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The Concept of Leadership During Climatological Crisis: A Comparative Case Study of Puerto Rico Higher Education

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Walden University
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MA, The City University of New York-Brooklyn College, 2009

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Abstract

During times of climatological crisis, leadership is a crucial component of postsecondary education administrators' arsenal, specifically regarding their ability to execute strategies in action plans aimed at restoring the normal operations of institutions. This comparative case study aimed to examine how strategies in crisis leadership plans were implemented in Puerto Rico's higher education system, focusing on the experiences of key administrators in two higher education units who managed the response to the impacts of the 2017 Hurricane Maria. The conceptual framework for this investigation was grounded in Blanchard and Hersey's situational leadership theory and Bass's transformational theory. In-depth interviews were conducted with 12 higher education administrators from two academic units who led strategies to restore the everyday operations of their institutions in the aftermath of Hurricane Maria. Data analysis was implemented through the grouping and categorization of codes with shared relationships obtained through qualitative analysis software. The key findings show that Puerto Rican higher education administrators leading the response to Hurricane Maria implemented multiple leadership styles to promote trust and security, used multifaceted crisis communications strategies, emphasized the value of resilience and security in risk and issues management, and adapted their institutions to be hubs for peace and support through community engagement. The results of this study emphasize the role of higher education in driving social change by adopting diverse leadership styles that enhance trust and security, thereby transforming institutions into community-focused centers of peace and support that are well-equipped to navigate climatological challenges with sustainable and innovative strategies.

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Dedication

In the quiet corridors of knowledge, I dedicate this dissertation to Carmen Laura Aponte Suárez, affectionately known as "Bubi." With the grace of an educator and the wisdom of a librarian, she illuminated the path that led me toward the pursuit of social justice through academia. Her unwavering dedication to the pursuit of knowledge and her passion for empowering others continue to be a guiding light on this scholarly journey.

To the resilient students of higher education in Puerto Rico, this dedication stands as a testament to your unwavering spirit. In the aftermath of Hurricane Maria, you defied adversity and demonstrated remarkable strength and support for your beloved island. Your determination to continue your studies in the face of overwhelming challenges serves as a poignant reminder of the power of education to uplift and unite.

Lastly, with a heavy heart, I pay tribute to the 4,600 souls who tragically perished because of Hurricane Maria's devastating impact in 2017. This dedication is a solemn reminder of the urgent need for resilience in the face of climate change and its far-reaching consequences. May their memory inspire us to work tirelessly towards a future where such losses are prevented, and where the bonds of community and compassion prevail.

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Acknowledgments

I would like to express my heartfelt gratitude to several individuals who have played instrumental roles in guiding me through the challenging journey of completing my dissertation. First and foremost, I extend my deepest appreciation to my beloved mother, Irem, whose unwavering support and encouragement have been the cornerstone of my academic pursuits. Her belief in my abilities served as a constant source of motivation, and I am immensely grateful for her enduring presence in my life.

In times of academic challenges and moments when motivation waned, my partner, Efrain, emerged as a pillar of strength. His unwavering support, patience, and understanding were invaluable during the rigorous demands of doctoral studies. Efrain's belief in my capabilities and his constant encouragement propelled me forward, and I am deeply thankful for his presence in my life.

Lastly, I want to extend my appreciation to my dear friends Santiago, Janille, and Anne Marie, whose friendship and camaraderie have provided much-needed solace and moments of respite during this academic journey. Their unwavering friendship and encouragement have been a source of inspiration and joy, and I am grateful for their enduring presence. To all these individuals, I offer my heartfelt thanks for their indispensable contributions to my academic success and personal growth.

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Chapter 1: Introduction to the Study

Background

Leadership in climatological crises has become a topic of discussion in higher education (Abukalaf et al., 2020; Bishop et al., 2015; Enamait, 2018; Gouwens & Lander, 2008; Kyne et al., 2020; Shelton & Thompson, 2020; Trenor & Velotti, 2013; Van Hamersveld, 2019). In recent years, hurricanes have caused severe damages to communities. According to Cochran (2020), the 2020 hurricane season broke all records. Similarly, Mark (2017) observed that the five most covered environmental stories in the U.S. media and news for 2017 were all related to hurricanes. These hurricanes were Harvey, Irma, and Maria, which struck Texas, Florida, and Puerto Rico, respectively. These weather events have been challenging for higher education administrators, who in recent years have also had to address the COVID-19 pandemic.

In recent climatological crises due to Hurricane Harvey in 2017 and Hurricane Florence in 2018, administrators in colleges reported that they were responsible for ensuring the safety and security of their staff, faculty, students, and visitors (Van Hamersveld, 2019). According to Cochran (2020), considering the devastation caused by hurricanes in past years and the forecast for more intense storms due to climate change, higher education leaders need to develop crisis plans adapted to these climatological phenomena. There is a lack, however, of understanding of how higher education leaders execute crises plans according to these climatological events. Moreso, the role of the leadership in executing crisis plans is little understood.

Cochran (2020) explained that 2020 was one the most active and devastating seasons ever, indicating that recovery will take years. Studies suggest that climate change is excruciating and fueling more intense storms. It is time to create a better future to propose communities that face the worsening effects of these climate extremes (Cochran, 2020).

According to the Centre for Research on the Epidemiology of Disasters (2019) and the Asian Development Bank's Independent Evaluation Department (2015), global climate changes are increasing the frequency of natural disasters. Hydrological meteorological events have tripled in number from 1980 to 2018. According to the EM-DAT database of global natural disasters (EMDAT), the number of people affected by natural disasters has also increased, particularly from climatological, hydrological events like hurricanes (Centre for Research on the Epidemiology of Disasters, 2019). The context of higher education has not been an exception. More knowledge in leadership is necessary for crisis planning and postcrisis, when leaders undertake action plans to restore normal function in institutional operations (Zamudio-Suárez, 2018).

Hurricanes and Higher Education in the Mainland of the United States

McCullar (2011) noted that since the first decade of the 21st century, numerous leaders in higher education have participated in addressing natural disasters. Based on scholars' information on how global warming exacerbates more severe storms and natural disasters, U.S. higher education has been part of the execution of many crisis management plans leading to restoration change (Bacher & Devin, 2005; Cochran, 2020; McCullar, 2011). Scholars like Bacher and Devin (2005) and McCullar (2011) noted that

after Hurricane Katrina (2005) and Hurricane Rita (2008), leaders of coastal universities in the United States learned to strategize and respond to many leadership roles. These lessons emerged from the impacts caused by these phenomena in their communities and to their different stakeholders. Consequently, during the aftermath of Hurricane Gustav (2008) leaders made some improvements in their execution and action plans. Rddad (2020) highlighted that leaders from various universities and campuses, particularly in the Gulf region including New Orleans, started to develop and enhance their crisis management plans in response to the warnings for Hurricane Delta in 2020.

The research concerning crisis management and leadership during Hurricane Katrina and Hurricane Rita indicates that leaders in higher education should reassess their crisis response strategies and preparedness. This need arises from the unprecedented scale of the disasters that universities encountered during those events, as noted by Henderson (2005) and McCullar (2011). Mainly, Hurricane Katrina taught leaders in higher education in the Gulf Coast region in the United States to adapt crisis management plans due to shutdowns slowly and to look for assistance caused by the aftereffects of hurricanes (Lipka, 2005; McCullar, 2011; Williams, 2007). Therefore, literature regarding the aftereffects of Hurricane Rita and Katrina highlights that leaders of higher education institutions need to respond strategically to different scenarios and have existent plans for continuity (McCullar, 2011).

Hurricanes and Higher Education in Puerto Rico

In recent years, since the impact of Hurricane Irma and Maria in Puerto Rico, many scholars have studied the impacts in educational environments and strategies that

resulted in attending the aftereffects of this phenomenon with no precedents in diverse damages. Hinojosa et al. (2018), from the Center of Puerto Rican Studies at Hunter College, reported that an estimated 17,250 students aged 18 to 24 had left Puerto Rico post-Hurricane Maria. Academics concurred that many universities after Hurricane Maria could not reopen their institutions in a pertinent schedule due to electricity outages, web interconnectivity issues, and infrastructure damage (Zamudio-Suárez, 2017). The State Department of Puerto Rico (2018) published a report of lessons learned in crisis management after Hurricane Maria. Based on the insights of the report, experts concluded that leaders of educational institutions should do the following to engage in effective crisis management following an event like Hurricane Maria: (a) reinforce the accessibility of contact information of different stakeholders, (b) identify the communication equipment and information technology (IT) infrastructure during and after a crisis, (c) identify the security resources accessible, (d) offer education in the preparedness and readiness of crisis and crisis managements, and (e) plan in accordance with the institutional mission to assure the well-being of their stakeholders (Zamudio-Suarez, 2017). Many other universities needed to create partnerships and joint efforts to provide online courses to their students due to the absence of web clouds, web connectivity and lack of electricity (Estudios Técnicos Inc, 2017).

Zenere (2018) stated the need for Puerto Rico schools' reopening after Hurricane Maria to ensure emotional stability and family connectedness toward the purpose of recovery. Shelton and Thompson (2020) found that college students transitioning after the crises of Hurricane Maria were greatly affected, and community ties, along with

logistical challenges, influenced their college experiences after the storm. According to Zenere, non-profit organizations focused on mental health and wellness helped with international recovery efforts with experiences in natural disasters. In their assistance in Puerto Rico after Hurricane Maria, they determined strategies for schools' recovery by identifying needs and available resources and a plan for reopening schools.

Zenere (2018), as a school psychologist, worked closely with mental health professionals on the island. Zenere, who served as an advisor to the secretary of education of Puerto Rico, provided strategies in school reopening that consisted of (a) providing technical assistance, (b) conducting training for school mental health professionals, and (c) offering recommendations for preparing to meet the short- and long-term needss of students, their families, teachers, and support. According to Zamudio-Suárez (2018), many institutions had their students, faculty members, and administrators cleaning debris and cutting tree limbs at the main campus for more than 6 days, in prolonged time frames as part of the recovery process.

When responding to crises caused by external forces like climatological events, leaders should identify the immediate crisis and the threats originated to determine the best strategies to respond to them (Abukalaf et al., 2020; Bishop et al., 2015; Buller, 2015, H. F. Garcia, 2006; Kyne et al., 2020). According to Fubini (2011), there is limited time and lack of information for leaders to examine (a) the tradeoffs between the swifts action and (b) the risk of acting with an untested approach when confusion and chaos often exist. The literature regarding general crisis leadership shows that in moments of crisis management, leaders have to adopt situational and transformational qualities of

leadership that involve proactivity and reactivity to safeguard the different institutional aspects that entailed the well-being of their stakeholders (Bishop et al., 2015; Buller, 2015). The Interstate School Leader Licensure Consortium provides several standards that have been qualified as critical components in educational leadership in schools. However, none of these standards specify (a) components in crisis leadership in academic administrators, (b) strategic qualities in plan executions, nor (c) specify if they can be transferable to the context of higher education.

Academic administrators operating in distributed systems of power have faced several challenges in executing the strategies in their plans (Koseoglu et al., 2009). The concept of crisis leadership in the face of climatological events is contextualized in many roles, practices, organizational culture, institutional governance, budgetary issues, and other variables (Demiroz & Kapucu, 2012; Koseoglu et al., 2009; Van Hamersveld, 2019). According to Trainor and Velotti (2013) and Buller (2015), it is of vital importance to understand and have a broader analysis associated with the concepts of effective leadership in crisis, considering crises are different in (a) nature, (b) in physical and organizational contexts and (c) are propelled by different ecological and sociopolitical drivers.

Problem Statement

Many parameters for leadership have been evaluated in the context of the climatological crises confronting post-secondary education in the United States (Bishop et al., 2015; Kyne, 2020). The problem was the lack of understanding of leadership in the execution of plans in postsecondary higher education in institutions in Puerto Rico, from

the experiences of administrators leading the aftereffects during a climatological crisis caused by Hurricane Maria. This study's research site was two academic units of postsecondary education in Puerto Rico whose leaders had executed their institutional crisis plan to respond to Hurricane Maria's aftereffects. Both units are in different districts and with different governance: One is public, and one is a for-profit postsecondary institution serving more than 1,000 students (National Center for Education Statistics, 2019). A comparative case study may help to understand, differentiate, and synchronize different leadership realities of how administrators of these academic units confronted infrastructural, student support, governmental affairs, emergency funding, institutional fusions, and academic constraints, leading the execution of their plans' strategies after the crisis caused by Hurricane Maria.

Purpose of the Study

The purpose of this exploratory comparative case study was to explore the concept of crisis leadership plans' execution of strategies in Puerto Rico higher education from the experiences of critical administrators in two academic units of post-secondary education, who led the response to the aftereffects of a climatological crisis caused by Hurricane María. The premise was that leadership is a crucial component in executing crisis plans due to climatological phenomena to restore the desired normality in operations. Crises therefore are context based, and proactivity in crisis plans could be reactively reinforced when execution of strategies arise. In general, I sought to explore the concept of leadership in the execution of plans and climatological crises in postsecondary education.

Research Question

How have key administrators in two academic units of postsecondary education in Puerto Rico implemented crisis leadership plans' execution strategies leading to the aftereffects of a climatological crisis caused by Hurricane Maria?

Conceptual Framework

The conceptual framework for this study consisted of different leadership theories that have been studied in higher education administration. The first was the theory of situational leadership presented by Hersey and Blanchard (1969). This theory focuses on the social situations in which leaders act and develop leadership skills and abilities toward the challenges and tasks to be completed according to specific situations. In moments of climatological crisis in educational institutions, leaders must situate the specific roles and strategies due to the adversities that changed the typical status-quo of strategic planning before crises (H. F. Garcia, 2006; Gowen & Lander, 2008). This approach and subsequent research regarding situational leadership propose that social situations rather than individual characteristics determine leadership's appropriate approach (Thompson & Vecchio, 2009). Research regarding leadership at the face of climatological crises in educational contexts shows that situational leadership contextualizes the real threats of the crisis to promote the fastest, most accurate institutional resilience (Demiroz & Kapucu, 2012; Edward, 1996; Foote, 1996; H. F. Garcia, 2006; Gowen & Lander, 2008; Koseoglu et al., 2009: Thompson & Vecchio, 2009).

The second leadership theory I used was Bass's (1990) transformational leadership. Climatological adversities in educational contexts require leaders to communicate and convince stakeholders about the inherency of the problems and their solvency (Buller, 2015; Gowen & Lander, 2008). Transformational leadership is focused on transforming followers' opinions and attitudes to enact a social change or to remain confident about the changes. In the execution of crisis leadership strategies, changing the affected stakeholders' opinions into resilient attitudes is crucial (Koseoglu et al., 2009). According to Bass, the focus of transformational leadership is to propel for stakeholders to support each other and the organization's plans and identity.

Nature of the Study

I used a qualitative approach for this research. The concept that these leaders construct their understanding of crisis situations aligns with the qualitative epistemological view that knowledge is formed through the subjective interpretation of diverse human experiences, as discussed by Ravitch & Carl (2016). By conducting a comparative case study, I sought to provide an exploratory explanation of how administrators of two academic units of postsecondary higher education institutions in Puerto Rico lead strategies according to the execution of their crisis plans caused by the events of Hurricane Maria. According to Yin (2014), case studies are comprehensive research strategies for empirically exploring a contemporary phenomenon in its natural context. A comparative case study may provide a heuristic problem-solving approach to the phenomenon of interest by allowing for a comparison of similarities and divergences in approaches during a specific event in their respective contexts (Barlett & Varuss,

2017). Therefore, concerning the strategies of crisis leadership in Puerto Rico, especially in higher education responding to the aftermath of the climatological crisis caused by Hurricane Maria, conducting a comparative case study across two post-secondary academic units will offer deeper insights into the similarities, realities, and relevant factors of these units. This will help to outline new methods required in the execution of crisis leadership strategies due to climatological events.

The selection of a qualitative approach justifies the inductive process of reasoning required in this specific phenomenon of investigation. This approach is different from quantitative deductive reasoning, the aim of which is to understand a general problem based on a particular situation (Ravitch & Carl, 2016). In this case, I implemented an inductive reasoning process to explore the specific idea of successful crisis execution plan strategies to the general problem of crisis leadership in Puerto Rico's postsecondary education. By interviewing administrators, I sought to better understand the concepts and realities of crisis leadership strategies in crisis execution plans. This study may offer a contextual understanding of crisis leadership in plan execution strategies.

Definitions

The following definitions are used in this study:

Climatological crisis: Disruption of societal, institutional, and economic affairs due to emergencies or unexpected events caused by meteorological phenomena such as hurricane, tornadoes, or any hydrological weather condition (Catullo, 2008; McCullar, 2011).

Climatological events: The results of the physical laws that determine changes in the atmosphere and consequent impacts. These events and changes are studied and recorded through the empirical analysis and observation of meteorology (National Weather Service, 2018).

Crisis leadership execution actions: Leadership plans that focus on the tenacity, tactics, and grit required to influence action across various organizational challenges (Fubini, 2011). Leadership in execution actions focuses on how leaders must act at critical moments to shape their organizations and their career (Fubini, 2011).

Crisis: Unexpected events characterized by instability, emergency, and danger. Crisis often is followed by adverse changes to the status quo in political, societal, economic, and environmental affairs (Buller, 2015; Rollo & Zdziarski 2007).

Crisis management: Managerial processes that organizational leaders pursue in the face of unexpected harmful events (in this research, due to environmental–weather related events). The levels of crisis management are divided into (a) precrisis, (b) response, and (c) postcrisis (Zdiarski, 2007). Crisis management is characterized by events that represent (a) a threat to the organization, (b) an element of surprise, and (c) a short time for decision making (Coombs, 2007; Foster & Lipka, 2007).

Higher education administrators: Stakeholders within the distributed systems of powers of a postsecondary institution, in charge of leading and executing administrative works that could be related to financial, human resources, or operational tasks (McCullar, 2011).

Leadership in crisis: Transformational and situational actions of administrators to direct and lead different stakeholders in an organization in the face of unexpected events when uncertainty and emergency sometimes prevail (Buller, 2015; Lipka, 2005).

Strategic planning: The managerial anchorage of an organization that propels long-term operation and innovation by setting goals and benchmarks to be achieved (Hinton, 2012). Strategic planning involves analyzing the internal environment of an institution for weaknesses and strengths and the external environments for opportunities and threats (Hinton, 2012).

Assumptions

I assumed that the participating administrators' perspectives of crisis leadership related to execution strategies in the aftermath of Hurricane Maria were based on the managerial experiences and knowledge of administrators in many hierarchical levels, aligned to strategize, to the team, and execute an action plan. Different administrative levels have primary roles in identifying the resources and actions that are required in handling crises, including crisis phases where aftereffects of events are led (Coombs, 2007). Scholars have stated that in crisis stages, administrative leadership in change management are led by senior spheres of leadership as chancellors, presidents, provosts, and deans. Consequently, administrative spheres of leadership such as human resources, risk management, operational management, technology management, and community relations are among other crisis management leaders (Coombs, 2007; McCullar, 2011). Another assumption was based on leaders' inherent power in higher education's

administrative spheres to create, implement, strategize, and execute plans contextualized to proactive and reactive scenarios of crisis (Buller, 2015).

Scope and Delimitations

The study's scope is centered in two academic units of Puerto Rico higher education and the experiences of eight administrators within the public and private sectors that lead and executed different leadership strategies due to the crisis caused by Hurricane Maria. I selected participating administrators based on their involvement in planning and decision-making in the execution of emergency plans due to the climatological events. Other key stakeholders, students and faculty, were excluded in this investigation because of my focus on leaders' implementation of strategies. An exploratory comparative case study was implemented to observe concepts and themes of crisis leadership in both institutions' execution strategies due to the aftermath caused by Hurricane Maria. The findings of this investigation may be transferabe to higher education environments situated in highly risked environments of hydrological extremes as hurricanes, to enhance their leadership in the execution of crisis plans.

Limitations

Some of the study's limitations might be related to language barriers to maintain the required objectivity of the desired data collection without any biases or erroneous contextualization in the translation process. A recording in the pre-coding and coding process will be presented to selected English professors to ensure a peer-reviewed translation. Some limitations also revolved around the methodology employed of non-probabilistic sampling of "snowball sampling." According to Heckathorn (1997),

snowball sampling occurs when participants are recruited from among their acquaintances and represent some biases. In this research, participants are selected from the leaders who are recommending which participants will participate in the in-depth interviews in their respective institutions. Accordingly, to Heckathorn (1997), this situation could represent some biases. Some initial questions to interviewees could be employed to ensure voluntary participation with required informed consent. According to Trochim (2006), informed consent means that "prospective research participants must be fully informed about the procedures and risks involved in research and must give their consent to participate" (p. 1). Essentially, this means that prospective research participants must be fully informed about the procedures and risks involved in research and must give their consent to participate, be interviewed, and participate in the interviews is free and voluntary. According to Trochim (2006), free and not coerced participation in research is vital, especially in "captive audiences" like universities, that researchers could rely upon.

