



MONASH University

**SOCIAL MEDIA AND LEARNING: A STUDY OF WATER RESOURCE
MANAGEMENT IN MPOPHOMENI TOWNSHIP, KWAZULU-NATAL,
SOUTH AFRICA**

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ABSTRACT

Social media has gained publicity within different sectors (government and non-governmental organisations) over the past few years, as a way of sharing information. However little research is evident on the use of social media to share information on the management of water resources. This study is one of its' kind and explores how sharing information through social media can facilitate dialogue, learning and community engagement in the management of water resources. The intention of this study was to go beyond using social media to share information by investigating how information was shared before the use of social media was implemented in the Save Midmar Dam Project; the justification for and selection of suitable social media platforms; how information is shared; the type of information shared; the role which social media has played in the diffusion of information; the learning that has resulted, and how this may have facilitated behavioural change that would lead to improved management of water resources.

This study adopted a descriptive qualitative case study approach, with Mpophomeni Township, KwaZulu-Natal, South Africa being the case selection. This research approach was compatible with the topic in question because it helped me in understanding how information sharing using social media can facilitate learning on the management of water resources. A combination of primary and secondary data collection tools and approaches were designed and followed in gathering data for this study. A description of these together with data analysis, research rigor and ethical considerations are also discussed.

The results suggest that while use of social media has played an important role in learning and behavioural change at this stage of the project, this has largely been evident among the Enviro-Champs. They use social media platforms effectively in many aspects of their engagement among themselves, with the professional staff of supporting NGOs, and in sending information to the municipality. This has helped them establish a collective identity and a sense of professionalism that has played an enabling role as they engage with the residents of Mpophomeni Township. It cannot be assumed that all residents of a township like Mpophomeni have ready access to social media platforms. And, even if they could, the subject, water resource management, may be both unfamiliar and seem to have little relevance in daily life. The Enviro-Champs turned to other ways of engaging and communicating, using face-to-face discussion and drama presentations. This helped to reinforce their collective identity and gain recognition among residents, young and old. The results present evidence these

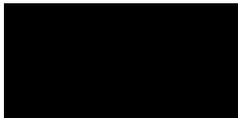
engagements have resulted in behavioural change and that these successes reinforce the identity and commitment of the Enviro-Champs.

This study has illustrated that social media can be positioned within the broader realm of water quality management as a tool for enhancing social learning. From this exploration, it can be argued that social media in water management requires the development of systems-based tools to guide policy formulation, implementation and analysis. For future research furthering this study, research on how different constituencies perceive the value and use of social media in water management can be conducted. Also understanding the kinds of social media platforms that have been established to promote broader social learning processes at larger scales than communities in water resource management.

Keywords: Social media, Learning, Water Resource Management

DECLARATION

I, Elsah Nomsa Dhliwayo, declare that this thesis submitted for the degree of Master of Philosophy in Integrated Water Management at Monash University contains no material accepted for an award of any other degree or diploma in any university or other institution. To the best of my knowledge, it contains no material previously published or written by another person except where due reference is made in the text of this thesis.



Elsah Nomsa Dhliwayo

18 July 2018

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DEDICATION

I dedicate this thesis to first and foremost my Lord and Saviour Jesus Christ for His sufficient grace in my life. I also dedicate this thesis to my parents (Mr Sydney and Mrs Charlotte Dhliwayo) thank you for being my pillars of strength and believing in me that I can achieve anything in life with the help of the Almighty God.

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ACRONYMS

DUCT	Duzi Umngeni Conservation Trust
DWAF	Department of Water Affairs and Forestry
Enviro-Champs	Environmental Champions
EVC	Environmental Champions
MiniSASS	mini South African Scoring System
MUHREC	Monash University Human Research Ethics Committee
NGO	Non-Governmental Organization
RSS	Really Simple Syndication
SARMCOL	South African Rubber Manufacturing Company Limited
UMDM	uMgungundlovu District Municipality
WESSA	Wildlife and Environment Society of South Africa
WRC	Water Research Commission

CHAPTER ONE: INTRODUCTION TO THE STUDY

1.1 Overview

Water cannot be managed in isolation and it is the responsibility of everyone to make sure that water is safeguarded (United Nations, 2013). In this context, it becomes necessary for communities to mobilise themselves to manage or devise approaches to manage their water sources collectively. Meinzen-Dick, DiGregorio and McCarthy (2004) stress the importance of collective action when individuals strive to achieve mutual goals such as water security. Water security, which can be understood as a shared goal, is defined by the United Nations (2013) as the ability of people to protect maintainable access to the right amount and adequate quality of water for supporting livelihoods, well-being of humans, social-economic development and safeguarding protection against water-borne pollution and water related tragedies. It involves the integrated management of water resources across all levels of social organisation including individuals, communities, local government, national government and international government. Such integration requires exchange of information, knowledge and interaction among stakeholders when protecting and instilling value on water sources (Morgan and Orr, 2015). In this context, it is posited that social media can be used to share information pertaining to the management of water resources to facilitate broader outcomes such as social learning.

This study sought to explore how information sharing using social media can facilitate learning and collective action for the management of water resources to improve water security. The study drew on a case study of Mpophomeni Township in KwaZulu-Natal Province of South Africa where participants in the Save Midmar Dam project were using social media to share information pertaining to the project. This chapter serves as an introductory to this thesis and includes four sections contextualising the study. The first section provides the background of the study which considers water quality issues in South Africa, social media and learning. This is followed by two sections that present the research problem and research questions respectively. The last section outlines the structure of the thesis.

1.2 Background of the study

1.2.1 Water quality issues in South Africa

The decline of water quality is a major water problem in South Africa. While there may be many contributing factors (Nkhata, Breen and Hay, 2014), what is of particular relevance to this study is the understanding that pollution arising from sewage and waste discarded into

streams appears to be a major factor resulting from rapid population growth and poor service delivery (Maluleka 2005, UN Water 2007, Callan 2010 and Van Deventer 2012). Otiemo and Ochieng (2004) observed that, particularly during the 1960s, 1970s and 1980s, the increase in population growth led to serious reduction and degradation of water resources in South Africa. While this continues unabated, the increase in population without maintaining and expanding the infrastructure strains sewer and water treatment infrastructure. This is aggravated when inappropriate materials are discarded in toilets causing sewers to block and surcharge. With increasing population growth, there is also an increase in solid waste further straining effluent management efforts. In this regard, Kolbe (2014) draws attention to how in the uMngeni River Catchment, where this study was located, there is no proper management of waste and people end up disposing their solid waste in streams that flow into water storage reservoirs.

The Save Midmar Dam Project was designed as a response to deteriorating water quality in Midmar Dam, an important water resource within the uMngeni River Catchment. The causes of poor water quality were largely attributed to poor solid and waste management, ageing and strained infrastructure due to population growth, and agricultural run-off. It was believed that Mpophomeni, a settlement immediately above the dam, contributed significantly to the decline of water quality within Midmar Dam due to persistent discharge of raw sewage and poor solid waste disposal (Ground Truth, 2010b). In an attempt to at least contribute to a solution, a Citizen Science Project (the Save Midmar Dam Project) was initiated with the intention of bringing about behavioural change that would result in improved waste disposal both within the sewer system and in the surrounds, particularly the uMthinzima Stream that discharges into Midmar Dam (UMDM Report, 2017). It was envisaged that such a project would require interaction among participants based on the sharing of information and knowledge as well as learning as suggested by Morgan and Orr (2015). It was anticipated that social media could be used as a medium for exchanging information to facilitate learning around the management of water resources.

