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Exploring the use of social media to enhance public engagement during times of crisis in the city of Cape Town

by

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DECLARATION

I, **Chumani Waxa,** declare that the contents of this dissertation represent my own unaided work, and that the dissertation has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

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Signed   **Date**

ABSTRACT

This study examined the use of social media to enhance public engagement during the water crisis in Cape Town, South Africa. It emerged from the water crisis experienced in Cape Town in the year 2017 which threatened water availability to households in the city. From the early stages of the crisis until its resolution, public authorities engaged local households using different platforms to disseminate various pieces of information. These included traditional platforms such as newspapers, radio, television, and community meetings, as well as modern platforms comprising primarily social media. The results reveal that the improved features of modern platforms make them more desirable than traditional platforms. However, in times of crisis, such as the water crisis, local authorities should be more decisive about which platforms to use since information needs to be disseminated quickly and with broad reach. There is limited knowledge regarding whether modern platforms such as social networking sites are reliable for public engagement during such times. Thus, this study used the technology affordance theory to explore the extent to which local authorities relied on social media to engage the public during the water crisis in Cape Town. In addition, the study applied the attribution theory to gain insight regarding the different causes ascribed to the water crisis by the local authorities and those ascribed to it by the public. Using a mixed methods approach, this study engaged affected communities and local authorities. Qualitative data were gathered using key informant interviews and data from Twitter, while a household survey was conducted to obtain quantitative data. The key findings reveal that local authorities rely significantly on social media for public engagement. Moreover, the findings show that there was sustained communication of important information between local authorities and the public during the water crisis. In addition, the findings indicate that many people are yet to use social media to engage local authorities. These findings are significant in that it may contribute towards further enhancement of communication between local authorities and the public, particularly in terms of the application of social media during similar public crises.

Keywords: City of Cape Town, communication, public engagement, social media, water crisis

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DEDICATION

In loving memory of my late Grandmother, Mantombi Emily Waxa, this is for you Jambase,

ndiyabulela.

GLOSSARY OF ACRONYMS

COCT	City of Cape Town
DA	Democratic Alliance
E-Tolls	Electronic Tolls
GM	General Motors
RQDA	R Qualitative Data Analysis
SA	South Africa
SCCT	Situational Crisis Communication Theory
TA	Theory of Attribution
URLs	Uniform Resource Locators
USA	United States of America

CONTENTS

LIST OF FIGURES

LIST OF TABLES

SUBMISSION TO JOURNALS

Parts of this work have been reworked and submitted for publication in the *Information Polity* journal. It is currently under review.

CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND AND CONTEXT

As a developing country, South Africa has faced numerous challenges in the past two decades (Ramsamy, 2018). These challenges have ranged from economic turbulence, environmental challenges, to sociopolitical challenges including corruption and rampant crime (Casale & Posel, 2011:308). While these challenges are often discussed at a national level, different cities in South Africa have endured these challenges to different degrees and at different times. Over the years, Cape Town has experienced significant population growth as more people flock to the city seeking a better standard of living and a more urban environment (Horn, 2018).[1] This growth in population stems from people migrating to Cape Town from different provinces of South Africa, other parts of Africa, and from all over the world (Kingma, 2018). It is undeniable that population growth in cities inevitably adds pressure to infrastructure (e.g. housing and health facilities) and natural resources such as consumable water (Pettersson, 2018:17) which in turn presents challenges to urban planners and local authorities of deciding what aspects of urban development to assign the highest importance.

In recent years, one challenge which appears to be of major concern in cities is water security (Koop & Leeuwen, 2017). As a result of drought, related to climate change, water availability in cities globally is reducing (Ray & Shaw, 2019) and the issue of water shortages in cities has emerged as a global challenge. For instance, Chennai in India, as well as Cape Town and many other cities in South Africa have encountered critical water shortages within the last 6 years (Krueger, Borchardt, Jawitz, Klammler, Yang, Zischg & Rao, 2019; Arcanjo, 2018) while cities such as Harare in Zimbabwe also face serious water shortages (Nhubu, Mbohwa & Muzenda, 2019). The causes of these water shortages have been debated in many studies with several different arguments being put forward (Rugumalila & Gibbs 2015; Muller, 2018; Di Baldassare, Wanders, AghaKouchak, Kuil, Rongecroft, Veldkamp, Garcia, Van Oel, Brein & Van Loon, 2018). Floerke and Schneider (2018) argue that the increase in water shortages in cities is a result of

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[1] Cape Town is a city in the western part of South Africa ranked to be one of the top cities in Africa and globally. It is a beautiful city with a rich history starting from the European encroachment which resulted in numerous social divisions including those of class, ethnicity, gender and religion (Worden, Van Heyningen & Bickford – Smith, 2004:7). It now boasts with its tourist attraction destinations such as the famous Table Mountain and Robben Island.

climate change while Muller (2018) puts forward an argument that water shortages are the result of human actions. Regardless of the reasons provided for the water shortages it is evident that the effects are universally undesirable (van Wilgen & Wannenburgh, 2016). Unfortunately, these water shortages are expected to continue as no concrete solutions are currently available, coupled with the complexity of hydrological conditions and global warming which cause the situations to worsen (Onyenankeya, Onyenankeya & Osunkunle, 2019:55-65).

Cities have local authorities whose mandates include managing the various challenges the city faces (Madumo, 2015:158). As part of this process, local authorities engage with citizens to consult regarding the issues faced by their communities and to hear their demands, as well as to solicit ideas and provide critical information relevant to the situation and involve the community in the planning process when deciding how to address the concerns and demands they bring (Aykroyd, 2012:8). In the context of crises such as Cape Town's water crisis, public engagement could be utilised by local authorities to create awareness of the situation, such as distributing information pertaining to dam levels (Pettersson, 2018:30). It could also be used to distribute water restriction schedules and establish new efforts to avert the crisis. However, public engagement is complex, particularly during crises. In the context of the Cape Town water crisis, Enqvist and Ziervogel (2019) argue that public engagement was controversial.

The dynamics of public engagement have changed significantly over the years due to numerous factors (Thomas, Hardy, Lazrus, Mendez, Orlove, Riviera-Collazo, Roberts, Rockman, Warner & Winthrop, 2019). In the past, for instance, societal dynamics in cities have changed drastically, with city populations increasing significantly and becoming notably more diverse (Worden, Van Heyningen & Bickford–Smith, 2004:7). As a result, local authorities are also finding the need to transform their public engagement approaches to suit the contemporary order of engagement which is mostly in virtual spaces. Once considered the traditional method of public participation, public, town-hall style meetings have become less common (Kim, 2015:8). Furthermore, people are no longer prepared to take hours off their days to attend traditional public participation meetings, particularly during this type of crisis which necessitates immediate action. Under normal circumstances the biggest drawback to this method of public participation is the limitation it imposes in terms of time and space (Li, 2016:71).

Parallel to this, the advancement of technology allows for the use of new methods and technologies that can more easily reach wider communities (Giglitto, Ciolfi, Claisse & Lockley,

2019) to potentially solve the problems posed by more traditional public engagement practices. Currently, social media networks are being used to organise events, communicate information, solicit membership, distribute petitions, and share documents, photographs and videos (Rania, 2016:36). In this way, social media platforms are presenting government departments with a potential alternative to engage the public (Lee & Kwak, 2012).

There are many definitions of social media. For instance, Badawy & Hashem (2015) define social media as a platform that gives people an opportunity to be content creators, controllers and transparent users, in which the content once shared, creates conversations where all of the social media users can engage and interact with all posts. Zheng, Aung, Erdt, Peng, Sesagiri, Raamkumar & Theng, (2019) describe social media as a new platform used by scholarly journals for the purposes of disseminating and evaluating research outputs. Amedie (2015:6) defines social media as "a new forum that brings people together in a virtual platform to exchange ideas, connect with, relate to, and mobilize for a cause, seek advice, and offer guidance". For the purposes of this study, social media refers to an online platform which facilitates communication in a social way and in a virtual environment. These platforms are accessible through the Internet and allow for the creation and dissemination of information quickly to large populations in a cost-effective way (Kim, 2015:3).

Despite the affordances of social media, there are many concerns on the use of the tools for public engagements (Gibbs, Rozandi & Eisenberg, 2013). For instance, while there is evidence of social media's potential to reach large populations, there are conflicting views and limited empirical evidence regarding the usefulness of these tools during times of crises (Kavanaugh, Fox, Sheetz, Yang, Li, Shoemaker, Natsev & Xie, 2012). Despite such controversies, the use of social media has not decreased as a means for corporate communication nor during times of crisis (Lyon & Montgomery, 2013). With all this as context, the current study aims to explore the use of social media for public engagement during the water crisis in Cape Town. For reference, the study will also bring forth other countries that have used social media for public engagement during a crisis.

1.2 PROBLEM STATEMENT

This research explores public engagement between local government and its residents over social media networks during the water crisis in Cape Town. If managed poorly, the water crisis could have potentially erupted into a disaster. For Cape Town local authorities, the water crisis had to be managed with priority as water scarcity poses a threat to the population (Pettersson, 2018:18).

The first step towards minimizing the risk of a disaster was appropriate public engagement to relay critical information comprising the scheduled water closure, water restrictions, and the sharing of general information that was necessary during the water shortage. Local authorities had diverse options when it came to choosing platforms for public engagement. Empirical evidence suggests that they made use of several different communication channels to facilitate the sharing of important information. Although local authorities adopted multiple public engagement channels, there is a growing belief that social media played a significant role and will eventually become the primary tool for public engagement (Alexander, 2016). Despite this, there is currently only anecdotal evidence to support these claims. Thus, it is unclear how the manner in which the City of Cape Town used social media contributed to the mitigation of the crisis. Furthermore, there is limited knowledge as to the nature of conversations which social media enables and by extension, the extent to which social media can be relied upon as a tool for public engagement during specific crises.

The problem discussed here emerges as the result of several characteristics of social media. Firstly, for authorities to effectively utilise social media it requires investment in resources such as time and personnel. Secondly, there are no established metrics for measuring the 'success' of social media use. Although the City of Cape Town eventually contained the water crisis, it remains difficult to determine the extent to which social media tools specifically contributed towards public engagement during the crisis. As a result, should the crisis recur, there is no definitive way of knowing the extent to which social media should be used, and how useful these platforms will be for crisis communication compared to other forms of public engagement.

1.3 RESEARCH QUESTIONS

The primary research question in this study is:

1. How, and in what ways, did City of Cape Town authorities use social media platforms for public engagement during the water crisis?

The primary research question is guided by the following sub-questions:

    i.   What methods are used by local authorities for public engagement?
    ii.   What opportunities and challenges exist in the use of social media for public engagement?
    iii.   What role can social media play in public engagement?

1.4 RESEARCH OBJECTIVES

The primary aim of this study was to establish how the city of Cape Town used social media platforms for public engagement during the water crisis. This aim is guided by the following objectives:

    i.   To determine the methods used by local authorities for public engagement.
    ii.   To explore the opportunities and challenges that exist in the use of social media for public engagement.
    iii.   To explore the role that social media plays in public engagement during crisis times.

1.5 SIGNIFICANCE OF THE STUDY

This study has both practical and theoretical significance. Currently, many cities in South Africa and other African countries are experiencing numerous challenges including water shortages. Addressing these challenges requires a robust approach to public engagement. As Enqvist and Ziervogel (2019) indicate, existing communication processes are poor. Through its findings, this study hopes to facilitate local authorities to establish whether social media can be relied upon for public engagement during times of crisis. In addition, the study makes the following contributions:

- Deliver evidence-based information for local government organisations to use to identify and implement best practices in using social media platforms towards the improvement of citizen participation.

- The realisation of this puts local government at an advantage to benefit its community in that, it will also ensure that public participation platforms are open daily, through the accessible communication channels of social media platforms, as opposed to the traditional monthly community meetings in a single physical location. The study plays a vital role in the contribution of theoretical understanding of how social networks are transforming relationships between society, local authorities, and residents, and how social media can help enhance the eight principles of Batho Pele which are Consultation; Service Standards; Access; Courtesy; Information; Openness and Transparency; Redress and Value for Money.

- For the purposes of anticipated outcomes, this study will use the Situational Crisis Communication Theory which will provide the understanding, explanation, and prescribed actions for crisis communication which assist in protecting the reputation of the organization. For practice, the study will use the structural lenses of the attribution theory which will serve as the basis for explaining the relationship between crisis-response strategies and crisis situations. While there already exists a decent scholarship on the use of social media for public engagement, and in crisis times, this study provides an analysis of social media use during a specific and to some extent, a unique crisis. By doing so, the study contributes to the body of knowledge around public sector communication. Furthermore, the study makes use of emerging data collection techniques, namely web scrapping, and by so doing, it contributes to research methods within the public administration domain.

- In terms of its research methods, the current study applies innovative research methods, such as netnography, to extract data from the Twitter social network. Using open source software R. Techniques, the methods in this study could be applied to other challenges faced by the city such as energy shortages.

1.6 DISSERTATION STRUCTURE

This dissertation comprises five chapters. Chapter 1 provides an introduction to the study, the research problem, research questions and objectives, as well as the significance of the study. In Chapter 2 the theoretical framework is discussed on which the study is anchored. The study moves on to explore the research methodology, detailed in Chapter 3, before presenting the study findings in Chapter 4. The study concludes with Chapter 5 which provides a summary of the key findings, conclusion, and avenues for further research.

1.7 CHAPTER SUMMARY

This chapter discussed the background and context of the study, Cape Town was identified as the area of study. Furthermore, the problem statement was discussed, also showing how the problem was identified. The chapter also discussed the research questions and the research objectives of the study. In addition, the chapter discussed the significance of the study.

CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter discusses the theoretical frameworks on which this study is anchored as well as studies that relate to this study. This study focuses on the potential use of social media towards public engagement during times of crisis and adopts the Situational Crisis Communication Theory (SCCT), closely aligned to the Attribution Theory. This framework is selected because it provides the understanding and explanation of the instruments used for crisis communication. In addition, this study presumes that it is inevitable that during a crisis, institutions and individuals, collectively referred to as actors, blame or attribute the crisis to others. This study will therefore refer to the constructs of the Attribution Theory to determine whether this was the case during the Cape Town water crisis. In addition, the study builds on the Technology Affordances Theory to explore the potential of social media for public engagement during crisis. The use of multiple theories and/or frameworks in this study is premised on the complexity of the case under study which is further unpacked in detail in subsequent sections. In addition to presenting the theoretical framework, this chapter includes a literature review in which related studies are discussed. This was done to identify existing gaps within the literature and to situate the study in the ongoing discussions relating to the topic being investigated. In this study, the related studies examined pertain to urbanisation, crisis response, public engagement and social media.

2.2 THEORETICAL FRAMEWORK

Having clarified the terms used in the study, this section examines the theories and frameworks used in the study. Considering the complexity of the concepts under investigation, the study triangulates two selected theories to provide a holistic analysis of the study constructs: Situational Crisis Communication Theory (SCCT) and Technology Affordances Theory. Each is described below. The selected theories also influenced the selection of literature reviewed in the related studies section.

2.2.1 Situational Crisis Communication Theory (SCCT) and Attribution Theories (TA)

Kyhn (2008:23) states that the SCCT is designed to provide understanding, explanation, and prescriptive crisis communication. This is used to investigate how various elements in a crisis affect people's perceptions of a crisis and their reactions to it (Coombs & Holladay, 2011). Earlier discussions of this theory include Coombs (1995) whose main research area is crisis research with a focus on the development and testing of SCCT (Kyhn, 2008:24). According to van Rensburg, Conradie and Dondolo (2017), the SCCT assists management to make decisions such

as developing appropriate responses, not only after a crisis, but also during an ongoing crisis event. Cooley and Cooley (2011:205) indicate that the SCCT consists of the following core elements; the crisis situation, crisis response strategies, and a system for monitoring the crisis situation and the crisis response strategies.

The first of these core elements is the crisis situation which itself consists of three clusters. The first cluster is the crisis cluster which entails natural disasters, rumours, workplace violence and product tampering. In this cluster, a company is recognized as a victim (Zhou & Ki, 2018). The second cluster is the accidental cluster, entailing challenges, mega-damage, technical breakdown accidents and recalls. In this cluster the company is considered to have not intended this crisis in its actions. The third cluster is the preventable cluster entailing human breakdown accidents and recalls, organizational misdeed with or without injuries, and management misconduct. In this cluster, the company places people at risk, takes inappropriate actions and violates laws/regulations (Cooley & Cooley, 2011:205). Shepherd (2019) classified the Cape Town water crisis in the first cluster, referring to it as an environmental catastrophe, and the COCT municipality had no control over the unfolding disaster. On the other hand, Robins (2019:5) classified the Cape Town water crisis on the second cluster referring to it as a technical breakdown. They argue that "infrastructure is typically invincible until it breaks down" which according to the second cluster implies that the COCT in its actions did not intend the crisis. Rivas (2018) argues that the COCT water crisis was a result of mismanagement rather than a natural disaster and that the crisis was a result of misused appropriated funds for desalinated plants which would place the crisis in the third cluster.

The second core element of SCCT is a review of crisis response strategies (Coombs, 2017). The crisis response strategies found in this element are focused on repairing reputation and reducing negative effects. Dulaney and Gunn (2017:16) add that the SCCT has ten possible response strategies available to managers which are grouped into three postures, namely; deny, diminish and deal. The deny response strategy is a strategy that entails condemning the accuser (Triantafillidou & Yannas, 2020) and involves the organization confronting the person or group blaming them for the crisis. This occurs when the organization distances itself from the crisis (Siddiqui, Mehjabeen & Rahman, 2019). Lastly, scapegoat is where the crisis manager blames the supplier for the crisis (Antonetti & Baghi, 2019). The diminish response strategy includes the excuse and justification techniques. Excuse is where the organiation denies the intent to cause harm while justification is where the organization minimizes perceived damage (Cooley & Cooley

2011). Enqvist and Ziervogel (2019), argue that the COCT applied the denial strategy by distancing themselves from the sources of the water crisis and confronted residents on the excessive use of water. This view of the COCT's strategy was a result of their decision to shift away from the water governance approach of building new dams to meet growing water demands. In addition, they adopted a "block tariffs" approach where households who used water excessively would have to pay a higher rate per litre than those who used less water.