Additionally, the study's scope encompasses only two academic units of higher education, providing only a portion of the realities of what strategies and leadership were executed in crisis plans in Puerto Rico higher education, leading to Hurricane Maria's aftermath. Another limitation is that the leadership's concepts and realities in execution strategies leading to Hurricane Maria's aftereffects are based on the administrators' perspective. However, the experiences of stakeholders as academics and students, are not evaluated.

A triangulation and saturation of data will be employed to achieve a comprehensive evaluation of themes that emerged from crisis leadership in executing strategies in Puerto Rico higher education after Hurricane Maria. Starks and Trinidad (2008) consider saturation as the point at which additional data do not lead to any new emergent themes. Based on the conceptual framework, saturation will be ensured when enough data illustrates the conceptual framework and its related constructs proposed in the research (Starks & Trinidad, 2008).

Significance

This study will provide insights into a local problem in Puerto Rico higher education, where climatological drivers of change are causing leaders to contextualize and provide different plan execution strategies due to the crisis caused by natural disasters like hurricanes. This study's uniqueness is based on having more information on the meanings, roles, vision, competencies, practices, and styles that leaders face at the face of critical climatological events. The study wants to provide information on how leaders provide strategies for their institutions' realities and can continue their normal operations (Demiroz & Kapucu, 2012; Kyne et al., 2020; Trenor & Velotti, 2013). Therefore, according to Buller (2015) and Bass (1990), leaders' role is to situate and support followers through the best path to take actions when facing drivers of institutional change.

Considering how contextualized and broad the topic of leadership at the face of climatological crisis is, having more insights into the concepts associated with strategies and plan executions will benefit higher education administrators to enforce the best

course of action in the future. Consequently, leaders will implement new strategic reasoning in their institutions and reinforce policies to attend to the crises arising from climatological disasters. The findings obtained in this research may provide more insights into the concepts associated with leadership in crisis phases leadership and execution of strategies, transferable to similar contexts vulnerable to catastrophic climatological events like Hurricane Maria.

Summary

This study of higher education in Puerto Rico may help administrators to situate and execute the proper leadership needed in crisis plans to better respond to the aftereffects of climatological catastrophes such as hurricanes. Administrators may be able to use this study's findings to identify the best leadership styles for the execution of plans in the crisis phases of emergencies. This study may deepen knowledge of effective leadership in the execution of strategies and help administrators to determine how to communicate to stakeholders the actions needed to restore their operations in the face of adversities (Buller, 2015; Coombs, 2007; Demiroz & Kapucu, 2012; Foote, 1996; H. F. Garcia, 2006; Gowen & Lander, 2008; Koseoglu et al., 2009: Thompson & Vecchio, 2009). This study's results may contribute to effective leadership practices in Puerto Rico higher education and similar contexts, which are vulnerable to climatological adversities.

The findings may help leaders to strategize, organize, and execute the needed actions in their crisis plans when limited precedents are available. Specific situational necessities are crucial to be led and managed. Transitioning from the foundational insights delineated in Chapter 1, this comprehensive analysis paves the way for an

extensive exploration of the surrounding literature concerning effective leadership in crisis situations, particularly within the higher educational sector. By examining the landscape of leadership strategies in times of crises, the discourse is enriched, providing a robust foundation for understanding how educational leaders can effectively navigate and mitigate the impacts of unforeseen climatological adversities.

Chapter 2: Literature Review

The purpose of the literature review is to define critical terms and the conceptual framework of the study. This review will be aligned with the study's problem concerning the lack of understanding of the leadership in the execution of Puerto Rico higher education strategies, leading to Hurricane Maria's aftereffects.

Literature Search Strategy

This comparative case study will include a literature review of situational and transformational leadership theories in what it means to lead the execution strategies in crisis plans due to climatological events like Hurricane Maria. Also, the literature review will help define and explore concepts and definitions associated with: (a) the general definition of crises, (b) climatological events, (c) global warming, (d) climatological crises, and (e)action plans. Subsequently, concepts associated with higher education as administrators, strategic planning, and crisis management phases will be defined and intertwined with leadership subjects in the crisis leading to the execution of strategies in plans. Peer-reviewed articles, books, dissertations, and press articles will be the resources that will provide the scope of the literature review proposed in this comparative case study.

Conceptual Framework/Theoretical Foundation

The conceptual framework of this study revolves around situational and transformational theories. Both theories emphasize the contextual and charismatic aspects of leaders at the face of crises. In terms of executing action plans due to crisis management, both theories embark and ontological view of how leadership is situated in

specific situations and how the empathetical connections of leaders transform attitudes into actions.

Situational Leadership

The conceptual framework of this study revolves around the theories of situational and transformational theory. In terms of execution of strategies, Blanchard and Hersey (1967) propose that leadership in institutional tasks is correlated to specific situations and their performers' capabilities to achieve them. Scholars consider this approach as situational leadership. Therefore, leaders in the response of strategic planning and leading the action to require plans must be aware of multiple contexts of their situations and individuals' readiness of their groups to respond to determined tasks. In situational leadership, there is no better approach than another. The most effective approach following this rationale is when this leadership responds and adapts to their groups and individuals' specific needs (Bateman & Snell, 2004; Blanchard & Hersey, 1967). Effective situational leadership must determine the level of maturity of their individuals about their tasks (Demiroz & Kapucu, 2012; Thompson & Vecchio, 2009). According to Hoglum (2012), most individuals have high, moderate, and low maturity to their confidence and capabilities to the organizational tasks and strategies proposed to be acted. In critical situations, the level of maturity of individuals and groups might be reversed due to the uncertainty of situations. Therefore, low-maturity individuals require more leadership direction than high-maturity employees (Barth-Farkas & Vera, 2014).

Leaders should adopt different behavioral styles to situate the communications, organization, and action plans to their groups' maturity. Most of the styles situate the

strategies to groups that sometimes (a) must be told and teach how to respond, (b) others will need to be convinced in order to complete a determined task, (c) some individuals could be delegated actions due to their expertise and willingness, and (d) others should be motivated and encouraged to take actions (Blanchard & Hersey, 1967). The main component of situational leadership for organizational managers is to break a linear mind according to problems and solutions (Safi & Burell, 2007). According to Safi & Burell (2007), linear thinking is in the total juxtaposition of situational leadership rationale, as it breaks multiple possible scenarios to solve situations. Leaders in the face of crisis cannot be linear-minded in solving or accomplishing tasks, as they work with the "extraordinary." Extraordinary situations and crisis-driven breakdown situations require "extraordinary" governance and politics temporarily, demanding an "emergency governance and management regime" to cope with and manage the situations (Blake, 1996). Situational leadership is a unique element in crisis management. This leadership approach will provide the coaching, guidance, adaptability, and mentoring required to managerial aspects to execute plans facing extraordinary changes (Barth-Farkas & Vera, 2014; Blanchard & Hersey, 1967; Safi & Burell. 2007).

Transformational Leadership

In many instances, leaders must change followers' attitudes and convince them to act according to a specific situation. Scholars in times of crisis explain that the transactional leadership style of rewarding and punishing actions or letting followers determine actions to fend for themselves does not provide the intended normalcy of operations aimed in crisis (Blanchard & Hersey, 1965). When leaders situate the context

and best scenarios for strategies, the charisma, trust, and personalities convince the problems' inherency and their solvency to followers (Katou, 2015). Likewise, leaders need to coach and transform followers' attitudes to trust, sometimes utterly overwhelming actions and strategies to be implemented.

Following this rationale, Bernard Bass (1985) proposed transformational leadership in the juxtaposition of the transactional leadership approaches. Leaders' personalities and charisma can inspire followers to embrace changes with clear expectations, perceptions, and motivations to work towards common goals through the leaders' visions of strength. Transformational leadership is measured in terms of leaders and followers. Based on Antonakis et al. (2003), the central precepts of transformational leadership are (a) credibility, (b) trust, and (c) motivation to followers to leaders towards a common purpose.

An effective transformational leader can (a) serve as a role model to followers, (b) inspire and motivates followers through having a shared vision, and (c) provides personal attention to each follower. In times of crisis, transformational leadership's essential role is to stimulate followers' creativity and intellect to challenge the status quo and propel innovation through adversities. Katou (2015) consequently stated that leaders' charisma and credibility guided transformational leadership to propel organizational performance towards determined strategies. This relation of performance and transformational leadership assumes that in times of crisis and post-crisis, organizations require, as Katou (2015) explains, "speedy transformational change" (p. 7).

A transformational change could be possible if there is an organization-wide awareness of the need to act. Only through charisma and trust (components of transformational leadership), these actions can be convinced to followers and ultimately achieved (Katou, 2015). Another component of transformational leadership in times of crisis is building a sense of identity. Buller (2015) and Katou (2015) explain that facing adversities sometimes is propelled with fear and lacking a sense of organizational identity is detrimental to restate "who we are" and "where we are heading" as a group. Therefore, transformational leadership should be proactive in building a sense of trust, credibility, and identity to have a better response in the execution of strategies dealing with crises' aftermath (Buller, 2015).

Transformational and Situational Leadership in Higher Education Crisis Management

Both transformational and situational leadership have been the conceptual frameworks of the rationale in post-crisis management studies in higher education due to climatological adversities (McCullar, 2011; Nielsen et al., 2012; Rolod & Zdziarki, 2007). In post-crisis management of the execution of strategies, transformational leadership and situational leadership have been crucial in (a) change leadership and (b) leadership styles. According to McCullar (2011) and B. D. Garcia (2015), after Hurricane Katrina, leaders in higher education were initiators of change to enact plans according to the specific aftereffects. Many of these effects were related to campus closures, relocation of students, and communications problems (B. D. Garcia, 2015; McCullar, 2011). Therefore, leaders have shown that situational and transformational leadership skills

served to: (a) ensure an understanding of the leader's organization, (b) perform a self-assessment of leadership skills, (c) assess others' responses to change, (d) learn the change process, and (e) commit to change (Nielsen et al., 2012). Consequently, in the execution of plans, leaders, and administrators that managed strategies in executions plans due to Hurricane Katrina in 2005 and Rita in 2008, explained that situational leadership helped them to determine the styles to be initiated in decisions, planning, and grouping (Lipka, 2005 ; McCullar, 2011).

According to Rolod and Zdziarki (2007), many leaders adopt different leadership styles based on the followers' specific characteristics and tasks that are part of a post-crisis management plan. Rolod and Zdziarki (2007) explained that leadership styles in crisis management in educational environments could be authoritarian, where leaders make most of the decisions with limited input from their followers. Others implement democratic styles to propel a less directive approach to their followers than a laissez-faire style, where names only recognize leaders. However, followers are responsible for committing actions, like organizing committees with less intervention of their leaders. Situational leadership enables leaders in higher education to situate the best styles according to their plans' normality in the face of crisis (Rolod & Zdziarki, 2007). In times of crisis in higher education, transformational leadership ignited followers' vision and direction to embrace changes and innovation (Bacher & Devlin, 2005; Buller, 2015; McCullar, 2011).

Literature Review Related to Key Concepts and Variables

The key concepts and variables of this research are related to climatological crises from the geophysical realm of terminologies to more managerial terms, approaches and models related to execution of plans. The choice of literature selected, aim to delineate an understanding of what could be consider a climatological crisis, examples in the higher education scenario and how leadership related to plans during the crises phases of these events are executed.

The Relationship Between Climate and Weather

To understand the concept of climatological events first is essential to have a broader understanding of the meaning of climate and how it is compared with the weather. According to the National Weather Service (2019), the climate is the average of the atmosphere's running conditions and its effects on earth. The agency explained that most of the time, that average on atmospheric conditions is estimated at scales of 30 years. Weather is the average of atmospheric conditions in short-term measures. In other words, the climate is the long-average weather conditions on earth (National Weather Service, 2019).

Some of the frequently used variables to measure weather are temperature, humidity, atmospheric pressure, winds, and precipitation. To classify climatological events, meteorologist proposes the concept of climate extremes. Climate extremes are defragmented in various groups arranged according to low or high standards of measures of temperature, humidity, or amount of precipitation, and it could be arranged in terms of events driven by these climate variables. According to Easterling et al. (2000), climate

extremes can be droughts, forest fires, floods, or hurricanes that, according to meteorologists, do not occur necessarily every year at a given location.

Natural Disasters

Today, many of the challenges today are higher education institutions face are natural disasters and their aftermath (McCullar, 2011). As an initial definition of natural disasters, researchers have agreed that is sudden, shocking nature effects caused by extreme meteorological or geological events that produce severe damages, and their results cannot be controlled in communities and institutions. According to Van Aalst (2006), natural disasters consist of earthquakes, fires, tornados, hurricanes, ice storms, blizzards, droughts, landslides, and floods. As discussed in the previous definition, natural disasters cannot be controlled and be predicted, mainly their effects. Some scholars explain that natural disasters are directly connected to cause severe damages in infrastructure, lives, and trauma to their victims (McCullar, 2013; Smits & Ezat, 2003). Other recent studies show that natural disasters directly connect to the impoverishment in the given countries facing their aftermath. According to Wang et al. (2020), natural disasters are closely linked to socioeconomic factors like poverty, economic growth, and financial development. Consequently, societies facing socioeconomic adversities present disadvantageous contexts for innovation and higher education perpetuation (Strauss, 2017).

Recent Natural disasters could be Puerto Rico's different earthquakes and seismic activities in 2020, shocking the island's southern side and causing severe aftermath in the entire territory. Based on reports, the island has been affected by electrical power to

supply its customers, displacing several families to shelters, and destroy the infrastructure of 4 municipalities, including schools (Chavez et al., 2020). According to Chavez et al. (2020), from November 2019 to January 2020, more than 1,000 aftershocks have been reported from 2.5 to 6.4 in magnitude. Through Australia, acute fires beginning in July 2019 have caused multiple deaths and destruction. According to Yeung (2020), these events have destroyed more than 2,000 families, animal, and vegetative habitats and exacerbate weather conditions, causing heat and droughts. Other events reported in Asia causing severe danger and crisis are (a) Philippines typhoons, (b) in the northern Caribbean, Hurricane Dorian in 2019 causing devasting effects in the Bahamas, and (c) Indonesian flooding in 2020. All these last natural disasters caused concurring aftermath commonly denominated in natural disasters of several deaths, catastrophic damages to infrastructure, severe despair to communities, and displacement of multiple families (The Straits Times, 2020).

Hurricanes

Hurricanes are a climate extremes phenomenon that can cause considerable damages and disasters in the population (Easterling et al., 2000). The National Center for Atmospheric Research (2019) explains that 10,000 people worldwide die each year in hurricanes. Hurricanes are characterized by having intense winds, waves, and even tornadoes; floodwaters are their most dangerous aspect (N.C.A., 2019). The Center for Science Education (2019) noted that coastal communities can experience extensive damage (p. 1). Physical damage, depending on the winds' strength, could include

- changes to natural environments

- movement of beach sand
- carrying away of large boulders in the powerful surge of ocean water
- toppling of trees
- flooding of low-lying areas

Hurricanes take unpredictable paths and have a specific time to be tracked by meteorologists, but even hurricanes' warning can cause crisis within the possible communities affected (Abukalaf et al., 2020; Coombs, 2007; Kyne, 2020; McCullar, 2011). According to the Saffir-Simpson Hurricane Wind Scale (SSHWS), an atmospheric tropical cyclone must have 1-min maximum sustained winds of at least 74 mph to be classified as a hurricane (Williams, 2005). According to meteorologists, the highest classification in the scale, Category 5, consists of storms with sustained winds over 156 mph (National Weather Service, 2019). Williams (2005) explains classifications can indicate the potential damage and flooding a hurricane will cause upon landfall. Table 1 represents the relationship between the SSHWS classification, winds, and forecast damages of hurricanes.

Table 1

SSHWS Classification, Winds, and Forecast Damages of Hurricanes

SSHWS classification	Winds (mph)	Possible damage
Category 1	75–95	Very dangerous can produce some damages.
Category 2	96–110	Hazardous winds will cause extensive damage.
Category 3	111–129	Devastating damage will occur.
Category 4	130–156	Catastrophic damage will occur.

Category 5	157	Catastrophic damage will occur.

Note. SSHWS = Saffir-Simpson Hurricane Wind Scale. Adapted from the National Weather Service (2019) as an explanation on the intensity of winds and related damages caused by hurricanes. From *National Weather Service*. Copyright 2019 National Weather Service.

In the Caribbean, the Gulf area, and the Southeast region of the United States, hurricanes are a prevalent form of natural disaster and cause of long-term damage (McCullar, 2011; Smits & Ezat, 2003). In higher education, most of the studies have shown severe effects for institutions and stakeholders from hurricanes in Categories 4 and 5 (Abukalaf et al., 2020; Bishop et al., 2015; Catullo, 2008; Gouwens & Lander, 2008; Johnson, 2008; Kyne, 2020; McCullar, 2011; Redden, 2017; Trenor & Velotti, 2013; Van Hamersveld, 2019; Zdziarski, 2001). According to Redden (2017), senior leaders at different higher education institutions in Puerto Rico and U.S. Virgin Islands stated the destruction caused by Hurricanes Maria and Irma when they swept through the Caribbean in 2017. The storms damaged buildings, displaced students, and promised to stress already strained budgets (Redden, 2017).

Higher education in the Gulf area of the United States had one of the most significant shutdowns in American history because of Hurricane Katrina, Rita, and Dorian (Abukalaf et al., 2020; Bishop et al., 2015; McCullar, 2011; Lipka, 2005). There have been several studies in crisis preparedness and crisis management after these two catastrophic hurricanes. According to Catullo (2008), higher education in the Gulf area

increased by 89% of their preparedness in post-crisis plans after Hurricane Katrina. Academics concurred that since most institutions in this region had never faced major disasters, consequently, Hurricanes Katrina and Rita provided an opportunity for higher education to examine their preparedness (Catullo, 2008; McCullar, 2011).

Global Warming

According to Oxfam International (2019), "changes in the global climate exacerbate climate hazards and amplify the risk of extreme weather disasters" (p. 2). Global warming is associated with intensifying natural disasters that ignite crises based on climatological -weather-related events. The National Aeronautics and Space Administration (2019) stated that global warming had increased air and water temperatures on the planet, rising sea levels, supercharging storms with higher wind speed, prolonged droughts, and intense wildfire seasons precipitation, and by its results, more flooding. Recent statistics concerning the effects of global warming estimated that more than 20,000,000 people a year are forced from their homes by climate change since 2015–1019. Consequently, the United Nations Environment Program estimated that adapting to climate change and coping with damages will cost developing countries $140–300,000,000 in U.S. dollars per year by 2030 (Oxfam International, 2019).

After the United Nations Climate Summit, politicians urged industries to access different alternatives to prevent and avoid actions to the environment worsening conditions. Higher education as an industry is not exempt from these conversations. According to Cobretti (2019), in 2006, the American College and University Presidents' Climate Commitment was created, and 12 university presidents agreed to commit to

carbon neutrality, conduct an inventory of greenhouse gas emissions, and create a climate change action. Orr (1993) explains that global ecological crises are part of a lack of values, knowledge, and perspective, making education a crisis. Higher education as a center of education should reinforce solutions, policies, alliances, and research that lead communities for social impact in environmental sustainability and climate action solutions (Cobretti, 2019).

Crises

Crises are context-based and therefore lack concordantly among academics to have uniform elements in its definition. Relativism plays an extensive hermeneutical approach to define the construct of crisis (De Parres García, 2015). According to McCullar (2011), sociological crises are different and hard to allocate to a narrowed perspective. Crises are various and triggered by different situations. For this research, one of the general definitions used to define crisis is based on the Collins dictionary (2012) descriptions of crisis. One perspective to view the concept of crisis is "a condition of instability or danger, as in social, economic, political, or international affairs, leading to a decisive change" (p. 1). Crises can produce an interruption of the normalcy in each status-quo, causing physical, psychological, technological, and economic harm to the stakeholders who are experiencing these events when happening (B. D. Garcia, 2015, McCullar, 2011, Zdiarski, 2006).