1.2.2 Social media

In the context of this study, social media is viewed as any tool which makes use of the internet so as to help establish connections and promote dialogues between companies, peers and friends. Those involved use social media to share knowledge, opinions, ideas, experiences and insights. Social media makes use of pictures, words, audio diagrams and chatter (Solis, 2010). In particular, it refers to the use of web-based and mobile technologies to turn human

communication into interactive dialogue (Baruah, 2012). Social media comes in many different forms including: magazines, forums, weblogs, blogs, micro-blogging, wikis, podcasts, pictures, video, rating sites and bookmarking. With the universe currently in the midst of a social media revolution, it is more than evident that social media platforms such as Facebook, Twitter, MySpace, YouTube and Skype, are now being used extensively to communicate and learn (Baruah, 2012).

Grady and Bateson (2012) observed that social media is more prevalent and used to communicate between local authorities and communities in developed countries than it is in developing countries. Research shows that it is only now that some local authorities in developing countries have started to use social media platforms to communicate and share information between different stakeholders thereby encouraging learning (Australian Government Management Information Office, 2006). However, local authorities in developing countries are challenged because of inadequate communication technologies, lack of skilled people in operating and managing the use of social media and the lack of finances being one of the greatest challenges (Grady and Bateson, 2012).

Grady and Bateson (2012) suggest that the use of social media as a means of communication between different stakeholders will serve a lot of purposes including: improved efficiency and interaction; improved participation; polycentric governance; learning; networking; simplified service to local people at any time; transparency and accountability on the body of operations; and, enhancing interdepartmental coordination. In this study, I sought to understand how information sharing using social media platforms can facilitate learning about management of water resources that could lead to changed behaviours, thereby improving water security.

1.2.3 Learning

The relationship between learning and environmental management has been an area of interest to many authors (Keen et al. 2005, Wals 2007, Muro and Jeffery 2008). Biggs, Schuluter and Schoon (2015) describe learning as a multifaceted phenomenon which includes:

1. Acquiring information and increasing knowledge,
2. Memorizing,
3. Acquiring facts, skills and methods,
4. Making sense or abstracting meaning

5. Interpreting and understanding reality in a different way by reinterpreting knowledge

There are two complementary forms of learning which are believed to enhance the resilience of environmental services: loop learning and social learning (Biggs, Schuluter and Schoon, 2015). While both are important for this study, it is important to stress the role social learning can play in collective management of water resources. This is discussed further in Chapter Two. In this study, I investigated how information sharing using social media platforms was used to facilitate learning and enable behavioural change in support of management of water resources.

1.3 Research problem

While supplying water to emerging settlements is a major problem in most developing countries, managing the polluted return flows into water courses and storage impoundments has proved to be a more serious challenge. This is particularly so in settlements such as Mpophomeni, where infrastructural investment has not matched the population growth. The consequence has been streams of raw sewage flowing from manholes into the uMthinzima Stream which then flow to Midmar Dam (UMDM Report, 2017). This compromises the water quality security of the downstream communities and industries that depend on water from the dam (Kolbe, 2014). A founding assumption of the Save Midmar Dam Project was that the residents in Mpophomeni lacked awareness and information on the management of sanitation and solid waste within their area and as a result, they were not aware of the consequences for water resources (Kolbe, 2014). They suggested that social media platforms could be used to share information, promote learning and enable the behavioural changes that would be required to improve management of sanitation and solid waste.

In instances where communities mobilise themselves to manage or devise approaches to manage their water sources, challenges of collective action and monitoring may limit their effectiveness (Australian Government Management Information Office, 2006). The use of social media has emerged as an approach to mobilise communities around the sharing of information about water security thereby encouraging an innovative approach that can address monitoring and participation problems among local communities. However, at least in the context of settlements such as Mpophomeni in South Africa, there is need to understand how social media can facilitate the sharing of information, encourage learning among residents and different stakeholders and bring about behavioural change leading to improvement in the management of water resources and thereby improving water quality security. The research reported in here seeks to contribute to this understanding by testing the following proposition:

Sharing information through social media facilitates dialogue, learning and community engagement in the management of water resources.

1.4 Research questions

The question posed in this study was therefore: How does information sharing using social media facilitate learning for the management of water resources? The study attempted to answer this question by investigating: how information was shared before the use of social media was implemented in the Save Midmar Dam Project; how information was shared when the project was put in place; the justification for and selection of suitable social media platforms; the type of information shared; the role which social media has played in the diffusion of information; the learning that has resulted, and how this may have facilitated behavioural change that would lead to improved management of water resources.

1.5 Structure of the thesis

This thesis is structured into six chapters as follows:

Chapter One: Background of the study

This chapter introduces the thesis, and expands on the background of the study, research problem and research objectives.

Chapter Two: Literature Review

The second section of the thesis presents the literature which guides the study. The review focused on developing a description of social media identifying the perceived benefits and challenges of using social media, and the use of social media in South Africa. I present the guidelines that have been developed for using social media, the different sectors using social media, and a framework for understanding the ‘building blocks’ use of social media. Literature about learning and guidelines for learning is also discussed in this section.

Chapter Three: Research Area and Methodology

This section provides a detailed description on the background of Mpophomeni (social, political and economic), Midmar Dam and the stakeholders that it serves within the area. I provide background to the water, sanitation and solid waste management services and the Save Midmar Dam Project. Particularly, I develop my justification for using Mpophomeni and Save

Midmar dam Project as the case study. The research design and methodology for the study is also presented.

Chapter Four: Research Results

This section provides the results gathered during data collection. I start by presenting findings about the use of social media before the Save Midmar Dam was implemented. I then address the selection of suitable social media platforms, the available social media platforms, reasons for using social media, how information is shared and the type of information shared, the role which social media has played, diffusion of information, the learning that has resulted, and its influence in bringing about behavioural change.

Chapter Five: Discussion

This section discusses the findings of the research presented in chapter four in relation to the literature presented in chapter two. I return to consider the proposition that guided this research and respond to the research question.

Chapter Six: Recommendations and Conclusion

In this chapter I summarise my findings, draw conclusions drawn and make recommendations for further research.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The use of social media for information sharing directed toward facilitating learning for the management of water resources has received little attention in the environmental literature. Thus, the literature reviewed in this chapter draws on experiences in business, marketing, public relations, journalism, communications, non-profit and the voluntary sector. This chapter sets the theoretical foundation of the study. The key concepts of the study are reviewed in detail to establish current understanding of how information sharing using social media can facilitate learning and bring about behavioural change.

2.2 Understanding the concept of social media

2.2.1 Description of social media

Social media is defined by Kaplan and Haenlein (2010) as a set of internet based applications that are constructed on the technological and philosophical fundamentals of web 2.0 and allow the formation of user generated content. When using social media, the users are in a position to create, share and exchange information in the online world. In simpler terms social media is described as any tool which makes use of the internet to so as to help connections and dialogues between companies, peers and friends. Burah (2012) opines that the term social media refers to the use of web-based and mobile technologies to turn communication into interactive dialogue. This notion of 'interactive dialogue' has particular significance for learning (Janhonen and Johanson, 2011) and thus for this study. Another definition that was added by Erasmus (2012), is that social media is a comprehensive collection of online word of mouth forums. In this sense, social media provides the medium through which ideas are shared and around which discussions and meetings attain relevance. And, this 'relevance' is enriched and strengthened when social media involves sharing content or information in the form of pictures, words, audio diagrams and chatter (Solis, 2010). As such, Janhonen and Johanson (2011) consider that social media platforms which are based on Web 2.0 were established to enable the new combination of information collaboration.

