only be utilized for this study.

The purpose of this qualitative study is to explore the experiences of university officials who have utilized virtual emergency management systems, as a technological platform, for communication of information, coordination of resources, and strategic thinking throughout a critical incident in the tactical and operational environments.

Do you have any questions or concerns before we begin the interview?

(Present Demographics Questionnaire)

We will start with the collection of information on the Demographics Questionnaire. Please take a moment to fill out this information.

(Collect Demographics Questionnaire)

Take a moment to concentrate on the critical incident(s) and your experiences with this incident.

(After acknowledgment that the participant is ready, move on to the questions)

Critical Incident

1. As a university official, what are your experiences involving critical incidents at your institution of higher education?
2. What is needed to effectively prepare for, respond to, and recover from a critical incident?
3. What are your experiences working within the incident command system and multi-agency coordination systems (i.e., EOCs)?
4. What emergency management training for emergency management staff and senior university administrators did you utilize prior to the critical incident?

Communication and Coordination

1. What have you experienced with communication between university emergency managers and senior university administrators prior to a critical incident at your institution?
2. What have you experienced with communication between university emergency managers and senior university administrators during a critical incident at your institution?
3. What have you experienced with communication between university emergency managers and senior university administrators after a critical incident at your institution?
4. What was your experience with resource allocation and coordination prior to, during, and after the critical incident?

Virtual Systems

1. What are your experiences using virtual emergency management systems within your operations?

This is the conclusion of the interview. Thank you for your participation.