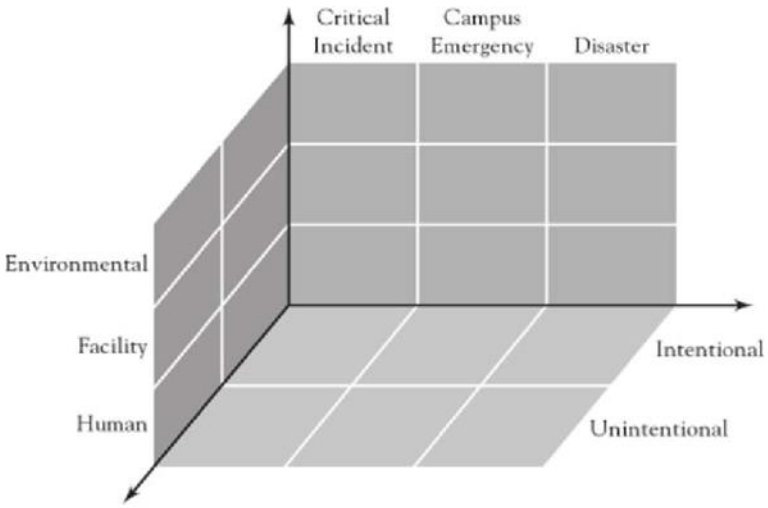
One of the best definitions of higher education crises is provided by Zdziarski (2006). According to De Parre García (2015), Zdziarski's definition of crisis in higher education synthesizes the concepts related to corporate and governmental affairs bringing

higher education into the context. According to Zdziarski et al. (2007), a campus crisis is often sudden or unexpected, which disrupts the institution's normal operations or its education mission and threatens the well-being of personnel, property, financial resources, or reputations of the institution.

Figure 1 explains Zdziarskis et al.'s (2007) rationale in terms of a crisis matrix in institutional environments. Based on their research, scholars have categorized crisis into three groups: (a) environmental, (b) facility, and (c) human. Environmental crises are defined as those that originated from natural causes, and humanitarian crises are related to criminal or violent crises (B. D. Garcia, 2015).

Figure 1

Crisis Matrix



Note. This model, adapted from Zdziarski (2006), delineates the rationale of a crisis matrix within institutional environments, classified into three impact groups. It is derived from *Campus Crisis Management: A Comprehensive Guide to Planning, Prevention, Response, and Recovery* (p. 355), by Zdziarski, E.L., II, Dunkel, N.W., & Rollo, J.M., &

Associates, 2007, Jossey-Bass. The adaptation and use of this model are intended for educational purposes under fair use guidelines, and a request for permission to utilize and adapt the content is currently pending.

Characteristics of Crises

Crises are commonly believed to be guided with uncertainty and emergency. Crises affect all demographics relative to the lack of control of their normal activities. In other words, crises affect bad, competent, wealthy, poor, young, adults, and elderly indiscriminately, breaking the typical feeling of control to their normal activities or safety constructs (McCullar, 2011). In some crises, technology and communications are disrupted and produce anguish and despair among persons. Academics and researchers also point out that post-traumatic psychological disorders are propelled by disasters, specifically in post-crisis stages (Shelton & Thompson, 2020 ; Coombs, 2007). In the physical aspects, crises represent threats, destruction of properties, danger, and harms affecting the well-being of persons and stakeholders. Organizations and higher education struggle with these disruptions. During crisis stages in institutions, there are always risk management factors that are sometimes proactively foreseen and strategized or reactively managed (Buller, 2015; B. D. Garcia, 2007; Shelton & Thomposon, 2020). Some literature pointing to crises are related to realms of natural disasters, terrorism, workplace

violence, disease outbreaks, unforeseeable technical problems, product failure, emergencies, malevolence, confrontations, mismanagement, organizational misdeeds, economic hardship, accidents, rumors, and bad leadership (McCullar, 2011).

Camera (2019) explained that higher education is confronting a crisis of trust and viability from candidates and students regarding crisis based on leadership. Many universities and institutions are closing due to drops in enrollments, propelled mainly by economic influences, demotivating students to pursue post-graduate education. A definition of crises in higher education, defined by Zdziarski et al. (2007), states that higher education crises are events that disrupt the orderly operations of institutions or their educational mission. Nevertheless, as distributed managerial enterprises with multiple publics and stakeholders, most of the higher education crises revolve around disruptions of the standard management of operations, classes, and allocation of human resources (Bheling, 2014; McCullar, 2012).

Climatological Crises

As mentioned in the general definition of crises, the concept of climatological disaster is also broad and hard to narrow into a single concise definition. A significant difference is that human hands do not cause climatological crises, as it could be technical crises and recent pandemic crises like the COVID-19 virus. However, academics throughout the research of crisis caused by climate adversities point to three indicators subdued to this concept as they are (a) disasters, (b) global warming, and (c) leading with emergencies (Cobretti, 2019; Gilpin & Murphey, 2008). Natural disasters and global warming could be interpreted as initiators of climatological crises propelling significant

scale impacts encompassed in societies, and emergencies are the outcome of these crises located into specific contexts (Gilpin and Murphey, 2008). A climatological crisis could be defined as a disruption of the status quo in operations, triggering danger and instability to different social, economic, and managerial spheres caused by natural disasters (Cobretti, 2019; Coombs et al., 2010; Gilpin & Murphey, 2008).

Higher Education and Climatological Crises

In the realm of higher education, academics provide different scopes of natural disasters initiating climatological crises, as outcomes of climate conditions in extremity are favorable to disrupt the normalcy and disruption of institutions. Based on recent academic literature, some climatological crises in higher education are the different aftermaths and destructions of universities around the Gulf area of United States due to several hurricanes like Katrina, and Rita (Rollo and Zdziarski, 2007), damages caused by tornadoes in the Midwest of the United States, disruption and destruction of institutions' infrastructure and communications in Puerto Rico and U. S. Virgin islands higher education by Hurricane Maria and Irma, as well as relocation, cancellations of classes and damages due to severe wildfires causing destruction and dangerous conditions in universities in Los Angeles, California (Johnson, 2019; Redden, 2017; Shelton & Thompson, 2020).

Higher education leaders should safeguard the security of all their constituents and infrastructure. These natural disasters force leaders to redirect, innovate, and lead change above predetermined plans due to uncertainty and disruptions caused by a crisis with moderate precedents in the magnitude of impacts. Proactivity is essential in crisis

leadership and planning in higher education. Ulmer et al. (2007) explain that crises in higher education should not be treated in the way of "when it will happen," but conversely, emergencies and crises must be planned as" if they will happen."

Stakeholders in Higher Education During Climatological Crises

In times of crisis, stakeholders in higher education are participants with different levels of interest in institutions. Some stakeholders in times of crisis have a level of dependency on institutions, and leaders' decisions will directly or indirectly impact others. According to Gilpin and Murphey (2008), stakeholders dependent on organizations are employees, staff, and faculty. Stakeholders affected directly or indirectly by decisions in higher education are students, donors, community members, corporate partners, and any other who might contextually be considered a target of crisis and therefore treated by institutions (Gilpin & Murphey, 2008).

During the different stages of a crisis, higher education stakeholders should be informed of what is happening, and institutions should safeguard them accordingly to their mission and vision. Psychologically, higher education should enforce emotional intelligence. According to Vandervoort (2006), treating employees and integral members of institutions with empathy, awareness, and compassion will make them become franchised to the enthusiasm and belonging to their institutions. The human factor beyond quantifiable data is often appreciated during crisis times from the stakeholders' side (Vandervoot, 2006).

Administrators in higher education are crucial in times of crisis and the execution of crisis plans. According to B. D. Garcia (2015), administrators are in charge of different

managerial aspects of institutions and significantly impact the direction of an institution beyond the educational elements. Some common positions in post-secondary administration include the provost, dean, president and vice president, department director, and registrar (McCullar, 2011). According to Garcia, there is a connection between crisis leadership and the relationship between presidents and crisis managers. Garcia stated that "both must offer support, tangibly and intangibly, to one another so that others across the university see the importance being placed on crisis management" (p.165). Both levels of leadership should collaborate mutually to ignite an institutional culture that not only has resources to keep constituents safe but anticipates a culture of innovation. According to Garcia, leaders ultimately should learn from crises to sustain a deeply embedded culture of safety and preparedness that transcends all current and future institutional processes.

One of the most critical tasks of administrators in higher education is to ensure their institution's vision and mission in all plans and look at their responsibility to their students in times of crisis (Behling, 2014). Some of the duties from administrators in times of crisis are to direct effective leadership to enforce the execution of strategies and ensure their stakeholders' trust. According to McCullar (2011), if stakeholders trust their organization, they will trust how leaders will handle crises.

Institutions should be responsible for students as their primary stakeholders. According to Behling (2014), students are the raison d'être of institutions. Students will value institutions that show effectiveness in crisis management. During the COVID-19 pandemic, universities in the United States effectively responded to continuing classes by

moving face-to-face courses to remote learning due to lockdowns and guiding health safety and no restrictions to remain in their household for lockdowns (Kim, 2020). After Hurricane Maria, some opportunities were provided to measure how important it was for universities to respond quickly and handle crises from the students' point of view. In student satisfaction assessments, Wayland (2018) found that students valued as important priorities after Hurricane Maria: (a) communication, (b) academic support, and (c) financial aid. The study showed that students valued how institutions communicated their plans quickly, provided grades for some students of "I.W.," meaning incompletes due to the crisis, and institutional financial aids were released to supply different student needs (Wayland, 2018).

Adversely, some crises in Puerto Rico higher education failed to be responded in a timely and accurate. After the seismic events in Puerto Rico in 2020, some students showed their concerns and insecurity in plans' inadequacy. Most of the discomforts presented were based on the lack of information regarding the safety in some campuses' infrastructure (Rodriguez-Velázquez, 2020). Also, after the outbreak of the COVID-19 pandemic, students presented their concerns to the Puerto Rico fiscal control board related to the lack of information regarding the plans of transitioning lessons to distance learning, grading periods, and repositions the economic crisis. According to students, institutional leadership failed in providing a clear idea of communicating their strategies (Rodriguez-Velázquez, 2020).

The Relationship Between Government and Higher Education During Crises

Crises, in general, are linked with governments. Higher education in times of crisis both works with local, state, and federal governments in terms of governments (De Parres García, 2015, McCullar, 2011). The dependency and relations of higher education with the government depend on a larger or smaller scale, with higher education needs. Public universities depend on most of the cases of more government resources in their budgetary relocation of funds than private universities. The Federal Emergency Management Agency (FEMA) helps institutions handle tragedies and catastrophic incidents at colleges and universities. Some of the events range from hurricanes, earthquakes, suicide bombers, incidents involving homemade explosives, and pandemic outbreaks that have been reviewed and captured in various after-action reports (FEMA, 2019). According to Waugh and Streib (2006), sometimes government entities have been criticized for having unquestioned power and political agendas to meet the local needs of their institutions inefficiently. Therefore, higher education must achieve good relations and positive connections with governmental entities to make processes to secure negotiations and align institutional policies for crisis management according to state and local policies (Jungwon, 2021). Administrators in higher education could receive training from FEMA's Emergency Management Institute). According to FEMA (n.d.), the program trains leaders to meeting identified needs and learning all-hazard exercise-based training courses and emergency crisis management training.

Puerto Rico's higher education also manages crises in the realm of local, state, and federal agencies. Considering the current Puerto Rican government-debt crisis, most

local and state governments could not embark on most of the funding and resources necessary to attend higher education emergencies. During the postcrisis phase of Hurricane Maria, local and state government partnered with a nongovernmental organizations to accelerate and revitalize recovery efforts in Puerto Rico higher education in private and public sectors (FEMA, 2017). Concurrently, Puerto Rico, as a U.S. territory, received emergency assistance from the federal government through FEMA (FEMA, 2017).

During the aftermath of Hurricane Maria, the Department of Education enacted the Hurricane Education recovery funds through passed legislation. Enaction of the Honoring Hometown Act of 2018, Puerto Rico higher education is an equal participant of the available funds for meeting the educational needs of individuals affected by disasters or emergencies related to Hurricanes Harvey, Irma Maria in the United States. With this act's public law enacted, Puerto Rico's higher education could apply and receive funding. Funding is eligible for (a) emergency assistance to institutions and students in any area affected by the mentioned hurricanes, (b) for payments to institutions of higher education to help defray the unexpected expenses associated with enrolling displaced students from institutions of higher education directly affected by the hurricanes (Honoring Hometown Act, 2017). A total of 2,700,000,000 U.S. dollars are to remain available through September 30, 2022, bypassed legislation for higher education recovery efforts for U.S. states and territories (Honoring Hometown Act, 2017). Federal Government, through FEMA, has the primary purpose of coordinating the response to a disaster that has

occurred in the United States, and that overwhelms the resources of local and state authorities (Department of Homeland Security, 2018).

Culture of Innovation From Crises

Although crises revolve around negative aspects, there are also positive outcomes (McCullar, 2011). Most positive results propel innovation to institutions and ignite the proactivity in leading change (Buller, 2015; McCullar, 2011). According to Buller (2015), when external drivers like climatological events cause leading changes, most institutions experience reactive changes. Lessons learned from responsive changes propel more proactivity for future decisions in an organization that values innovation (Buller, 2015).

Crises help strategic planning and could potentially revitalize institutions' missions, strategies, and plans (Buller, 2015). Also, according to McCullar (2011), a crisis "can bring people together and foster new solidarity and cooperation within an institution" (p. 25). Changes during crises are opportunities for institutional leaders to educate stakeholders to embrace their institutional identity (Behling, 2014; Buller, 2015).

Crisis Management

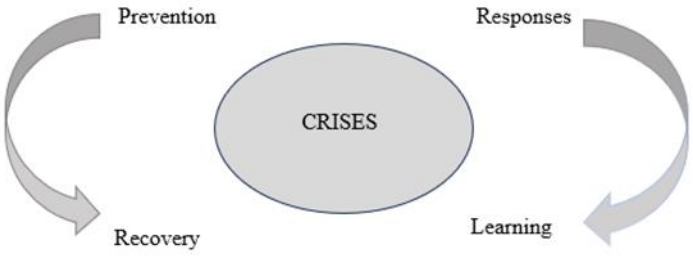
Historically crisis management has been a managerial topic contextualized and narrowed to unintentional or intentional events affecting institutions. According to B. D. Garcia (2015), accidental events propel crises with no intention of humans (e.g., Fires, earthquakes, hurricanes). It is part of many variables: risk management, opportunities, phases, typology, systems, and stakeholders. Therefore, strategic planning is crucial in the process of crisis management. According to B. D. Garcia, crisis management is a

strategic planning process that emphasizes communication and preparedness. Higher education leaders, in this process, require a vast understanding of the systems and the symbolic values intertwined in their institutions. Bolman and Dealman (2009) identified four frameworks where leaders can identify challenges in adversities and crises to strategize these systems. These frameworks are the structural, human resources, political and symbolic frameworks of organizations. All of them are part of the system or subsystems that crises and incidents can affect an organization (Bolman & Dealman, 2009).

Figure 2 illustrates the crisis management cycle as an essential component of systemizing the phases where planning should proceed. All crises are part of a planning cycle. Zdziarski, Rollo et al. (2007) proposed that this cycle includes prevention, response, recovery, and learning stages. According to B. D. Garcia (2015), this large cycle is the core in higher education crisis management. Based on Zdiarski et al. (2007), institutional crises management is a process of prevention that will facilitate recovery. Adherently, recoveries are based on precise responses where past and present experiences enrich the learning process for future events.

Figure 2

Crisis Management Cycle



Note. This model was adapted from Zdziarski (2007), identifying the institutional's cycle of crises management in terms of leading. From *Campus Crisis Management: A Comprehensive Guide to Planning, Prevention, Response, and Recovery* (p.355), by Zdziarski, E.L., II, N.W. Dunkel, N.W. & Rollo, J.M., &, Associates. Copyright 2007 by Jossey-Bass, and Coombs, W. T. & Holladay, S. J. (2010). *The Handbook of Crisis Communication.* Copyright 2010 by Blackwell Publishing Ltd.

Following this crisis management cycle, Coombs (2007) encompassed these four components into three main phases to manage crises. Figure 3 displays these phases as (a) precrisis, (b) crisis, and (c) postcrisis. Prevention, planning, and mitigation occur during the pre-crisis phase. According to Driscoll (2018), during the pre-crisis phase, leaders have the opportunity to create crisis management action plans, emergency plans, assign personnel, educate employees and constituents, train team members, test communication systems, gather supplies, discover vulnerabilities, and prepare for possible crisis scenarios.

The crisis phase is where responses to crises occur. During this stage, leaders must collect adequate information on the crisis and be identified, collected, and evaluated to be isolated and successfully managed (Driscoll, 2018). In this stage, aftermaths are handled, and the desired order of operations is expected to execute plans. The last stage is post-crisis, where recovery and learning are projected. In this post-crisis stage, once strategies in execution in plans are accomplished, leaders need to learn how to prevent them on future occasions. An essential part of post-crisis management is assessments. It represents the learning sphere of post-crisis management for leaders and plans (McCullar, 2011). Assessments will illustrate achievements and failures in crisis plans. According to B. D. Garcia (2015), assessments need to indicate the precise crisis and strategies to reach potential damage caused in crisis management. Records of plans, meetings, and communications should be part of these assessments as precedents for future similar crises (Bishop & Filfolt, 2011; Coombs, 2007; Maringe, 2020; McCullar, 2011). A more in-depth analysis will be presented in the crisis phase levels and how effective leadership was implemented to execute action plans for this investigation.

Figure 3

Zdziarski's (2007) Crisis Management Cycle Aligned With Coombs's (2007) Phases of Crisis Management

Pre-Crisis phase	Crisis phase	Post-Crisis phase
Prevention Mitigation	Response Planning	Recovery Learning Assessments

Note. This model is a synthesis of Zdziarski's (2007) crisis management cycle and Coombs's (2007) insights on three strategic tiers to allocate crises management planning. From *Campus Crisis Management: A Comprehensive Guide to Planning, Prevention, Response, and Recovery* (p.355), by Zdziarski, E.L., II, N.W. Dunkel, N.W. & Rollo, J.M., &, Associates. Copyright 2007 by Joey-Bass.

Crisis Phase

Management. In crisis phase management, leading execution strategies of recovery efforts occur. According to Driscoll (2018), in this level of change management, the role of leaders is to develop strategies, setting of priorities, focus the available resources and energy for strengthening the operations, and ensure that both the employees and various other stakeholders are working for the attainment of the common goals. According to Driscoll (2018), leadership in execution action plans focuses on the tenacity, tactics, and grit required to influence action across a wide range of organizational challenges. Rafaelli (2014) explains that instead of contemplating "what"

leadership is attained in execution plans, leaders should focus on "how" they must act at critical moments to shape their organizations and their careers. Crisis phases are stressful and traumatic processes to the victims and community in general in higher education (Coombs, 2007). In crises caused by natural disasters, leaders must identify damages and contextualize the extent of these damages and restoration (Bishop & Fifolt, 2011).

Students, who are the raison d'être of higher education, must be tracked nationally and internationally to get back to normal activities. Strategies for cleaning and restoring academic and physical infrastructure and finding effective communication channels for monitoring and recording all plans as assessments are essential. Community engagement will facilitate the restoration of processes, as it could be through alliances, partnerships, or collaborations. Bundy et al. (2017) explain that crisis management could create constructive engagement with other organizations. Hence, during crisis phase management, there is a call for all leadership levels: internationally, nationally, and locally to find common grounds in shared wisdom (Bundy et al., 2017). In terms of public relations, positioning institutions as corporate "citizens" with everyday needs and disposition to help others is essential in crisis phases. This approach is crucial in establishing good opinions and attitudes from internal and external communities (Kim et al., 2009).

Strategic Planning. The crisis phase is a critical tier in the recovery efforts of institutions. Bishop and Fifolt (2011) and Rollo and Zdziarski (2007) state that required planning is needed to restore normal operations of institutions after climatological crises. The best way to picture crisis phase management in climatological crises in higher education is dealing with the aftermath of damages, both physical and emotional, after

the climate events have come to an end (Abukalaf et al., 2020; Bacher et al., 2005; Bishop and Filfolt, 2011; McCullar, 20011). Crisis phase management involves a process of execution of strategies based on action plans. In this process, (a) communication is essential, (b) leadership skills to strategize and to group tasks, (c) issues management, and (d) risk management in determining strategies (Rollo & Zdziarski, 2007). Also, in the execution of plans, strategic reasoning is needed (De Jardins, 2014).

Regarding strategic reasoning, a strengths, weaknesses, opportunities, and threats (SWOT) analysis could help leaders to build goals in crisis planning. According to Hinton (2012), leaders need to identify through the internal environments of institutions, strengths, and weaknesses and be responsive to external opportunities and threats present in selecting goals and strategies. Figure 4 illustrates the SWOT analysis as a process to be contemplated by leaders in action plans.

Figure 4

Strengths, Weaknesses, Opportunities, and Threats Analysis

STRENGTHS (Internal)	WEAKNESS (Internal)
OPPORTUNITIES (External)	THREATS (External)

Note This model was adapted from Hinton (2012) to explain strategic reasoning planning on external and internal environments in higher education environments. From *A practical guide to strategic planning in higher education*. Copyrights 2012 from Society for College and University Planning.