In the context of this study, Social media would have to engage websites and applications that enable the users to create and share content; and importantly, to participate in social networking that facilitates learning about the management of water resources. While Social media comes in many different forms (including magazines, forums, weblogs, blogs, micro-blogging, wikis,

podcasts, pictures, video, rating sites and bookmarking), social networking sites have particular relevance (e.g. Facebook, LinkedIn, Myspace, video and photo sharing websites which are Flickr or YouTube, Blogs corporate or personal which includes Twitter, discussion boards and groups which includes Google groups or Whirlpool, Wikis which include Wikipedia, Instant messaging and emails) (Australian Government Management Information Office, 2006).

Oyza and Edwin (2015) proposed an all-inclusive and working definition constructed around the notion of social media being made up from two working words which are “**social**” and “**media**”. In this study, social, implies that there must be interaction between individuals of common interest, a group or community. Media, on the other hand, refers to the medium through which such interaction is enabled. It provides the platform, channel or medium that allows for creation and exchange of comments generated by the users. Social media are the platforms which have been adopted by the people within Mpophomeni Township to communicate in an interactive dialogue sharing information about managing their water resources (their common interest) which might lead to learning and supportive behavioural change.

In the next section I consider the perceived benefits of using social media.

2.2.2 Perceived benefits of using social media

There are a number of perceived benefits to using social media within different sectors or between different stakeholders. For example, it is considered to: improve transparency, effectiveness response time, and affordability. And, it enables people to learn, encourages networking and communication with anyone at any time, thereby increasing interaction between people and two-way communication that promotes continuous feedback.

Jenkins (et al., 2009) considers that the use of social media to share information among stakeholders creates opportunity for the development of skills, peers to peer learning, broadening of cultural expression and more empowered formation of social responsibility. Furthermore, Kestdever (2008) asserts that, the use of social media for information sharing within governments and other organisations allows building of relationships, conversations, community sharing, connectedness, and better transparency.

Alexander (2003) suggests that the use of social media as a platform for sharing information among stakeholders makes information easily accessible, particularly when the social media

platform being used is organised. When information is available online it will be easier for people to access information and learn rather than incurring the expense of travelling to different service providers to enquire and report issues regarding their environment. Social media enables information to be diffused in a quick manner compared to the use of traditional media. This means that a larger audience is reached at once, rather than sending messages to single individuals which consumes a lot of time. Furthermore, interaction is made easy thereby having high chances of being able to respond immediately thus making communication easier and more effective (Bryman, 2001).

Alexander (2003) asserts that the use of social media to communicate can enable the local community to interact better with their local government providing information which might be of use to the local government. It is further postulated that the use of social media will enhance understanding of the broad environment of the local community particularly of the processes of governance at all levels, thereby providing for establishment of discussion groups on social media that can enhance the effectiveness of pressure on groups and increase learning (Bryman, 2001).

An advantage of the use of social media is that group size is not limited. While group size can be contained, large groups can be created through establishment of networks which are powerful because people are able to learn through sharing of different ideas within a much expanded base of experience (Alexander, 2003). Thus while interaction between people who reside in the same community can communicate on issues of particular concern, they can draw from the experiences of others and learn about issues that may have yet to arise in their community. This can enhance the credibility of the shared information (Janhonen and Johanson (2011). When users who are brought into the social media network create such additional value (information, understanding, knowledge for example) for the group, it is referred to as the 'network effect'.

Smith and Wollan (2011) consider that social media moves from the traditional way of communication which is one way, as it enables two-way or many-to-many communication notwithstanding the time and location of people. The two-way communication encourages engagement on issues of interest or concern. In principle it can involve all in the community because everyone who has access to the social media will be able to see what is being communicated, and will be able to express their views or their opinion. However, the use of social media does not guarantee engagement particularly among poorer people where

participating may incur cost. Thus when considering the use of social media to disseminate information and promote learning across a wider community, it has to be augmented with other forms of communication that reach those who are marginalised. Despite the above mentioned benefits there are also limitations associated with sharing information using social media. These are raised in the following section.

2.2.3 Perceived limitations of using social media

Ketsdever (2008) has drawn attention to some of the limitations of using social media, in particular: lack of proper attention to important information; too much information which is not well interpreted thereby leading to distortion of the message; lack of effective content filters and failing to clearly express the message being communicated.

Inability to control confidentiality and the distribution of information is considered one of the major limitations of using social media to share information within different stakeholders (Smith and Wollan, 2011). This may have particular relevance in communications between government officials and citizens where ‘sensitive’ issues may be addressed and where communication using social media may tend to be conveyed in language that is ambiguous. Smith and Wollan (2011) also draw attention to the limitations arising from deficiencies in the skills that are required to manage and control the messages distributed on the platform. Notwithstanding these limitations, social media is emerging as the dominant form of communication and establishment of networks that can be used to learn and exert influence (Janhonen and Johanson, 2011).

In the next section I review literature on the use of social media in South Africa.

2.3 The use of social media in South Africa

The potential of social media platforms to connect people is evident in the increase in public awareness, recognition and use (Oyza and Edwin, 2015). In the African context, South Africa is viewed as the technological leader with use of social media increasing among individuals and organisations (Dlamini and Johnston, 2018). South Africa falls in the top 10 ranking of mobile Facebook penetration (80.5%) in the world. In a report by Fuseware (2012) it is recorded that in 2012 there were 5 352 900 Facebook users in the country and of these users, 80.5% access the Facebook platform via mobile phone. Since then the use of Facebook has increased and Social Media Landscape (2018) records that Facebook is the most used social media platform in the country with 16 million users followed by YouTube which has 8.74

million users, while Twitter has 8 million users, LinkedIn has 6.1 million users and Instagram has 3.8 million users. The same study found that businesses are having a greater percentage of the social media usage with the following statistics: Facebook with 97% usage, Twitter 90% usage, LinkedIn 72% usage which is the same as Instagram and YouTube has the least usage of 68%. The increased access to mobile Internet in South Africa has already had a profound impact on many facets of the population's social fabric and media use trends (UNICEF, 2011).

2.4 Guidelines for using social media

Developing a social media policy is an important first step for government and/or departments considering using social media and can ultimately serve as a key enabler for responsibly and effectively leveraging social media tools (The Department for Government Information Communication Systems of the Republic of South Africa, 2011).