The SCCT has been widely applied in different types of crises as a communication strategy. For instance, Cooley and Cooley (2011:30) demonstrate how General Motors (GM), previously one of the United States of America's automotive industry giants, upon submitting to bankruptcy in 2008 applied the SCCT to respond to and control the crisis in which they habitually used the justification strategies. They justified their past failures in the marketplace and made reference to the communities that the company is involved and what it would take to build a profitable business. Furthermore, they used the "excuse strategies in which they placed the company as a part of a larger suffering economy. In addition, after a leak of customers' information at TJX in 2007, the SCCT was applied in response to the crisis and to control the possible risk to reputation. According to Lai (2010), the SCCT highlights people's perceptions of crisis, their response to the actions of crisis management, and audience response to the organization and its esteem during a crisis. It is on these merits that this study contends that the SCCT can be applied to investigate the water crisis in Cape Town. While the study acknowledges that every crisis is unique, it is prudent to suggest that the prescriptive guidelines offered by the SCCT are able to help crisis managers protect the organisation's assets and can assist managers in preparing for and responding to crisis (Dulaney & Gunn, 2017:16). The Attribution Theory (TA) offers the rationale between variables in SCCT. When an individual or organization is considered responsible for a crisis, the stakeholder will exude emotions such as anger (Kamau, 2016). Studies such as Coombs (2007) have found that during crisis, there is always an element of attribution and the TA suggests that the affected people will seek to find solace in attributing the crisis to the negligence of the organization prompting crisis response in defence of the organization's reputation (Sarkar, Sarkar, Mahinder, & KhudaBukhsh, 2020).

According to Martinko (2018), the TA primarily focuses on the causal explanation for outcomes. Such outcomes can be in the form of successes or failures and human nature dictates that people seek to establish the cause of the outcome. Furthermore, Shaver (2016) suggests that the TA

answers questions relating to people's opinions about other people or organisations. According to Grammer (2019), the water crisis could have been averted long before its occurrence. It was projected in 2007 that by 2015 Cape Town would experience water drought (Muller, 2018). A study of the Western Cape's water supply system in 2007 revealed the projected water shortage and conclusively expressed how demand management or the encouragement of the water conservation would not be sufficient to overcome the drought, projected to occur in 2015 (Grammer, 2019). According to the TA, the water crisis can be attributed to the negligence of those in power by not acting in time, to do all that was necessary to ensure that the water crisis did not materialise.

2.2.2 The Technology Affordances Theory

In addition to the theory focusing on crisis communication, the study also applied the Technology Affordances Theory to explore the potential and the limitations of using social media as part of crisis communication. According to Gaver (1991:80), affordances are "properties of the world defined with respect to people's interaction with it", in this study referring to virtual communication platforms i.e. social media. Using this definition, the study submits that it is possible to have different perceptions of the affordances. In relation to social media, studies have focused on different uses of social media such as communicating positive news (as well as incorrect information), marketing, and e-governance. In some cases, opportunities to use social media affordances have been overlooked (Manca, 2020). On the other hand, there are several cases in which social media has been perceived to have affordances but in fact did not. For example, for many years, individuals have attempted to use social media for regime change, such as democratic transitions and mobilizing protests but failed to achieve the desired outcomes (Munene & Magara, 2018). Therefore, it is prudent to suggest that by applying the Technology Affordances Theory depicted in Figure 2.1, it is possible to investigate the potential of social media during the crisis.
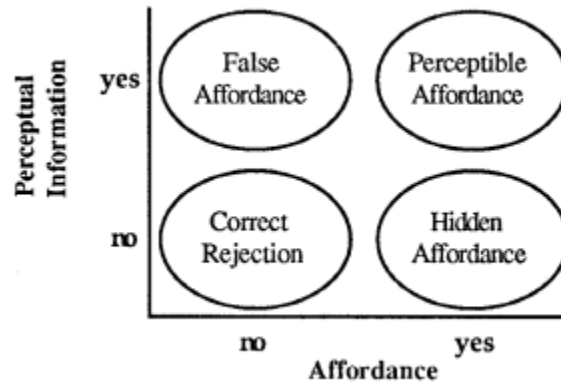
Figure 2. 1: Technology Affordance

Source: (Adapted from Gaver, 1991)

In the context of this study, the affordances theory is applied to explore the affordances of social media during crisis communication. Building on Hafezieh and Eshraghian (2017) the study explores social affordances from four main perspectives as follows in Table 2.1:

Table 2.1: Contextual explanation of technology affordances

Affordance dimension	Theoretical Explanation	Contextual explanation
Correct rejection:	When technology has no affordance and individuals/institutions have no perceptual information	It could be that social media was never intended for crisis communication and therefore was never used for such
Hidden affordance:	When technology has an affordance, but individuals/institutions have no perceptual information	It could be that social media was overlooked as a communication tool
False affordance	When technology has no affordance, but individuals/institutions have perceptual information	It could be that social media was never intended for crisis communication but was perceived to be.
Perceptible affordance:	When technology has an affordance and individuals/institutions have perceptual information	It could be that social media was effectively used for communication during the crisis

There are several social media platforms, for example, Twitter, Facebook and Instagram which are used by different groups of people for different purposes (Huang, 2019). In this study, the researcher explores in detail the reasons for the use or rejection of certain platforms by the City of Cape Town and its residents during the water crisis.

2.2.3 Summary of theories

Following the discussion of the frameworks individually, this section integrated the SCCT and Technology Affordances Theory. As other related studies suggest, both the SCCT and Technology Affordances Theory have inherent limits and weakness which makes it necessary to use a complementary theory in order to bring about balance and justification of the affordance of social media in different circumstances. The SCCT focuses on communication during crisis times, and to an extent, accommodates the use of social media for communication purposes. However, the SCCT does not look extensively into the technical affordances of social media. Thus, it is vulnerable to techno-determinism which makes assumptions about the affordances of technology. To overcome this challenge, the study argues that the Technology Affordance Theory which enables objective assessment of the potential of social media is applied thereby enabling the study to offer critique on what social media is and is not capable of. However, this theory also bears weaknesses in that the Technology Affordances Theory assumes that technology is used in similar environments whereas technology can also be used when there is no crisis. However, the ways in which it is used when there is a crisis and when there is no crisis are different. For example, social media is used for communication, but it is used to communicate very different things during a crisis compared to when it is used in non-crisis situations. The Technology Affordances Theory fails to account for the latter as it does not consider the context of communication and the situation.

2.3 URBANISATION AND RELATED PROBLEMS IN AFRICA

Developing countries are characterized by the rapid growth of cities within a particular country, attracting foreign investment and growth in the economy leading to great mobility in labour markets (Johannes & de Laiglesia Juan, 2009:35). Cape Town in South Africa is a city that has

developed significantly, with a population estimated at 2.06 million in 1998 to 3.42 million in 2008 and 4.43 million citizens in 2018.[2] The significant growth of Cape Town is a result of urbanization which attracts people seeking better opportunities and living standards, both in Africa and on a global level (Seto, Parnell & Elmqvist, 2013:16). Cape Town has also seen a significant rise in the number of students coming in from African francophone countries to study in local institutions (Rushwaya, Newlands & Mutambara, 2018). According to Cartwright (2015), the African continent has been going through a phase of urbanization in a rate that it has never been experienced before. It is estimated that 22 million people are added to Africa's cities every year and by the year 2056 nearly 1.34 billion people will be residing in African cities (Cartwright, 2015; Battersby, 2016). People migrate for various reasons; some migrate seeking employment opportunities which are not found in their areas of origin (Crawley & Blitz, 2019) while others relocate from rural areas due to poor living standards and infrastructure, seeking better living standards in these urban areas (Pettersson, 2018). Whatever the reason, Cape Town has become crowded and more diverse between the years 1998 and 2018 (Parker, 2018). The growing population presents several challenges for local authorities as informal settlements are established in many parts of Cape Town, leaving local authorities with a duty to intervene by providing housing and infrastructure (Pettersson, 2018).

In areas with high population and diversity, problems such as resource shortages are inevitable (Opeyemi, 2018). From the available studies, municipalities have struggled with the implementation of water justice in Cape Town due to the rapidly growing informal settlements (Enqvist & Ziervogel, 2019). Cape Town was soon faced with the crises of water shortages and transportation. The water levels of dams were running low due to a lack of rain throughout the winter season, and even summer rain was rare (Maxmen, 2018). Another crisis that emerged was that of transportation. As the population increased, and Cape Town became more and more urbanized, people were buying vehicles and subsequently the roads were no longer large enough to accommodate the increased number of vehicles. Public trains and busses were overcrowded and unrest was imminent. This was the beginning, and the cause of the transport crisis (Ferreira & Boschoff, 2014) but this study will only discuss the water crisis. Several studies have already been conducted regarding the Cape Town water crisis but many of them have focused on causes and solutions or have been conducted within the geographical discipline. Few, if any, studies have addressed the public engagement process pre-, during, and post-crisis.

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[2]Cape Town population 2020. Accessed February 29, 2020 from:
http://worldpopulationreview.com/world-cities/cape-town-population/

2.3.1 Water crisis in Cape Town

Due to climate change, drought cycles have increased over the past 20 years. Cape Town, like the rest of South Africa, experienced a significant drought in 2016, following severe water shortages (Sousa, Blamey, Reason, Ramos & Trigo, 2018). This can be attributed to the increased rate of urbanization and population growth in the city (Ziervogel, 2019). The water demand of the COCT is influenced by population growth and water losses (Lawens & Mutsvangwa, 2018). This growth in population had a great impact on the existing water supplies that were developed decades ago. Home to approximately four million people, Cape Town faced one of the most life-threatening crises of water shortage due to its dry climate in the years 2016 to 2018, coupled with high water consumption by the increased population (Parks, McLaren, Toumi & Rivett, 2019). According to Parks *et al* (2019), this rapidly urbanizing coastal city experienced three consecutive winters of low rainfall, the city's worst drought in over 100 years. This raised a new phenomenon termed "Day Zero" which signalled the day that the city would run out of potable water. The reservoirs supplying Cape Town were expected to drop below 13.5% of their total capacity, and 10% of the remaining water would be difficult to extract (Parks, 2019). To exert control and delay getting to "Day Zero" the City of Cape Town implemented water restrictions which included communal standpipes to residents which provided a limited supply of water where residents had to bring containers, and the installation of water meters limited to 25 litres per day, per person in their place of residence (Grammer, 2019). When the restrictions were first implemented, 60% of the population were using 87 litres of water per person per day on average (Parks *et al*, 2019).

Figure 2. 2: Communal standpipes

(**Source** : Parks *et al,* 2019)

Communal standpipes, shown in Figure 2.2, were one of the control mechanisms used by the City of Cape Town Metro to control the excessive use of water by limiting the amount of water residents were able to take home for consumption, particularly at such a critical stage. These standpipes were strategically placed to be within reach of everyone in that community and served the communities with clean, drinkable water with a height that could accommodate a container of up to 25 litres only. Members of communities in different parts of Cape Town would queue for water with their cans, bottles, and other containers so they could have water at home in case their taps ran dry (Grammer, 2019). Social media was buzzing as people were sharing the locations of standpipes, this information was also shared by the City of Cape Town on official social media pages. This assisted with the ease of locating the standpipes. Furthermore, these standpipes tell a story. People from different ethnic groups and diverse backgrounds queued up in the same lines for a common need. Figure 2.3 below displays the amount of water that was treated by the City of Cape Town per year in comparison to the growth of the city per year. It is evident from the graph that the population growth surpassed the required amount of water treated per year to sustain the population. The drought was therefore imminent and inevitable without the intervention of the municipality to institute water restriction (Luker & Harris, 2019).
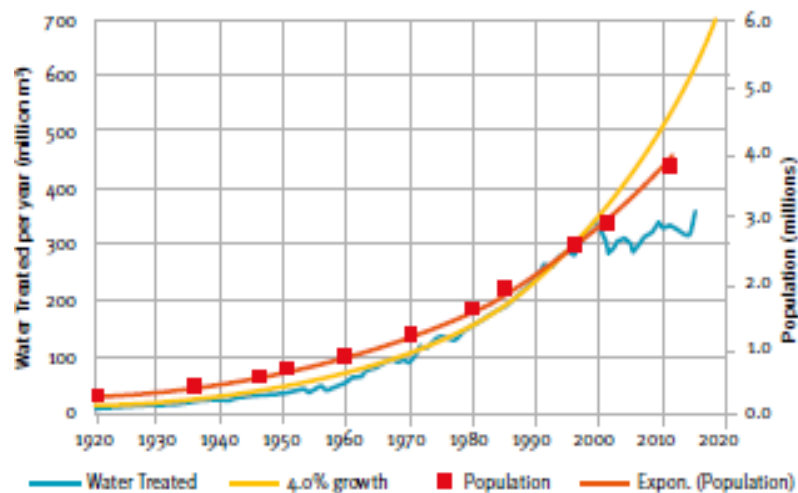
Figure 2.3: Quantity of water treated per year, and population over time in Cape Town.
(**Source:** Parks, 2019**)**

As the population grew, the use of water increased exponentially because people started establishing businesses such as car washes and dry cleaners which require large amounts of water to operate. In some areas, people were watering their gardens twice a day, particularly

during the summer season. These factors contributed significantly to the decreasing water levels in the city which meant that the COCT had to find other means of ensuring that these problems were addressed and solved immediately.[3]
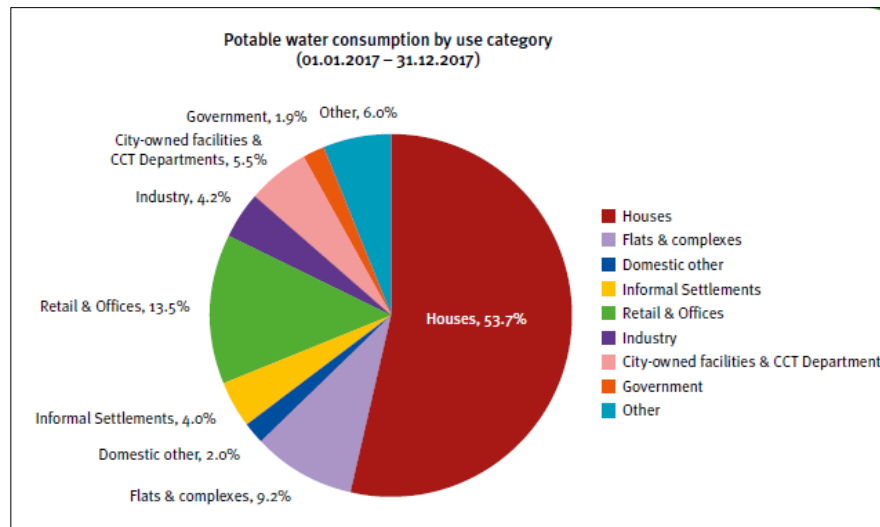
Figure 2.4: Potable water consumption in Cape Town by use category in the year 2017**.**
(**Source**: Parks, 2019)

Figure 2.4 depicts the categories of water usage which is useful for determining which sectors use the most water. Looking at Figure 2.4, it is evident that residential dwellings used the most water in the city, which indicates moderate growth due to emigration and migration to the City and Western Cape Province in general. The Retail & Offices sector – business hubs that make significant contributions to Cape Town's economy – is shown to be the second greatest consumer. The third largest category is Flats and Complexes which are also private homes but with sectional titles and that are mostly controlled by corporate bodies that ensure the correct use of water. The Other category can be assumed to be referring to the unregistered or informally erected taps that are used for business purposes such as car washes. It can also be assumed that the 53.7% water usage by households is not only a reflection of the basic water needs in the household such as cooking, bathing, and gardening but also includes water being used for gardening purposes and

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[3] For detailed list of restrictions applied by the city of Cape Town, see Level 3 water restrictions Accessed January 8, 2020 from: https://www.westerncape.gov.za/general-publication/simple-ways-save-water-your-home?toc_page=1

recreational use such as swimming pools in residential areas. It also includes water used by businesses operating from a residential home such as the leasing out of a tap to a car wash operator. The water crisis was not a result of negligence by the local authorities, but the residents of Cape Town also played a considerable role. It was for this reason that the city's first strategy in its efforts to avert this crisis was to engage the residents of the city regarding the usage of water and the danger that lay ahead.

2.3.2 Crisis response

According to Brown (2019), crisis response involves the identification and management of an organization's vulnerabilities to the kind of risks that may result in significant damage or harm to either the organization's internal or external stakeholders. Watson and Compton (2019) suggest that a crisis response should consist of improved knowledge about the risk accompanied by an enhanced attitude in averting the risk. Coombs (2007) adds that a response to a crisis is also determined by the nature of the crisis which can range from reputational to natural. According to Coombs and Claeys (2019), the primary goal when responding to any crisis faced by an organization is to protect the organization's most important asset, namely, its reputation. Lai (2010) concurs that an important component of crisis response is that organizations must handle any crisis appropriately since reputation and credibility are crucial assets for any organization. Many crisis events start as small but noticeable threats and due to poor management, they erupt into crises (Coombs, Holladay & Tachkova, 2019:31). Depending on the nature of the crisis, a crisis response might be implemented before or after the disaster (Maas, Lyer, Gros, Park, McGorman, Nayak & Dow, 2019:19). According to Maas *et al.* (2019) crisis response is an act that is done to prepare for, respond to, or recover from a crisis event. Crisis management is therefore critical to the functions of an organization as it involves planning and dynamic incident response to unpredictable situations that occur (Chan, 2014). In the context of the Cape Town water crisis, crisis response would entail the city's efforts to respond to and recover from water shortages.