Action Plans During Crisis Phases

In crisis management, action plans are a vital tool for assessment and structure. Action plans are part of the vast strategy where institutions identify necessities and steps to fulfill determined goals (Leigh & Morgan, 2014). Higher education is considered a collaborative tool, where distributed power systems as colleges and universities collectively work towards the planning (Desjardins, 2014). The primary purpose of action plans is to (a) provide accountability in the crisis management process, (b) determine steps towards required tasks and minimize through specific resources trial and error efforts fulfilling desired goals. According to Desjardins (2014), one advantage in action plans during crisis phases due to climatological events is to provide a series of structured steps to accomplish goals and timelines for each one.

Nevertheless, according to Bishop and Fifolt (2011), most of the crises caused by climatological events are difficult to be led through predetermined action plans. Most of the time, the plans emerge reactively, leading and managing the changes caused by the circumstances (Bishop & Filfolt, 2011). Hurricane Maria, in 2017, was not an exception to many issues and challenges for all leaders in Puerto Rico. According to Vargas (2017), the impact of sustained winds of 110 miles per hr, accompanied by high-scaled floods, devasted telecommunications, interrupting communication for 3,400,000 persons, and interrupting agencies' fast response crisis management. Therefore, action plans are part of a structured, step-by-step vision to ensure determined goals are achieved based on leaders' proactive or reactive responses (Bishop & Filfolt, 2011; Buller, 2015; Dejardins, 2014).

Communications in Crisis Phase Management

Communications are an unavoidable and challenging process in crisis management (Driscoll, 2018). Coombs (2010) explains that communications as crises are socially constructed phenomena, with a variance of urgencies and institutional symbolism. Crisis communications is a process situated along the different crisis stages mentioned in this chapter, including pre-crisis stages, crisis-stages, and post-crisis stages (Coombs, 2010). Therefore, action-plan communications will determine how effectively stakeholders will understand and respond to different critical issues. The most important thing is to situate the additional messages regarding crises and communicate them (Abukalaf et al., 2020; Adubato, 2008; Coombs, 2007). Coombs (2007), an expert in communications, explained that the situational crisis communication theory encompasses different strategies for analyzing stakeholders' perceptions regarding the critical messages in times of crisis. Therefore, this type of communication is audience-oriented, dealing with the stakeholders' negative perceptions in crisis times. Media releases, social media communications like posts and blogs, electronic mails, and text messaging are among the most common and precise channels to disseminate crisis phase management messages (Abukalaf et al., 2020; Tinker et al., 2009).

Higher education leaders during crisis phases should have concise, informative, and factual communications plans (McCullar, 2011). During the COVID-19 pandemic, educational institutions, through local and state agencies' help, disseminated concise-ready-to-read information related to updates, statistics, and other critical information about the disease and its potential transmission to all stakeholders its community. The

promptness from leaders communicating important messages during crises will avoid subsequent issues in crisis response. Following issues in a communication delay could propel an institutional image damage control, ignited by the media or stakeholders' discomfort regarding security (Flieger, 2013). In higher education, as distributed systems of powers and with multiple stakeholders, scholars determine the importance of differentiating the public for which communications strategies and respective messages are disseminated (Coombs, 2010; Zdiziarski et al., 2007). Internal and external communications are the primary community's higher education strategize plans in crisis phases (Abukalaf et al., 2020; Coombs, 2007; McCullar, 2011).

Internal communications refer to communications disseminated to an institution's operations (Adubato, 2008, Melichar et al., 2017). In times of crisis, internal communications are intended for stakeholders whose communications are confidential and may not be a matter of external communications. McCullar (2011) explains that internal communications include financial information, human resources-related information, schedules, contact phone numbers or email address, or other relevant information related to their works. In climatological crises, some higher education used texting, blogs, intranet systems, and emails to disseminate essential updates to students and other critical stakeholders (McCullar, 2011).

External communications are mainly disclosed to the media and are opened to the community (Adubato, 2008). Higher education should have good relations and transparent information for the press (Coombs, 2010; Melichar et al., 2017). Therefore, the process should be opened with messages directed exclusively to the story or situations

(McCullar, 2011). According to Coombs (2010), the media cannot be an enemy of institutions, but proactive and accessible relations are essential for higher education and the media. Proactivity in this networking and tailored relation will assure good opinions and, therefore, better attitudes toward different publics (Booz Allen Hamilton, 2009)

Social-mediated communication strategies have become a popular medium as people spend more time online in blogs and social media in times of crisis. Booz Allen Hamilton (2009) explains that social-mediated connections need to evaluate the source and form of information and how they affect the possible crisis response strategies. Not all social media infrastructures are effective or adaptive to the different changes arising in crises (Fischer et al., 2011). According to Fischer et al. (2011), evaluation and trials of effectiveness among demographics need to be evaluated in communications strategies before crises. The concept of E-leadership is a new trend in management among social-mediated mediums, where face-to-face interaction is mediated with virtual spaces.

According to Cook (2010), e-leadership leaders in a virtual environment have essential responsibilities as face-to-face leaders. These responsibilities could be organizing and motivating teams, monitoring progress, and developing team members (Avolio et al., 2002; Cook, 2010; Sugandha, 2020). Especially since technology allows one to work from anywhere, in times of crises, e-leadership should let space to face challenges such as meeting rapid technological changes and developing technical skills like learning how to use technology to facilitate leadership (Cook, 2010).

It is almost certain that electrical power and technological infrastructure will collapse due to electrical energy in climatological crises. Electricity and

telecommunications after Hurricane Maria interrupted the interconnectivity of 3,300,000 Puerto Ricans. Therefore, audio transmissions in amplitude modulation (AM) broadcasted through regional radio stations served as valuable communication sources in times of climatological crises.

According to Appel (2017), radio transmission was a crucial component of communications on the island due to the collapse of telecommunications and electricity. Through regional, local, and national broadcasting radio news centers, many institutions and governments disseminated crucial information towards recovery efforts in Puerto Rico dealing with Hurricane Maria's aftereffects (Appel, 2017; Nieves et al., 2018). Higher education leaders should identify and create liaisons with local and national radio stations to activate communications plans, mainly during climatological crisis-phases in the absence or lack of electrical and telecommunications infrastructure. Like all action plans, crisis communications plans mediated with technology, media, social-mediated mediums, and radio should strategize in all stages of crisis as pre-crisis, crisis phase, and post-crisis stages.

Issues Management in Action Plans

In terms of issues management, strategic planning issues should be filtered and ranked to provide the best strategies in times of crisis. According to Jacques (2007), the filter criteria used by leaders in issues management are (a) designating targeted strategies, (b) relevance of issues, (c) actionability of issues, (d) criticality of issues, and (d) the urgency of issues. According to Jacques (2007), issues management for institutions

provides a bridge to crisis management and will ensure institutions' overall reputations and financial stability.

In managing issues during crisis phases caused by climatological events in higher education, leaders must identify and contextualize precise damages and restore them (McCullar, 2011). Maringe (2020) explains that centralizing communications in crisis times is vital to avoid the multiplicity of tasks that will corrode into losses for institutions. Based on Coombs's (2007) research, issues after environmental disasters can be operational, technical, related to infrastructure, and psychological, as it could be trauma and stress. According to Coombs (2007), the suddenness of unexpected events and the victims' level of preparedness could propel or mitigate multiple issues caused by climatological crises. Sughanda (2020) explains that leading crises plans concerning issues involves specific leadership roles that will transcend empathetical qualities to clear tactical outcomes. Therefore, most of the roles leaders should consider when managing issues after climatological crises will be (a) mentoring, (b) influencing, (c) counseling, (d) facilitators in meetings, and (e) engagement (Coombs, 2007; Sughanda, 2020).

According to Sughanda (2020), leaders’ mentoring and influencing guide the human capital to the right path to complete specific tasks. Counseling, meetings, and engagement are charismatic roles that could be strategized to connect with the human capital empathetically to provide the right confidence to achieve determined tasks in the proposed path.

Risk Management in Action Plans

According to Nastos et al. (2020), a risk is the actual potential exposure of something of value to a hazard often related to the product of probability and loss. In climatological disasters, risk management in institutions analyzes the actual happening of disasters than potential hazards. Besides dealing with potential threats, risk management observes the factor chance of hazards occurring. According to Spountzaki and Doudoulaki (2011), managers dealing with geophysical hazards should analyze how weak institutions are to these hazards. Economic, sociological, physical, and environmental conditions propel a given risk's susceptibility to occur (Nastos et al., 2020; Spountzaki and Doudoulaki, 2011). Societies, in general, are facing new systemic risks, and according to scholars, environmental risks as global warming, accumulation of pollutants, thinning of the ozone layer are igniters of climatological crises (Lalonde & Boiral, 2012).

In terms of hurricanes, considered geophysical climatological hazards, Caribbean countries are susceptible to these events from June 1 to November 30 (National Oceanic and Atmospheric Center, n.d.). Therefore, higher education institutions are susceptible to these events and need to be prepared through these months for (a) the probability of occurrence of these risks and (b) the estimation of the potential impacts. Also, risk management in climatological crises should observe different levels at which institutions should take appropriate measures and the tendency toward increased selective information and disorder resulting from a combination of risks. The next concept is resilience. In terms of resilience, leaders should observe how prepared their institutions

can be as a system exposed to hazards to adapt and resist changes to reach and maintain an acceptable level of functioning and order structure (Nastos et al., 2020). According to Lalonde and Boiral (2012), risk management should be seen as a practice-based approach where leaders should think of strategies to do and not systems that should have to be done. Resilience helps leaders to learn from past experiences for a better future. The last concept in risk management is reliability. Leaders should analyze how reliable the protective devices are against hazards to treat issues (Nastos et al., 2020). When examining reliability, managers should question how the implementation of measurements situates to the specific issues of their internal and external environments and remain vigilant in its monitoring (Bolhom, 2010; Herbane, 2010; Lalonde & Boiral, 2012).

Action plans in crisis should analyze how susceptible to hazards institutions are, be resilient to them, adapt from these unexpected or foreseen changes, and how reliable strategies are to respond to them. According to MacKay (2020), risks management in action plans helps leaders reduce the threats postured by known hazards, although at the time accepting unmanageable risks and maximizing any related benefits. Action plans that are risk-managed have proper assessment and evaluations, identify risks, and estimating costs (Nastos et al., 2020). Also, risk management evaluations in plans are balanced through the governance of institutional policies and local legislation (MacKay, 2020).

ISO Standards in Global Risk Management

Some organizations share common knowledge and consensus regarding innovation and solutions to global challenges. The International Organization for Standardization (ISO) is a nongovernment international agency with 165 national standards bodies, commonly named ISO standards (Yorke, 1999). Some of the ISO higher education standards for risk management include (a) 9000 for quality management, (b) 14001 for environmental management systems, and (c) 22320 for security and resilience in emergency management (Lalonde & Boiral, 2012). Many scholars have correlated the benefits from proactive measures based on ISO Standards 9000 and 14001 in quality management and environmental management systems in higher education institutions. Risk management observing these precepts improved the relationship of institutions with authorities and stakeholders and enhanced institutions' environmental performance and sustainability in terms of crisis management (Lalonde & Boiral, 2012). However, these precepts were not directly drawn with ISO Standards 31000, which are internationally commonly agreed standards in risk management. According to Lalonde and Boiral (2012), ISO Standards 31000 for Risk Management provides a framework for higher education institutions encompassing of the following key activities:

- Define a mission statement for the risk management plan.
- Include an analysis of the external and internal environment.
- Explain the principles and objectives that the plan will be based on.
- Identify mechanisms of accountability.

- Identify the resources to be allocated to implementing the plan or policy.
- Engage in communication both internally and externally
- Establish a process for the plan's implementation, monitoring, and updating.

According to scholars, there are some advantages of ISO Standards 31000 in Risk Management assessments and some disadvantages (Bolhom et al., 2012; Herbane, 2010; Lalonde & Boiral, 2012). Among the advantages, it is commonly agreed that these standards provide a systematic and structured process for leaders to identify significant risks and implement effective management (Lunquist, 2006).

Disadvantages, mainly regarding climatological crises, are based on the lack of higher education institutions' risk management systems anticipating damages caused by climate adversities (Lunquist, 2006). Other disadvantages could be that many small organizations lack resources to invest in the proper management systems, or mainly risk management plans provide the company a false feeling of safety. Plans are for assessment purposes but not functional role in the execution. Therefore, the best risk management plans are situated within the specific needs of the internal and external organizations' multilevel infrastructure (Yorke, 1999).

Execution of Action Plans

One of the essential measures in action plans that sometimes are neglected is plans' execution (De Jardins, 2014). According to Des Jardins (2014) and Chadwick (2016), plan execution will address the action steps for each objective of a plan. Hence, for each strategy of "what" is intended to be achieved, a "how" action step will be executed must exist (Des Jardins, 2014). Most of the time, the action steps in plans must

be achievable and reasonable. Processes and designs should be communicated and structured in a step-by-step formula. Resource allocation also plays a fundamental part in propelling flexible execution of action steps in timely completion. Deadlines are crucial in action plans. Although in crisis, having a specific due date of goals can be problematic, leaders require them. According to Chadwick (2016) and Desjardins (2014), it is essential to have milestone dates to initiate action plans to obtain completion. Thus, having a millstone date impels and initiation towards a culmination, likely in action plans.

Most successful action plans also have adequate persons to make the execution of plans happen. According to Chadwick (2016), the execution of plans has a designated person who directly impacts required actions and will be responsible for its completion. Desjardins (2014) also determines that the ownership of action plans is based on the idea that one person “must be responsible and accountable for tracking the progress toward each objective, keeping the team informed, ensuring timely action steps are occurring and adjusting the actions as reality teaches us what needs to shift" (p. 72).

Even though one person is responsible for action steps, it is also advised to support each action step. Support in action steps will designate multiple persons or one assistant to help the person responsible for leading the action to achieve the determined goal. Finally, execution in action plans requires metrics that could inform leaders that goals are completed (De Jardins, 2011). Metrics translate corporate goals and objectives into accomplished actions (Overfield et al., 2021). Having the right metrics in action plans will allow satisfactory results and a space to identify opportunities to improve (Overfield et al., 2021).

The Role of Leadership in the Execution of Action Plans

Proper leadership is crucial in times of crisis. Regarding the execution of action plans, Chepul (2020) explains that great execution comes from outstanding execution leadership, and excellent execution leadership comes from the consistent and intentional effort on the part of the leader. Therefore, all aspects discussed in crisis management will be decisive in how effective leadership was taken in handling the action plans. Leaders dealing with climatological crises in higher education should situate the issues and how they will respond (Chepul, 2020; McCullar, 2011; Rollo & Zdziarski, 2007). Effective leadership in the execution of actions plans should identify and implement decision making based on (a) the best leadership styles, (b) the roles that are suitable to propel effective execution, (d) ignite an authority based on trust, and (e) develop the best competencies to achieve goals (Bishop et al., 2015; Chepul, 2020; McCullar, 2011; Rollo & Zdziarski, 2007, Ulmer et al., 2007).

In terms of leadership styles, scholars explain that these could be authoritarian and democratic in times of crisis. Authoritarian is a leadership style where leaders implement decisions without the participation of other stakeholders or sometimes with limited participation (McCullar, 2001). In other words, in an authoritarian leadership style in crisis times, leaders expect those followers complete commanded orders.

Democratic styles, by contrast, involve the participation of stakeholders in the decision-making of action strategies. In this approach, leaders seldom make decisions independently without the participation of followers (McCullar, 2011). In climatological crises, leaders could adapt both or one style depending on the inherency and range of the

issues. Crisis manager leaders should be flexible in adapting one style or other based on the different crisis phases (Des Jardins, 2011; B. D. Garcia, 2015). The decision of which style is more effective than others should be taken in a sharp focus on what strategies should involve followers' participation or how constitutional the change is to command solvency (Buller, 205; Des Jardins, 2011). In decision-making, leaders could be reactive or proactive, leading the changes ahead of the different issues (Buller, 2105).

An essential role of leaders in executing action plans is to be visible and accessible to the followers executing a crisis plan (B. D. Garcia, 2015; McCullar, 2011). It is assumed that the more accessible leaders are to its different stakeholders will assure the successful handling of crisis management. Bishop et al. (2015) explain that after Hurricane Gustav, higher education leadership's leading role was bringing security to the different stakeholders and providing a clear path to follow. An effective leader enacting a crisis plan should guide its community to the right track and show followers solvency with the appropriate resources (Buller, 2015; Gowen & Lander, 2008). Therefore, the essential roles for leaders executing action plans are security, enablers of solutions, and learning to be open and honest, flexible, and empathic (Bishop et al., 2015, Ulmer et al., 2017). McCullar (2011) explains that leadership roles should favor the leadership style selected for the specific situation. Therefore, some roles will adjust better in authoritarian leadership and vice versa; some roles will adapt better in democratic leadership styles.

Competencies are leaders' abilities that will guide and provide the desired success in executing strategies in action plans (Fearn-Banks, 2011). Competencies are predominant in the execution of planned leadership, where trust from followers and

actions are required (McCullar, 2011). For followers to respond to leaders in the decision-making process and execution phases of plans, leaders must have some competencies. According to scholars, some of these competencies required in climatological crisis execution of plans are communication, negotiation, delegation, decisiveness, willingness to make hard decisions, understanding organizational culture, motivational skills, technical capabilities, mitigation, fully engaged with decisions, and a clear vision (McCullar, 2011; B. D. Garcia, 2015; Fearn-Banks, 2011).

Also, technologically minded competencies are required in crisis times in the 20th century (Miller, 2020). Technological decisions are part of the endeavor leaders should undergo, outweighing the cost of providing alternatives, mainly in IT infrastructure during crisis times. According to leaders in higher education, leaders should have suitable competencies in adapting institutions to the best IT infrastructures in lack or disruptions. Among the many issues that leaders in higher education handled with technological competencies leading action plans based on climatological crises, were related to finding collaboration with other institutions to provide web cloud storage, inversions of new satellite infrastructure, and installation of mobile electric units (Bishop et al., 2015; McCullar, 2011; Zamudi-Suárez, 2018).

The topic of leadership in the execution of action plans, in the end, is intrinsically related to the essential part of an execution, decision making (Champagne, 2007). In times of crisis is expected that leaders undergo a decision wrong or right. It is expected that all plans are consistently monitored to adapt, readapt, or take a turn in another direction (Des Jardins, 2011; Miller, 2020). In times of crisis, the leadership hierarchy is

intended to make plans in a timely and accurate manner, gain followers' trust, and react to sudden changes (McCullar, 2011).

Correct decisions in times of crisis should be measured within the scope of institutional and government policies, but mainly altruistic and ethical standpoints should prevail (McCullar, 2011; Miller, 2020). A balance of costs and liabilities with care and altruism is mainly the formula that scholars point to the exemplary leadership in decision making in higher education in times of crisis (Fearn-Banks, 2011; McCullar, 2011). According to Catullo (2008), the best way for leaders to decide on action plans leading to the crisis should be taken by stressing stakeholders' general wellness and security tempered with the governmental, local, and institutional policies.

Summary and Conclusions

Climate extremes in weather conditions cause a hydrological phenomenon that can be destructive for societies, countries, and communities. Hurricanes are climate extremes that, in the past 20 years, have caused crises in institutions like higher education. As a related phenomenon of climate extremes, hurricanes are considered to be caused by the global warming that the world is facing, and therefore a common form of natural disasters. Higher education in the United States has created councils like the American College and University Presidents' Climate Commitment (Sustainable Development Goals Partnership Platform, n.d.) to address and reinforce common knowledge on prevention and leadership dealing with different aspects of global warming.

Climatological crises are among the most common environmental crises, causing a disruption of the normalcy and the status quo of operations in higher education institutions. Crisis management is a necessary tool for the endeavors of leaders dealing with changes caused by climatological extremes. Administrators in different hierarchical levels significantly impact an institution's direction beyond the educational elements necessary in crisis management. Crisis management is a process identified by scholars to be situated in three analytical levels or phases of evaluations: (a) pre-crisis, (b) crisis phase, and (c) post-crisis. Crises phase stages include the response of strategies and execution of plans. In executing action plans, leadership should identify issues and risks to strategize the best direction towards the stability aimed at crisis management. Communication and leadership are two critical benchmarks that bring action plans in the right direction in this process. Overall leadership in the execution of action plans will define the roles, competencies, and styles that will conduct the completion and success of the execution of actions in the face of climatological crises in higher education.