The Department for Government Information Communication Systems of the Republic of South Africa (2011) states that planning to use social media platforms should be done as part of a wider effort to develop the department's communications strategy. The notion of strategic communication is particularly important because it helps to bound and provide context for dialogue, thereby serving to focus attention and learning. In the context of this study having a communication strategy would help to focus communication around the goals of the Save Midmar Dam Project, particularly the improvement of water quality. It has been suggested that the following guidelines should be considered before making use of any social media platforms as it will help with selecting the proper platform to match the particular needs (The Department for Government Information Communication Systems of the Republic of South Africa, 2011):

- a) Set clear, achievable, and measurable goals at the beginning
- b) Employ an integrated campaign that utilises the full potential of both traditional and social media platforms
- c) Identify your target audiences
- d) Use the right channels
- e) Identify the Information and Communications Technology (ICT) requirements for specific platforms
- f) Develop a risk management strategy
- g) Assign a social media communications team
- h) Put guidelines for use into place
- i) Be transparent about your intent and deliver on promises

- j) Allow for several trustworthy people to respond to user comments promptly
- k) Create engaging content using interactive channels
- l) Inform people whenever new content is posted
- m) Determine success criteria and Key Performance Indicators (KPIs)
- n) Evaluation

Furthermore, a Community Volunteering Charity, The Conservation Volunteers (2013) suggests that before using social media platforms organisations should:

- a) Decide on your communications aims
- b) Learn about your audience
- c) Tailor your content to that audience
- d) Post regular, useful updates
- e) Build relationships
- f) Participate in the community
- g) Allocate resources
- h) Not do it just because everyone else is
- i) Not speak too soon
- j) Not just broadcast

As the name implies, the Save Midmar Dam Project was established with a defined purpose that would provide context for communication. And understandably, the guidelines draw attention to matters such as the logistics that may be required for achieving success. But these guidelines also give emphasis to responsibility and accountability that should accompany participation, values that would be required to sustain the networks beyond the term of the project. The provision of appropriate guidelines is thus important. It allows selection of the proper platform to use while at the same time, providing guidance necessary for building relationships founded on trust which in turn, can lead to social cohesion (Community Volunteering Charity, The Conservation Volunteers, 2013). Those who set up the Midmar Dam Project would be responsible for selection of a platform and establishing the guidelines for engagement.

2.5 The use of social media within different sectors

2.5.1 The use of social media by the government

Government departments at local, state and national level have implemented the use of social media for different purposes (Merchant, Elmer, and Lurie, 2011). For example, Riedyk (2009) asserts that social media is being used by governing bodies to alert citizens about emergency management, job advertisements, notices about weather and job conditions and many other services which they offer through Twitter and Facebook. Furthermore, Bertot, Jaeger, and Grimes (2010), opine that social media enables the government to become more liable and open by providing information on citizen rights, government guidelines, resolutions and performance.

For example, Australia is one of the countries in which government is using social media as a means of communicating with residents in local communities. They postulate that the use of social media within government improves the efficiency and provision of service delivery (Australian Government Management Information Office, 2006). A government survey asserts that Australian communities have embraced communicating with local government using social media to the extent that it has become the preferred way of accessing new information from the government and learning about governance issues (Australian Government Management Information Office, 2006).

The historical context of the Mpophomeni settlement and associated deficient service delivery by government (Koble, 2014), together with the intention of using the Save Midmar Dam Project to improve water quality, suggest an important role for social media as government seeks to engage the residents and secure their commitment to reducing pollution of Midmar Dam.

2.5.2 The use of social media within businesses

Social media is used extensively within the business sector, particularly in marketing. But one of the main reasons is that effective use of social media creates and supports the relationships on which marketing success is built (Piskorski, 2011). Rybalko and Seltzer (2010), suggest that even though social media facilitates the exchange and sharing of ideas, many businesses are not using it to its full potential.

Businesses are also using social media to meet the community's needs, not just to advertise (Splauding, 2010). Zhang, Liu and Xiao (2008) postulate that with the presence of Really

Simple Syndication (RSS), a term used to refer the collection of Web feed formats that provide updated or shared information in a standardised way, social media users are able to modify and make sense from the content which they obtain from others. This has helped individuals to learn from the topics which are essential to their purposes. Moreover, sharing information using social media assists organisations as it reduces the number of people asking the same question as the information will be readily available. This is also supported by Qualman (2010) who suggests that when someone experiences problems in the field they can ask for assistance on the social media platform and when another person faces the same problem, there will be no need to ask the same question but just search for the topic finding solutions more quickly. This has particular relevance for residents in communities characterised by poor service delivery, such as Mpophomeni where they may need to solve the problem for themselves. When using social media in this way, it can bring about social cohesion as individuals come together as one to solve a shared problem.

2.5.3 The use of social media within the education system

Education systems have incorporated the use of social media within their learning environment. Ullrich et al., (2008), states that the principles of social media (Web 2.0) complements contemporary educational theories like constructivism and connectionism. Social media has assisted learners to engage in the learning process despite residing in what might be a remote geographical location, or even a location in which formal learning is difficult, or too costly to access. Importantly, those situated in such situations become connected through social media and the resulting teamwork has assisted learners to extract relevant lessons from information sharing (Dabbagh and Kitsantas, 2012). This has particular significance in the context of this research where those who engaged the Save Midmar Dam Project would have had little prior opportunity to learn about water resource management and the role individuals can play in improving local conditions.

2.6 Theory for social media

How should we understand social media and what are its components? The Honeycomb framework is perhaps one of the most widely applied frameworks used to define social media and guide the selection of appropriate social media channels (Sahharon et al., 2014).

2.6.1 The Honeycomb Framework (social media framework)

The honeycomb framework was created to describe social media functionality through combining and accepting different views of social media participants (Kretzmann et al., 2011;

McCarthy et al., 2010). It is constructed from seven building blocks which are explained below. By identifying the components (building blocks) the framework helps develop understanding of specific facets of social media user experience, and the implications this may hold for achieving a desired outcome. The 'blocks' may be used individually or together to gain insight into what users' engagement needs are. Utilised individually and together, these blocks can help managers to make sense of the social media ecology, and understand their audience and their engagement needs (Kietzmann et al., 2011). The honeycomb framework:

1. Defines different sides of the social media user experience (Kietzmann et al., 2011). It explains whether the user experience is driven by primary, secondary or tertiary building blocks.
2. Is viewed as a tool that managers can use to assess the specific community needs and conclude on the appropriate social media platform to use (Kietzmann et al., 2011).
3. Can be applied continuously as method of assessing how the needs of the community changes of the social media applications (Kietzmann et al., 2011).

The seven essential building blocks of honeycomb framework are:

Identity

Identity shows how social media users reveal their identity on a social media platform. It is also known as self-disclosure on the social media platform (Kietzmann et al., 2011). For example, the revealing of age, sex, gender, school, job etc.

Conversation

Conversation mainly illustrates how different users of social media communicate on different social media platforms like Facebook, Twitter, YouTube, and blogs. How people converse depends on the type of social media being used to (Kietzmann et al., 2011).

Sharing

Sharing emphasises the degree to which users of social network exchange, forward and distribute data or information to (Kietzmann et al., 2011). When people are sharing data or information it shows that interaction is going on, and that networks and relationships are being constructed.

Presence

Presence in the Honeycomb Framework refers to the level which the user of a social network platform is accessible or not. The presence of the user can show if the user is available or not, the location of the user whether real or the virtual (Kietzmann et al., 2011).

Relationships

The relationship on the framework entails how the social media users associate with each other and their names being found on the friends list of each other. It also reveals a chain of friends when different users have mutual friends (Kietzmann et al., 2011).

Reputation

According to Kietzmann et al. (2011), reputation is described as a way in which social media users help each other and stand on their behalf. Normally reputation goes along with trust and reliability.

Groups

Different groups are formulated by the social media users. Communities and sub-communities are created depending on how and with whom people interact on social media.