There are several crises response options that can be exercised when faced with a crisis. The choice of which option to apply depends on the nature of the crisis and the dangers associated with the eruption of the crisis. In a study done by Lai (2010), TJX customers' confidential information was leaked by unknown intruders. Communication was then established between the company and its customers via the company's official website which was a primary tool of

communication for public engagement. As the damage was reputational, more platforms of public engagement had to be established in order to rapidly reach as many of their customers as possible. TJX established toll-free numbers for their customers in different countries to express their concerns regarding the breach of their information (Lai, 2010). Coombs (2011:380) suggest that the Internet had a significant effect on the speed and ease of communication. Primarily, a crisis response is aimed at protecting the reputation of the organization (Coombs & Cloaey, 2019). However, some studies show that certain crises require the organization to prioritize its stakeholders, for example, staff, clients, customers, media, financial institutions, or local government council (Board, 2019). In his SCCT, Coombs (2007) argues that the primary focus of the crisis response depends on the nature of the crisis and whether the crisis poses a greater threat to the reputation of the organization or its stakeholders. Furthermore, in his classifications of the different types of risks, he points out that an organization will prioritize protecting its reputation if the crisis was preventable (Denner, Viererbl & Koch, 2019).

Further, studies such as Kyhn (2008) suggest that a crisis damages the reputation of an individual or an organization since it gives people reasons to think badly of the organization or the individual, hence the need for a crisis response. In Yang (2020) where the late basketball player Kobe Bryant was accused of sexual assault, the accusations would mean the end of his career due to reputational damage. Kobe responded by apologizing to his fans on social media and via a press release. The reputation of Kobe Bryant was therefore repaired as a result of this type of crisis response (Yang, 2020). However, as stated earlier, the response to a crisis depends on the type of crisis, while the manner in which the response is received by those affected by the crisis is dependent on the impact or final outcome of the crisis itself. Although the producers of the Boeing 737 MAX8 which resulted in 338 fatalities in the years 2018-2019 engaged in crisis response, it was unsuccessful as the attribution was on the negligence of the company because two of its planes crashed as opposed to one incident (Kaitano & Nhamo, 2020:100). The damage costed the company its reputation and billions of US dollars in monetary value.

2.3.3 Public engagement
According to Li (2018:71) public engagement purposely includes the public with the aim of collaborating in the formulation of policies and development plans, primarily to promote joint decision making. The importance of public engagement cannot be overemphasized as it is crucial for progressive governance and maintaining harmony between the public and government. Dean (2019:171) identifies it as a valuable element of democratic citizenship and democratic decision

making. Li (2018:71) identifies four categories in the continuum of participation comprising; 1) Inform the public, 2) Listen to the public, 3) Engage in problem-solving and 4) Develop agreements. Theories on participatory democracy, deliberative democracy, and social capital make several claims regarding public engagement. Participation gives citizens a more direct say, it affords a voice to those regarded as minorities, it encourages civic skills and civic virtues, it results in rational decisions based on public involvement, and it encourages support for the outcome and the process (McLaverty, 2017).

A significant number of democratic countries view citizen engagement as an important element of good governance (Mzimakwe, 2010:501). Having an opportunity to participate in and express views on the operations of local government grants citizens a sense of belonging and ownership. In addition, it builds trust between the citizen and the local government due to the openness and transparency in the relationship (Mzimakwe, 2010:505). South Africa has been faced with numerous setbacks that relate to government spending without consulting its citizens, such as in the case of the E-Tolls (Matsiliza, 2016).

2.3.4 New public engagement strategies
New forms of governance have emerged alongside the Internet. They encourage higher levels of transparency and accountability and are viewed as a way of improving citizens' trust in government (Bonson, Torres, Royo & Floras, 2012). According to Stephen (2014), several organisations and government institutions have established their own social media platforms in order to cater to their citizens in terms of public engagement. Governments have discovered the potential of social media sites to aid in government information-sharing and outreach (Skoric, AlAwadhi & Scholl, 2015). For example, in Kenya, the government created a forum for public participation in governance through social media whereby important issues could be addressed through Facebook, Twitter, WhatsApp, Skype, MySpace and other social media platforms (Kamwaria *et al.*, 2015). During the 2013 elections in Zimbabwe political participation through the social media was encouraged (Kombeni, 2017:31). Today, instead of gathering in a common physical space to attend a public meeting or to participate in a political debate, many citizens meet in symbolic, virtual spaces based on shared interests, needs or identities (Jensen, 2018). The initiative to take public participation to social media platforms allows for the inclusion of all ages in the community whereas previously community meetings were viewed to only be for the elderly. Other additional advantages in taking public participation to social media include it being a much more convenient platform to discuss and make decisions efficiently, it is a more cost-effective platform due to the lack of travel costs, and its ability to reach a wider audience.

Lovari and Valentini (2020) suggest that in the past few years, public engagement practices have transformed. Advances in digital technologies, including social media, and the increased availability of the Internet have prompted governments to change the ways they engage the public (Mahajan-cusack, 2016; Bertot, Jaeger & Grimes, 2010). According to Karakiza (2015) e-government presents a transformation in the public administration comprising of a) active participation of citizens in public affairs; b) close collaboration between public services, the government, and citizens; and c) transparency of state activities. Of interest in this study is the growing use of social media platforms for public engagement during crises (Palen & Hughes, 2018). According to Chan (2014), there are many advantages which have been put forward for using social media for public engagement and the study explores these in the next section.

2.3.5 Social media and public engagement

In recent years, the flood of new technologies and the extensive use of social media have changed the way in which people communicate with one another (Gwaka & Smit, 2018; Karakiza, 2015). Social media is a conglomeration of web-based technologies and services such as blogs, micro blogs (e.g. twitter), and social sharing services such as Facebook (Obar & Wildman, 2015). It is a part of the political landscape used to monitor citizen's opinions (Pettersson, 2018:4). Social media also facilitates a speedy exchange of information between users and offers certain benefits to the public sector, such as the enhancement of transparency and citizen participation (Aykroyd, 2012:30). Pettersson (2018:10) suggests that during a crisis people turn to social media for emotional support as "social media can provide a sense of not being alone". On the other hand, Fardouly, Magson, Rapee, Johnco and Oar (2020) argue that social media has a potential negative influence, particularly on young people. Our study focuses on the twitter platform which is an open platform that is easy to join. When using twitter to communicate, one can reach a large group of recipients in a matter of seconds (Xu & Wu, 2020:8). This statement is supported by Karakiza (2015) who postulates that social media reaches a wide community in a matter of minutes, making it extremely useful for public engagement should the government wish to convey any messages. In the case of this study examining the Cape Town water crisis, it is argued that in any crisis situation where a large number of recipients need to be reached, twitter is always the quickest and most effective through its retweet, tag, and share functions.

According to Klimova and Pikhart (2020:111), the largest social media platform is Facebook, with more than 2.23 billion users monthly. Facebook gives people numerous ways to communicate, people who have been affected by a crisis can share their ideas, interests, preferences and information. Affected people can easily publish their own content, share images and videos, like

others' posts, and easily follow pages (Almansoori & Habtoor, 2018). In the context of the COCT social media platforms, Twitter is more popular than Facebook with approximately 335 million users monthly. Twitter allows people to upload posts of up to 140 characters (Murakami & Yamagata, 2020:228) and the network is built based on following others or by establishing one's own network. On Twitter, users usually mark their posts with hashtags, consisting of a # symbol followed by text (e.g. #hashtag) to identify their messages and help others to understand and share messages with them in the occurrence of any crisis or disaster. The information on Twitter can be distributed using re-tweets, a process used to pass on or replicate published information (Almansoori & Habtoor, 2018).

According to Lee and Kwak (2012), social media can be classified into two groups. One group is classified as expressive social media, where people are able to express themselves through sharing texts, pictures, videos and music with others. This is popular on social media platforms such as Facebook, MySpace, Twitter, YouTube and Flicker. The other group is referred to as collaborative social media, which enables people to work together to achieve common goals through interactive and social processes. Platforms such as Wiki and Google Docs are excellent examples of collaborative social media (Lee & Kwak, 2012). Social media has helped facilitate several successful government interventions all over the world ever since its adoption by the public sector. Opeyemi (2018:1) notes that social media networks have been used to promote political awareness in the United Kingdom where "Social media has redefined the freedom of speech statement". This was achieved purely by virtue of the platforms provided by social media where people are able to voice their opinions and share ideas without any struggle. According to Karakiza (2015:385), "Digital citizens are all over social media", and that is where the government should look if they wish to reach a wide community quickly. Furthermore, these technologies promote improvements in numerous areas, including better delivery of government services to citizens, improved interactions with businesses and industry, and increased citizen empowerment through access to information.

Transparency is an integral element of good governance and the new styles of governance present new opportunities for transparency and accountability (Lovari & Valentini, 2020:33). According to Bonson *et al.* (2012) the initiative surrounding e-government is found in almost all modernization programs of western democracies. This is because governments across the globe face pressure to change and present innovative ways in which their bureaucracies relate to citizens (Bonson *et al.*, 2012). E-government is adopted as a mechanism to be used to strengthen transparency and accountability and to bring about change in the passive role that citizens had

as customers or clients (Bonson *et al*., 2012). Toscano (2015) is of the opinion that public participation via social media fails to lead to informed decision making, better public policies, or stronger service delivery in the sense that information from social media is discounted by organisations compared to information from traditional sources, whether those are public meetings or news sources. However, Rowe and Frewer (2000) argue that in any platform, governance that involves citizen participation is imperative in enabling the government to deliver what the citizens really want. In addition, the government will not be held solely accountable for any decisions they make as they would be joint decisions made alongside the citizens which decreases the number of protests on service delivery. Governance with the citizens also assists in policy making (Shukla & Mathur, 2020:11). Involving the citizens in policy making not only makes them feel part of governance but it also brings satisfaction to the citizen that the government is for them and about them. Subsequently, this brings about a relationship of trust between the citizen and their government.

2.4 CHAPTER SUMMARY

This chapter discussed the theoretical frameworks on which the study is anchored. Two frameworks have been identified for the study and these are Situational Crisis Communication Theory and Technology Affordances Theory. The chapter discussed and justified the use of these two theoretical frameworks, particularly demonstrating how they complement each other. In addition, the chapter discussed the related studies to show that while there is growing scholarship on the water crisis there is a gap in relation to public engagement during crisis times. In all, this chapter provides a theoretical and contextual basis for the study.

CHAPTER THREE: RESEARCH METHODS

3.1 INTRODUCTION

This chapter presents the research methods. More specifically, the chapter discusses details on the selection of research paradigms, data collection techniques, and data analysis. In addition, the chapter explains elements relating to research ethics as well as the research limitations. The chapter begins with the research design, followed by details on data collection and sampling. In addition, the chapter will present the data analysis, research ethics and the study limitations.

3.2 RESEARCH DESIGN

Research design is a sequence of data collection that is planned by the researcher to use in the development and collection of data (Marczyk, DeMatteo & Festinger, 2017). Furthermore, this design guides the researcher into understanding the type of data required to answer the research question or hypotheses. When creating a research design, the researcher can either adopt a descriptive research or an exploratory research method. According to Tetnowski (2015), descriptive research seeks to richly describe a phenomenon and the context in which it occurs whereas exploratory research seeks new insights into a phenomenon (Rahi, 2017). This study adopts both the descriptive and exploratory approaches in that it describes the water crisis while also exploring the use of social networks for public engagement during the water crisis. By employing both descriptive and exploratory research the study ultimately uses a mixed-methods approach.

3.2.1 Mixed-methods

As previously mentioned, this study adopts a mixed-methods approach, using both qualitative and quantitative methods. Quantitative research focuses on the collection of numerical data while the qualitative approach focuses on collection of data that is narrative in nature. The introduction of the mixed-methods approach meant that researchers could fuse both methods and analyse numerical data as well as narrative data in one research project. Researchers employing mixed-methods seek to draw on the strengths of both the qualitative and quantitative approaches whilst minimizing their weaknesses. Mixed-methods bring in different results that all contribute to one significant answer to arrive at a robust conclusion. Some research questions or hypotheses need both numbers and theory to bring about an answer to the research purpose, hence the existence of a mixed-methods theory. It is important to note that the water crisis was an issue that affected both the municipality and its residents. This study seeks to gather information from all affected

parties which in this case are the City of Cape Town municipality and its stakeholders and role-players. To achieve this, the researcher needed to use suitable research methods to collect the relevant information. In this study, qualitative method was used to gather data through interviews with City of Cape Town officials. The use of interviews was suitable as the number of participants required was not more than 10. In addition, data were collected from 80 community members by way of a questionnaire. Since the sample was large and widely spread, the questionnaire was a suitable instrument to collect useful and comparable data from many individuals.

3.3 DATA COLLECTION AND SAMPLING

The study used mixed methods for the purposes of data collection and sampling. A qualitative approach was used to collect rich data from various sources to gain a deeper understanding of individual participants, including their opinions, perspectives and attitude.

3.3.1 Qualitative approach

According to Mohajan (2018), qualitative research is "a form of enquiry that explores phenomena in their natural settings and uses multiple methods to interpret, understand, explain and bring meaning to them". Furthermore, it is about gathering information and analysing it considering its quantitative and qualitative aspects (Maxwell, 2008). Qualitative research is a field of inquiry that cuts across disciplines and subject matters and involves an in-depth understanding of human behaviour and the reasons for it. In this research project, qualitative research enabled the researcher to explore the use of social media to enhance public engagement during times of crisis in the City of Cape Town. Multiple qualitative methods were adopted in this study, namely interviews with city authorities, twitter data scraping, and informal discussions with various community members. In this study, the researcher also considered adopting a focus group discussion to bring together various actors, but this was insurmountable due to logistical challenges and a lack of financial resources.

3.3.2 Key informant interviews

Key informant interviews were conducted with five purposively selected municipal officials. According to Kumar (1989) & Gwaka (2019), the key informant interview allows the researcher to select the right informant. In this study, the researcher approached the COCT and requested meetings with the individuals most involved in the water crisis. All interview participants were actively involved in the communications department at the time of the water crisis. The COCT, together with the researcher, identified the following as key informants: Director of Communications, Manager of Communications, Campaigns Coordinator, Social Media

Coordinator, and Communications Portfolio (also, see Table 3.1 for additional details on the selected participants).

Table 3. 1: *Summary of key informant interviews*

	Participant Designation	Role during the crisis Reason for selection	Critical insights/ data obtained
R1	Director Communications	Director of Communications	Executive level
R2	Manager of Communications	Manager of Communications	Management level
R3	Campaign Coordinator	Campaign Coordinator	Operations level
R4	Social Media Officer	Social Media Consultant	Operations level
R5	Social Media Officer	Social Media Consultant	Operations level

Source: Researcher's own compilation

Local Government is charged with the responsibility of delivering basic services to residents. During the water crisis, these local authorities engaged with the public in many ways and their experiences of this engagement are central to this study. To obtain data, the researcher conducted key informant interviews with the city officials. Key informant interviews are considered appropriate when conducting exploratory studies with the aim of obtaining rich insights from knowledgeable participants. To select the most appropriate participants, the researcher first approached the City of Cape Town with a request to conduct research. During this engagement, key informants were identified and interviews with the individuals were scheduled for periods when they were anticipated to be free from critical work tasks. The researcher developed an interview guide which was used during the interviews. In each interview, participants were informed of their rights (e.g. right to withdraw/ not respond to questions they did not feel comfortable answering). Permission to audiotape the interview was requested at the start of each interview. In the end, the researcher conducted 10 interviews with city officials.

3.3.3 Netnography

In addition to the key informant interviews, qualitative data were also obtained from the Twitter social media platform. Over the years, social media platforms have become critical sources of research data on various topics including natural disasters, national and global crises, politics, health, and a variety of other subjects. Social media platforms allow different users to create and share information in a social manner. Increasingly, topics of interests are also discussed

extensively on these platforms. The discussions on social media generate large amounts of unstructured data which can be useful for research. In the context of this study, the water crisis in Cape Town generated discussion on numerous social media platforms, including Twitter, and continues to do so. The study argues that the availability of large amounts of data presents an opportunity to analyse different elements on the water crisis. In this study, data from Twitter (tweets) were extracted using open-source software R version 3.6.1. Following the pairing of Twitter and R, data collection involved searching of tweets using a variety of combinations.[4] For example, in Figure 3.1, a search was conducted of tweets that referenced "cityofCT + water" (limited to 100 000 tweets: n=100 000, available in English: lang = "en", since 1 January 2016: since =2016-01-01). The researcher conducted further searches using various combinations of parameters for example, "dayzero+capetown+water", "*capetown+dayzero*" and "*capetown+drought*".

```
watercityofCT <- searchTwitter("cityofCT+water", n = 100000, lang = "en", since = "2016-01-01")

     Warning message:
In doRppAPICall("search/tweets", n, params = params, retryOnRateLimit = retryOnRateLimit, :
  100000 tweets were requested but the API can only return 159
```

Figure 3. 1: Extract from R studio

3.3.4 Quantitative

In the quantitative data collection, the researcher made use of a household survey in the form of a questionnaire. This questionnaire was designed to capture responses from various Cape Town residents coming from different parts of the city. It consisted of 34 questions divided into four sections, namely; demographics, social media access and use, engaging with local authorities, and communicating during crisis periods. Using the four categories, the researcher wanted to identify several things. Firstly, the study sought to gather different views from people who came from different areas of Cape Town. Secondly, the researcher wanted to determine how people from different areas of Cape Town access social media and how they use it. Thirdly, the questionnaire aimed to establish how people from different ends of Cape Town perceive the use of social media as a tool to engage with local authorities. Lastly, the questionnaire aimed to establish how the residents of Cape Town perceive the use of social media as a tool for communication with the local authorities during times of crisis.

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[4] This process requires Twitter authorization (to have a developer account) and involves the use of confidential log-in information

The primary purpose of the questionnaire in this study was to complement qualitative data in various ways. Firstly, through the questionnaire, the researcher was able to quantify different aspects in this study which qualitative methods could not achieve. For instance, using the questionnaires, the researcher asked respondents on the frequency they received updates from local authorities. The questions in the different sections were varied in topic and style to ensure that as much data as possible was collected. In the study, 150 questionnaires were distributed and of these, 96 had most sections completed and were used for data analysis. Thus, the study achieved a response rate of 86%. To ensure internal reliability, the researcher performed a Cronbach Alpha test which returned 0.86 which is acceptable since it is greater than 0.7. The data was manipulated using R functions, and additional analysis is presented in Appendix 4.

3.4. DATA ANALYSIS

In a mixed methods study, data analysis, like data collection is also conducted using mixed approaches. In this study, since both qualitative and quantitative data were collected, data analysis was also completed using quantitative and qualitative data analysis techniques.