Chapter 3: Research Method

The purpose of this qualitative comparative case study will be to explore the crisis leadership in the execution of action plan strategies in Puerto Rico higher education from the experiences of critical administrators in two academic units of post-secondary education, leading the aftereffects of a climatological crisis caused by Hurricane Maria. Insights of this study will provide administrators in higher education in Puerto Rico and similar contexts a broader knowledge of the required leadership in the execution of plans due to climatological crises. Because global warming is increasingly propelling critical hydrological events like hurricanes, leaders in higher education should force social justice to execute crisis plans effectively (Cobretti, 2019; Oxfam, 2019).

The significant sections of Chapter 3 will be (a) the paradigm of study, (b) the design of the study (comparative case study), (c) the rationale of the study, and why a qualitative approach will be executed in this research, (d) the participants, and (e) sampling. A non-probabilistic sampling method nominated as “snowball” will be employed. In this sampling method, some higher education leaders were purposefully selected, and a subsequent recommended small population identified b these initial leaders will expand some knowledge in the study. Consequently, the sample size and justification, data collection, data analysis, and interpretation plan will be presented in this chapter.

Research Design and Rationale

The research question for the study was, How have key administrators in two academic units of post-secondary education in Puerto Rico implemented crisis leadership

plan execution strategies leading to the aftereffects of a climatological crisis caused by Hurricane Maria? The central concepts and phenomenon of this study were based on Blanchard and Hersey's (1967) situational leadership theory and Bass's (1985) transformational leadership theory regarding the execution of action plans:

1. In organizations in the face of crises, there is no leadership approach better than another. Following this rationale, the most effective approach is when this leadership responds and adapts to their groups and individuals' specific needs and capabilities (Blanchard & Hersey, 1967).
2. Leaders' personalities and charisma influence the inherency of crisis plans' actions through the strength of their vision, which consequently inspires followers to embrace changes with clear expectations, perceptions, and motivations to work towards common goals (Bass, 1985).
3. Effective leadership in the execution of actions plans involves identifying and implementing decision making based on (a) the best leadership styles, (b) the roles that are suitable to propel effective execution, (d) authority based on trust, and (e) development of the best competencies to achieve goals (Bishop et al., 2015; Chepul, 2020; McCullar, 2011; Rollo & Zdziarski, 2007, Ulmer et al., 2007).

Method and Design

Among all the research approaches, the qualitative method based on a comparative case study was chosen. Following the explorative character of the research question of a typical "how" answer, a qualitative approach will guide this research

(Butin, 2010). According to Klenke (2018), this study's qualitative approach will provide an in-depth analysis of multilayered issues constructed through the interactions of higher education leaders in a precise climatological emergency. In qualitative study, which was rooted in constructivist epistemology, I surmised that social interaction shaped the execution of actions plans by higher education leadership in Puerto Rico after Hurricane Maria . This concept is based on meanings, roles, and facts learned and discovered through interpreting the administrators' realities. A qualitative approach provides a more subjective scope of interpreting these realities, surpassing the positivist modus operandi of objectivity and measurability characterized by quantitative methods (Saldaña, 2016).

A qualitative approach was selected instead of a quantitative, considering that the positivist nature of relating or correlating variables in this investigation does not meet the explorative character of discovering realities, concepts, and experiences related to how leadership was implemented in action plans. This explorative study intends to transcend a paradigm's statistical aspects into a more in-depth approach to context-based leadership experiences. According to Klenke (2018), qualitative research in leadership is well-suited in academia because of the multidisciplinary nature of this field, as it must be more open about paradigmatic assumptions.

A comparative case study will guide exploration in this investigation as a multi-bounded system of leading cases in executing action plans due to climatological crises. One of the researchers' endeavors in a comparative case study is to compare the core of participants' perception of a phenomenon. According to Yin (2017), the primary process of achieving this perception is by description. Furthermore, a comparative case study

involved a limited number of participants engaged with investigation phenomena to generate patterns. Furthermore, Victor (2017) explained that in a comparative case study, the researcher needs to manage their own experiences and perceptions to understand how the participant experiences and perceives the study phenomenon.

Yin (2009) explained that multiple-case sampling strengths the authenticity, validity, stability, and confidence of the findings. Additionally, Yin (2009) explains that comparative case studies provide a cross-case synthesis as an analytical procedure when the researcher examines two or more cases. Considering Puerto Rico higher education has multiple and diverse higher education systems, having more than one case sharing the same leadership similarities in the execution of action plans is ideal for data saturation and enriching the content of analysis.

The selection of a comparative case study will be a better way to expand more generalized information about how leadership was implemented in actions plans in times of climatological crises. According to Goodrick (2019), case studies are based on comparison within and across contexts to provide more insights when experiments or hypotheses cannot be contemplated. According to Goodrick (2019), in the realm of the leadership of action plans, it is essential to identify with a cross synthesis of cases how and why some policies, programs, or strategies can be implemented to achieve plans. Recent studies related to the implementation of COVID-19 policies and environmental committees to prevent global warming in higher education show this type of rationale in qualitative research (Hogle-Hazelton et al., 2021; Rohling et al., 2016). Based on discoveries, this synthesis will facilitate the tailoring of future outcomes and expand more

knowledge about the cause or relation of variables in plans' failures with future experimental studies (Goodrick, 2019).

Role of the Researcher

As a direct instrument of investigation, the researcher in a qualitative investigation approach wants to report the reality of a phenomenon in its own or multiple contexts. As an observer of reality within a specific world, it is essential to highlight that there is a relationship between the researcher and the researched (Janesick, 2016). Trustworthiness and authenticity are both contemplated to be balanced in a complete and fair report of discoveries. The primary technique in observation from the researcher's role is to practice neutrality under the phenomenon of investigation (McLellan, 2016). Therefore, the researcher is called to observe and avoid personal biases and falsification of information.

As a primary investigation instrument, I will have a neutral empathy with participants following an in-depth data collection. Empathetic neutrality means that the observer most negotiates with the participants to co-construct realities in an unbiased observation technique, avoiding personal biases (Janesick, 2016). According to Maxwell (2013), it is called upon the researcher to be in continuous reflexivity of their roles in a qualitative investigation to determine what he/she is allowing the participants to see or inhibit seeing regarding the multiple realities to be unfolded.

According to McClellan (2016), the researcher is the data collection instrument and should report possible biases and errors limiting the qualitative inquiry. As an administrator who was part of the team leading and executing action plans during the

crisis, I will make sure that personal biases will not be obstacles to transparency, trustworthiness, and validity of the data collection. Therefore, rigorous scrutiny in the procedures of data collection will be implemented. All these procedures will secure a high-quality collection of information and transparent analysis for better findings.

Methodology

Participant Selection

Based on the purpose of investigation, academic vice presidents as administrative leaders will be purposefully and conveniently sampled. Once they are contacted, and from their point of view and leadership, they will indicate which directors will be designated to be reached for the interviewing process. According to Mc McLellan (2016), purposeful sampling enables the researcher to describe the subgroup-respondents (in these vice presidents and directors) in more depth to generate extensive responses.

Vice presidents are conceived to be aware of the strategic planning and inherency of decision making in crisis management. It is contemplated that they are more accessible to reach than presidents or provosts (White, 2004). Vice presidents or Vice provosts in the realm of academic affairs will be contacted by email, so they can instruct what leaders, including directors, could participate in the interviewing process. According to White (2004), vice presidents of academic affairs (a) participate in the overall directions for the university's academic programs, (b) anticipate future developments in higher education and their impact on the university, (c) identify the threats and opportunities they pose, and (d) evaluates the needs inherent in meeting those challenges creatively and effectively. Therefore, once vice presidents of academic affairs are reached, they will be

asked to select the appropriate directors they believe are best qualified for the interviewing process. This non-probabilistic sampling process is called snowballing sampling or chain sampling.

According to Naderifar et al. (2017), this sampling method consists of the researcher asking for the first few samples (in these cases vice presidents of academic affairs), if they know anyone with similar views or participation during the execution of crisis management in action plans, (preferably directors of infrastructure, risk management, or student affairs) to take part in the research. An explanation of my purpose of investigation will be provided to all of participants. I will identify myself as a doctoral student in higher education leadership and management. Emails will be researched from the web directory and confirmed with the human resources office. The email will also provide the alternative of videoconference or calls due to the inclemency caused by the COVID-19 pandemic.

An ideal sampling will be six participants in each case. According to Latham (2020), in case studies, saturation often occurs between 12 and 15. Considering the homogeneity of participants in both cases (they share the same positions of leadership) a selection of 12 participants will be made. Selecting this number of participants will help to remain focus on the problem of investigation and limit threats and biases that can invalidate the data collection due to the incidental openness of the relationship between the interviewer and interviewee (Latham, 2020).

Procedures for Recruitment, Participation, and Data Collection

For the data collection process in this research, virtual interviews will be conducted with leaders. Virtual interviews have become a common form of data collection. According to Lo Iacono et al. (2015), internet-based communication channels have become increasingly popular in qualitative research. Technology related to voice over internet protocol (VoIP) allows synchronous communication with video and audio using the internet (Lo Iacono, 2015). These technologies permit information to be gathered, breaking geographical barriers and providing flexibility to researchers to access the needed information from their interviewees. Considering the situation of the COVID-19 pandemic, it will be ideal for health precautions and remote working policies from the Puerto Rico Health Department to provide VoIP technologies to assist the virtual interview process regarding the data collection of this investigation. When using these technologies, Deakin and Wakefield (2013) explained that interviews could efficiently be conducted from the comfort of one's home, eliminating the need to travel and finding a venue and participants' cost of travel.

Lo Iacono et al. (2105) explain that using VoIP technologies to substitution personal interviews will assure essential pillars in the data collection's validity as the usual in-person interviews. Among these pillars, Lo Iacono et al. (2015) explain that virtual interviews (a) will provide a verification of identity, (b) assure rapport in the communication process with the interviewee, and will (c) assure recordings, with the option also to use written texts. Also, some studies have shown that participants sometimes opt to use online interviews, as they feel more comfortable in their style and

approaches than in-person interviews (Lo Iacono, 2015). The selected VoIP will be Skype. Several qualitative investigations place Skype interviewing as an effective VoIP technology in qualitative research (Deakin & Wakefield, 2013; Hana, 2010; Lo Iacono, 2015).

Some limitations can be contemplated during the process. Ethical issues will be discussed with participants in terms of (a) informed consent, (b) the right to withdraw, and (c) confidentiality. According to Hanna (2012), these ethical issues sometimes are unsteady to gather in online communications. Ethical solutions to these issues will be discussed in the ethical procedures section of this chapter. Likewise, alternate similar VoIP technologies as Skype could facilitate the participants' integration in the research process. If other VoIP technologies are integrated, they will be informed of the investigation results.

Instrumentation

The interview will consist of open-ended questions to enrich the quality of content within the leadership field in the execution of action plans from the perspective of higher education leaders in Puerto Rico. According to Sulton et al., (2015), open-ended questions are exploratory and help researchers have more insights on topics that leaders are not familiar with. Considering the novelty of leadership in the execution of plans, dealing with Hurricane Maria's aftermath, open-ended questions will provide more insights and discoveries on this topic. Also, with a small group of participants, it will be ideal to attain each experience's uniqueness in this topic, with open-ended questions.

Open-ended questions will provide more insights within multiples unquantifiable aspects of leadership that could be discovered. The questions I asked to uncover the realities of leadership in the execution of actions plans were

1. Can you tell Hurricane Maria represented a crisis in some aspects of your institution? If yes, why?
2. Does your institution had a previous emergency plan that guided the strategies dealing with Hurricane Maria's aftermath?
3. Do you think this emergency had no previous precedents, or could it have been proactively foreseen in terms of planning?
4. There are any standards or principles in risk management planning for climate adversities or any other threats?
5. Does your pre-existent crisis emergency plan effectively deal with the mitigation process of Hurricane's Maria aftermath?
6. In the absence of a previous plan: how the strategies of mitigation dealing with Hurricane Maria's aftermath were planned or selected?
7. What issues were selected or determine to be strategized?
8. How do these issues were strategized or solved?
9. There was a time frame to guide to completion of plans accurately. Do you believe the completion time was unobservable in this process?
10. How was the process of communication between targeted stakeholders regarding the inherency of the issues to be solved?

11. How do you describe your leadership role in the emergency plan's overall execution with this climatological experience?
12. How do you describe your leadership competencies in the emergency plan’s overall execution with this climatological experience?
13. What are some of the lessons learned from your institutions leading execution plans due to climatological crises as Hurricane Maria?

Virtual interviews will be done individually with the 12 selected participants. A guide sheet of questions will be presented to participants before interviews and modified throughout the data gathering process. Triangulation will be implemented by analyzing additional information from the interviewees as news reports, strategic plans, crisis plans, and resilience reports to accrediting bodies. According to McCullar (2011), triangulation is a critical process to assure the findings' integrity by validating them with multiple sources.

Data Analysis Plan

An open coding technique will be employed during the data collection process to both a priori and posteriori and identify themes and subthemes regarding the investigation problem. Starting the virtual interviews, some broad, open-ended questions regarding leaders’ experiences in executing action plans will be employed. Open-ended questions will help to build rapport to narrow a proceeding and more in detail a priori coding. Some a priori questions that I would like to investigate will be taken from tenets regarding leadership style, roles, competencies, authority, trust, and decision-making in executing action plans in crisis management. According to Boyatsis (1998), a priori coding is a

deductive approach based on codes that the researcher identifies before examining the data. This coding will be theoretically extracted from the literature review and leadership theories as part of this research's conceptual framework. Once the interviews take place, some other questions will arise posteriori, enhancing the process of investigation inductively. This inductive and deductive analysis will be the "hybrid" rationale of questioning in the data collection.

After interviews are finished, notes will be verbally discussed with participants helping the inductive reasoning of data collection. Consequently, some transcriptions will be sent to participants for their review. According to McCullar (2011), sending transcripts to participants in interviews will help researchers to make corrections, check for the accuracy and clarification of information.

Regarding the coding process, transcribed interviews will be submitted to the QDA Miner Lite program. The open coding process discovered in this program will allow finding key recurring themes and topics. These themes and sub-themes will be grouped in major hierarchical categories related to leadership in the execution of crisis management plans that will arise deductively and inductively during the data analysis process.

An intercoder will assist the data collection process in selecting topics, categories, and themes emerging in this coding process. Intercoder will assist a cross-analysis in various ways. First, between the comparison process of data obtained among participants in both cases. Second, between coders in the data analysis process to secure and propel new knowledge findings between cases. When reporting the results, formatting direct

quoting will be employed when essential discoveries are similar between participants based on a cross-analysis of cases. A comparison between findings and the theories that framed this research—Bass's transformational and Hersey and Blanchard's situational leadership theory—were also reported as part of the data analysis.

Trustworthiness

Credibility (Internal Validity)

Continuous feedback with the participants will be conducted to verify that the data collected during interviews is precise and accurate through the scope of their social constructs and realities. According to Maxwell (2013), audiotaping, verbatims transcripts, and members' checking of interviews will help align the researchers' interpretations with the participants' realities. Once interviews are completed, a follow-up email will be sent to participants to validate the information or make corrections as needed. After corrections are received, a phone call or videoconference will be scheduled with participants to validate that the information received is correct verbally. This verification process is part of a triangulation process. Members' check is an essential factor in setting the credibility in qualitative inquiry, as it corroborates those personal biases are not interrupting the interpretation process (Ramraj-Sookdeo, 2020). Triangulation is a vital part of qualitative studies' validity, aiming to find a convergence of the understanding of the phenomena with different sources (Patton, 2015).

Transferability (External Validity)

Regarding the external validity that this research intends to provide, the data collection and findings will be extracted by a significant participant population.

According to Ramraj-Sookdeo (2020), a well-defined sample with a considerable population will help determine more credibility, allowing adequate data saturation. The purposefully selected sample of 12 participants of different institutional governance and geographic regions affected by Hurricane Maria will propel the findings' content based on interviews between 60 to 90 min. Also, participants could be purposefully stratified in typical roles of administration between cases to safeguard the triangulation of emerging discoveries and establish coincident or discrepant data associated with interviewing questions. Additionally, according to Patton (2015), peer and committee helping and reviewing interview data will ensure the credibility and transferability of findings. Data will be peer-reviewed with the selected intercoder and professional peers to find supporting and discrepant discoveries that will be carefully examined to determine final findings.

Consequently, descriptions will help determine readers a possible transferability of discoveries. By describing these findings and data collection procedures, leaders in higher education executing action plans due to climatological crises will validate that their contexts are promising to apply the knowledge obtained in this investigation. Statistics Solutions (2020) explain the descriptive process of data collection as providing a thick description of the phenomenon. The author explained that thick description is a technique in which a qualitative researcher provides “a robust and detailed account of their experiences during data collection” (p. 1). In order to propel this thick description of the process, I will provide notes of the interview process, descriptions of the social and institutional context where interviews take place, time of interviews, medium that there

were employed for the interviews, delays, and possible problems or controversies that could happen.

Dependability

When referring to dependability, the logic's focus is how reliable the research findings are (Miles et al., 2014). Audit trails will be strategies that will illustrate to the readers all the process related to the researcher's as documentation of data, data analysis plan, methods, decisions, and changes, as well as the rationale involved in the selection of themes and sub-themes (McClelan, 2016; Statistics Solutions, 2020). A data analysis software QDA Miner Lite will assist the processes and procedures of data collection. QDA Miner Lite, identify internal traits with an intuitive coding system, organizing information in a tree structure. This coding process will facilitate the identification process of recurring themes and topics. The point of audit trails is to provide readers the confidence and transparency that decisions are based on the participants' experiences and not the researcher (McClelan, 2016). According to Wheaton College (2020), the selected software QDA Miner Lite will provide support to the researcher by (a) adding comments or memos to coded segments, (b)text search tool for retrieving and coding text segments, (c) coding frequency analysis, and (d) export tables to Excel, Word, or CSV. All these features will facilitate the rigor and intended transparency to support the reliability of the data analysis (Saldana, 2015).

Confirmability

According to Tobley and Begley (2004), confirmability is the degree of objectivity and neutrality obtained in research. Therefore, confirmability wants to

safeguard that results are based on the investigation's findings and not on the researcher's assumptions (Saldana, 2015). The collaboration of experts in the field to corroborate research questions and instruments to adjust any decision will be employed. The integration of experts of fields for reviewing purposes will help avoid biases in all data collection stages (McClelan, 2016). Also, reflexivity will help establish the confirmability aimed in this research, using records and journal of decisions made to avoid personal biases (Patton, 2015). Likewise, records and journals will include internal and external communications, methodologies to be employed, and personal introspections. Ramraj-Sookdeo (2020) explains that an open-minded attitude, flexibility, and continuously reflecting on the phenomenon of interest to ensure fidelity that the participants' experiences produce the data are crucial components to establish the proposed confirmability. These reflections will be implemented and grounded in all levels of research.

Ethical Procedures

In conducting this qualitative research, I anticipated some ethical issues related to obtaining the consent of participants. Ethical principles based on professional and universal standards of integrity, respect for persons, responsibility, and justice (Centre for Critical Health Qualitative Research, 2020) were adhered to during all stages of the investigation. I also observed the guidelines for professional research standards of the Institutional Review Board at Walden University (Walden University, 2020). Some other ethical principles that were followed, mainly during the data collection process, were

benevolence and confidentiality, as part of universal and professional educational standards.

Ethical issues prior to conducting the study will revolve around obtaining the required permissions for investigation. According to Ramja-Sookdeo (2020), proposal approvals and selections of suitable investigation sites are among the most important ethical issues addressed before a study begins. To engage in participant selection and data collection, I needed to obtain approval from Walden University's Institutional Review Board. Once I obtained approval from the Institutional Review Board (approval no. 09-30-22-0673287; see Appendix A), I sought permissions from the investigation site . I contacted vice presidents of selected higher education institutions and provided them with the prospectus and the purpose of study.

At the beginning of the study, ethical issues will also be contemplated. For the concept of this investigation, these issues will be addressed by identifying (a) areas that will benefit participants and (b) having the participants' consent to participation. Before interviews with selected participants, all protocols of ethical standards of working with human subjects will be disclosed (Batool & Chayas, 2020). The purpose of the investigation will be disclosed with participants and issues regarding privacy in contact information, informed consent procedures, data collection strategies, and members' check's follow-ups. These steps will address and validate ethical issues regarding participants' consent in qualitative research. The coding assistant signed a confidentiality agreement (see Appendix B).

Additionally, before the beginning of the investigation, areas that result in ethical issues and should benefit participants during the investigation will be technology intervention in the investigation. Ethical issues regarding online research such as virtual interviews mediated with VoIP's and email will be disclosed. According to Brownlow and O'Dell (2002), there are increasing ethical issues due to the increment of online qualitative research methodologies. Each one could be unique to such research and more 'traditional' ethical concerns. Considering the methodologies and instrument of investigation based on virtual interviews, some of the issues to be observed will be privacy for participants' information, informed consent, and narrative.