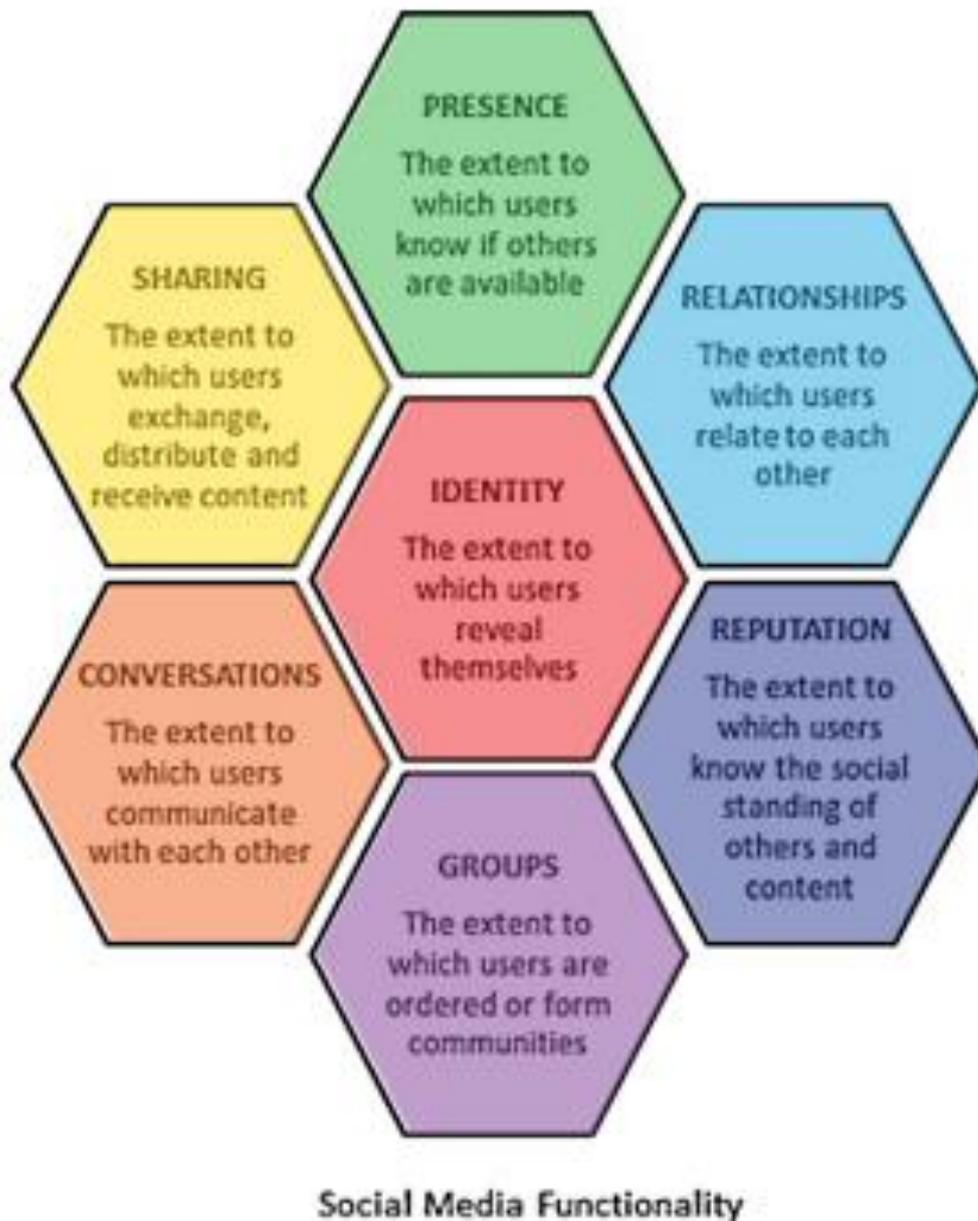


Figure 1: An image of the honeycomb framework, (Kietzmann et al., 2011)

Applying the functional building blocks within the honeycomb framework can create social cohesion within the group of people using social media to share information (Sahharon et al., 2014). In the context of Mpophomeni where social cohesion is envisaged as a requirement for achieving the intentions of the Save Midmar Dam Project, the continuous sharing of information using social media might create social cohesion within the group, thereby leading to learning and behavioural change. In the following section I consider how application of the

functional building blocks can create social cohesion, as discussed by Sahharon and Bolong (2014).

2.6.2 Social cohesion created by functional building blocks

As the term implies, social cohesion reflects the willingness of people to be part of a group that shares the same purpose or goal. It reflects their sense of togetherness, sense of belonging, social trust and social interaction (Sahharon et al, 2014). In the context of this study where the intention of the Save Midmar Dam Project was to achieve collective commitment to improve water resource management, it is evident that such an outcome would reflect the extent to which the project was able to develop social cohesiveness among residents. Understanding of the concept is elaborated below.

Sense of togetherness

Togetherness is considered to be one of the key elements when adapting social cohesion (Sahharon et al., 2014). It refers to an individual feeling honoured and full of pride when other members of that community relish working with each other. The members within the group would always be willing to share, work and include each other, and take pleasure by benefiting in community involvement (Bolong, 2011). This sense of togetherness can be achieved through ‘Sharing’, which is included in the social media functionality. The ‘Sharing’ functional block signifies the degree of engagement where online users exchange, distribute and receive content (Kietzmann et al., 2011).

Sense of belonging

The sense of belongingness arises when an individual feels a part of a community, and that the community ‘belongs’ to them (Bolong, 2011). It reflects the individual’s feelings of attachment and responsibility to the group to the extent that the person may have no wish to leave the group. The sense of belonging can be conveyed through the depth of interpersonal relationships between virtual communities and through associations, where users can be related to other users (Kietzmann et al., 2011).

Social Trust

Social trust only occurs when each individual of the group believes that integration and unity exists within the group (Sahharon et al, 2014). The factor of trust brings people together to work and socially unify so that each member of the community performs their individual’s

duties (Bolong, 2011). Kietzmann et al. (2011) observe that ‘Reputation’ is the extent to which users can identify the standing of others. Within the social media platform, trust is embodied in the concepts of reputation and identity as they relate to trustworthiness.

Social interaction

Social cohesion cannot be developed or sustained in the absence of social interaction (Sahharon et al, 2014). But in order to maintain a relationship, such interactions have to dynamically exchange information while intentionally striving to meet each other’s expectations, without asking anything in return to maintain their relationship. Such interactions among members within virtual communities are encouraged as they help to form and sustain relationships necessary for social cohesion (Bolong, 2011). Functional blocks such as ‘Conversation’ and how ‘Groups’ in social media help to group users enabling them to manage their interactions and thus become more cohesive.

In relation to this study, water resource management provided the shared context for interaction, and social media was used to enable individuals to exchange relevant information. The expectation was that this would promote cohesion among individuals in the group thereby encouraging sharing of information necessary for collective learning that would be required to improve management of water resources.