3.4.1 Qualitative

Qualitative data analysis was conducted using R. Firstly; data from the key informant interviews was transcribed by listening to the audio repeatedly. The researcher transcribed the interviews onto plain text notepads. The finalised transcription notes were then assessed for completeness before they were imported on to R using the RQDA (qualitative data analysis). For social media data, the analysis started with data cleaning which entailed removing URLs, hashtags, punctuation, emojis, stopwords, and numbers, whitespaces, and converting to lower case. The process of content transformation was critical to ensure that only relevant data were used for analysis. After data cleaning, the data were manipulated using different functions, including word cloud, and results from this are presented in section 4. In addition, cleaned data was copied to MS Word for coding. The researcher started reading through the data (not complete sentences, since these were transformed) developing notes and headings. Using doc tools, an MS Word add on, the notes and headings that had been developed were extracted into a new document for further analysis. Following this, the researcher refined the groupings to reduce the number of codes by combining similar or related categories. Since the study was inductive, discretion was used to interpret the categories and the codes were then refined to satisfaction. The focus of the analysis of social media data was to establish narratives emerging from the messages. Despite

the potential of social media analysis, the study acknowledges the limitations which social media data present hence the use of themes as shown in Table 3.2.

Table 3.2: Qualitative data analysis based on themes

Phases	Stages	Actual data analysis activities (What the researcher did)
Initialization	- Reading transcriptions and highlighting meaning units - Coding and looking for abstractions in participants' accounts. - Writing reflective notes.	- Transcriptions were carefully studied - Notes were written up in Ms Word
Construction	- Classifying. - Comparing - Labelling - Translating & transliterating - Defining & describing	The researcher classified the responses into general comments, complaints, notifications
Rectification	- Immersion and distancing - Relating themes to established knowledge - Stabilizing - Finalization - Developing the story line	- From the responses, the researcher further analysed related themes emerging (for instance, complaints were linked to attributions) - This was followed by developing narratives on the water crisis under three subheadings – locus, controllability and stability

 Source: Vaismoradi *et al.*, (2016)

3.4.2 Quantitative

Since this study followed a mixed-methods approach, quantitative data were collected using household survey questionnaires which were administered to residents of the Cape Flats, Cape Town CBD, Northern, and Southern suburbs. The decision to adopt a questionnaire was based on the need to extend and quantify the exploratory dimension of the study (cf. Boynton & Greenhalgh, 2004). For instance, through the questionnaire, the researcher was able to quantitatively establish aspects of the study area such as household demographics and the frequency of updates from local authorities which qualitative methods could not achieve. There are different guidelines when developing questionnaires including Gillham (2008) and Atkinson (2007) and following some of the guidelines, our questionnaire consisted of different question types and was structured in 5 sections. The questionnaire consisted of 40 questions and when exported to R, it had a total of 91 variables. To select the communities, the researcher applied a proportional quota sampling. Thus, the researcher aimed to select areas representing the different socio-economic statuses of Cape Town. Within each community, a random sampling approach was used to identify participants, and data were gathered using the assistance of locally recruited individuals. In each of the four selected communities, 50 questionnaires were distributed and from the 200, only 96 were returned with most sections completed, and were used for data analysis.

3.5 ETHICS

Ethics clearance for the study was obtained from the Cape Peninsula University of Technology ethics committee (see appendix 4). In addition, the researcher also obtained clearance from the City of Cape Town to engage the local communities (see appendix 3). In conducting this study, research ethics observed included:

- Confidentiality – The identity of the participants remained confidential and this was observed in all engagement with the relevant participants.
- Harm to participants – the researcher ensured that this study did not result in any harm or damage to the research participants and their related companies. This study therefore is purely for academic purposes and while no harm can be foreseen, the researcher will not be held responsible for unforeseen circumstances that may result in harm.
- Informed Consent – the researcher sought the consent of research participants; thus, no participants were coerced into participating. Further, to ensure that participants were aware of what they are participating in, the researcher clearly explained the nature of the study and its objectives to the participants.

- Invasion of Privacy – the researcher ensured that no private information was used for the study, unless authorised by the participants. As such, the researcher requested exclusive permission where the data obtained is private. Furthermore, the researcher will not use the data gathered for the personal benefit of the researcher.

3.6 LIMITATIONS

Although the study applied a robust methodology there are limitations which need to be considered. Firstly, the study extracted data solely from twitter whereas the City of Cape Town uses more than one social media platform. It is possible that data from other platforms would provide different results. Furthermore, the questionnaires were distributed in four areas and with additional resources the data collection could be expanded. While these are limitations, the study mitigated them by using diverse data sources, that is, the researcher did not rely solely on the social media data but also used questionnaires and key informant interviews.

3.7 CHAPTER SUMMARY

In this chapter, the study discussed the different research paradigms and explained the rationale for selecting mixed methods. The chapter also explained the data collection process and analysis conducted. Further, the chapter provided details relating to ethical clearances and limitations of the study. Overall, this chapter is central to the study in that it details the critical activities relating to data collection and analysis. The data collection activities are linked to the preceding section of literature review. From this data, the researcher can present the study findings which is done in chapter four.

CHAPTER FOUR: FINDINGS AND DISCUSSION

4.1 INTRODUCTION

This chapter presents the findings of the study. As explained in the previous chapter, the study used a mixed-methods approach, employing both qualitative and quantitative data techniques. Qualitatively, the study used key informant interviews, netnography and informal discussions while a household survey questionnaire was used to obtain quantitative data, the results presented in this chapter will also follow a mixed-method. The results will include narratives, direct quotations, pictures, and the researcher's interpretations, as well as quantitative results presented in the form of graphs and tables. Firstly, results relating to social demographics of the respondents are presented followed by a detailed description of the water crisis in Cape Town, before turning to public engagement, with a specific focus on the use of social media.

4.2 DEMOGRAPHICS

4.2.1 Location and household size

In this study, the respondents engaged were municipal officials who hold different positions and were directly involved in public engagement and other spheres during the water crisis. In addition, individuals were also drawn from four purposively selected areas. This section presents the summary of respondents from the four communities.

Table 4.1: Summary of household sizes by location

Location	Household size 1-3	4-6	7+	Total
Cape Flats	6	6	2	14 **15%**
CBD	17	13	3	33 **35%**
Northern Suburbs	11	15	2	28 **30%**
Southern Suburbs	8	12	0	20 **21%**
Total	42 **44%**	46 **48%**	7 **8%**	95

Table 4.1 details that the largest percentage of respondents (35%) was from the Central Business District (CBD), followed by the Northern Suburbs with 30%. 21% of respondents were from Southern Suburbs, and the Cape Flats had the fewest participants with only 15%. In terms of household sizes, most respondents (48%) were from households with 4-6 family members, followed by 1-3 household size at 44% and households with 7 or more members comprised only 8% of respondents.

In addition to household size by location, the study also explored the gender distribution by location and the results are presented in Table 4.2. In the Cape Flats, the study established that 57% of respondents were female with 43% male. In both the Northern and Southern suburbs, the study found a similar bias with more female than male respondents. However, the CBD had only 27% female respondents which contributed to a significant difference (p = 0.00897) between gender distribution and location.

Table 4.2: Location and gender

```
================================================
                            Gender
Location                Female   Male    Total
------------------------------------------------
Cape Flats                 8       6       14
                          57%     43%     15%
------------------------------------------------
CBD                        9       24      33
                          27%     73%     35%
------------------------------------------------
Northern Suburbs           17      11      28
                          61%     40%     30%
------------------------------------------------
Southern Suburbs           14      6       20
                          70%     30%     21%
------------------------------------------------
Total                      48%     47%     95%
================================================
Chi^2 = 11.58037     df= 3      p = 0.00897
```

4.2.2 Period of stay

The study also asked the respondents about the period of their stay in the current location. More than 50% of the respondents had stayed in their current location for longer than 5 years. However, as indicated in Table 4.3, other respondents suggested different periods of stay and despite any challenges which people face e.g. in townships, they still stay for a considerable amount of time – and could be tied to the fact that even when there is a water crisis, they are unlikely to move. The Pearson's Chi-squared test indicated that there was a highly significant difference between the period of stay and location with a p-value of 0.00.

Table 4.3: Period of stay based on location

```
====================================================================================
                                    Period of staying in this location
Location                 <1 year       1<x<3         3<x<5        >5 years Total
------------------------------------------------------------------------------------
Cape Flats                     0             0             2            12      14
                           1.179         2.800         0.102         2.675
                           0.000         0.000         0.143         0.857   0.147
                           0.000         0.000         0.118         0.235
                           0.000         0.000         0.021         0.126
------------------------------------------------------------------------------------
CBD                            2            11            11             9      33
                           0.218         2.933         4.395         4.288
                           0.061         0.333         0.333         0.273   0.347
                           0.250         0.579         0.647         0.176
                           0.021         0.116         0.116         0.095
------------------------------------------------------------------------------------
Northern Suburbs               1             6             3            18      28
                           0.782         0.029         0.807         0.586
                           0.036         0.214         0.107         0.643   0.295
                           0.125         0.316         0.176         0.353
                           0.011         0.063         0.032         0.189
------------------------------------------------------------------------------------
Southern Suburbs               5             2             1            12      20
                           6.528         1.000         1.858         0.149
                           0.250         0.100         0.050         0.600   0.211
                           0.625         0.105         0.059         0.235
                           0.053         0.021         0.011         0.126
------------------------------------------------------------------------------------
Total                          8            19            17            51      95
                           0.084         0.537         0.179         0.537
====================================================================================
```

Statistics for All Table Factors

Pearson's Chi-squared test

Chi^2 = 30.32986   df. = 9   p = 0.000385

4.2.3 Respondents' gender by age

Further, the respondents were classified in table 4.4 by gender with 51% of the respondents being female and 49% being male. In terms of age groups, the 18-30 age group had the most participants (55) followed by the 31-40 group with 28 respondents, while 41-50 had just 12, and there was only a single participant in the 50+ age range.

Table 4.4: Summary of respondents by gender and age

```
                                   Age
Gender                    18-30   31-40   41-50    50+   Total
-------------------------------------------------------------
Female                     24      14      10       1     49
                                                          51%

-------------------------------------------------------------
Male                       31      14       2       0     47
                                                          49%

-------------------------------------------------------------
Total                      55      28      12       1     96
                           57%     29%     13%      1%
=============================================================
Chi^2 = 7.185695    df= 3       p = 0.0662
```

4.2.4 Education

In terms of education, most study participants (61%) indicated that they had attained tertiary education, while 38% had a high school qualification, and one respondent (<1%) had not attained any form of education. Despite the different social dynamics in the areas, (e.g. Cape Flats is known for various social ills), the study found no significant difference (p = 0.878) between the location and level of education. Similarly, the study did not find any significant difference (p = 0.543) between the highest level of education attained and gender.
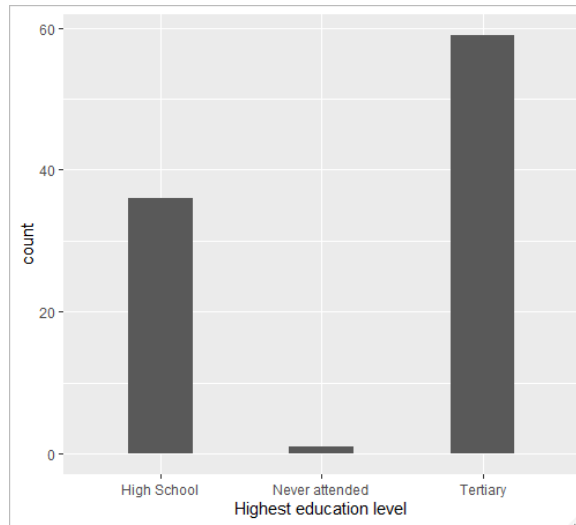
Figure 4.1 Highest education level of the respondents

4.2.5 Employment

In terms of employment, the study found that 70% of the respondents were employed while 30% were not. Further analysis as shown in Table 4.5, using the gender lens shows that 78% of female respondents were employed and 22% of female respondents were not while 62% of male respondents were employed and 38% were unemployed. No significant difference was found (p = 0.0909) between gender of respondent and employment status.

Table 4.5: Summary of employment status by gender

```
=======================================================

                          Employment Status
Gender                  Employed    Unemployed    Total
-------------------------------------------------------
Female                        38            11       49
                           0.423         0.977
                             78%           22%    0.510
                           0.567         0.379
                           0.396         0.115
-------------------------------------------------------
Male                          29            18       47
                           0.441         1.018
                             62%           38%    0.490
                           0.433         0.621
                           0.302         0.188
-------------------------------------------------------
Total                         67            29       96
                             70%           30%
=======================================================
```

The study further profiled respondents' employment status based on education levels. As Table 4.6 shows, of those with high school education, 69% are employed and 31% unemployed, while the only respondent with no formal education is also employed. Furthermore, 70% of the respondents with tertiary education are employed while 30% of those with tertiary education are unemployed. This corresponds to prevailing unemployment challenges in the country (Graham, Williams & Chisoro, 2019)

Table 4.6: Employment Status

```
=======================================================================
                                          Employment Status

Highest Education Level               Employed   Unemployed   Total
-----------------------------------------------------------------------
High School                                 25           11      36
                                         0.001        0.001
                                           69%          31%   0.375
                                         0.373        0.379
                                         0.260        0.115
-----------------------------------------------------------------------
Never Attended                               1            0       1
                                         0.131        0.302
                                         1.000        0.000   0.010
                                         0.015        0.000
                                         0.010        0.000
-----------------------------------------------------------------------
Tertiary                                    41           18      59
                                         0.001        0.002
                                         0.695        0.305   0.615
                                         0.612        0.621
                                         0.427        0.188
-----------------------------------------------------------------------
Total                                       67           29      96
                                           70%          30%
=======================================================================
```

4.3. WATER CRISIS IN CAPE TOWN

In this section, the study focuses on the water crisis in Cape Town. The water problem in Cape Town was predicted several years beforehand but intensified between 2015 and 2018 (cf. Robins, 2019). During this period, the water levels dropped to their lowest in the year 2017, as shown in Figure 4.2. In response to this, a water resilience task team was established in May 2017. After that, the city launched its Disaster Plan in October and it was after that the concept of Day Zero came to life.

4.3.1 The drought

The drought experienced by Cape Town was the first of its kind in many years and it was life-threatening (Robins, 2018). This drought was the result of unfavourable climate conditions and ecological fragility, but its impact was exacerbated by the negligent use of water by the residents of Cape Town, accompanied by the leakages from infrastructure disparities that were discovered during the crisis. Due to the lack of rainfall for months, the city anticipated drought conditions but the speed with which they arrived was unanticipated. This can be attributed to the rising population in Cape Town, particularly in the more affluent areas, as studies have shown that more than 70% of the water use was in the suburbs of Cape Town. Nonetheless, the duty to save water became everybody's, whether resident or tourist merely visiting the city. The water shortage was a national disaster, and Cape Town city officials said the drought was unprecedented. Apart from the city, the general community also weighed in on the drought and there was sustained discussion on social media. One community member stated that:

> "*I live in Cape Town and many neighbours have social media. We had a really bad drought a couple of years ago and de… https://t.co/Pa5eM02uQm"*

Further to this, there is evidence suggesting that drought experienced in Cape Town is part of a larger set of global environmental changes. There are national and international organisations partnering with governments to address the challenge presented by the drought.

4.3.2 Rising population and increased water consumption

Apart from the drought, the growing population, and related water consumption, contributed to the water crisis. According to City officials, there was an increase in Cape Town's water consumption and in terms of actual figures shown in figure 4.2, the water consumption peaked at **357,865,301 KL** annually while water levels in the dams were also dropping significantly. It is important to note that although there has been a significant increase in the development of informal settlements more than 70% of the water was consumed by the more affluent areas of Cape Town.
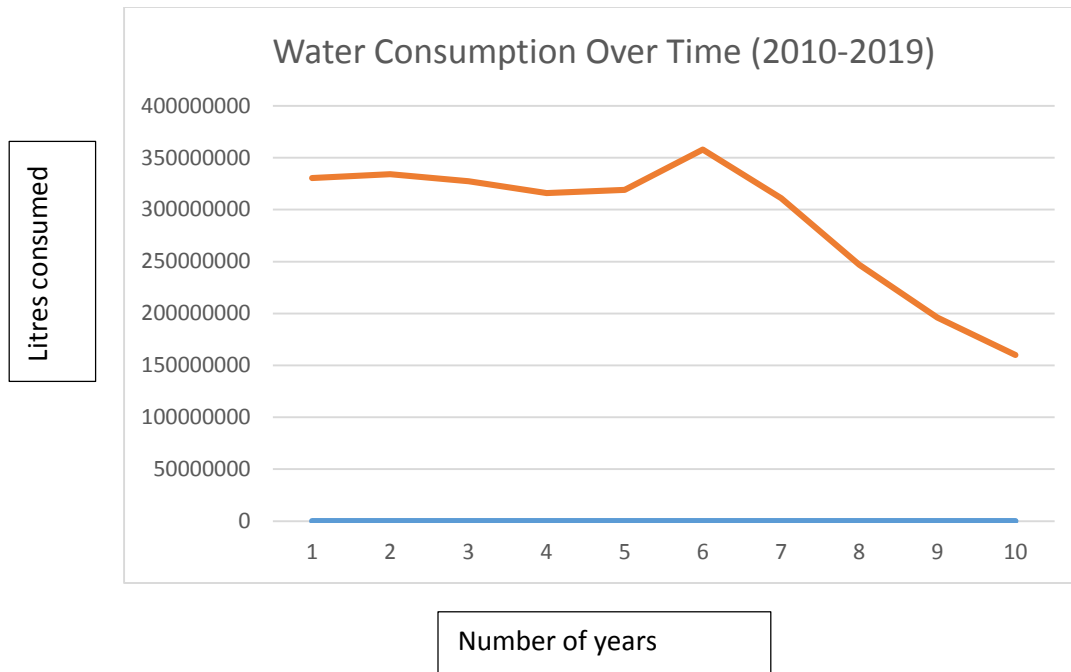
Figure 4. 2 Water Consumption overtime

Source of statistics: City of Cape Town (unofficial records)

4.3.3 Effects

The water crisis had several effects on the community. In this study, it was found that the effects were cross-cutting i.e. there were social, cultural and economic effects. For example, from the data obtained on twitter one participant said the following:

> *"cityofCT thank you second day without water and we have kids the youngest being [age] this needs to be sorted"*[5]

This was starting to affect the wellbeing of children and eventually resulted in stressed parents as the tweet indicates. In addition, the water crisis had different financial implications for different social groups, for instance, while low income households struggled to raise adequate financial resources to buy drinkable water, the wealthy accumulated more financial resources from the crisis (Robins, 2019). Apart from specific social groups there are businesses that rely on water for productivity, and such challenges resulted in them suffering financial losses.