While collecting the data, building trust with participants will be crucial. According to Batool and Chayas (2020), trust in qualitative research can be obtained by not disturbing or pressuring contacts or participants is with the investigation, respecting their time and engagement. Also, this investigation will avoid ethical issues by deceiving participants. Special audits regarding how results will be saved, and pseudonyms linked to participants' identities in the data collection will be discussed and presented. Furthermore, while analyzing the data, a fictitious name will be employed. According to Chamberlain (2000), this will avoid ethical issues regarding participants' privacy in disclosing their names. Similarly, multiple perspectives of results will be shown. According to Chamberlain (2020), in ethical-pondered studies, reports provide positive and negative results to assure a rich and broader content of themes in qualitative investigations.

Finally, ethical issues while reporting data will be observed. Communicating the results in an appropriate language will avoid ethical issues being confronted. According to Rossiter et al. (2014), researchers must select and unbiased language denoting personal interpretation. Regarding the raw data obtained in this investigation, it will be stored for five years. Raw data in qualitative research is considered the information collected to understand the phenomena as documents, journals of observations, diagrams, and mainly the memo notes of participants' words. Raw data will be kept in stored files and hard disks for revisions if necessary.

Summary

Chapter 3 initially discusses how the research question, purpose of study, and literature review will adhere to the research design through the qualitative lenses of analysis. It is explained and proposed why a qualitative tradition of the investigation will better provide a scope of analysis to this investigation phenomenon, as it is leadership in the execution of action plans due to climatological crises. Consequently, this chapter provides a detailed outline of the methodological approaches regarding participants' selection rationality, sampling strategies, data collection, and data analysis. Regarding the software to assist the data analysis's credibility, it was stated that QDA Miner Lite would be selected.

Therefore, it was also discussed how the competencies of trustworthiness were necessary to be present at all investigation levels. Elements of credibility, dependability, transferability, and confirmability will reduce biases and ensure an accurate analysis of findings. Finally, ethical principles were contemplated in different stages of investigation

as it is related to human participation. Fundamentally, ethical risks were anticipated before the investigation while collecting the data, analyzing the data, and finally reporting it. Some risks of ethical issues and solutions for each of them were presented, outweighing any harm participants might undergo.

In Chapter 4, details of the findings will be presented. Before Chapter 4 is initiated, approval from Walden University's the Institutional Review Board will be necessary. Chapter 4 will discuss in-depth answers to the research question and discussions, conclusions, and findings of key terms presented in this investigation.

Chapter 4: Results

The purpose of this qualitative comparative case study explored the crisis leadership in the execution of action plan strategies in Puerto Rico higher education from the experiences of critical administrators in two academic units of post-secondary education, leading the aftereffects of a climatological crisis caused by Hurricane Maria. The content of this chapter is organized to provide the results obtained in this investigation. These results will be reported in five sections to guide the data collection and analysis. The first section will discuss the setting grounded in each academic unit during the interviews and the situations and limitations that arose during the data collection. Second, the chapter will describe the participants in these interviews and the questions employed to guide the data collection of this research. Last, the rationale and processes of coding, categorizing, and triangulating the discoveries in each case so results and findings are presented.

Setting

The participants in this research were administrators within academic and infrastructural realms of higher education who participated in strategies in executing crisis plans to restore the operations of their respective academic units. The academic units offered undergraduate and graduate degrees. One institution was private, and the other was a campus of a public state university. Some delays happened during the recruitment process, and more orientations and modifications to consent forms were employed to guarantee participants' confidence in their participation. According to Pérez et al. (2022), recruitment could be challenging when discussing sensitive topics or

communication barriers are contemplated. I believe language barriers were perceived and probably a sensitivity of invasiveness to not having supportive documents to validate their plan execution.

Regarding the changes in the consent forms, most were related to omitting documentation that emerged in the execution of plans. Only one case provided a copy of the institutional self-study prepared for the years covered during Hurricane Maria. Strategies aligned with resource allocation and funds for emergencies were observed in the self-study. Also, student affairs and human resources data of achievements and assessments were analyzed for a broader scope of how organizational climate aligned with the different tenets observed in the research questions. Likewise, both academic units' institutional mission and vision were analyzed to have some strategic sights on how planning, leadership, and community engagement could provide angles aligned with leadership in crisis management. Nevertheless, document notes were made, and phrases were underlined and identified with the question the data aligned with.

Regarding the language used to conduct the interviews, there was some hesitation among participants to use the English language. One participant switched the discussion to Spanish during the interview, having agreed to be in English, two participants felt more comfortable in their vernacular language, Spanish, and two participants decided to complete the entire interview in English.

Participants

There was a total number of 12 participants in the data collection. The saturation of codes and data emerged with six participants based on the specificity of the

investigation paradigm and the sample participants' homogeneity. Every discovery aligned themes and principles concurrently, with no significant variations. It is believed that considering the homogeneity of societal backgrounds and demographics on the island of Puerto Rico, all participants experimented with the execution of their plans with the same rationale in terms of communication, issues, risks, and leadership styles. According to Inter Q (2023), when the homogeneity of populations and events in paradigms of investigation is very similar, data tend to saturate around five to 12 cases of data.

All of the participating leaders were administrators in different roles, leading teams that executed strategies during the aftereffects caused by Hurricane Maria. Participants A and A1 were the president and provost of an institution; Participants B and B1 were the vice president of academic affairs; Participants C1–C4 were directors of academic departments; Participant D was the director of infrastructure; Participant E was the chief financial officer of a campus, and Participant F was director of information technology.

Data Collection

I collected data by conducting virtual interviews and reviewing authorized documentation. Virtual interviews with leaders took approximately 1 hr with each case. Interviews were audio-recorded as stated in the consent forms. The audio recording helped ensure the data collection, which was later transcribed for revisions with participants. After the discussions, a members check was arranged with participants to discuss the overall content of the interviews based on the 13 interview questions.

Members checks involved sending transcripts of interview data to participants for review and confirmation via email. Participants were given the opportunity to suggest revisions or confirm that the data were suitable for coding. The process typically took between 2 weeks to 3 months, with all participants ultimately agreeing via email that the transcripts were acceptable, eliminating the need for further telephone or in-person follow-ups. Table 2 provides an interview question organization with numbers, which later serve to code each category and theme according to them.

Table 2

Interview Questions

Question no.	Interview question
1	Can you tell if Hurricane Maria represented a crisis in some aspects of your institution? If yes, why?
2	Does your institution have a previous emergency plan that guided the strategies in dealing with Hurricane Maria's
3	aftermath?
	Do you think this emergency had no previous precedents, or
4	could it have been proactively foreseen in planning?
	Are there any standards or principles in risk management planning for climate adversities or other threats?
5	Does your pre-existent crisis emergency plan effectively deal with the mitigation process of Hurricane Maria's aftermath?
6	In the absence of a previous plan, how were the strategies of mitigation dealing with Hurricane Maria's aftermath planned or selected?
7	What issues were selected or determined to be strategized?
8	How are these issues strategized or solved?
9	There was a time frame to guide the accurate completion of plans. Do you believe the completion time was unobservable in this process?
10	How was the communication process between targeted stakeholders regarding the inherency of the issues to be solved?
11	How do you describe your leadership role in the emergency plan's overall execution with this climatological experience?
	How do you describe the maturity level of your followers' assigned task?
	Was delegation applied, or was some supervision of execution needed?
12	How do you describe your leadership competencies in the emergency plan's overall execution with this climatological experience?
13	What lessons did you learn from your institution leading execution plans due to climatological crises like Hurricane Maria?

Interview questions were grounded in transformational and situational leadership theories, based on the role and influence of leaders in the execution of plans and the contextualization of determining tasks and strategies to specific needs in times of crisis. After transcribing the data from interviews, a process of verifying the answers with an intercoder was conducted after the interviews. The peer-reviewed analysis was completed in two ways: after two interviews, a brief meeting was held to discuss impressions and revisions of overall insights. Notes were taken into journals to be later coded and used in the data analysis. It did not occur in the other four interviews because of time restrictions and availability. Nonetheless, one formal meeting was conducted in all six cases for the peer-reviewed decoding process.

Table 3 shows the number of peer-reviewed revisions for each participant and the time frame to send transcripts to each participant for the member checks. Participants engaged in member checking via email.

Table 3

Peer Review Process

Participant	No. of revisions	Time frame to send transcripts
A	2	2 months
A1	2	2 months
B	1	2 weeks
B1	1	1 week
C	1	3 months
C1	1	3 months
C2	1	1 week
C3	1	1 week
C4	1	1 week
C5	1	1 week
D	1	2 months
E	2	3 months

I sent transcriptions and voice recordings associated with each question to interviewees for member checks. The period to send transcripts averages from 2 weeks to 3 months. Participant agreed to respond to the emails with their observations and corrections. None of the participants decided to have virtual or telephonic revisions regarding the transcripts from their interviews. Checking the data obtained in interviews with participants ensures the credibility and accuracy of the data analysis.

Data Analysis

After checking the data with participants, the interview questions were selected to target specific data clusters with common relationships that served as categories. Henry et al. (2015) state that data clusters classify similar data into groups. The software NVivo helped to group codes based on shared relationships. After identifying codes, they were sorted into clusters for each question, concurring with the categories' relationship.

NVivo facilitated a description of how many case counts were associated and the code counts for each cluster of codes. According to Kashy and Hagiwara (2012), case counts are the number of participants associated with specific codes, and code counts are the amount of important information related to a particular code. Then, data export from NVivo was exported to a Word document to provide an analysis of clusters of principles aligned to each category that emerged from questions. Therefore, the rationale for this axial coding was based on interview data as emerging codes aligned to specific questions and clusters of data that provided recurrent information answering each interview question.

According to Kashi and Hagiwara (2012), axial coding refers to relating codes with each other deductively and inductively to develop themes. The categories obtained from the data collection were (a) communication styles, (b) risk and issues management, (c) leadership styles, (d) institutional planning, and (e) community engagement. Table 4 exhibits some of the emerging codes aligned in each category.

Table 4

Emerging Codes

Category	Code
Communication styles	Inherency of problem, no internet, absence of email, think outside the box, radio, visits, meetings, written communications, signs
Risk and issues managements	Debris, no water, no electricity, floods, leptospirosis, student retention, anxiety issues, students nowhere to go, courses, lose the academic semester
Leadership styles	Pacesetting, laissez-faire, affiliative, autocratic, transformational, coaching, empathetic, humanitarian, lead clear objectives, lead by example
Institutional planning	No precedents, create phases, clear objectives, proactivity after crises, learning process, adaptability, assessments, mitigation, public–private alliances
Community engagement	Citizens of our community, provide peace, support in needs, FEMA hubs and Red Cross hubs, emotional and psychological support, recreational activities, moving forward, provide basic needs such as water and food, Wi-Fi and electricity hubs

Note. FEMA = Federal Emergency Management Association.

Consequently, the emerging themes that will be used to report the results obtained in this data collection and that consequently answer the research question of how have key administrators in two academic units of postsecondary education in Puerto Rico implemented crisis leadership plan execution strategies leading to the aftereffects of a

climatological crisis caused by Hurricane Maria, will be (a) implementation of multiple leadership styles throughout the planning process, (b) multifaceted forms of communication, (c) identification of infrastructural and human resources risks, (d) phasing of issues management, and (e) supportive community engagement. Table 5 presents the analysis process of themes that emerged from categories and coding research questions aligned with each theme and category.

Table 5

Themes, Categories, and Coding Interview Questions

Theme	Category	Interview question
1. Implementation of multiple leadership styles throughout the planning process	Leadership styles (C1)	11, 12, 13
2. Multifaceted forms of communication	Communication styles (C2)	10
3. Identification of infrastructural and human resources risks	Issues and risk management (C3), institutional planning (C5)	1, 2, 5, 7
4. Phasing of issues management	Issues and risk management (C3), institutional planning (C5)	1, 2, 5, 7, 8
5. Supportive community engagement	Community engagement (C6)	6, 12

Results

This investigation's results align with transformational and situational leadership constructs associated with leadership styles in times of crisis. The conceptual background of these theories serves as the basis to answer our investigation question: How have key administrators in two academic units of post-secondary education in Puerto Rico implemented crisis leadership plans' execution strategies leading to the aftereffects of a

climatological crisis caused by Hurricane Maria? This question can be viewed as a matrix surrounded by the 14 interview questions, which helped to discover all the codes, categories, and themes where the results will be presented. Based on these concepts in leadership, insights related to issues management, risk management, communications, and community engagement resulted in subsequent categories that aimed to answer the research question. The results will be presented and divided into emerging themes to answer the research question.

Theme 1: Implementation of Multiple Leadership Styles Throughout the Planning Process

Leaders in this research showed that it was necessary to adapt to multiple leadership styles to achieve determined objectives in times of crisis. It could be deduced that multiple leadership styles were effective, based on the collective sense of how teamwork was achieved to pursue main goals. Participant C highlighted that one of the main lessons learned through leading strategies was “a vivid example of when a group of people achieves their goals when working towards common goals.”

When asking precise questions regarding leadership, it was at the end of interviews, on average, around 40 min after each participant’s respective interviews. The reason was to connect participants, at the beginning of their interviews, with the planning process restoring the normalcy of operations of their academic units and leaving until the end of the interviews a summative perspective of their understanding of the leadership concept. Participants were asked to describe the roles and competencies they believed defined their leadership. Some participants had precise knowledge of theories and

definitions aligned with scholars regarding leadership and stated connecting words of the theories. An example was the word “transformative,” as in transformational leadership theory. Participant A expressed, “I was a transformative leader, making my community believe we would overcome the emergency.” Participant E described the overall competencies throughout the plan’s execution as " a humanitarian leader who wanted to transform attitudes into actions.”

Participants in leadership roles related to general strategic decisions in their institutions felt more transformative when describing their competencies during these events. These types of leaders explained how important it was to guide, trust, communicate, decide, show, and inspire their respective followers. According to Sparks (2021), transformational leadership does not care about positional power but how influential the leader is in the decision-making of their followers. Leaders that showed characteristics of transformational leadership related to competencies that enacted their influencing skills to convince the inherency of a problem and provide not only words but actions to achieve objectives. Participant A stated that when leading strategies to their followers, the best practice was “to be the first to be seen on campus and the last on campus while leading the strategies for dealing with the aftereffects.”

Participant A1 expressed that, in some instances, there is a level of autocracy when defining a clear objective in times of crisis.

> As a leader dealing with a crisis, there are many styles you need to embody, even autocratic styles, in some decisions. I had a clear perspective of when operations needed to be restored, and I felt it was my call to decide that dateline.

Other leaders, like Participant B, did not express the word *autocratic* or felt related to that style.

> I recognize I had to control decisions initially, but it is not my style. I like to have conversations, but in crises, at some point, you have to say this is how it will happen, and that is how it must happen.

Participant C explained that followers even appreciate autocracy in crucial decisions in times of crisis.

> Our people even appreciated that, at some points, the higher management levels had a clear objective to follow… in times of crisis as a leader, you cannot be so democratic; otherwise, we could not have opened our institution in a record time… in times of crises, followers tend to look for their leaders and follow them.

Other participants felt they could not make decisions if not taken democratically. Participant D explained that decision-making was democratic among team members. Following this line, Participant D stated, "what I did not know was maybe answered or pointed out by another team member and vice versa." In democratic styles, six out of twelve participants related to this style, representing 33% of the interviewees. Participant B expressed that calling their team to brainstorm was part of a "democratic consensus." About this argument, Participant B stated that "sitting at a table with my team discussing the course of events and actions" makes it a democratic leadership style.

After I asked participating leaders to describe their roles and competencies, I shared a screen with seven different leadership styles and brief definitions and asked which one they identified with. The leadership styles I presented were

- affiliative
- autocratic
- coaching
- democratic
- laissez-faire
- pace-setting
- transformational

Table 6 presents the percentage aligned to the engagement of styles described by leaders when sharing these styles and their definitions during the interview process.

Besides autocratic and transformational, which were discussed previously. Leaders identify that their styles in some tasks were situational to achieve determined objectives. Following this rationale, leaders' top two leadership styles related to being situational to tasks were affiliative leadership (100%) and pacesetting (83%). Affiliative leadership promotes teamwork and affiliation between team members to achieve goals (Knights, 2022). This leadership style aligns with situational leadership in times of crisis.

Participant A explained that in some tasks, it is essential to "promote teamwork and, therefore, to be affiliative." Leaders in some academic units explained how affiliation propelling collaboration helped accomplish the main objective of reopening their institution in a record time. In terms of pacesetting leadership, Knights (2021) explained: "It is a very goal-oriented emotional leadership style that drives high-achieving team members to accomplish at as high a rate as possible" (p. 1). Leaders in

this interview found pacesetting crucial in leading the guidelines to achieve specific goals, mainly related to student services and issues management.

Table 6

Participants' Leadership Styles

Leadership style	No. of participants (N = 12))	%
Transformational	12	100
Autocratic	6	50
Affiliative	12	100
Pacesetting	12	100
Coaching	4	33
Democratic	2	17
Laissez-faire	0	0

Participant B expressed how precise leadership is essential in times of crisis to direct goals as "people look to their leaders during crises." In times of this climatological crisis caused by Hurricane Maria, leaders believed that the concept regarding their leadership styles was mainly transformative. Some instances were autocratic, with exemplary attitudes necessary in making decisions and showing the course of action. Leaders needed to situate their styles to achieve goals in this transformative process. Therefore, affiliative qualities and pacesetting in management were required to restore the status quo.

Theme 2: Multifaceted Forms of Communication

One of the issues that Hurricane Maria brought was the absence of electricity and internet connectivity. According to Harris (2018), 83 percent of the households in Puerto Rico were without electrical power for more than 100 days, from the date of the hurricane until the end of 2017. This section delves into the distinctive and unconventional modes

of organizational communication that surfaced in the aftermath of Hurricane Maria, where the absence of electricity and internet connectivity compelled organizations to explore alternative avenues for staying interconnected amidst the technological void. Amidst the challenges posed by the hurricane's impact on infrastructure, this investigation unravels the inventive strategies organizations adopt to foster effective communication with stakeholders in the face of technological limitations.

Based on all leaders, the most arduous struggle brought by Hurricane Maria caused the island to remain uncommunicated. About this situation, Participant A explained:

> In PR [Puerto Rico], we had a hurricane and a tropical storm here and there, impacting some areas of the island. It made it easy to find support from areas that were not affected. However, the one thing we were never used to and, therefore, with no precedents, was managing a crisis where the whole island remained uncommunicated for almost a month, which made the whole situation a crisis.

For some leaders, communication with their team members and assurance of security represented an imminent issue that called for a communications plan. During the subsequent 3 weeks after Hurricane Maria, leaders started to appear at their institutions; most were contacted by calls or emails with occasional reception, and others decided to present themselves to campus. Some leaders expressed how bad the conditions were in their respective towns of residence regarding the accessibility of internet connection: Participant D stated, “I could not communicate with any of my supervisors; the internet accessibility was unavailable, so I decided to arrive on campus.”

Even though texting and emailing are customary forms of communication in institutional communications, when technology cannot assist this process, leaders must find ways to be present and affirm their security. It is crucial for the human safeguarding of institutional resources and a method for strategic leaders to see how many team members can participate in the institutional recovery efforts. Participant C stated, “when we gradually knew our staff was okay and who we were counting on for the recovery effort, it was the only time we could create a plan.”.

Radio communications served as a primary form of communication in the early stages of communication with stakeholders. Radio transmissions from some A.M. stations were liaisons of many institutions to send initial communications to their communities about when institutions were open and how to report their safety to designated contacts. Some higher education institutions had operating radio stations that helped to provide initial communications. Still, other institutions relied on some commercial stations to support a vast space of interlocutors in communities to help establish contacts with their teams. According to Takashi et al. (2018), local audiences could follow the events related to Maria thanks to battery-operated radio receivers. Nevertheless, the power and communications blackout reverted radio to a one-way communication medium. Thus, individuals went to radio stations to either relay that they were okay or find out about loved ones (Takashi et al., 2018).

Another way of communication was by arranging handwritten signs in the main gates of some institutions to provide initial communications on how campuses were,

dates of reopening, and much other relevant information regarding contacting stakeholders after the crisis. Participant D stated,

> We went to the basics; initially, due to the damages to our campus, we arranged signs located and the main gates of the campus, at that time locked and closed, with information regarding reopening, academic affairs information, times that goods were distributed and even paydays for all employees.