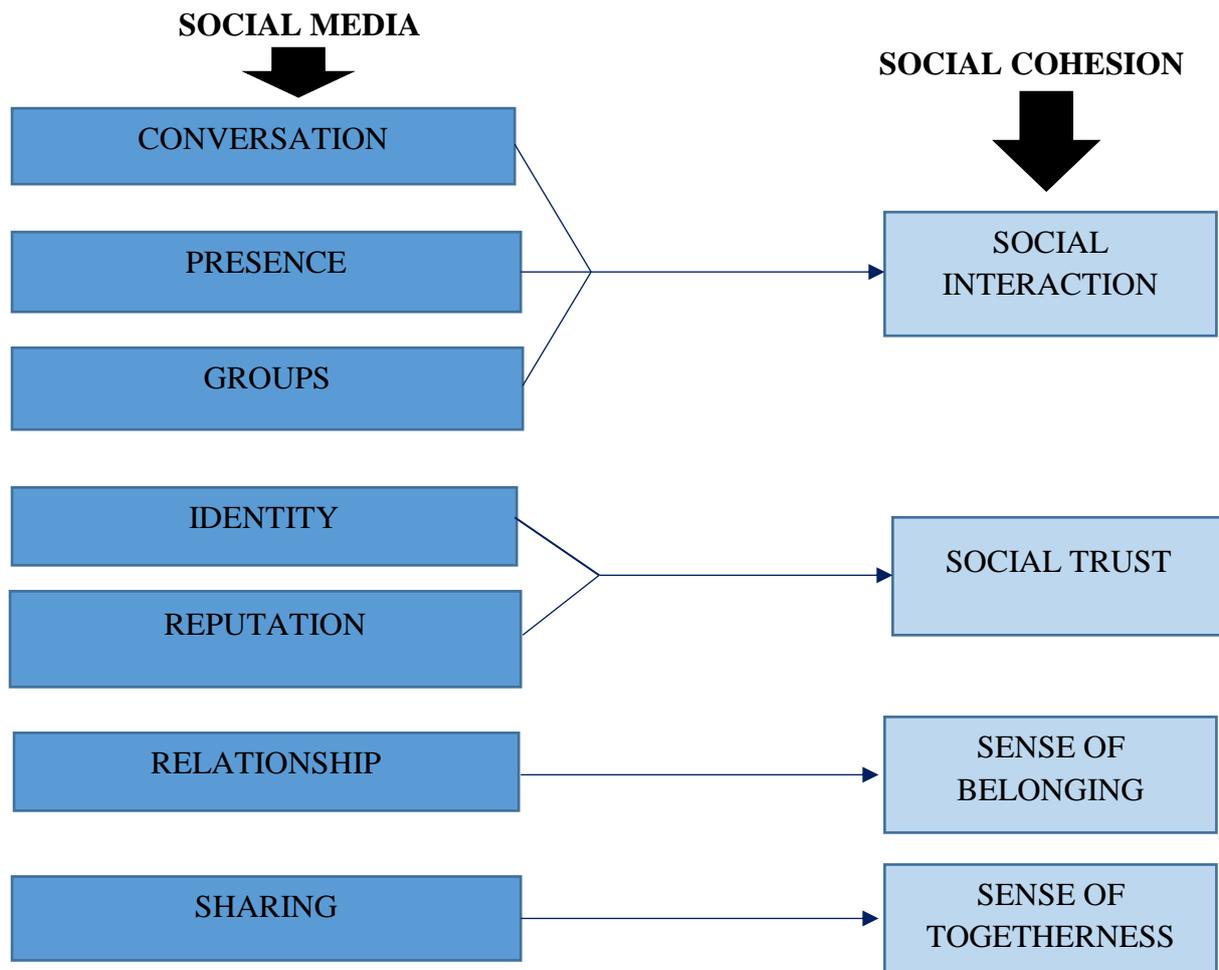


Figure 2: An illustration of how social media functionalities can create social cohesion (Samah, Badsar, Hassan, Osman and Shaffril, 2013)

2.7 Learning

Biggs, Schulter and Schoon (2015) assert that learning can be fostered in a variety of ways, including through processes of experimentation and monitoring, through knowledge co-production and collaboration. In this study where there was little prior knowledge and understanding of water resource management, the concept of ‘knowledge co-production’ holds particular relevance as it leads to a sense of ‘ownership’ within the group (Razak, 2009). The use of social media to share information among stakeholders can enable knowledge co-production, particularly in a water resources management context when it is supported through long term monitoring, diverse participation, appropriate facilitation, sufficient financial and human resources and social networking (Biggs, Schulter and Schoon, 2015). However, it is argued that learning can be undermined by failing to take into account asymmetrical power relations, the appropriate scale for learning activities and the human financial costs involved

(Biggs, Schulter and Schoon, 2015). This has relevance in the Save Midmar Dam Project where it sought to enable interaction among stakeholders with widely differing backgrounds and experience.

Salijo (1979), in Biggs, Schulter and Schoon (2015) describes learning as a multifaceted phenomenon which includes:

1. Acquiring information and increasing knowledge,
2. Memorizing,
3. Acquiring facts, skills and methods,
4. Making sense or abstracting meaning,
5. Interpreting and understanding reality in a different way by reinterpreting knowledge.

The Save Midmar Dam Project would have to take all these facets into account particularly because of starting knowledge level of members of the Mpophomeni Settlement.

There are two complementary forms of learning which are believed to enhance resilience of the environment services: loop learning and social learning.

2.7.1 Loop learning

Pahl- Wostl (2009) described single loop learning as being the correction of mistakes and enhancing of practice without altering guiding assumptions or routines. Single loop learning offers no room for contemplating the world views neither does it allow analysis of the guiding practises (Biggs, Schulter and Schoon, 2015). In contrast to single loop learning, double loop learning involves the assessing basic assumptions, progressing from knowledge that is expert and technical driven to social learning (Johannessen and Hahn 2013). Biggs, Schulter and Schoon (2015) in simple terms defined triple loop learning as ‘Learning about learning’. Triple loop learning has limited literature but is focused on tailoring governance norms as well as protocols (Armitage et al., 2008). In projects of short duration, and where a subject may be totally new to participants, such as in the Save Midmar Project, there may not be opportunity to progress to the stage of reflection required for double loop learning. What may be most important would be the extent to which the participants have learned and progressed together.

2.7.2 Social learning

Friedmann (1984) (cited in Muro and Jeffery 2008) state that the concept of social learning can be traced back to the work of Lewis Mumford (1938) who asserted that if citizens were exposed

to knowledge on social and natural surroundings, by learning from experts, social change would be possible. Embodied in the concept of social learning is that it takes place through interaction with others, in other words, it requires active participation (Argyris and Schön (1978) cited in Reed et al., 2010).

While loop learning is mostly concerned with and defined by, what is learned for example, new skills and practices or new values and assumptions, social learning tends to be defined by how learning takes place through interactions (Biggs, Schuler and Schoon (2015)).

The following guidelines are considered important when fostering learning (Biggs, Schuler and Schoon (2015):

- Supporting long-term social-ecological monitoring
- Provide opportunities for interaction that enables extended engagement
- Enable diverse participation that considers representativeness and knowledge sources as well as clarity of roles
- Effectively facilitate adequate conditions that foster understanding of others' perspectives and experiences
- Ensure sufficient resources to enable learning processes through adequate funding and skilled team
- Enable networking.

2.8 Summary

The proposition underlying this research is that, in the context of Citizen Science as implemented in the Save Midmar Dam Project, sharing information through social media facilitates dialogue, learning and community engagement in the management of water resources. In this chapter I introduced the theoretical foundation of the study describing and explaining the role social media can play in promoting dialogue, learning and the development of group cohesion that supports collective action. I suggest that such collective action is a requirement for mobilising community efforts toward improved water resource management. This is illustrated in Figure 3 where I argue that when social media is used to share information it contributes to building relationships that provide a foundation for collective (social) learning and that as this develops, so too does trust.