The lack of water also had health implications. Many global organisations such as the World Health Organisation, suggest that it is imperative that growing cities such as Cape Town maintain a stable water supply system to avert a health crisis. Outbreaks of diseases such as malaria, which usually erupt in spaces filled with stagnant or dirty water, are found to be imminent in such environments. Due to the water crisis, other individuals started making plans to relocate to start afresh in different countries. This presented challenges in the economy of the country at large, with such challenges emanating from the lack of water. It then became necessary for people to change their daily patterns and habits regarding water consumption to use water sparingly. Swimming pools could not be refilled, gardening had restrictions, and time spent in the shower had to be reduced. It was advised to use a bucket when washing a vehicle and to only water plants with recycled water.

From the discussion thus far, it is evident that the water situation in Cape Town had developed into a crisis. A time of intense difficulty was fast approaching in Cape Town and the city's resources were under pressure as the utilization was very high due to the significant increase in the population (Pettersson, 2018:36). The water crisis initially affected areas with high population density and as a result of slum creation the water crisis worsened, crime rate increased, there was inadequate infrastructure, inadequate transportation system, congestion and poverty (Muller, 2017). The growth of these challenges presented a crisis to the local authorities. As the water crisis became a serious matter, the term "Day Zero" emerged as a term that was used on a daily to spread awareness of the gravity of the crisis (Maxmen, 2018). Pettersson, (2018:18) adds by saying, this is a term that was used by the local authorities to create awareness of the day that the residents of Cape Town would run out of piped water. The growing problems necessitated action from the local authorities, and public engagement through social media was an option that presented many opportunities for facilitating crisis control (Bertot, Jaeger & Hansen, 2012). Several studies (Felix, 2020; Pieczka & Escobar, 2013; Ehnis & Bunker, 2012; Christensen, Laegreid & Rykkja, 2019) suggest that whenever there is a crisis, there is need for public engagement to avert the crisis. In the next section, the study presents findings on public engagement in Cape Town paying specific attention to engagement during the water crisis.

4.4. PUBLIC ENGAGEMENT

The study will now present its findings on public engagement during the water crisis. We focus on the accessibility of the local authorities, turnaround times, satisfaction within the public, and the use of social media for engagement during the crisis.

4.4.1 Local government's accessibility

The study participants were questioned regarding the extent to which local authorities were accessible to them. The study findings, as presented in Table 4.7, show that most respondents think that local authorities are not as accessible as they would like them to be.

Table 4.7: The accessibility of Local Government

```
=====================================================================
                        How accessible are local authorities?
Location                Always    Never   Occasionally    Total
---------------------------------------------------------------------
Cape Flats                   1        3            10        14
                         0.263    0.145         0.089
                         0.071    0.214         0.714     0.151
                         0.250    0.188         0.137
                         0.011    0.032         0.108
---------------------------------------------------------------------
CBD                          1        8            22        31
                         0.083    1.333         0.224
                         0.032    0.258         0.710     0.333
                         0.250    0.500         0.301
                         0.011    0.086         0.237
---------------------------------------------------------------------
Northern Suburbs             2        2            24        28
                         0.526    1.648         0.186
                         0.071    0.071         0.857     0.301
                         0.500    0.125         0.329
                         0.022    0.022         0.258
---------------------------------------------------------------------
Southern Suburbs             0        3            17        20
                         0.860    0.056         0.108
                         0.000    0.150         0.850     0.215
                         0.000    0.188         0.233
                         0.000    0.032         0.183
---------------------------------------------------------------------
Total                        4       16            73        93
                         0.043    0.172         0.785
=====================================================================
Chi^2 = 5.521288      df= 6        p = 0.479
```

Less than 1% of respondents indicated that municipal officials were always available, while 17% indicated that authorities were never accessible. However, the majority of respondents (78%) indicated that local authorities are occasionally accessible while some respondents who did not

answer this question at all. In support of the above, one respondent, during an informal discussion, even made a comment saying:

"*These people [COCT] do not care about us people who stay in the townships*"

However, this contradicts what the local authorities stated. When the study asked the local authorities, during key informant interviews, of their accessibility to the public, one official said that:

"*We are always accessible to our communities and we even encourage them to make use of all the platforms available to reach us, one of which is social media*"[6]

Table 4.8: Engaging local authorities

```
=================================================
                      Options available to engage
                          local authorities
Location                  Other      Social
                                      Media     Total
-------------------------------------------------
Cape Flats                    9           5         14
                          0.034       0.052
                          0.643       0.357     0.154
                          0.164       0.139
                          0.099       0.055
-------------------------------------------------
CBD                          14          15         29
                          0.710       1.085
                          0.483       0.517     0.319
                          0.255       0.417
                          0.154       0.165
-------------------------------------------------
Northern Suburbs             17          11         28
                          0.000       0.001
                          0.607       0.393     0.308
                          0.309       0.306
                          0.187       0.121
-------------------------------------------------
Southern Suburbs             15           5         20
                          0.702       1.072
                          0.750       0.250     0.220
                          0.273       0.139
                          0.165       0.055
-------------------------------------------------
Total                        55          36         91
                          0.604       0.396
=================================================
Chi^2 = 3.655373     df. = 3       p = 0.301
```
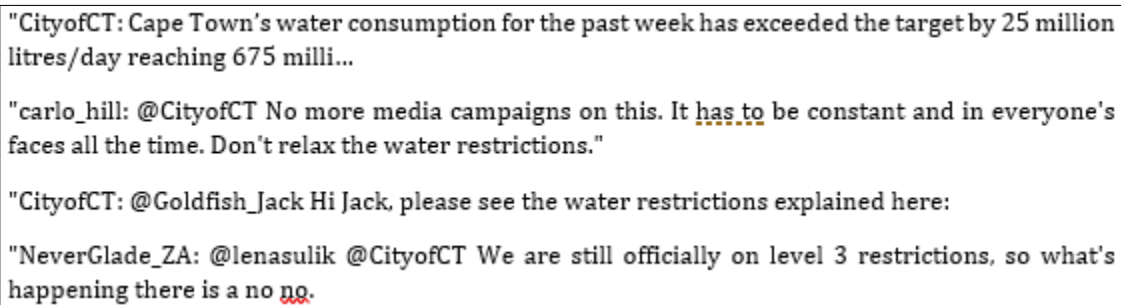
Based on the accessibility of the local authorities, the study further probed the options available to the public by which they could access the local authorities. The findings reveal that the public

---

[6] Key informant interview (management), City of Cape Town, 31st October 2019

has several options available to them including social media, town hall meetings, call centres, and walk-in options. Since this study focuses on social media, Table 4.8, shows that at least 40% of the respondents use one of the several social media platforms to engage with and access the local authorities. Further analysis by way of a chi-square test, shows that there is no significant difference (p = 0.301) between the location of a respondent and the options available to them to engage the local authorities. The study findings also confirmed that the COCT participates on different social media platforms as one respondent indicated that:

> *"The COCT has been active on different platforms including Twitter, Facebook, Insta. We are also active on LinkedIn"*[7]

The study also explored Twitter to establish whether there were any engagements between the local authorities and the communities. From this exercise, it was established that there were multiple interactions between the local authorities and the community. As an example of an interaction specifically relating to water crisis, the following conversation was found:

"CityofCT: Cape Town's water consumption for the past week has exceeded the target by 25 million litres/day reaching 675 milli...

"carlo_hill: @CityofCT No more media campaigns on this. It has to be constant and in everyone's faces all the time. Don't relax the water restrictions."

"CityofCT: @Goldfish_Jack Hi Jack, please see the water restrictions explained here:

"NeverGlade_ZA: @lenasulik @CityofCT We are still officially on level 3 restrictions, so what's happening there is a no no.

Figure 4.3 Twitter conversations

Although Figure 4.4 shows conversations between local authorities and the public, it is concerning that, as shown in Table 4.8, only 40% of the household survey questionnaire respondents indicated that they made use of at least one social media platform to engage the city. With only 40% of respondents using social media, it shows that there are still many citizens relying on traditional means of engaging the authorities. This can largely be attributed to councillors who engage the public in their constituencies and loud hailers that were used by the city mainly to address large gatherings. While the traditional means still suffice, this study argues that there are several opportunities to be harnessed from social media.

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[7] Key informant interview respondent number three.

"We also made use of loud hailers and drove around the locations that were using water excessively, this was one of the ways the city ensured that the message gets to the users"

In line with global trends, there are efforts to transition towards e-governance in South Africa, and the Western Cape government has set up Cape Access points to allow internet access among marginalised groups. Despite considerable investments into the project, it is concerning that most respondents are unaware of and do not make use of these facilities (Kassongo, Tucker & Pather, 2018). Given the ubiquity of social media, the study further asked the respondents about the extent to which they had access to Internet. In the study, it was found that 48% had access to Internet while 52% had no access. Further analysis revealed that the most common method of accessing the Internet was via mobile phone. From the responses, it was established that participants also accessed Internet using home computers, work computers, and school computers. As for those who did not have Internet access, cost was identified as the main reason. There are several studies (Sen, Joe-Wong, Ha & Chiang, 2012) which support our findings and the argument that cost is the major limitation of Internet access, especially among poor communities.

4.4.2 Cape Access

Residents expressed frustration over the expensiveness of accessing the internet to engage in social media, prompting the government to establish the Cape Access programs to allow Internet access amongst marginalized groups. Apart from the individual options to access Internet, the Western Cape government has developed Internet access points allowing people the opportunity to access the internet at no charge, these have played a great deal in the communication between the local authorities and the citizens over social media platforms. The study further asked the respondents whether they were knowledgeable of the Cape Access program and the accessibility of the Cape Access points. From the study findings, it was established that 57% of the respondents were not aware of the Cape Access program, while 38% of the respondents were aware and within a 5km radius of the Cape Access point. Residents who were within the 5km location of an access point, but unaware of its existence could not be quantified.

4.5 COMMUNICATION DURING WATER CRISIS

This section focuses on the narrative analysis of social media texts. Using the Attribution Theory, the analysis will unpack the feelings of those affected by the water crisis using three dimensions, namely: Locus, Stability, and Controllability. Direct quotations extracted from Twitter were used

to give additional context regarding the conversations concerning the water crisis that were making the rounds on social media.

4.5.1 Usefulness of social media during the water crisis

In the preceding section, it was established that social media was being used for public engagement by local authorities, including during the water crisis. Although there were many individuals still not using social media, from an affordances perspective, it was evident that social media improved communication between local authorities and the public (Bonson, 2012). The study asked COCT officials about the usefulness of social media, mainly relating to reaching a broader audience and speed, and one of the respondents indicated that:

> *"One of our future objectives is to reduce the time it takes a resident to have their query resolved, in the last three months we have reduced our response time from an average of 45 minutes to 15 minutes on Facebook. Our response rate is 94%. We are confident of social media's potential in improving our public engagement as evidenced by its use during the water crisis"*

The city has noticed the significance of social media and is making notable investments in social media. When COCT officials were asked about the management of the social media accounts, one of the respondents indicated that:

> *"Up until about four months ago, our accounts were managed by an external agency, we managed to establish an in-house team that consists of one coordinator and three social media officers to manage the social media pages, they work shifts seven times a week to ensure they respond to many of our residents."*[8]

4.5.2 Narratives based on attribution theory

In the preceding section, it was shown that social media platforms are used by the local authorities for public engagement. In this section, the focus is on the narratives within the messages and stories shared on social media using the attribution theory. It is argued that analysing the content and its meaning helps to establish the different attributions made by community members and the city on the water crisis. The attribution theory is characterised by three dimensions - locus, stability and controllability - the study findings are presented based on these dimensions.

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[8] Key informant interview respondent 5

4.5.3 Locus

In terms of locus, the causes of the Cape Town water crisis can be identified as either internal or external by local authorities and communities. In this study, each group identified the causes of the water crisis mainly as external. The inverse of this is that if these attributions are true, it would mean that the causes are internal for the other group. For instance, the local authorities suggested that the water crisis in Cape Town could be attributed to high water consumption, and water waste. In a tweet, the local authorities noted that:

> *"Cape Town's water consumption for the past week has exceeded the target by million"*

On the other hand, communities thought that poor investments in water infrastructure were the reason for the water challenges, as demonstrated in the following message:

> *"Have the authorities in @WesternCapeGov and @CityofCT made sufficient investments in new bulk water storage"*

It is unlikely that local authorities would admit that internal factors contributed to the water crisis despite considerable mismanagement and corruption matters which are related to crisis, evidence of which was presented at the state capture inquiry commission. However, following a message from the Cape Town City Mayor, Patricia de Lille, it became evident that the water crisis may have been linked to internal matters within the local authorities unknown to the public and one message from Twitter read:

> *"Thank you. @PatriciaDeLille Who exactly are the "laptop boys"? Give us the story about #DayZero"*

However, there are other events within local authorities that were known to the public and were attributed to be part of the causes of the water crisis. For instance, the community members perceived the causes of the water crisis to be external, as they argued that the water crisis was a result of poor administration (an internal cause for local authorities) as suggested in the following text:

> *"@CityofCT With the DA falling apart so is your service. It has now been a month and still you have not been able to [solve this problem]"*

However, there was a realisation among the community members of the need for the community to be cautious in its use of water. Thus, the community admitted that the cause of the water crisis could be internal. For instance, one community member argued that:

"Water restrictions should not be relaxed. The world's population has grown, resources have not"

For both the community and local authorities, there was also an admission that the causes of the water crisis were external (e.g. difficult task and bad luck). This is undeniable, as many have acknowledged the contribution of drought to the water crisis.

4.5.4 Stability

This causal dimension suggests that causes of a crisis can be constant or varying over time. Findings in this study suggest that causes of the water crisis vary over time and can thus be classified as unstable. For instance, it was established that individual efforts and attitudes towards conservative use of water changed over time which resulted in the following alert by the city:

"Cape Town's water consumption for the past week has exceeded the target by [number] million litres/day"

Beyond this, it was found that there was general appreciation of how the local authorities and community members collectively made efforts to avert DayZero. One community member indicated that:

"@Derek_Hanekom You're right. We did collective water savings in #CapeTown it worked. Let's #DayZero #Eskom now."

This statement confirms the observation that communities attribute success to "competence and how hard they try" (Graham, 1991). Further, success often generates positive affective feelings as are displayed in this tweet:

"Cape Town is putting out the word \"We're back!\" after 3 years of drought nearly made CT the world's 1st modern city to…"

This perspective contrasts the earlier suggestion of a divided society. Thus, from analysing the social media stories and posts, it is evident that failures are attributed to external factors while success is internalised by actors.

4.5.5 Controllability

The controllability dimension refers to personal responsibility, or whether a cause is subject to one's own volition (Graham, 1991). In this study, several responses suggested that the water crisis cause was controllable. Firstly, when reflecting upon the crisis, community members suggested different measures for the local authorities to put in place which included the development of appropriate infrastructure. In addition, those who experienced the Cape Town water crisis were cautioning other cities on the possibility of water crisis unless specific action was taken, as indicated in this tweet:

> *"Cape Town and Chennai should serve as cautionary tales: cities need to act now, before city water shortages"*

On the other hand, others argue that the water crisis was a result of an uncontrollable cause, drought. One of the statements supported this view by indicating that:

> *"Cape Town faced the unprecedented prospect of having to turn off water supplies due to the worst drought in the century"*

The findings suggest that local authorities and the public think that the water crisis has certain elements that are controllable, and other elements that are uncontrollable. These perspectives have inspired this study to contribute to an improved understanding of the water crisis and perceptions of diverse actors.

4.6 CHAPTER SUMMARY

This chapter presented the research findings. The chapter discussed the demographics of the respondents to bring a broader and more inclusive perspective on the water crisis. Furthermore, the chapter discussed in detail the water crisis that took place in Cape Town, citing the different experiences from the residents and the municipal officials as a crisis of this magnitude was unprecedented. In addition, the chapter detailed findings on how the local authorities engage with the residents on a day-to-day basis. Lastly, the chapter discussed the communication and the methods used between the local authorities and the residents of Cape Town during the water crisis period.

CHAPTER FIVE: SUMMARY OF FINDINGS AND CONCLUSIONS

5.1 INTRODUCTION

This chapter provides the conclusions deduced from the study findings and the recommendations relating to both practice and research. The chapter starts by outlining a summary of the key findings before presenting the conclusions. It then shifts to presenting the implications of the study on policy and practice, followed by suggestions for future research.

5.2 SUMMARY OF KEY FINDINGS

This study focused on the use of social media for public engagement during the water crisis. For Cape Town, the water crisis was critical between the years 2015 and 2018. As part of the broader findings, the study indicated that urban areas such as Cape Town are facing multiple challenges including water shortages, energy crises, and transport crises, as stated in (Ferreira & Boschoff, 2014; Opeyemi, 2018); (Maxmen, 2018). In terms of public engagement during the water crisis, the study found that the city uses a variety of communication platforms including social media. Furthermore, the study found that the city has considerable presence on social media platforms and uses them to engage the public. This study focused on the use of Twitter and found that the Twitter platform is used extensively for engagement during times of crisis, including during the water crisis. It is noted that the city was making significant investments in social media, such as hiring social media experts. From both the local authorities and the general public, there was a significant acknowledgement of the benefits of using social media for engagement during the water crisis. Some key findings from the study indicate that both the local authorities and the public preferred social media as a channel of communication, mainly Twitter due to its cost effectiveness and the speed with which it can relay information as suggested by (Aykroyd 2012:30). However, although social media platforms are useful, there are also concerns raised by both the local authorities and the public regarding its use, such as the issue of fake news.