In the face of no electric power and internet connectivity, in-person communication was employed to maintain the daily functions and tasks while executing plans. Many leaders recounted having daily meetings to ensure the week's priorities for each team member, support any new or emerging need due to the overall island's critical conditions, and engage peers in moral support. Additionally, regarding academic affairs, daily meetings ensured a uniform message of what was happening or intended to occur weekly so professors could communicate to their respective classes and students. Therefore, supporting hubs were created to ensure any communication regarding issues was directed to a specific information center. Participant B stated, "any student concerns or questions related to plans or academic affairs were directed to our designated hub." Academic teams arranged space with the help of electric generators, computers, volunteers, and professors as an information hub for relevant educational information.

When wireless interconnections were gradually established, and phone lines were gaining access as soon as towers were raised and reconnected, academic leaders used emails as standardized forms of effective communication, with bulleted messages short and precise. Also, telephone calls were arranged by organized teams to locate students

and raise a database of relevant information, including specific needs, their safety, and their interest in returning to campus that semester. Participant C explained how a spreadsheet shared by different units served as a database, where information collected by almost 4,000 students was gathered to know essential data such as safety conditions, interest in completing the semester, particular needs or resources, and their willingness to return to campus.

Based on the information obtained from the different cases, the communication process was phased to create contact with stakeholders and ensure a clear, uniform message prevailed in executing plans. Initial communications varied from radio-transmitted messages to handwritten signs in commonly denominated areas recognized as stakeholders as they were main gates. Once initial communications were established, leaders knew the human resources available to restore the overall normal operations of their respective institutions. During this process, leaders expressed that daily meetings and information contact hubs were arranged to ensure that “clear” and “uniform” messages were disseminated according to the area of interest, including student affairs. All leaders agreed that Email and telephone calls were the reliable technology mediums that helped share communications and create a student database once electric power was possible.

Theme 3: Identification of Infrastructural and Human-Related Risks

This section reveals the outcomes of a leader’s perspective on the intricate relationship between security, restoration of operations, and infrastructural damages as primary risk assessments. Leaders aim to navigate the aftermath of unforeseen

challenges, particularly in salvaging the semester. Among the primary risk assessments, the results in this section elucidate the nuanced interplay between human and infrastructural vulnerabilities in ensuring the resilience and continuity of academic endeavors.

Participants were asked to define how Hurricane Maria represented a crisis in their institutions based on their perspectives on crisis definitions, codes regarding risks, and emerging issues. According to Cirillo (2020), if leaders are on an immediate urgency to solve an issue, it could be due to critical conditions. Most leaders expressed that the risks associated with the risks were not immediate; most risks menaced the well-being, and restoration in adequate time was crucial to prevent critical outcomes. All participants categorized risks identified in two realms of importance for execution strategies: infrastructural risks and human-related risks. Some leaders anticipated formal assessments before the crises related to some infrastructural dangers that could have happened in the events of hurricanes.

Regarding infrastructural risks, leaders mainly identify the conditions of having an operational campus that represents no risk for their stakeholders. Human value and security were consistently ranked as the most important to be strategized. Participant C stated, “any risk and strategy that was the first to be considered were related to human value and security.” Following this line, leaders like Participant A explained that creating suitable spaces for restoring operations was part of the main purpose of an effective risk assessment.

> Our main risk was security, asking: How can we create more suitable spaces, and what would you do if specific areas were damaged? If they are not available, your second concern is utilities and telecommunications. Do you have the electric power to operate all activities, so stakeholders do not lose connection and communications access? So those are your main operating concerns.

Also, having an infrastructure that could not supply electricity consequentially brought risks related to a lack of bombs pumping water supply and unsanitary conditions, including conditions for leptospirosis outbreaks in communities. According to the Pan-American Health Organization (2023), leptospirosis is a zoonotic disease that can be epidemic in regions, mainly after heavy rainfall. In some areas, there were bursts of this bacterium due to the flood occasioned by Hurricane Maria, causing several deaths. Participant D narrated how the floods on campus and the lack of water supplies to provide the required cleansing conditions were risks that needed to be prioritized before opening the institutions.

Other human-related risks were associated with the participation of students cooperating in cleaning the areas. Participant D explained that in reopening their institutions, students came to the campus, letting institutional leaders of some divisions know that they were ready and accessible to cooperate in the campus's cleaning activities. Nevertheless, risks associated with health, insolation, and wounds were foreseen when allowing some students to collaborate. Therefore, leaders determined specific tasks, times, and supervisors to enable students to participate but with a previous assessment of risk factors in their tasks. Participant D stated,

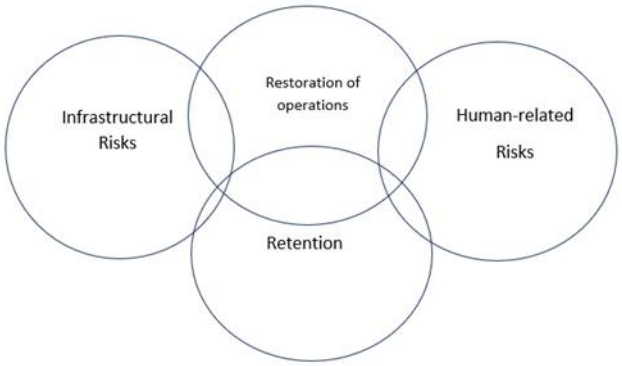
> We were happy with their willingness to cooperate and be part of our resilience. However, from a risk assessment and the liabilities that could be caused to our institutions, the conditions were considerably hazardous to let them participate in all the tasks.

Some strategic leaders interviewed from their respective units identified that retention and recruitment of students were contemplated in risk assessment. Most of these universities and campuses operate mainly on incomes that came from enrollment. Therefore, there was a call to strategize on providing security to students to pursue the rest of their respective semesters. Participant C's initial concern, as stated, was, “How do we retain students to pursue their semester, and how can we recruit prospective students in uncertain conditions on our island?”

Regarding risks, leaders found that the human factor was always a priority. There were risks anticipated, but the emerging risks from the crisis Hurricane Maria represented were primarily related not to a linear perspective of analysis but holistically to how to provide and create secure spaces to reopen their respective institutions. Following this rationale, leaders' main concerns about risks were to ensure that stakeholders and students were safe and, therefore, retained to end the semester, inspiring upcoming students to be recruited for subsequent academic terms. Figure 5 represents the nonlinear relationship between restoration of operations and retention and infrastructural and human-related risks.

Figure 5

Relationship of Risks to Restoration of Operations and Retention



Theme 4: Phasing of Issues Management

The deliberate approach of leaders in addressing issues management was to strategically phase the top priorities as (a) safety and (b) relocation of operations to suitable spaces. Examining the rationale behind this sequential decision-making process, the results of their respective interviews shed light on the nuanced strategies employed by organizational leaders, particularly in prioritizing the safety of stakeholders and orchestrating the seamless relocation of operations to optimal environments. After assessing risks, leaders moved their efforts to issues management related to risks. Therefore, strategies according to the action plans emerged. All leaders agreed in terms of strategizing issues management into phases. There were two main stages: (a) safety and (b) relocation of classroom spaces.

Safety

Safety was denoted as an initial phase of strategies to be implemented. In terms of safety, all leaders explained how cleaning the debris was essential to restore the everyday

operations of their institutions. Most implemented strategies that demanded the collaboration of many constituents of their universities, including students. Others denoted outsourcing budgets to companies that collected natural waste and sent them to recycle centers that processed it for further use. Participant D explained,

> Collaboration from our community was always active. Once we denoted the tasks appropriate for each group of constituents, we elaborated daily routines, including dividing the types of debris and storing them in non-obstructive areas based on their composition: biodegradable or other non-biodegradable materials.

Consequently, leaders explained how electric power and running water represented a sense of security. Therefore, another essential issue to be strategized was habilitating institutions with the required power plants so water could be pumped, spaces could be organized to provide classes, propel adequate ventilation, and gradually restore electronic communications. In these efforts, once resources were identified to restore power supplies, strategies related to relocation and adaptability of spaces started to be executed.

Relocation

A vital component of relocating and adapting classroom spaces was identifying power plants and diesel supplies to maintain a continued and programmed timing of their use. Some leaders found limited access to diesel supplies, and others found it relatively easy. Participant E narrated that, on some occasions needed to visit diesel suppliers in the early hours to operate some of their power plants. Others, like Participant C, explained that some small power plants that used gasoline were sometimes required to personally

obtain the gasoline doing extreme lines due to the island's gasoline scarcity. In some cases, the access and distribution of diesel was easy and accessible. Participant A stated, “we have a marvelous board of trustees that contacted their contacts to provide our institution with the required diesel. Therefore, it was not a worry for me in those aspects.”

In these terms, the accessibility to gasoline and diesel supplies for leaders depended mainly on the networking each institution had to obtain. After coordinating power plants and combustible supplies, all cases concurred in relocating classrooms with non or scarce ventilation to open spaces. Once the spaces were relocated and prepared, the academic aspects of daily classes were strategized to continue their normal operations toward the end of the semester. Academic leaders explained how courses’ schedules were modified, sections of the same courses were joined, and night session courses were opened on weekends. The main objective for many academic leaders who participated in these interviews was to execute strategies that help academic affairs finish the semester at the end of the fall semester in December and not extend it. It can be deduced from this information that issues management was a strategy in phases based on two objectives, concurred by all cases: (a) re-open as rapidly as possible, and (b) do not need to extend the academic semester. In these efforts, the first phase was to provide a safe environment for each institution’s community and then move on to relocating and adapting spaces with the required spaces and resources to help continue the academic endeavors to be completed.

Theme 5: Supportive Community Engagement

An important role that institutions encompassed once their spaces were safe and adapted was to support student life and community engagement. Hurricane Maria caused physical infrastructure adversities, but beyond that, it caused emotional and psychological damage to students and community members. According to leaders, institutions became supportive citizens, opening their spaces as hubs of peace and support.

Participant A said the institution became a "hub of peace for the community." Many leaders pointed out that many students expressed that coming to campus was the only activity that made them feel that their lives were normal in the middle of many adversities. Participant A shared insights regarding how institutions became a place to provide peace.

> We learned that people needed to see that we responded effectively to the disaster. That provided a message of hope. Responsibility for reopening the university and providing this space where students thank you. It provided a place of hope, which was crucial for people as everyone dealt with their situations. We provided a place that they could come to where they could find some support, where they could discover just a place to gather in their lives, and here to help them figure out how they would move forward.

Four leaders, representing 66% of interviewed cases, explained how psychological support was provided. According to the Miami Herald (2018), the psychological effects of Hurricane Maria were severe to many students who feared food

scarcity, damaged homes, and family members who needed to leave the island. Participant B expressed:

> Counseling was active during the aftereffects of Hurricane Maria but not as much as during the pandemic period or after the 2020 earthquakes. However, it was the beginning of an evident need for our institution to strategize to help the emotional aspects of our students and stakeholders to empower the process to move forward during adversities. Who would have thought Maria was only the beginning of so many other adversities?

Another support that universities entailed was providing organized hubs of food and over-the-counter supplies to their communities. All leaders representing their academic units in this research agreed that during the first 2 months of Maria, their institution was available to provide supplies and food to their institutions' members and the Puerto Rico communities in general. These hubs provided nonperishable foods, medicines, and cleansing supplies that were scarce in some communities and vicinities. These centers responded by donations to various stakeholders: (a) students, (b) administrators or institutional members, and community members across the island and different towns.

Local and federal governments also supported institutions, providing donations for supplies and prepared food to be distributed daily. Also, public-private alliances emerged in some academic units to respond to needs, mainly in preparing food and water for students and sharing temporary Wi-Fi stations on campuses to provide wireless connectivity. The support also included some academic units, helping communities of

different s to fill and receive assistance in their respective FEMA request forms for help due to the damages to their properties and loss of groceries caused by the absence of electric power in their homes. Participant E stated,

> A vital help was to assist members from our community and other towns in understanding and filling different types of assistance that FEMA provided based on qualifications. Helps could have been from deciding and submitting documents or evidence to how to type on the keyboard and sometimes translate terms mainly in English.

All cases explained how vital community engagement is in conjunction with academic affairs in times of crisis. Participants demonstrated that their communities in crises were also part of institutions' more significant commitment alongside their students and human resources. Campuses become centers of different support based on the necessities that could provide peace in times of adversity and support to the respective needs of the institution's communities in times of crisis.

Evidence of Trustworthiness

Credibility

As stated in Chapter 3, a triangulation process of members' checks was conducted to balance the researcher's interpretations with the interviewees' realities to limit possible biases. Another technique used to safeguard the credibility of this study was the participation of an intercoder who assisted in the data collection process. According to Ramraj-Sookdeo (2020), intercoders are a good practice in qualitative research. Intercoders can propel communicability and transparency of the coding process,

promoting reflexivity and dialogue within research teams and helping to satisfy diverse audiences of the trustworthiness of the research (O'Connor & Joffe, 2020).

Initially, I intended to conduct the member check in two phases. First, I would revise the interview transcripts by email and adjust any observations. Second, after making any revisions noted by the participants, I would proceed to have a telephone call or virtual communication with the participant to restate my observations. In all six cases, this could not be executed. Administrative leaders found the transcripts accurate with minor notes. The interview transcripts were reviewed by participants and sent back directly to the researcher by email. Regarding an intercoder, it was initially intended to have one person participate in all interviews. Recruiting participants took longer than anticipated, and because of limitations of coinciding in proposed times, a second inter-coder helped review the data obtained. Intercoders participated after interviews were conducted for 20 min to check notes and 1 hr during the transcriptions of interviews and coding and decoding analysis of cases.

Transferability

Transferability helps researchers and scholars decide if studies are replicable in their contexts. This investigation paradigm aimed to discover a particular topic at an exact moment in Puerto Rico's history: Hurricane Maria. Therefore, based on previous literature in sampling indicating saturation of data occurred in twelve participants, it is believed that this research was unnecessary as 6 participants provided a thick and wide scope coding in their realities, leading the execution of strategies in particular administrative roles in higher education. Twelve participants could have provided more

angles and data if the research was from students' or faculty's perspectives. Administrators in leadership roles leading and executing strategy in two academic units in Puerto Rico resulted in a small population. In similar research caused by other hydrological or climatological crises, the comparative case study could include more academic departments and even different academic units, such as elementary, middle, or high schools.

A peer-reviewed system was also executed in the data collection and coding process with the assistance of intercoders. This helped avoid biases and enhanced the process of identifying codes and aligning topics based on collaborative and peer-reviewed coding. Intercoders were administrative higher education leaders and graduate students whose knowledge helped to purify the information to provide more transparent and unbiased results.

Dependability and Confirmability

As indicators of trustworthiness, confirmability stems from validating that data collection was thoroughly checked to ensure that results can be repeated by other researchers. Concurrently, according to McClellan (2016), dependability refers to the study's consistent and repeatable findings. To support the confirmability and dependability of this research, many tactics have been used, from audit trails, member checks, triangulation, and coding rationales that support sufficient data for future researchers.

Audit trials, journal notes, audio recordings, and thick descriptions of moments and anecdotes supporting the interviews' content were analyzed and peer-reviewed. A

member check process with all participants cleared any misinterpretations during the data collection. Also, triangulation between cases and supporting documents was used to saturate the codes and themes from the data collection.

Summary

Key administrators in two academic education units in Puerto Rico implemented crisis leadership plans leading to the aftereffects of Hurricane Maria in a situational humane rationale based on security, safety, and support of their communities. A two-phase plan on providing protection and relocation of spaces provided the ideal scenario to drive their primary objectives of restoring normal operations and accelerating the support required for community engagement. It is also shown that these objectives were aimed at restoring the normalcy of operations so that the semester could be safe and the retention of students- necessary for tuition-based institutions- could continue.

Strategies encompassed these objectives by determining the required safety measures on campus and relocating spaces adapted to provide a proper academic life and community engagement. Risks and issues management contemplated these strategies. Among the different risks that emerged in these cases were related to physical and human-related infrastructures. Regarding issues management, the majority considered that the absence of electric power caused problems with water supplies, ventilation, and the use of different types of equipment. Also, the emotional aspects and different losses of students and the community represented imminent human-related issues. Consequently, communication was also essential to locating team members when wireless communications were absent during the crisis' 1st weeks and for institutions

reopening when academic affairs through students and professors were needed. To achieve this, multiple mediums that sometimes are not usual in the accustomed status quo were used to disseminate the desired communications.

Through the perspective of how the general leadership style was in this climatological crisis, it can be deduced that objectives were primarily led in an autocratic style, not by imposing but by communicating the inherency of the problems and their solvency. When plans were determined, the execution of strategies persisted in transformative and situational leadership styles consisting of affiliation, democracy, and pace-setting approaches to guide team groups to achieve their tasks. Figure 6 presents a summative rationale of the overall strategic reasoning of leadership in determining objectives and strategies, with the required multifaceted communications and risks and issues assessment during the plans' execution.

Chapter 5: Discussion, Conclusions, and Recommendations

This qualitative study aimed to explore the crisis leadership in executing action plan strategies in Puerto Rico higher education from the experiences of critical administrators in two academic units of post-secondary education, leading to the aftereffects of a climatological crisis caused by Hurricane Maria. Through an in-depth analysis of the experiences of these leaders restoring the everyday operations of their institutions after a climatological crisis, emerging codes provided a scope of thematical insights on how the leadership was executing strategies for restoring operations. Moreover, it provided valuable insights into how higher education leaders, in a historically critical moment caused by extreme hydrological phenomena, inspired and guided their constituents to a pathway to restoration, security, and hope in the resiliencies of drastic changes.

Interpretations of the Findings

The findings of these studies are based on the coding of the data obtained in interviews and categorized into common themes. The conceptual framework supporting this study is based on Bass's (1990) transformational leadership theory (1990) and Hersey and Blanchard's (1969) situational leadership theory.

Key Finding 1: Promotion of Trust and Security Through Multiple Leadership Styles

Administrators in Puerto Rican higher education promoted a culture of trust and security to execute their different recovery strategies through multiple leadership styles effectively. The leadership styles passed from transformational to situational leadership

in the different phases of action plans. In terms of transformational leadership, 100% of participants described the need to be transformational leaders leading by their examples and actions to accomplish determined objectives. However, in the conceptual framework, autocratic leadership was not contemplated. According to Sajjan (2023), autocratic leaders tend to control decisions by clear communication, structure, and an evident vision in their communication. Following this theory, 50% of leaders- 6 out of 12 participants- expressed the need to be autocratic leaders to transform attitudes, mainly when determining the main objectives. There was a call to communicate an inherency of a problem and the urgency of solvency, which needed and was, in some instances, appreciated among followers and served to have a pathway to follow. It could be interpreted that in times of climatological crises, with little or non-existent precedents as happened in Puerto Rico higher education when all types of communications collapsed island-wide, there was a transformative autocracy to ignite the general unawareness that required designated strategic leaders to set the pathway to follow in the action plan.

When teamwork was onboard to execute strategies, academic, operational, and financial leaders managed multiple situational leadership styles to implement the different strategies. Situational leadership is an approach that often adapts to team members' specific needs to achieve goals (Cherry, 2023). In executing strategies, leaders related to affiliative, democratic, pace-setting, and coaching leadership roles to achieve their primary goals. This aligns with Safi and Burell's (2007) insights in the literature review when stating the non-linear underlying principle in situational leadership that

provides multiple scenarios and problem-solving styles, depending on followers' maturity in executing strategies.

In times of climatological crisis, leadership styles, roles that propel effective execution, authority based on trust, and the development of the best competencies to achieve goals are necessary for the execution of effective execution in action plans (Bishop et al., 2015; Chepul, 2020; McCullar, 2011; Rollo & Zdziarski, 2007; Ulmer et al., 2007). This rationale was interpreted and aligned with the experiences of Puerto Rico's higher education leaders, who transformed and situated the best leadership practices to restore the operations of their respective institutions effectively.

Key Finding 2: Multifaceted Crisis Communication Styles

In terms of communications, through crisis management leading to the after-effects of Hurricane Maria, leaders situated multi-faceted communication channels throughout the different stages, outlining and restoring the everyday operations of their institutions. It aligns with Coombs's (2007) situational crisis communication theory regarding the different strategies targeted to disseminate critical messages in times of crisis. In this case, the usual or typical channels that required internet use were gradually added once electricity was restored in the different locations. Nevertheless, many basic forms of communication, such as in-person visits, meetings, billboards, and calls, were needed throughout the crisis phase's different early stages in the planning phases of action plans.

Hurricane Maria showed Puerto Rico administrators in higher education that the absence of electricity and wireless communications connectivity island-wide, specifically

in the early stages of planning, made administrators rethink and return to the basic forms of communication. In this historical moment, a hurricane was the cause of such a devastating outcome. However, habitual technological communications could collapse in some societies, not only because of other extreme hydrological phenomena but also because of earthquakes or natural disturbances of geomagnetic storms, which could completely disrupt our society and higher education.