With trust strengthening, social cohesion develops and a collective identity emerges. It is this collective identity that establishes the norms that guide collective action leading to improved water resource management. And as the benefits become apparent, there is new information to be shared, reinforcing the use of social media within the group. This research focuses on the use of social media in the Save Midmar Dam Project. The project was started in November 2015 and was implemented over two years five months. Understandably with such a short time frame, the interpretation proposed in Figure 3 would be in a formative cycle and one would have to be cautious when interpreting the extent to which use of social media may have brought about lasting change.

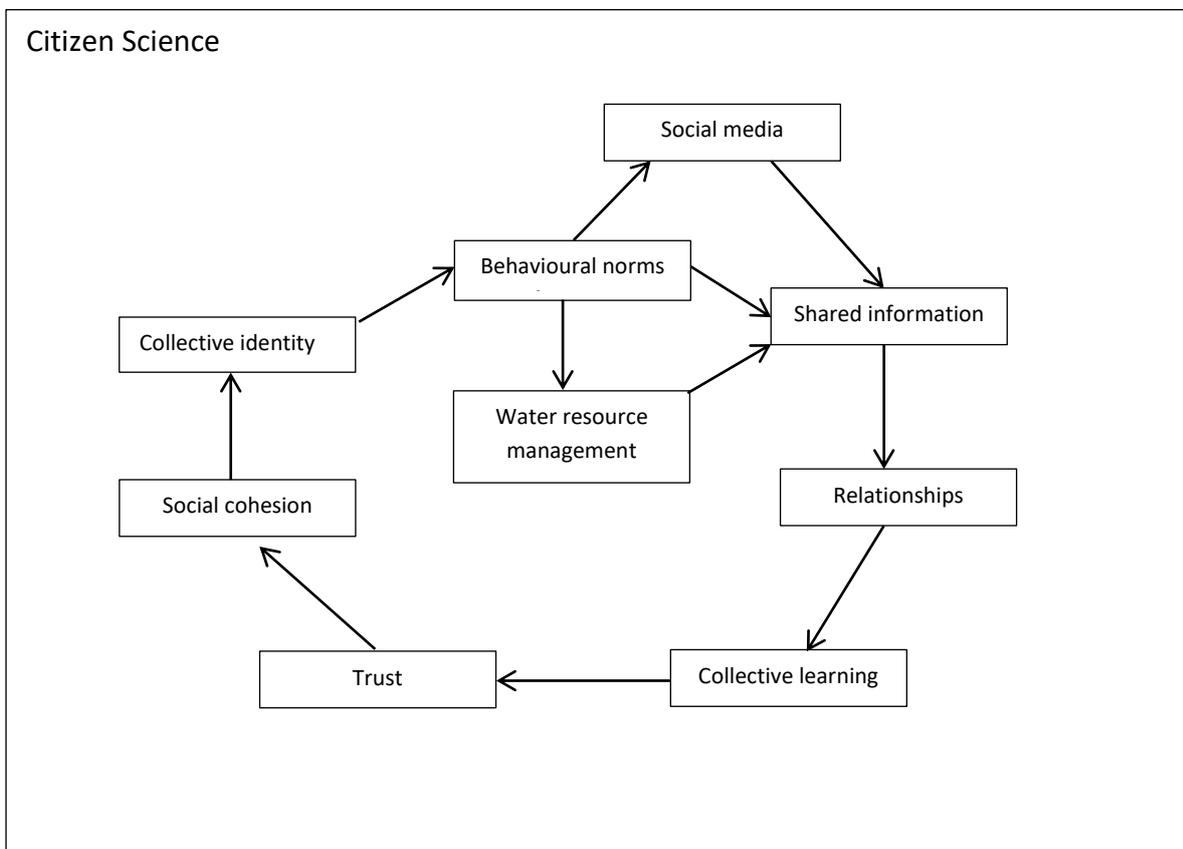


Figure 3: Conceptual Framework Source (Author)

CHAPTER THREE: METHODOLOGY

3.1 Introduction

The stated main aim of this study was to explore how information sharing using social media facilitates learning for the management of water resources. As not a lot of previous work has been done in the area of social media use in townships in South Africa, this study is therefore largely descriptive in nature. The guiding literature related to the central themes within this research was discussed in the previous chapter. A combination of primary and secondary data collection tools and approaches were designed and followed in gathering data for this study. A description of these together with data analysis, research rigor and ethical considerations are also discussed in this chapter. In case study research, and particularly descriptive research, an understanding of the context of the case is critical. As such, this chapter starts with a description of the study area detailing the location, history, socio economic status of residents and the environmental conditions associated with the study area.

3.2 Description of the study area (Mpophomeni Township)

3.2.1 Location

Mpophomeni Township is a peri-urban township located in the uMgungundlovu District Municipality in the province of KwaZulu-Natal in South Africa (Baiyegunhi and Makwangudze, 2013). The township is situated outside Howick and is 120km north of Durban (Baiyegunhi and Makwangudze, 2013). The name Mpophomeni, which is isiZulu, originated from the Howick waterfall and it means the place of the waterfall. The people in this area are mainly Zulu speaking and as of 2011 the population was approximately 25 000 people (Frith, 2014). However due to population growth and urbanisation the population has increased rapidly over the last few years. The township was built by the South African government in 1968 (during the apartheid era) to accommodate the black people who were living in the surrounding area (Zulu-Mpophomeni Tourism Experience, 2010).



Figure 4: Showing the location of Mpophomeni and its proximity to Midmar Dam (Source, Mpophomeni Location Guide)

(The red arrow on the map is showing the location of Mpophomeni and its proximity to Midmar Dam)

3.2.2 History

The township of Mpophomeni just like other townships in South Africa has its history in and was built by political conflict (Denis, 2013). Much of the political history and resulting poverty is associated with the South African Rubber Manufacturing Company Limited (SARMCOL) an employment powerhouse which then retrenched a thousand workers after a strike and many of the people retrenched were the residents of Mpophomeni. The retrenchments of workers also led to another political violence between the residents of Mpophomeni and people from other surrounding communities (Sinomlando, 2012). The violence erupted because the former

employees of SARMCOL were in favour of the ANC (African National Congress) and the workers who had replaced them were in favour of IFP (Inkatha Freedom Party) (Denis, 2013). This resulted in tension, violence and loss of life for many people.

3.2.3 Socio-economic profile

Due to the past political conflicts in Mpophomeni, the township has a high rate of unemployment and the socio-economic status of average residents is very low (Sinomlando, 2012). Due to this the people in the township receive sub-standard services from the municipalities and it does not contain urban facilities (Sinomlando, 2012). Moreover, many residents in the township are supposed to go to the nearby urban areas in search for jobs for them to have a livelihood and to have access to other essential services which are not provided in the area (Zulu-Mpophomeni Tourism Experience, 2010).