5.2.1 What methods are used by local authorities for public engagement?

Local authorities have a duty to ensure that they engage with the public on a regular basis This has historically been done through public meetings whereby the local residents would meet with the authorities in a community hall to listen to and engage with the public authorities. Another method that was traditionally employed was the local news bulletin. However, such bulletins were purely used to send messages rather than engaging the public. With the progress of time and

innovation, more methods of communication became available and were adopted for public use and for use by authorities for public engagement. Social media platforms like Facebook and Twitter became a new method of communication in addition to face-to-face public meetings and the news bulletins. Public authorities now regularly make use of Facebook and Twitter for the purposes of public engagement.

5.2.2 What are the opportunities and challenges that exist in the use of social media for public engagement?

The researcher acknowledged that there was an upside as well as a downside to the use of social media for public engagement, particularly during times of crisis. The water crisis brought a lot of emotions with it, notably the uncertainty and anger which was directed at the local authorities. In a country where the citizens have little trust in their government, this presented an opportunity to those that had political feuds against the COCT to start posting misinformation and rumours on social media - false information that would unfairly implicate the COCT in the water crisis. The COCT confirmed the presence of false information that was posted on social media during the time of the crisis. The measures that they had put in place to control this included press releases where they would issue a statement that did not necessarily create a dialogue with the false information but would put out the actual information. The COCT also urged social media users, particularly those that were in Cape Town, to be cautious and verify the credibility of a user. In some cases, the City had to make unpopular decisions that the citizens would not be happy about, such as the choice to increase tariffs which greatly upset the residents given the state of the economy at the time. An individual with a specific agenda would post that the City was misusing public funds which the City would respond to by posting pictures that showed the value that the people were getting. They would have to show the value for money in their services, and indicate the various costs involved in getting the water to come out of a household tap.

5.2.3 What role can social media play in public engagement?

The research found that social media has become an increasingly democratic space; there are not many platforms that allow everyone to freely express themselves. It is also a space that is used by people of different ages, different ethnic groups, and from different backgrounds and areas. Furthermore, through social media and the use of features such as geotagging - a form of adding geographical information to various forms of media - it is now possible to narrow one's focus down to a specific audience for which the information is intended. For example, if the COCT wants to address the residents of Kuilsriver, they can use geotagging and only address people

who are located in Kuilsriver. It was also established that these platforms were more convenient and easier to access for communication purposes, in that, a person can engage the public authorities without having to spend money and time travelling to a specific venue (Jensen, 2018). It does not however, replace the effectiveness and rigidity that comes with face-to-face public engagement meetings.

5.3 Conclusion

This study addressed the use of social media as a means of public engagement during the water crisis in Cape Town. Based on the analysis of the study findings, the study concludes that the city of Cape Town used social media platforms to engage the public by disseminating messages and receiving and addressing queries from the public during the water crisis. Social media platforms allowed the city to engage a wider audience within a short space of time. The usefulness of social media platforms for public engagement during the water crisis was acknowledged by the city officials engaged during the study. Thus, the study concludes that during the water crisis in Cape Town, social media platforms, mainly Twitter, were adopted and used in multiple ways by local authorities mainly for the purposes of public engagement. In addition, the study concludes that social media platforms were used as complementary channels for public engagement while other traditional forms of public engagement continued to be used by the city. At the time of the study, other research studies suggested that the city of Cape Town had averted the water crisis but discussions about the water crisis on social media continued. It is evident that the local authorities acknowledged the benefits of using social media during a crisis to the extent that the local authorities were making considerable investments in social media. In comparison to other studies, the results of this study were found to be similar to those of Boersma, Diks, Ferguson & Wolbers (2019); Su, Stepenkova & Kirilenko (2019); and Roy, Hasan, Sadri & Cebrian (2020). On the other hand, the results seem to contradict those of Reuter, Stieglitz & Imran (2019); and Lange (2019). Ultimately, there seems to be a consensus among studies that social media can be useful for public engagement during crises such as the Cape Town water crisis. The findings of this study make contributions to both literature and practice and these contributions are discussed below.

5.4 STUDY CONTRIBUTIONS

5.4.1 Contribution to knowledge

In recent years, urban challenges such as water crises and increased use of digital technologies, have dominated academic discussions. This study fused these emerging fields and presented an analysis based on unique events which occurred during the Cape Town water crisis. Through its findings and analysis, this study contributes towards improved understanding of the use of social media during the water crisis. While many other studies, including Aykroyd, (2012) and Alexander (2016), have also explored the use of social media during a crisis in different contexts, this study provides a unique viewpoint situated in a different context, namely, the Cape Town water crisis.

5.4.2 Contribution to theory

In terms of theory, the study applied the Attribution and the Technology Affordances Theories. By applying these theories in a complex domain, the study expanded on and tested the tenets of these theories. In terms of the SCCT theory, the study confirmed the existence of tension when faced with a crisis, and notes various actors attributing blame to other actors as stated in (Coombs, 2007; Sarkar *et al.* 2020). Furthermore, the study also confirmed the Technology Affordances theory, primarily regarding social media's potential as an information dissemination platform. In addition, the study showed that community members who were not aware of social media's capabilities did not use social media for information purposes. However, this was not an indication of lack of social media's affordances, further confirming the affordances theory.

5.4.3 Contribution to methods

The study applied emerging methodologies – specifically the web scraping technique – to obtain data on social media conversations during the water crisis. The use of online data for research is growing but is currently limited. Thus, through this study, it was demonstrated that online data, and online platforms, can be useful and are recommended for research within public administration.

5.4.4 Future research

There are several questions which emerged during this research but fell outside of the study's scope but are recommended as future research. From this study, the following questions represent future research avenues which could be explored:

- Are social media platforms being used in similar ways for public engagement in other urban challenges such as energy crises?
- Using sentiment analysis, what social dynamics can be extrapolated from the conversations occurring on social media relating to urban challenges such as the water crisis?

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APPENDIX 1: HOUSEHOLD SURVEY QUESTIONNAIRE

This research instruments contains survey questions for community members. All information provided will be kept in the strictest confidence, in line with Ethics of Social Research.

Section A: Demographics		Record the correct responses in this column
A1. Gender of respondent:	*1=male 2: female*	
A2. Age of respondent:	*1=18-30 2=31-40 3=41-50 4=50+*	
A3. Location:	*1=Cape Flats 2= Northern Suburbs; 3=Southern Suburbs; 4= CBD*	
A4. How long have you been staying in this location	*1= less than 1 year; 2= more than a year but less than 3* *3=more than three year but less than 5* *4=more than 5 years*	
A5. Marital status:	*1=single 2=married 3=divorced 4= widowed*	
A6. Highest education qualification:	*1=Primary; 2=High school;3=Tertiary; 4=Never attended*	
A7. Employment status:	*1=Employed;2=Unemployed*	
A8. If you are employed, what type of employment	*1=Formal; 2=Informal*	
A9. Household size	*1=1-3; 2=4-6; 3=7+*	

Section B: Social Media Access and Use		
B1. Do you have access to internet?	*1= yes ; 2= no*	
B2a. If yes, how do you access internet	*1= Smart phone; 2= Work computer; 3 = Home computer; 4 = School computer*	
B2b. If no, reasons		
B3. What are some of the challenges in accessing internet?	*1= Data costs ; 2=Unreliable connectivity 3=Lack of access*	
B4. Are you aware of Cape Access	*1= yes 2=no*	
B4a. If yes, how accessible is to Cape Access to you?	*1= within 1km ; 2= more than 1 km but less than 5km ; 3= more than 5km*	
B5. Are you aware of social media platforms?	*1= yes 2=no*	
B5a. If yes, which social media accounts do you own?	*1=Facebook ; 2= Twitter ; 3= Instagram 4=WhatsApp Other _____*	
B6. I use social media to,	*1= stay in touch with friends 2 =stay up-to-date with news 3 =fill up spare time 4 =General networking with other people 5 =share photos or videos with other 6 =share my opinion 7 = other purposes, specify _____*	

B7. How frequent do you access these social media platforms?	*1= At least 1 to 5 times a day* *2= At least 5 to 10 times a day* *3= At least 1 to 5 times a week* *4= At least 5 to 10 times a week*	
B8. What challenges have you experienced with using social media?	*1= Fake accounts ; 2= Scams ; 3= Fake news ; 4= Misleading news ; 5= connectivity* *Any other challenges?*	

Section C: Engaging Local Authorities		
C1. How accessible are local authorities	*1=Never; 2=Occasionally; 3=Always*	
C2. How do you engage local authorities (what options are there to engage)	*1=Social media platforms; 2=Town hall / Community Hall Meetings; 3=Call Centres; 4=Walk-in Centre*	
C3. How is the response time from the local authorities	**Social media**: *1=less than 1 hour; 2=between 1 hour and 5 hours ; 3 = less than 12 hour; 4=more than 12 hours but less than 24 hours;; 5=more than 24 hours; 6=Never engaged them*	
	Town hall: *1=less than 1 hour; 2=between 1 hour and 5 hours ; 3 = less than 12 hour; 4=more than 12 hours but less than 24 hours;; 5=more than 24 hours; 6=Never engaged them*	
	Call centre: *1=less than 1 hour; 2=between 1 hour and 5 hours ; 3 = less than 12 hour; 4=more than 12 hours but less than 24 hours;; 5=more than 24 hours; 6=Never engaged them*	
	Walk in: *1=less than 1 hour; 2=between 1 hour and 5 hours ; 3 = less than 12 hour*	

	4=more than 12 hours but less than 24 hours; 5=more than 24 hours; 6=Never engaged them	
C4. To what extent do you find this method effective?	Social media: *1=poor 2= moderate 3= good 4 =excellent*	
	Town hall: *1=poor 2= moderate 3= good 4 = excellent*	
	Call centre: *1=poor 2= moderate 3= good 4 = excellent*	
	Walk in: *1=poor 2= moderate 3= good 4 = excellent*	
C5. What is the cost implication of the method?	Social media: *1=low cost 2= affordable 3= expensive*	
	Town hall: *1=low cost 2= affordable 3= expensive*	
	Call centre: *1=low cost 2= affordable 3= expensive*	
	Walk in: *1=low cost 2= affordable 3= expensive*	
C6. Have you engaged with the local authorities directly or indirectly using social media?	*1=Yes; 2=No*	
C6a. If yes, in which social media platform from the following?	*1=Facebook; 2=Twitter; 3=Instagram; 4=WhatsApp*	
C7. Have you attended a community meeting, town hall or community hall chaired by local authorities?	*1=Yes; 2=No*	

Section D: Communication during crisis periods		
D1. What are some of the challenges which you encounter on a daily basis in the community?	*1= Transportation (Trains); 2= Crime; 3= Water; 4= Electricity*	
D2. To what extent is the community affected by these crisis	*1=Not affected; 2=Moderate; 3=To a greater extent 4= Excessively*	
D3. Would you say there was communication from the local authorities before the crisis to prepare you?	*1= Yes; 2=No*	
D3a. If yes, was any information disseminated through social media platforms	*1=Yes; 2=No*	
D4. What other platforms were used?	*1= Community halls; 2=CoCT website; 3= Radio; 4=News papers*	
D5. During the crisis, would you say local authorities disseminated enough information using social media?	*1=Not Satisfactory 2= Moderate 3= Satisfactory 4= Extremely Satisfactory*	
D6. To what extent do you think the information sent through social media by the authorities was satisfactory?	*1=Not Satisfactory 2= Moderate 3= Satisfactory 4= Extremely Satisfactory*	
D7. Which social media platforms did you prefer to access information from during the crisis?	*1= Facebook ; 2=Twitter; 3= Instagram; 4= WhatsApp* *Others, please specify*	
D8. How likely are you to share updates using social media during a crisis?	1=Unlikely; 2=Seldom; 3=Most likely	

D9. Would you recommend the use of social media platforms during a crisis?	*1=Yes; 2=No*	
D10. What will you do with the information you gather from social media during a crisis?	*1= Forward it to family and friends* *2= Post it on my profile* *3= View for my own interest* *4= Call in and verify*	

APPENDIX 2: INTERVIEW GUIDE
City of Cape Town official

Thank you for agreeing to participle in this interview. The purpose of this interview is to gather data for a research project focusing on the use of social media for public engagement during the water crisis. You have the right to withdraw from the interview or not answer questions which may not be comfortable to you. The estimated time for this interview is 20 minutes. Disclaimer: The views of the participant will not be regarded as official CCT policy.

1. Which department do you work for?

2. What is your position and how long have you been working for the department?

3. Were you working for the municipality during the water crisis?

4. Does the City of Cape Town use social media platforms for public engagement?

5. If yes, which social media platforms does the City of Cape Town use?

6. When did the CoCT start using social media for communication?

7. What role does social media play in public engagement?

8. Who manages these accounts? And are these for the entire city or do different departments have separate accounts?

9. Do you feel you are achieving your objectives? If yes, please tell why you say so? If not, why do you say so and what can be done?

10. What are your concerns (if any) about using social media platforms for communication?

11. Are the citizens encouraged to use social media platforms to engage the local authorities during crisis times?

12. Did you encounter any fake news said to be from CoCT during the crisis? If yes, how did you manage this?

13. Was social media useful in disseminating important information during the time of the water crisis and what challenges did you encounter?

14. What would you consider to be measures of usefulness in this case? (e.g. number of posts, likes, comments)

15. Were you able to reach citizens in large numbers and how did you measure this?

16. How often did you post updates during the water crisis on social media?

17. What kind of responses did you get from the citizens on social media and how did you address them?

18. Does the CoCT have clearly defined processes, procedures and policies regarding the use of social media?

19. Is there a platform on social media that encourages citizens to post their current state of affairs post crisis? If so, what responses do you normally get

APPENDIX 3: CITY OF CAPE TOWN RESEARCH CLEARANCE

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

URGENT

Date : 5 September 2019
To : Director: Policy & Strategy
Reference : PSRR-0119

Research Approval Request

In terms of the City of Cape Town System of Delegations (March 2019) - Part 29, No 1 Subsection 4, 5 and 6 "Research:

(4) To consider any request for the commissioning of an organizational wide research report in the City and to approve or refuse such a request.

(5) To grant authority to external parties that wish to conduct research within the City of Cape Town and/or publish the results thereof.

(6) To after consultation with the relevant Executive Director: grant permission to employees of the City of Cape Town to conduct research, surveys etc. related to their studies, within the relevant directorate

The Director: Policy & Strategy is hereby requested to consider, in terms of sub-section 5, the request received from

Name	: Chumani Waxa
Designation	: Masters candidate
Affiliation	: Cape Peninsula University of Technology (CPUT)
Research Title	: "Exploring the use of social media to enhance public engagement during crisis times: A case of the City of Cape Town municipality".
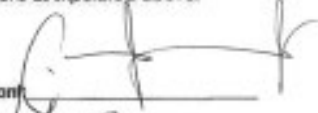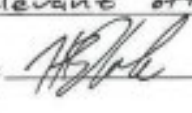
Taking into account the recommendations below (see Annexure for detailed review):

Recommendations

That the CCT via the Director: Policy & Strategy grants permission to Chumani Waxa, in his capacity as a Master's candidate in the Public Administration department in the Faculty of Business and Management Sciences at the Cape Peninsula University of Technology (CPUT), to conduct research subject to the following conditions:

- All Water & Sanitation department related staff engagement and request for data to be via the DWS Research officer: Annesley Crisp on annesleyVivienne.Crisp@capetown.gov.za;
- All Communications department related staff engagement and request for data to be via the Manager: Media – Luthando Tyhalibongo on luthando.tyhalibongo@capetown.gov.za;
- Submission of the questionnaire to participants 48 hours before interview;
- Anonymising of CCT officials and their inputs being adhered to in the research report;
- The City branding and logo not being used in the research report;
- Clear acknowledgement in the research/thesis report that the views of the participant are not regarded as official CCT policy;
- Submission of a pre final draft report to the Communications Department; for verification;
- Submission of the completed research report to the Director: Communications Department, Director: Policy & Strategy and the Manager: Research Branch, Policy & Strategy, within 3 months of completion of the research report.

VE.h : gew
05/09/2019

Delegated authority:

Approved ☑ Comment: _Interviews subject to availability and operational demands on the relevant officials_

Not Approved ☐ Comment:

Hugh Cole: Director: Policy & Strategy: _____

Date: _6/9/2019_

Acceptance by Applicant:

Chuma Waxa

I, ____ confirm that I agree to abide by the conditions as stipulated above.

Applicant _____

Date: _7/9/2019_

CCT departments: No interviews or data to be provided without proof of acceptance of the conditions under which the research permission is granted.	Kindly return signed copy to Jameyah.armien@capetown.gov.za

APPENDIX 4: UNIVERSITY ETHICAL CLEARANCE

Cape Peninsula
University of Technology

P.O. Box 1906 • Bellville 7535 South Africa •Tel: +27 21 4603291 • Email: fbmsethics@cput.ac.za
Symphony Road Bellville 7535

Office of the Chairperson Research Ethics Committee	Faculty: BUSINESS AND MANAGEMENT SCIENCES

At a meeting of the Faculty's Research Ethics Committee on **11 June 2019**, Ethics **Approval** was granted to **Chumani Waxa (214128326)** for research activities of **Master of Public Admin** at Cape Peninsula University of Technology.

Title of dissertation/thesis/project:	EXPLORING THE USE OF SOCIAL MEDIA TO ENHANCE PUBLIC ENGAGEMENT DURING CRISIS TIMES: A CASE OF THE CITY OF CAPE TOWN Lead Researcher/Supervisor: Prof S Cronje

Comments:

Decision: Approved

	18 July 2019
Signed: Chairperson: Research Ethics Committee	Date

Clearance Certificate No | 2019FOBREC685

APPENDIX 5: MANUSCRIPT SUBMITTED FOR REVIEW

The use of social media for public engagement during water crisis in Cape Town

Abstract

This study examines the use of social media for public engagement during the water crisis in Cape Town, South Africa. Using the technology affordance, the study explores the affordances residents explored during the water crisis and utilisation of social media by local authorities for public engagement. The study also applies the attribution theory to develop insights on the ascriptions of the water crisis cause between the local authorities and the public. Data for the study were gathered from both residents and local authorities using mixed methods approach. Ethical clearance for this study were obtained from the university research committee and City of Cape Town. Qualitative data were gathered using key informant interviews and netnography (online data scrapping from Twitter) while a household survey (n=96) was conducted to obtain quantitative data. Study findings show three social media affordances utilised by the public as well as efforts by local authorities to use social media for public engagement during the water crisis. Further, the content obtained from social media reflect deep societal concerns (e.g. corruption and discrimination) but the crisis was mainly attributed as external, unstable, and controllable. Our findings are critical towards handling future crises and suggest collaborative efforts as the desirable action.