Key Finding 3: The Value of Resilience and Security in Risks and Issues Management

Regarding risk and issues management, administrators showed resilience in readapting their spaces, academic life, and support centers to safeguard the most critical value for their communities: security. These actions promoted the recruitment and the safe retention rate of students, which is essential in the subsistence of tuition-based institution collection and represented an impending risk to institutions in the data collection.

There were no risk management standards leaders could have named regarding the crisis management planning caused by Hurricane Maria; leaders seemed to scan risks in their precise contexts. This concurred with York (1999) when stating that the best risk management plans are situated within the specific needs of the internal and external organizations' multilevel infrastructure.

However, many lessons in post-crisis phases ignited the renovation of curriculums with entrepreneurship and leadership courses to advocate social projects and lead them. The literature review emphasized the crucial role of innovation in shaping the

organizational culture of higher education institutions following crises. Scholars like Behling (2014) and Buller (2015) have argued that changes during such challenging times can serve as opportunities for institutional leaders to educate stakeholders and promote a stronger embrace of their institutional identity. Administrators also concurred that all invested significantly in equipping spaces with partial to complete connections to electric plants in case of power outages. These actions show the power of resilience and readaptation in susceptible scenarios of climatological crises.

Key Finding 4: Institutions as Hubs for Peace and Support

In times of climatological crisis, community engagement plays a pivotal role in fostering resilience and sustainable solutions. Puerto Rico higher education leaders showed that active involvement with their localities promoted awareness and collective action for restoring operations and proved institutions as hubs for peace and support. Hurricane Maria showed leaders in Puerto Rico's higher education that communities can address critical outcomes occasioned by global warming and climate change with institutions as pillars of social cohesion and support through collaborative efforts.

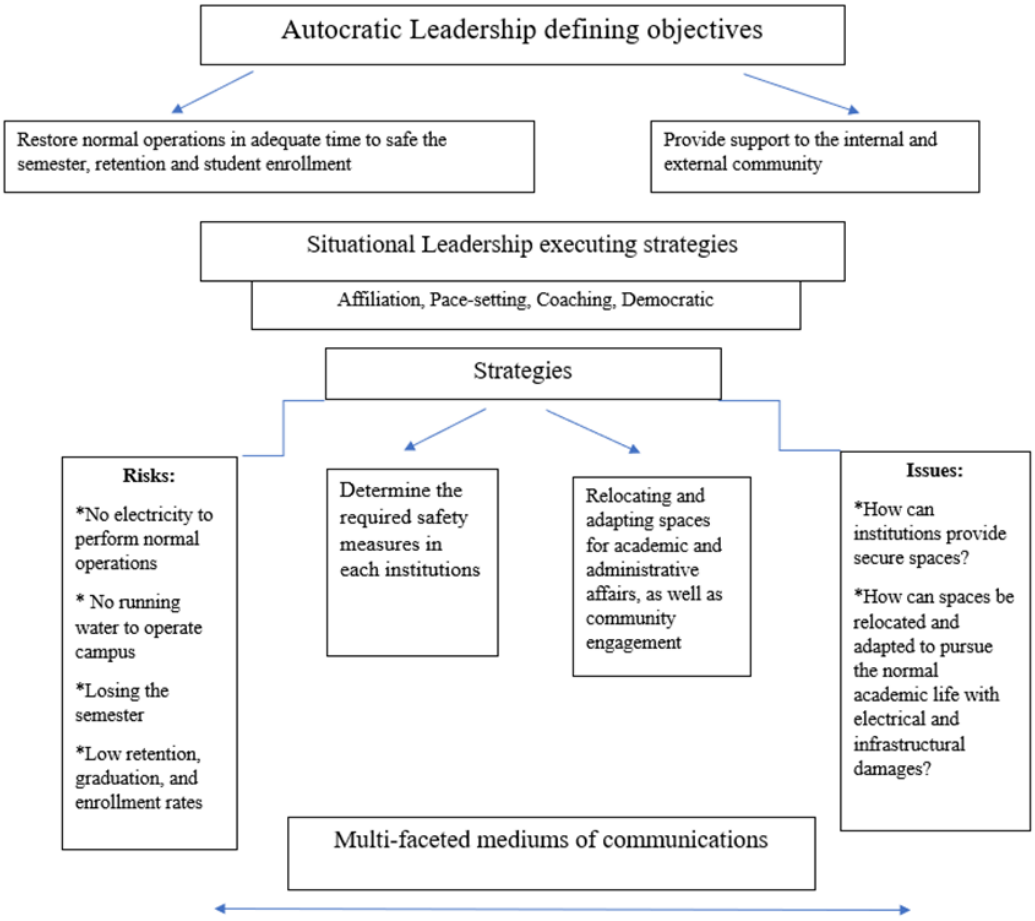
While the literature review did not initially anticipate community engagement as a central aspect of the investigation, it emerged organically during the interview process. The findings of the study align with McCullar's (2011) assertion that crises can catalyze unity and cooperation within an institution, highlighting the significance of community engagement as a response to such challenges.

Interpretation of the Strategic Reasoning of Leadership

Figure 6 presents a summative rationale of the overall strategic reasoning of leadership in determining objectives and strategies, with the required multifaceted communications and risks and issues assessment during the plans' execution. In the aftermath of Hurricane Maria, the comprehensive crisis management plan was designed with a multifaceted approach, leveraging authoritarian and situational leadership strategies.

Figure 6

Summative Rationale of the Overall Strategic Reasoning



Authoritarian leadership played a crucial role in setting clear objectives and ensuring a focused response to immediate threats, while situational leadership provided flexibility in adapting strategies to evolving circumstances. Incorporating risk and issues management, particularly emphasizes security and readaptation, further enhanced the plan's resilience, supported by diverse communication channels to facilitate rapid information dissemination and coordination across stakeholders.

Limitations of the Study

One significant limitation of this research is the exclusive focus on administrators in examining leadership in crisis management, leading to the after-effects of Hurricane Maria. The study primarily draws insights from the perspectives of organizational leaders, avoiding valuable input from faculty and students who constitute integral components of the educational system. This specific focus from the administrator’s perspective limits the holistic understanding of the crisis response dynamics within educational institutions, as the experiences and perspectives of administrators may not fully capture the varied and nuanced impacts on different stakeholders.

Another noteworthy limitation is the hesitancy among participants to provide documented evidence of their decision-making processes during the crisis. This reluctance may stem from concerns about potential repercussions or a desire to present their actions in a more favorable light. As a result, the study relies heavily on self-reported narratives, introducing a potential bias in the data. The absence of concrete documentation hinders the ability to validate and triangulate the information gathered, impacting, in some ways, the robustness and reliability of the findings.

Moreover, a notable limitation lies in the delay observed in participants confirming their participation in the study. This delay may indicate the sensitivity surrounding the topic, with participants potentially grappling with the emotional toll of revisiting their experiences during a crisis. The prolonged confirmation process adds an element of uncertainty to the research timeline, potentially affecting the study's timeliness and the ability to capture real-time reflections on leadership in crisis management. Despite efforts to mitigate this delay, it remains a factor that should be considered when interpreting the findings and generalizing them to broader contexts.

Recommendations

Building on the strengths of this study, it is crucial to acknowledge and leverage the recounted experiences of leaders navigating an unprecedented catastrophe with no historical precedent. The narrative of leaders functioning in a precise moment of history, marked by extreme infrastructural challenges, prevalent poverty, and profound uncertainty in their communities, offers valuable insights into the dynamics of crisis leadership. The study underscores the role of autocracy infused with humanity as a potent transformational leadership motor in determining the course of action in crisis management plans, providing a roadmap for future crisis managers. As such, future research and leadership training programs should emphasize cultivating humane autocratic skills and recognizing the unique demands of crisis management in contexts of extreme adversity.

Furthermore, the study highlights the significance of community engagement as a propeller of resilience during times of crisis. The community's active involvement in the

recovery process fosters a sense of ownership and solidarity and contributes to the overall effectiveness of crisis response strategies. Recommendations stemming from this strength include developing and implementing community-centric crisis management frameworks. Leaders and policymakers in higher education should explore avenues to strengthen ties between communities and decision-makers, fostering a collaborative approach that ensures the integration of local knowledge and resources into crisis plans. Regarding situational leadership in climatological crises, future research should explore how a combination of pacesetting, affiliation, and coaching skills can be strategically employed in varying crisis contexts. Understanding the synergies and trade-offs between these leadership styles in different crises (natural disasters, public health emergencies, etc.) can provide a more comprehensive guide for leaders, including higher education administrators.

Nevertheless, considering the limitations identified in the study, it is recommended that future investigations adopt a multi-sectorial approach, incorporating perspectives from various stakeholders. While focusing on leaders provides a valuable lens, a more comprehensive understanding of the overall leadership in executing climatological plans can be achieved by including insights from faculty, students, and other relevant community members. This multi-faceted approach will help triangulate the nuances of crisis management and provide a more holistic view of the decision-making processes and their impacts. Collaborative efforts across sectors can enhance the effectiveness of climatological plans by considering diverse perspectives and fostering a more inclusive and well-rounded approach to crisis leadership.

Implications

The discoveries in the aftermath of Hurricane Maria from the experiences of higher education leaders underscore the significance of disseminating diverse leadership styles during the planning phases of crisis management. By understanding and promoting various approaches, institutions can build leadership teams with skills tailored to different crisis scenarios. This inclusivity ensures a more adaptable and resilient response, addressing the community's diverse needs. Recognizing and valuing multiple leadership styles contributes to a more just and equitable approach to crisis management, emphasizing the importance of diversity in leadership development programs.

In terms of communications, the insights of this study collected from higher education administrators leading strategies post-Hurricane Maria reveal the transformative power of multi-faceted communication strategies. By effectively utilizing diverse channels such as returning to as billboards, radio messages, daily in-person meetings, telephone calls, home visits, emails, and eventually social media, administrators fostered a sense of unity and shared purpose among stakeholders. This emphasis on inclusive communication facilitated the dissemination of critical information and empowered the community, encouraging active participation in the rebuilding process. These findings underscore the importance of comprehensive communication strategies in promoting social change and justice during and after crises.

Concurrently, this study reveals the positive impact of well-defined policies in safeguarding educational institutions during and after crises. Administrators who had established and implemented crisis-responsive policies demonstrated higher

organizational resilience. These policies, encompassing disaster preparedness, resource allocation, and community engagement, act as foundational elements in promoting social justice by ensuring that institutions are better equipped to protect the interests and well-being of all stakeholders, especially vulnerable populations. The integration of these policies reflects a commitment to equity and justice in the face of adversity.

Finally, the insights gained from higher education administrators' post-Hurricane Maria leadership emphasize the importance of policies that enhance security and resilience. Security measures, such as solid infrastructure planning and risk assessments, contribute to the physical safety of individuals and assets. Concurrently, policies fostering resilience, including mental health support and community engagement initiatives, contribute to the community's overall well-being. These dual-focused policies address the broader spectrum of challenges posed by crises, aligning with principles of social justice by prioritizing the security and resilience of all community members, particularly those most vulnerable.

Conclusion

The comparative case study on climatological crises in Puerto Rico's higher education, focusing on the aftermath of Hurricane Maria, delivers a resounding message on the transformative capacity of resilience, diverse leadership styles, and robust community engagement. In the face of unprecedented challenges, the administrators emerged as resilient leaders, demonstrating an unwavering commitment to rebuilding and fostering a sense of normalcy. The study underscores that resilience is not merely a reaction to adversity but a proactive force that shapes and informs strategic decision-

making, laying the foundation for sustained recovery and growth. The administrators' ability to navigate complex crises with agility and determination is an inspirational model for educational leaders globally, highlighting resilience's catalytic role in the aftermath of natural disasters.

Moreover, the study illuminates the dynamic interplay of multiple leadership styles within crisis management. Administrators showcased a versatile range of leadership approaches, blending elements of autocracy, affiliation, and coaching to address the multifaceted challenges presented by the climatological crisis. This diversity in leadership styles reflects adaptability and speaks to the importance of recognizing and harnessing a spectrum of skills to respond to crises effectively. The findings emphasize that a one-size-fits-all leadership approach is insufficient in the face of complex challenges, encouraging institutions to cultivate a leadership cadre with a rich tapestry of skills to successfully navigate the intricacies of crises.

Perhaps most crucially, the study illuminates the integral role of community engagement as a linchpin for effective crisis management. The administrators' emphasis on inclusive communication and collaborative decision-making fostered a sense of unity, empowering the community to participate actively in the recovery process. The study sends a compelling message about the transformative power of communities when they are engaged as active partners in rebuilding efforts. It underscores that sustainable recovery from crises is not solely a top-down process but a collective endeavor where the strength of a community is harnessed to drive meaningful change. The study serves as a beacon, guiding educational institutions worldwide to prioritize resilience, embrace

diverse leadership approaches, and foster robust community engagement for a more just and resilient future in the wake of climatological crises.

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Appendix A: Walden University Institutional Review Board Approval

From: IRB <irb@mail.waldenu.edu>
Sent: Friday, September 30, 2022 5:49 PM
To: Aniello Alberti <aniello.alberti@waldenu.edu>
Cc: Lupo, Crystal <crystal.lupo@mail.waldenu.edu>; IRB <irb@mail.waldenu.edu>
Subject: IRB Approval Granted, Conditional upon Partner Approval - Aniello Alberti

Dear Aniello Alberti,

This email is to notify you that the Institutional Review Board (IRB) has approved your application for the study entitled, "The Concept of Leadership at the Face of Climatological Crisis: A Comparative Case Study of Puerto Rico Higher Education," conditional upon the approval of the research partner, as documented in a signed letter of cooperation, which will need to be submitted to the Walden IRB once obtained. You may not commence the study until the Walden IRB confirms receipt of that signed letter of cooperation.

Your approval # is 09-30-22-0673287. You will need to reference this number in your dissertation and in any future funding or publication submissions. Also attached to this e-mail are the IRB approved consent forms. Please note, if these are already in an on-line format, you will need to update those consent documents to include the IRB approval number and expiration date.

Your IRB approval expires on September 29, 2023 (or when your student status ends, whichever occurs first). One month before this expiration date, you will be sent a Continuing Review Form, which must be submitted if you wish to collect data beyond the approval expiration date.

Please note that this letter indicates that the IRB has approved your research. You may **NOT** begin the research phase of your doctoral study, however, until you have received official notification from the IRB to do so. Once you have received this notification by email, you may begin your data collection. Your IRB approval is contingent upon your adherence to the exact procedures described in the final version of the IRB application materials that have been submitted as of this date. This includes maintaining your current status with the university. Your IRB approval is only valid while you are an actively enrolled student at Walden University. If you need to take a leave of absence or are otherwise unable to remain actively enrolled, your IRB approval is suspended. Absolutely NO participant recruitment or data collection may occur while a student is not actively enrolled.

If you need to make any changes to your research staff or procedures, you must obtain IRB approval by submitting the IRB Request for Change in Procedures Form. You will receive confirmation with a status update of the request within 10 business days of submitting the change request form and are not permitted to implement changes prior to receiving approval. Please note that Walden University does not accept responsibility or liability for research activities conducted without the IRB's approval, and the University will not accept or grant credit for student work that fails to comply with the policies and procedures related to ethical standards in research.

When you submitted your IRB application, you a made commitment to communicate both discrete adverse events and general problems to the IRB within 1 week of their occurrence/realization. Failure

When you submitted your IRB application, you a made commitment to communicate both discrete adverse events and general problems to the IRB within 1 week of their occurrence/realization. Failure to do so may result in invalidation of data, loss of academic credit, and/or loss of legal protections otherwise available to the researcher.

Both the Adverse Event Reporting form and Request for Change in Procedures form can be obtained on the Tools and Guides page of the Walden website: https://academicguides.waldenu.edu/research-center/research-ethics/tools-guides

Doctoral researchers are required to fulfill all of the Student Handbook's Doctoral Student Responsibilities Regarding Research Data regarding raw data retention and dataset confidentiality, as well as logging of all recruitment, data collection, and data management steps. If, in the future, you require copies of the originally submitted IRB materials, you may request them from Institutional Review Board.

Both students and faculty are invited to provide feedback on this IRB experience at the link below:

http://www.surveymonkey.com/s.aspx?sm=qHBJzkJMUx43pZegKlmdiQ_3d_3d

Sincerely,
Libby Munson
Research Ethics Support Specialist
Research Ethics, Compliance, and Partnerships
Walden University
100 Washington Avenue South, Suite 1210
Minneapolis, MN 55401
Email: irb@mail.waldenu.edu
Phone: (612) 312-1283
Fax: (612) 338-5092

Appendix B: Confidentiality Agreement

CONFIDENTIALITY AGREEMENT

Name of Signer:

During my activity in collecting data for this research: The Concept of Leadership at the Face of Climatological Crisis: A Comparative Case Study of Puerto Rico Higher Education". I will have access to information, which is confidential and should not be disclosed. I acknowledge that the information must remain confidential, and that improper disclosure of confidential information can be damaging to the participant.

By signing this Confidentiality Agreement, I acknowledge and agree that:

1. I will not disclose or discuss any confidential information with others, including friends or family.
2. I will not in any way divulge, copy, release, sell, loan, alter or destroy any confidential information except as properly authorized.
3. I will not discuss confidential information where others can overhear the conversation. I understand that it is not acceptable to discuss confidential information even if the participant's name is not used.
4. I will not make any unauthorized transmissions, inquiries, modification or purging of confidential information.
5. I agree that my obligations under this agreement will continue after termination of the job that I will perform.
6. I understand that violation of this agreement will have legal implications.
7. I will only access or use systems or devices I'm officially authorized to access, and I will not demonstrate the operation or function of systems or devices to unauthorized individuals.

Signing this document, I acknowledge that I have read the agreement and I agree to comply with all the terms and conditions

By signing this Confidentiality Agreement, I acknowledge and agree that:

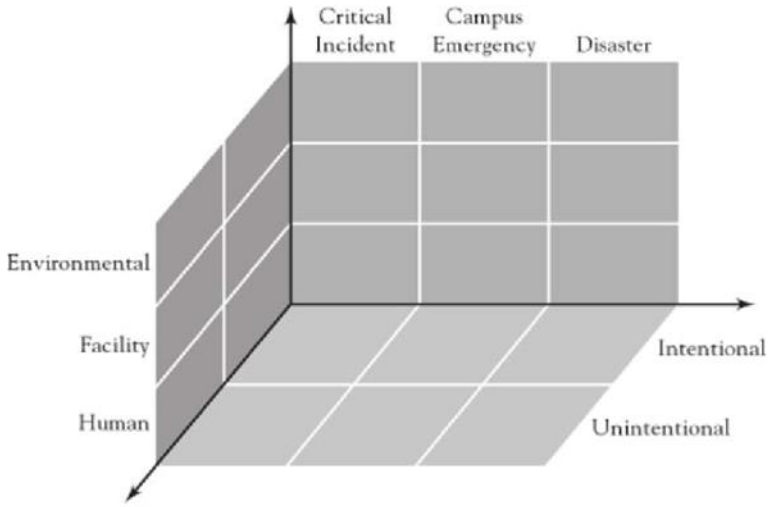
1. I will not disclose or discuss any confidential information with others, including friends or family.
2. I will not in any way divulge, copy, release, sell, loan, alter or destroy any confidential information except as properly authorized.
3. I will not discuss confidential information where others can overhear the conversation. I understand that it is not acceptable to discuss confidential information even if the participant's name is not used.
4. I will not make any unauthorized transmissions, inquiries, modification or purging of confidential information.
5. I agree that my obligations under this agreement will continue after termination of the job that I will perform.
6. I understand that violation of this agreement will have legal implications.
7. I will only access or use systems or devices I'm officially authorized to access, and I will not demonstrate the operation or function of systems or devices to unauthorized individuals.

Signing this document, I acknowledge that I have read the agreement and I agree to comply with all the terms and conditions stated above.

Signature: **Date:**

Appendix C: Adapted Crisis Matrix Model

This appendix includes the Adapted Crisis Matrix Model employed in the study to analyze institutional crisis response levels. The model is an adaptation of the framework proposed by Zdziarski (2006) in the context of educational environments facing crises.



This model, adapted from Zdziarski (2006), delineates the rationale of a crisis matrix within institutional environments, classified into three impact groups. It is derived from *Campus Crisis Management: A Comprehensive Guide to Planning, Prevention, Response, and Recovery* (p. 355), by Zdziarski, E.L., II, Dunkel, N.W., & Rollo, J.M., & Associates, 2007, Jossey-Bass. The adaptation and use of this model are intended for educational purposes under fair use guidelines, anequest for permission to utilize and adapt the content is currently pending.