Keywords: Cape Town, e-governance, Social media, Water crisis, Public engagement

Key points:

1. Social media affordances such persistent engagement make them appropriate tools for public engagement during crisis
2. Local authorities, working with the government, need to invest in mechanisms to improve public willingness to use social media to engage them
3. Social media content reveals invisible (or hard to see) societal issues which can be vital in addressing societal concerns

The use of social media for public engagement during water crisis in Cape Town

Abstract

This study examines the use of social media for public engagement during the water crisis in Cape Town, South Africa. Using the technology affordance, the study explores the affordances residents explored during the water crisis and utilisation of social media by local authorities for public engagement. The study also applies the attribution theory to develop insights on the ascriptions of the water crisis cause between the local authorities and the public. Data for the study were gathered from both residents and local authorities using mixed methods approach. Ethical clearance for this study were obtained from the university research committee and City of Cape Town. Qualitative data were gathered using key informant interviews and netnography (online data scrapping from Twitter) while a household survey (n=96) was conducted to obtain quantitative data. Study findings show three social media affordances utilised by the public as well as efforts by local authorities to use social media for public engagement during the water crisis. Further, the content obtained from social media reflect deep societal concerns (e.g. corruption and discrimination) but the crisis was mainly attributed as external, unstable, and controllable. Our findings are critical towards handling future crises and suggest collaborative efforts as the desirable action.

Keywords: Cape Town, e-governance, Social media, Water crisis, Public engagement

1. Introduction

This study focuses on the use of social media for public engagement by the Cape Town local authorities during and after the water crisis in Cape Town, South Africa.[9] Specifically, the study aims to establish the extent to which local authorities relied on social media to engage the public and the narratives which stories relating to the water crisis shared on social media represent about the Cape Town social dynamics. Communication during crisis times is challenging – e.g. what to communicate, how frequent and what medium to use (Coombs, 2010a). This was evident in the context of the Cape Town water crisis as Enqvist and Ziervogel (2019) findings show that communication between local authorities and the public was controversial. As part of the overall crisis response strategy, crisis communication involves bi-directional relaying of different messages which include official announcements (e.g. relating to state of the crisis, warnings and progress made) and public opinions (inquiries, confronting, blaming, and general humorous messages) (cf. Roshan, Warren & Carr, 2016). To ensure that messages are delivered to the target audience, actors in a crisis must carefully decide on the communication channel since different communication channels enable different communication narratives (Coombs, 2010b, cf. Yang, Kang & Johnson, 2010). However, the ubiquity of social media platforms appears to be defying all pre-existing crisis communication rules as authorities and the public, by default, turn to social for engagement during a crisis (Roshan et al., 2016).

In Africa, large populations are still without access to internet (GSMA, 2019) but social media use continues to rise particularly in urban areas (Poushter, Bishop & Chwe, 2018). The growing use of social media is enabling citizens to actively participate in discussions on everyday societal events on these social media platforms (Bosch, 2017). Admittedly, social media platforms, in contrast with traditional communication channels which were easily controlled by state organs, have created spaces for the public to be involved in discussions which they would previously be overlooked (Gwaka & Smit, 2018). However, the debate on the appropriateness of social media for discussing certain topics, including official communication in African governments, remains.

To address this knowledge gap, many studies are being conducted. However, most available studies appear to address use of social media during normal times. Given the rise in sporadic uncommon events (disruptions) it is evident that use of social media during disruptions/crisis also warrants attention. While the technical aspects of social media are important, understanding human behaviour, actions, and words (content shared on social media) promises critical contributions to literature. Thus, the use of social media during the Cape Town water crisis presents a unique opportunity to develop insights on the use of social media during disruptions. While there are many existing studies on use of social media during urban crisis (see for example, Palen, 2008; Alexander, 2014; Graham, Avery & Pank, 2015; Hunt & Specht, 2019), cities are different, and crisis in each city carries different meanings. In addition, the Cape Town water crisis

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[9] The term crisis can be used to refer to "corporate crisis" (Lee, 2019) but in this study, our focus is on "Cape Town's unprecedented 2017/18 water crisis [also known as "Day Zero"] (Rodina, 2019:1); also see "Cape Town water crisis" (Weaver, 2017). Also, we interchangeably use local authorities and the city to refer to the administrative unit (City of Cape Town).

has potential to produce new insights since the city, like the rest of South Africa, has complex socio-economic dynamics, which, to an extent, are shaped by the apartheid history (McFarlane & Silver, 2016). The stark differences between social groups which are evident in everyday societal challenges are an embodiment of urban politics (Larkin, 2008) and showed during the water crisis (Robins, 2019). As Barbehön and Münch (2017) suggest detailed analysis of actions, including social media posts, during a crisis, can reveal deep societal aspects.

The Cape Town water crisis has been examined from different disciplines e.g. engineering, geography, sociology, and politics. This appears to be in line with Ziervogel's (2019) recommendation to closely examine the crisis using different viewpoints. This study is an attempt to add contribute to this call from human-computer interaction and communication (public engagement) perspectives. Thus, we aim to determine whether local authorities used social media during the crisis to develop insights on whether social media can be relied upon should similar crisis occur. Further, we attempt to interpret the "hidden messages" from the content shared on social media enticed by Raupp's conceptualisation of social media as a *rhetorical arena* defined as "a space that opens during a crisis … where different actors, including other corporations, political actors, activists, experts, and the media, talk to and about each other" (Raupp, 2019:2). Therefore, by extending our analysis beyond simplistic causal relationship between social media, water crisis and public engagement, we aim to reveal the complex intertwining of these aspects.

Our study proceeds as follows: the next section provides a contextual background of the study followed by a discussion on the theoretical frameworks (affordances and attribution). The study then discusses the research methods followed by presentation of study findings. The final two sections of the study comprise a discussion of study findings and the study conclusion.

2. Study context

Cape Town ranks as one of the world's most beautiful cities and is a popular tourist destination. The city consistently attracts a high number of tourists each year as well as economic migrants from other cities in South Africa and across the globe. Over the past decade, the city experienced a steady (2.57%) population growth and the population is expected to reach 5 million people soon.[10] This population growth has simultaneously triggered investments in residential buildings. In socio-economic terms, Cape Town is characterised by high inequalities and within the *lower and middle class*, there is a growing housing challenge which has contributed an escalation of informal settlements (cf. McFarlane & Silver, 2016). As past studies show, an increase in population directly increases pressure on resources like housing, transport, and water (cf. Weaver, 2017). These challenges are further propelled by global environmental changes relating to climate change which are significantly contributing to food and water insecurity. For

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[10]Cape Town Population 2020. Accessed July 1, 2020 from:
 http://worldpopulationreview.com/world-cities/cape-town-population/

Cape Town, a water crisis between 2016 and 2018 which left the city on the brink of collapse *epitomised* the challenges facing the city. In this study, the phrase 'water crisis' is used to refer to "Cape Town's unprecedented 2017/18 water crisis [also known as] "Day Zero" [when] the city was expected to cut off water, leaving its 3.7 million residents without tap water" (Rodina, 2019:1). While "Day Zero" was averted, months leading to the next rains were characterised by spells of water cuts, long queues for water and intensive communication between local authorities and city residents.

In times like Cape Town's water crisis, it is critical for local authorities to develop and implement robust crisis management strategies and central to these strategies should be communicating with the public. Public engagement has been recognised as one of the central tenets of robust crisis management strategies in public engagement. Coombs and Holladay (1996) argue that poor public engagement during a crisis damages the reputation of an organisation and in turn, impacts future interactions between the organisation and its publics. Cognisant of this, the local authorities in Cape Town, to their credit, disseminated information in many ways. For instance, on arrival at the Cape Town international airport, travelers were reminded of the water crisis by large banners throughout the airport. Messages could also be found in public places including public transport such as the local taxis. Third parties such as *The Golden Arrow* bus company also participated in information dissemination, and water saving practices to an extent that *Golden Arrow* adopted the motto "*Saving water one dirty bus at a time*". In addition to these efforts and keeping up with technological advances, the city used social media platforms to interact with residents on issues relating to the water crisis.

Given the foregoing, our study builds from two perspectives. Firstly, Neresini and Bucchi's (2011) think that different platforms achieve different effectiveness when used for public engagement during crisis. It is the study's supposition that it is critical to determine the extent to which social media was useful for public engagement during the water crisis. however, metrics for determining "usefulness" are largely absent and the study argues that determining the use (actual and intended) is a critical step towards this. Secondly, Guidry et al. (2017) argue that different public engagement platforms enable co-construction of different narratives. Given this, it is possible that there are unique narratives which emerged from the use of social media for public engagement during the water crisis. Therefore, based on these perspectives, our study asks: to what extent did local authorities make use of social media during the Cape Town water crisis and what narratives can be deduced from the information shared on social media relating to the water crisis.[11]

3. Theoretical perspectives

In line with the study objective, our study adopts two congruent theoretical perspectives. On the use of social media for public engagement, we draw on the technology affordances theory and to explore the nature of conversations which occurred on social media, we turn to the attribution theory. The compatibility of the theories - affordances and

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[11] Usefulness requires detailed metrics and we opt to ask the extent of use as first order question

attribution - has already been established in related studies (see, Oz, Havens & Bisgin, 2018). We now turn to discuss each of the two theories.

3.1. Technology affordances theory

To examine the potential of social media as public engagement tools during the water crisis, this study applies the technology affordances theory. Gaver (1991:80) defines affordances as "properties of the world with respect to people's interaction with it" while Majchrzak and Markus (2012: np) suggest that the theory is premised on "uses and outcomes of information systems and technology are best understood in terms of *relationships* between individuals or organizations and technology features." Thus, the technology affordances can be subjective meaning that a technology can have different affordances for different people. Based on this, as this study explores the use of social media for public engagement during, it focuses on the interaction of local authorities (government departments) with social media and further seeks to understand how individual (education, social status) attributes of community members define the individual's relationship with social media. We argue that different attributes (of the local authorities as well as the public) may result in different relationships with social media thus, could result in different uses of social media during water crisis. Gaver (1991:80) illustrates this line of thought by arguing that, "[w]hether a handle with particular dimensions will afford grasping depends on the grasper's height, hand size etc." In addition to this, another critical aspect of the technology affordances theory is that technology affordances are independent of perception or appropriation. This means technologies are designed with affordances – and the fact that individuals are unable to appropriate these (or are unaware of the affordances) does not make the technology less useful. Building on this, we argue that social media platforms have been identified as communication platforms, including during crisis, and can allow interaction between local authorities and the public. thus, it is not a question of "if" but rather "how" local authorities in Cape Town used social media during the water crisis. however, the technology affordance theory does not provide a lens to understand the nature of conversations occurring on social media platforms and to achieve this, we turn to the attribution theory.

3.2. Attribution theory

The attribution theory seeks to explain the relationship between actors' interpretation of events and their actions. It has been applied in crisis studies for many years (see for example, Coombs & Holladay, 1996). In the context of a crisis, the attribution theory suggests that actors perceive the crisis in different dimensions which are: stability (assesses if the event's cause happens frequently (stable) or infrequently (unstable), controllability (whether or not the event's cause is controllable by the actor or others) and locus (if the event's cause is something about the actor or something about the situation). The ascriptions of problem cause reveal critical insights about the actors and to an extent, help to develop future expectations (when similar challenges occur) and

guide future actions. Furthermore, the responses of local authorities play a critical role in the legitimacy of the governing authorities as Coombs and Holladay (1996:292) think that:

The more publics attribute responsibility for the crisis to the organization, the greater the risk should be of reputational damage (a threat to legitimacy is a pan of the reputation). Crisis response strategies can lessen the reputational damage by mitigating the affective feelings generated by the attributions and/or altering the attributions themselves.

In this study, we argue that by analysing the social media posts, we can reveal the ascriptions of both the local authorities and communities relating to the water crisis in Cape Town. This is critical since Enqvist and Ziervogel (2019) indicate that during the crisis, poor communication and a lack of trust contributed to a near panic situation. The attribution theory provides a lens for the researchers to establish and understand the human behaviour t(responses) during the crisis. for instance, if the crisis is ascribed as external, it is possible that individuals will expect the "other parties" to change and not themselves. Further, by linking the attribution theory to affordances, we argue that social media afford users opportunities to posts (ascribe blame) without fear, and at times, without revealing their identities.

4. Research methods

In this study, mixed (qualitative and quantitative) data gathering, and analysis methods were adopted. Given the exploratory nature of the study, it was critical to develop both qualitative and quantitative insights. In addition, there are numerous advantages which have identified in using mixed methods including overcoming the weaknesses embedded in either qualitative or quantitative research methods. We discuss each research approach in the next section.

4.1. Qualitative methods

Qualitative methods adopted in this study are key informant interviews and netnography. In this study, we also considered adopting a focus group discussion to bring together various actors, but this was insurmountable due to logistical challenges and lack of financial resources.

4.1.1. Key informant interviews

The local authorities are charged with the responsibility of delivering basic services to residents. During the water crisis, these local authorities engaged with the public in many ways and their experiences in engaging the public is central to this study. to obtain data, the researchers conducted key informant interviews with the city officials. Key informant interviews are considered appropriate when conducting exploratory studies with the aim of obtaining rich insights from knowledgeable participants. To select the most appropriate participants, the researchers first approached the City of Cape Town with a request to conduct research. During this engagement, key informants were identified and interviews with the individuals were scheduled for periods they anticipated to be free

from critical work tasks. During interviews, an interview guide was used and at the beginning of each interview, participants were informed of their rights (e.g. right to withdraw / not respond to questions they did not feel comfortable. Further, permission to audiotape the interviews was requested at the start of each interview. In total, we conducted 5 interviews with city officials summarised in Table 1.[12]

[Table 1 here]

4.1.2. Netnography

In addition to the key informant interviews, qualitative data were also obtained from the Twitter social media platform, also known as netnography (Kozinets, 2015). Over the years, social media platforms have become critical sources of research data on various topics including natural disasters, national/global crisis, politics, health, and many other subjects. Social media platforms allow different users to create and share information in a social manner. Increasingly, topics of interests are also discussed extensively on these social media platforms. The discussions on social media generate large amounts of unstructured data which can be useful for research. In the context of this study, the water crisis in Cape Town drew discussions on different social media platforms, including Twitter, and continues to do so. We argue that the availability of large amounts of data presents an opportunity to analyse different elements on the water crisis.

In this study, data from Twitter (tweets) were extracted using open-source software R version 3.6.1. Following the pairing of Twitter and R, data collection involved searching of tweets using a variety of combinations.[13] For example, we conducted a search of tweets on ("*cityofCT+water*", "*dayzero+capetown+water*", "*capetown+dayzero*" and "*capetown+drought*").

3.1.3. Qualitative data analysis

Qualitative data analysis was conducted using R. firstly, data from the key informant interviews was transcribed by listening to the audio repeatedly. The researchers transcribed the interviews onto plain text notepads individually. The next step involved comparing notes and developing mind maps and finally themes. To analyse data obtained from the social media platform, the analysis started with data cleaning mainly removing (URLs, hashtags, punctuation, emojis, stopwords and numbers), whitespaces and converting to lower case. The process of content transformation was critical to ensure that only relevant data were used for analysis. After data cleaning, the data were manipulated using different functions including wordcloud and results from this are

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[12] The number of interviewees were limited due to commitments of city officials. However, while this provides a potential point of improving future studies, we attest that our engagements were extensive and produced sufficient insights to the satisfaction of the researchers. Further, the positions of the participants were sufficient for producing insights needed for this study.

[13] This process requires Twitter authorisation (to have a developer account) and involves the use of confidential log-in information

presented in section 4.[14] In addition, cleaned data was copied to Ms-Word for coding. We started reading through the data (not complete sentences, since these were transformed) developing notes and headings. Using doc tools (Ms-Word add on), notes and headings developed were extracted into a new document for further analysis. Following this, we refined our groupings to reduce the number of codes (combining similar categories, or related). Interpretation of the categories was our discretion. We continued to refine our codes until we were satisfied. The focus of the analysis of social media data was to establish narratives emerging from the messages. Despite the potential of social media analysis, we also acknowledge the limitations which social media data present.

4.2.   Quantitative methods

Since this study follows a mixed methods approach, quantitative data were collected using household survey questionnaires which were administered to residents in the Cape Flats, Cape Town CBD, Northern and Southern suburbs. The decision to adopt a questionnaire was based on our need to extend and quantify our exploratory dimension (cf. Boynton & Greenhalgh, 2004). For instance, through the questionnaire, we were able to quantitatively establish aspects of the study area such as household demographics and frequency of updates from local authorities which qualitative methods could not achieve. There are different guidelines when developing questionnaires including Gillham (2008) and Atkinson (2007) and following some of the guidelines, our questionnaire consisted of different question types and was structured in 5 sections. The questionnaire consisted of 40 questions and when exported to R, it had a total of 91 variables. To select the communities, we applied a proportional quota sampling, thus, we aimed to select areas representing different socio-economic status of Cape Town. Within each community, a random sampling approach was used to identify participants and data were gathered using the assistance of locally recruited individuals. In each of the four selected community, 50 questionnaires were distributed and from the 200, only 96 were returned with most sections completed, and were used for data analysis.

5. Study Findings
5.1.   Demographics of household survey respondents

The opening section of the household survey questionnaire focused on the demographics of the respondents (including their households). Questions in the section included location, household size, gender of respondent, education, and employment status. Results on these questions are presented in Table 2.

[Table 2 here]

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[14] Open source codes for data transformation are available from different websites.

As Table 2 shows, 51% of the respondents were female and 49% male. In terms of age groups, the 18-30 age group had the most participants (57%) followed by the 31-40 with 29% while the 41-50 age group had 13% and only 1 participant in the 51+ age range. In addition, almost equal participants were drawn from households of size 1-3 (44%) and 4-6 (48%) with only 7% participants coming from a household with 7 or more members. Most participants (61%) attained tertiary education while 38% studied up to high school level with only 1 participant without formal education. The Cape Flats (riddled with many social ills, including violence, see Sonnenberg, 2018) had the least participants (15%) while most participants were from the CBD. Northern and Southern suburbs had 29% and 21% respectively. Demographics for participants in the key informant interviews have already been discussed.

5.2.   Water crisis in Cape Town

Between 2016 and 2018, Cape Town faced a critical water shortage. While the water shortage was intense during this time, Muller (2017) argues that this water problem had been known for many years. As shown in Figure 1, water consumption in Cape Town peaked at 357,865,301 KL. However, there was a sharp decline in water consumption from 2015 and at this point, concerns on potential water crisis were growing.

Figure 1

As residents of Cape Town, the authors also experienced the reality of the water crisis. During this period, residential areas experienced incessant water cuts (rationing) for varying times ranging from a few minutes up to several hours a day. In addition, the water pressure was reduced. Due to these circumstances, individuals resorted to bulk stocking of water thus, bought water containers.

From our study findings, it was evident that the water crisis affected all social groups, albeit in different ways. To overcome the water shortage challenge, the local authorities set up water collecting points allowing individuals to access water. These access points were broadcast on different platforms including social media. Despite vivid pictures painted in many studies, the extent of the water crisis remains a contested fact among many. We asked the city officials, during key informant interviews, on the extent of the water crisis to develop insights on the situation. From the interviews, one official reiterated the seriousness of the situation indicating that:

> "*the city was at a bleak point, even as local authorities, we started to contemplate the unthinkable*"

Similarly, social media posts seem to support that the water crisis in Cape Town was dire. This is supported by a cautionary tweet from @ EFCatUNC suggesting that:

> "*Cape Town and Chennai should serve as cautionary tales: cities need to act now, before city water shortages*"

The extent of the Cape Town water crisis is reflected by several other elements which include its discussion at a global level, government commitments (e.g. forming ministerial task teams) and ongoing efforts towards disaster preparedness.

5.3 Discussing water crisis on social media – an affordances lens

In this section, we apply the technology affordance lens to understand the use of social media during the water crisis. Our focus is to understand what social media affordances were available to the public relating to the water crisis (i.e. nature of topics/themes). We identified three main affordances applicable to the water crisis and these are metavoicing, persistent engagement and visibility.

5.3.1 Metavoicing

As the water crisis unfolded, residents of Cape Town, as well as Twitter users living elsewhere started to discuss about the crisis online. The discussions on Twitter were often through comments, retweets, and polling on an original tweet. It can be argued that there was collective voicing (echoing) on issue relating to the water crisis and Majchrzak et al. (2013) identify this affordance as metavoicing. As the water crisis deepened, the local authorities had to make key decisions, including frequent switching-off of water in residential areas. Through the metavoicing affordance, residents weighed in and discussed these suggestions. In the context of water crisis in Cape Town, residents are located in different areas and it would be difficult to gather insights of different individuals but through technology (social media), it was possible for different individuals, regardless of location, to contribute. However, while metavoicing is important (inclusive decision making), it can also be difficult to make decisions when there are mixed reactions (conflicting reactions).

We can demonstrate the diversity of themes being discussed by combining the statements harvested from Twitter. Using R software and observing the word-mention limits (*min = 5; max =inf*) we developed a word cloud presented in Figure 2. As shown, some of the key words from the online conversations include water, cityofCT, consumption, exceeded, litresday (*sic*), target and global were common.[15] Further, the search also yielded mentions of other global cities in this case London and Amsterdam. While not part of the word cloud, we also noted (in other searches) mentions of other provinces in South Africa (especially Eastern Cape) which are also experiencing water challenges. For the public, metavoicing ensures that important issues are discussed until they are addressed and for the local authorities, it important in that it helps them identify key issues which need attention.

[Figure 2 here]

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[15] These keywords are subjective based on the topic, timing, and search strategy.

5.3.2 Persistent engagement

In addition to the foregoing, another important affordance of social media during the water crisis was persistent engagement. This refers to social media's ability to enable ongoing engagement and retention of past engagement (cf. Cabiddu et al., 2014). Given the nature of a crisis, it was important for engagement between local authorities and the public to be ongoing and timely. In the context of the Cape Town water crisis, figure 3 shows ongoing and, in some cases, real-time conversations between local authorities and the public were.

[Figure 3 here]

In addition, the water crisis extended for many months and through social media, discussions continued to occur, at times, building on previous social media posts e.g. reminders on restriction levels.

5.3.3 Visibility

The third affordance which social media enable is visibility. In this study, we consider visibility as making visible actors and concerns previously invisible or hard to see more visible. Through social media, previous social groups who had not been able to voice out their concerns and/or draw the attention of the local authorities, could air out their problems relating to the water crises. For instance, through social media, individuals are empowered to engage officials, who previously they could not engaged demonstrated by the following tweet:

> "I want to know from the minister whether they will put in place any means of even distributung (*sic*) water national"

Our findings suggest that the water crisis (and as it was experienced by the authors) affected diverse social groups (almost all areas had water shortages) but the major impacts were among the already marginalised groups who, for instance, could not afford to buy drinking water. It is reported in Robins (2019) that other social groups however benefitted financially from the water crisis which intensifies suggestions that the water crisis was an engineered one. Findings from Twitter suggest that individuals were able to highlight corruption, mismanagement and other social challenges faced by marginalised groups. These issues are often invisible (or hard to see) but social media posts increase their visibility.

5.4.   Social media and Public engagement

During the water crisis, appropriate public engagement was critical to preserve the reputation of local authorities and ensure coordinated actions to avert the crisis. studies have highlighted the potential of social media platforms, and in this study, we explore the

use of the Twitter platform for public engagement. From our findings, we established that local authorities (City of Cape Town) used Twitter (see, figure 4 for official account / handle). Figure 4 shows that the city has used the platform since 2010 and in the process, has accumulated over 370 000 followers.

Figure 4

Our observation was that the local authorities and the public had engaged on Twitter extensively during the water crisis. While we only focus on Twitter, the local authorities also have other social media account. We asked local authorities on the use of social media and the engaged official indicated that:

> *"as a local authority, we use Facebook, Twitter, YouTube and LinkedIn. Facebook and twitter are our most popular platforms that we use to engage the public. Social media plays a key role in three facets. Firstly, we can communicate to the public the City's IDP values and the strategies of our key directorates. Secondly, we use social media as a conduit between the residents and the city with a great deal in facilitating a conversation between the two particularly around service delivery. The third is to benchmark the sentiments of the residents when they are referring to CoCT."*

In line with these remarks, we explored, from the household survey, the perspectives of the respondents on the engagement with the local authorities. in Table 3, findings show that respondents from the CBD (52%) had the most engagement with local authorities using social media. Further analysis, chi-square test, show that there is no significant difference (p = 0.301) between the location of respondents and engagement with the local authorities.

Table 3

Further, when all locations were combined, only 40% of the respondents indicated that they engaged the local authorities using social media. This is despite efforts by the local authorities and government to promote e-governance in the study area through the Cape Access program (Kassongo, Tucker & Pather, 2018). While there are many community respondents who are yet to use social media to engage local authorities, those who do indicated that using social media resulted in swift responses (persistent engagement), often receiving responses within 5 hours. Even though only a smaller population used social media, we asked city officials how they used social media during the water crisis and one respondent indicated that:

> *"[social media] helped identify key themes that the residents were discussing. We picked up that a lot of disinformation in that some residents were confused around the cause of the water crisis, as some blamed it on the water usage in townships, some blamed on the lack of experience with regards to leak repair."*

Since we established that respondents also engaged the local authorities using other formats, we explored the general accessibility of local authorities to the public. Findings from the household survey show that 79% think that local authorities were "occasionally" accessible, while 17% suggested that officials were never accessible and only 4% think that officials are always accessible. The Pearson chi-square test (p = 0.479) suggest that there was no significant difference between the location of the respondent and their

perception on the accessibility of the local authorities. This finding was contrary to the city officials who indicated that they are mostly available to the community except during exceptional circumstances.

From the findings presented in this section, it is evident that for local authorities, like in the case of the public, social media has affordances for local authorities relating to public engagement. We consider the persistent engagement affordance as critical during crisis management. However, it was also evident from the findings presented that local authorities used "other" platforms to engage the public and these include written notices posted in public places. It is possible, therefore, that social media and other platforms had different contributions towards averting the water crisis, but it remains a challenge to accurately determine the contribution of social media in the process. Gwaka (2015) argues that metrics to measure social media effectiveness are not well developed and this frustrates efforts to determine the effectiveness of social media for public engagement during crisis. Faced with this challenge, it is the study's supposition that a critical analysis of the messages relayed on social media provides further important information useful to determine the importance of social media in addressing a crisis.

5.5. Social media stories – a narrative analysis

In the preceding section, we have demonstrated how both the public and local authorities turned to social media platforms during the water crisis. We aimed to highlight the potential of social media, without detailed analysis of the content of the messages sent over social media. In this section, we focus on the narratives in the messages shared on social media using the attribution theory. We argue that analysing the content and its meaning helps to establish the different attributions made by community members and the local authorities on the water crisis. The attribution theory has three dimensions (i.e. locus, stability, and controllability) and our study links the tweets to these three dimensions to draw conclusions on the

5.5.1. Locus

In terms of locus, the causes of the Cape Town water crisis can be identified as either internal or external between the local authorities and communities. In this study, each group identified the causes of the water crisis mainly as external. The inverse of this is that if these attributions are true, they become internal causes to the opposite group. For instance, the local authorities suggested that high water consumption (and water waste) could be attributed to the water crisis in Cape Town. In a tweet, the local authorities pointed that:

> "Cape Town's water consumption for the past week has exceeded the target by 25 million"

On the other hand, communities thought that poor investments in water infrastructure could be attributed to the water challenges as demonstrated in the following message:

> "Have the authorities in @WesternCapeGov and @CityofCT made sufficient investments in new bulk water storage"

It is unlikely that local authorities would admit that internal factors contributed to the water crisis despite considerable mismanagement and corruption matters which are related to crisis (e.g. evidence presented at the state capture inquiry commission, see for example, Hoffman, 2019). However, Patricia De Lille's message suggest that the water crisis could be linked to internal matters problems within the local authorities (which are not known to the public) and one message from Twitter asked:

> "Thank you. @PatriciaDeLille Who exactly are the "laptop boys"? Give us the story about #DayZero"

However, there are other events within local authorities known to the public which were attributed to be part of the causes of the water crisis. For instance, the community members perceived the cause of the water crisis to be external as they argued that the water crisis was a result of poor administration (internal to local authorities) as suggested in the following text:

> "@CityofCT With the DA falling apart so is your service. It has now been a month and still you have not been able to resolve this problem [water shortage]"

Further to the above, the study also established that among the community members, there was realisation that the community needed to be cautious on its use of water. Thus, the community admitted that the cause of the water crisis could be internal. For instance, one community member tweeted:

> "Water restrictions should not be relaxed. The world's population has grown, resources have not"

In terms of locus, it is prudent to argue that both the community and local authorities admitted that the main causes of the water crisis were external (e.g. difficult task and bad luck). The importance of locus is that if actors identify the causes as internal, it is likely to trigger behaviour change but if they attribute the problem as external, it is unlikely that there will be behaviour change.

5.5.2. Stability

This causal (stability) dimension suggests that causes of a crisis can be constant or varying over time. Findings in this study suggest that causes of the water crisis vary over time thus can be classified as unstable. For instance, we established that individual efforts and attitudes towards conservative use of water change over time demonstrated in the following alert by the city:

> "cape town's water consumption for the past week has exceeded the target by [number] million litres/day"

In addition, we found that there was general appreciation of how, collectively, the Cape Town community made efforts to avert DayZero. One community member indicated that:

> "@Derek_Hanekom You're right. We did collective water savings in #CapeTown it worked. Let's #DayZero #Eskom now.

These remarks suggest that through certain actions, water could be saved. Also, the statement confirms Graham's observation that communities attribute success, in the context of this study – averting DayZero - to "competence and how hard they try" (Graham, 1991). Further, success often generate positive affective feelings such as:

> "Cape Town is putting out the word \"We're back!\" after 3 years of drought nearly made CT the world's 1st modern city to…"

However, this perspective contrasts the earlier suggestion of a divided society. Thus, from analysing the social media stories and posts, it is evident that failures are attributed to external while success is internalised by actors.

5.5.3. Controllability

The controllability dimension refers to personal responsibility, or whether a cause is subject to one's own volition (Graham, 1991). In this study, we found several statements which suggested that the water crisis was controllable. Firstly, reflecting on the crisis, community members suggested different measures to the local authorities which need to be put in place which include the development of appropriate infrastructure. Referring to the drought, one post indicated that:

> "the DA was blamed because they didn't heed a warning given 20 years before."

In addition, we also found that those who experienced the Cape Town water crisis were cautioning other cities on the possibility of water crisis unless specific action was taken, and this is indicated in this tweet:

> "Cape Town and Chennai should serve as cautionary tales: cities need to act now, before city water shortages"

On the other hand, others argue that the water crisis was a result of an uncontrollable cause, drought. One of the statements supported this by indicating that:

> "Cape Town faced the unprecedented prospect of having to turn off water supplies due to the worst drought in the century"

Our findings suggest that local authorities and the public think that the water crisis has elements which are controllable and other elements which are uncontrollable. These perceptions have implications on behaviour change, strategies which can be implemented by local authorities to deal with such crisis and the reaction of the public to these strategies.

6. Discussion and conclusion

Water challenges in Cape Town are far from over. However, the dreaded DayZero has been averted, at least for now. With this study, we have indicated that the local authorities and the public engaged on social media, even though our focus was only on Twitter. Main

lessons for the remaining 60% who have not used social media to engage local authorities were the unique affordances which social media. The three affordances focused on this study were metavoicing, persistent engagement and visibility. In terms of social media use for public engagement during the water crisis, our findings echo previous research that argue for transitions towards e-governance in Africa (Thakur & Singh, 2012). The affordances highlighted in this study are consistent with expectations for inclusive development. Thus, social media has technology affordances enable story co-construction (cf. Wang, Kim, Xiao & Jung, 2017) while visibility allows most individuals to participate in discussions which they previously could not (Gwaka & Smit, 2018) and hidden stories (corruption, mismanagement) to be revealed.

Using the attribution lens, we sort to understand the meanings of the messages relayed on social media. This builds on Neresini and Bucchi's (2011:66) suggestion to go beyond simple "mapping [of] communication and public engagement activities to comparing them in such a way that their [usefulness] can be assessed in both absolute and relative terms" Like Anderson et al. (2016) our study noted that different narratives emerged from the tweets such as corruption, politics, and incompetence among the local authorities. To an extent, these findings confirm the political nature of the water crisis (Robins, 2019). In addition, both local authorities and residents seemed to accept only minimal responsibility thus, ascribed the crisis as external. In a way, we agree with this perspective as droughts and water shortages are increasing across global cities resulting from climate change. Nonetheless, there are areas which both local authorities and residents need to shoulder responsibility.

From the study findings and brief discussion presented, we draw two main conclusions. Firstly, social media platforms (in this study, Twitter) play an important role towards public engagement during crisis. In the case of the Cape Town water crisis, we conclude that Twitter was used extensively and continue to be used by the local authorities and the public for engagement (persistent engagement). Both the local authorities and the public acknowledge the usefulness of social media even though there appears to be no defined metrics to measure the usefulness of the platforms.

Secondly, in terms of the narratives which social media platforms enable, we conclude that social media allows diverse, often hard to see, messages to be shared. In terms of messages relating to the Cape Town water crisis, we found statements showing blame, (external attributions), denial, apologising, reminders, and celebrations. A close analysis shows that no group accepted blame for failure (in this case, the water crisis) but every actor was prepared to take recognition when there was success. Further, we noted that social media posts revealed structural elements of the society such as corruption and segregation which need attention.

Further, through the attribution analysis, we can make speculations about expectancy of success in future crisis, not only relating to water but other challenges as well. From the findings, there are suggestions that the water crisis cause was an unstable factor (poor planning by the city). Thus, it can be argued that unless there is significant investment in

water infrastructure, the water crisis is likely to occur again. On the other hand, investments without changed behaviour among residents might be a futile exercise.

In conclusion, though our study is not the first to explore social media use for public engagement, we offer new insights on the Cape Town water crisis and the study findings contribute to theory and practice. In theory, we demonstrate technology affordances in social media and extend its applicability. Practically, even though there remain a gap on effective adoption and use, we suggest that both the public and local authorities can turn to social media for engagement in times of crisis like the current COVID-19 pandemic. However, in doing so, there is need for addressing the teething issues with social media which include fake news and privacy concerns

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Tables and Figures:

Table 1: Summary of key informant interviews

	Participant Designation	**Role during the crisis Reason for selection**	**Level of engagement**
R1	Director of Communication	Decisions on timing of messages and medium used to disseminate	Executive level
R2	Manager of Communication	Managing staff, engaging residents through social media	Management level
R3	Campaign Coordinator	Monitoring	Operations level
R4	Social Media Officer	Social media consultant	Operations level
R5	Social Media Officer	Social Media Consultant	Operations level

Table 2: demographics of the respondents

		N	%
Gender	Male	49	51
	Female	47	49
Age	18-30	55	57
	31-40	28	29
	41-50	12	13
	51+	1	<1
Household size	1-3	42	44
	4-6	46	48
	7+	7	7
Education	Tertiary education	58	61
	High school	37	38
	No formal education	1	<1
Location	Cape Flats	14	15
	CBD	33	35
	Northern Suburbs	28	29
	Southern Suburbs	20	21

Table 3: Options to engage local authorities

Engagement channel	Cape Flats	CBD	Southern Suburbs	Northern Suburbs
Social media	36%	52%	39%	25%
Other	64%	48%	61%	75%

Figures:

Figure 1: Water consumption trends in Cape Town 2010-2019
Source: City of Cape Town (unofficial)

Figure 2: Cloudword developed from social media tweets

Figure 3: Twitter extracts on engagement between @CityofCT and other users

Figure 4: City of Cape Town Twitter account