3.2.4 Environmental conditions

Mpophomeni Township is within the uMngeni catchment area, and is situated less than 4km upstream of Midmar Dam with a number of tributaries to the uMngeni River running directly through Mpophomeni and into Midmar Dam (Mike Ward, 2016). The water courses (uMthinzima Stream) that run through Mpophomeni Township are impacted by substantial amounts of pollution in particular from solid waste and dysfunctional sewerage systems. This makes a major contribution to the nitrate and phosphorous loads that flow into Midmar Dam (UMDM Report, 2017). Mpophomeni constitutes 3% of Midmar's catchment area and yet contributes 51% of the E. coli and 15 % of the phosphorous load in Midmar Dam (SANBI, cited in Kolbe, 2014).

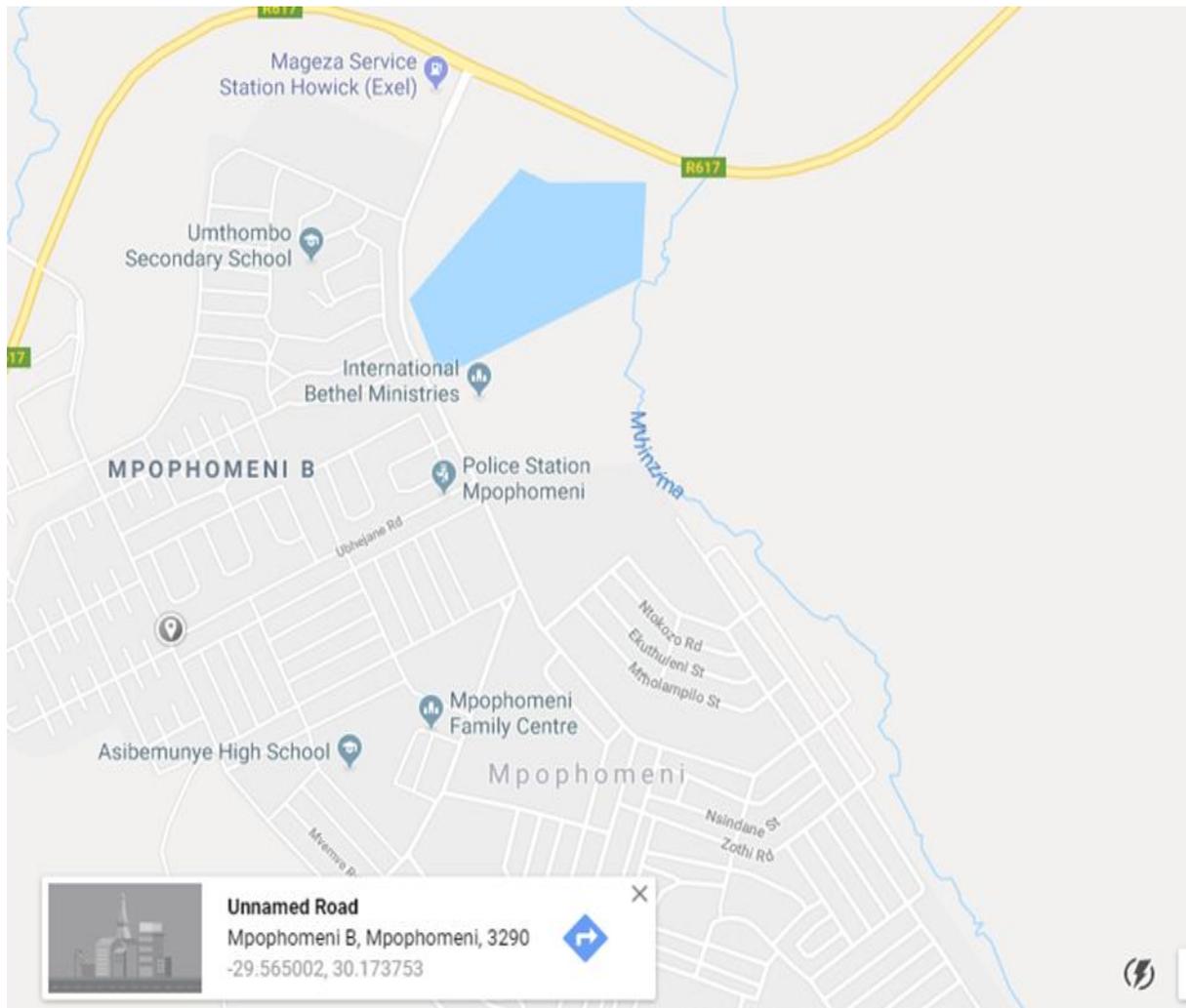


Figure 5: Showing the uMthinzima Stream and the proximity of the Mpophomeni to the stream (Google Maps, 2018)

3.2.5 Water Resources

Midmar dam supplies virtually all the water for Durban and Pietermaritzburg, South Africa's second largest economic hub (DWAF, 2008). Municipalities within KwaZulu-Natal (uMgungundlovu, eThekweni and Msunduzi) rely on Midmar Dam for fresh water supply to towns within the province. Moreover, Midmar is an important dam in this catchment as it supplies the bulk of the water and is also used for a number of recreational events, including the largest open water swim in the world, the Midmar Mile (Mike Ward 2016).

Despite Mpophomeni constituting only 3% of the Midmar's catchment area, the water quality assessment which was conducted indicated that from the period of 1999-2009 the pollution of the dam came from Mpophomeni (GroundTruth 2010a). This is because of uMthinzima Stream which passes through Mpophomeni into Midmar Dam. Furthermore, during the period of 2003-

2009 a health assessment of uMthinzima Stream was conducted by GroundTruth (2010b) and it also revealed the high levels of pollution to the dam. The high levels of pollution in the uMthinzima Stream were caused by the persistent discharge of raw sewage and poor solid waste disposal within Mpophomeni. The polluted water then flows straight into Midmar Dam deteriorating its water quality.

The water and sanitation service issues in Mpophomeni are provided by two municipalities which are uMgungundlovu District Municipality and uMngeni Local Municipality. The uMngeni Local Municipality manages the collection of solid waste in Mpophomeni (uMngeni Municipality, 2013), whilst the uMgungundlovu District Municipality (UMDM), which is the water service authority for the Mpophomeni Township, is accountable for the management of wastewater related matters and also the treatment of water (Taylor, 2013). Moreover, within the community are non-governmental organizations (NGO)'s such as Dusi uMngeni Conservation Trust (DUCT) and the Wildlife and Environment Society of South Africa (WESSA).

3.2.6 Water and Sanitation Management

There has been lack of proper sanitation in Mpophomeni and this has caused the decline of water quality in Midmar Dam due to the pollution of the uMthinzima Stream. It is indicated by Koble (2014) that because of the continuous increase of the population within this township the infrastructure has not been replaced so it is now being strained leading to continuous surcharging of manholes flowing into to the stream. Moreover, it was stated that the multifunctioning of sanitation infrastructure was caused by old pipes which were being blocked and broken and sometimes takes time to be repaired. Despite, UMDM employing plumbers to manage the repairing of infrastructures such as blocked or broken pipes and overflowing water points or manholes some of the infrastructure needs to be replaced (Kolbe, 2014).

3.2.7 Solid Waste Management

The uMngeni Local Municipality manages the collection of solid waste in Mpophomeni (uMngeni Municipality, 2013). The collection of solid waste in Mpophomeni Township during the apartheid era was influenced by race such that those who were not black received the services and those that were did not (Qotole, Xali, and Barchiesi, 2001). Due to this the residents who were not getting the service of solid waste collection, opted to dispose of their waste in open areas (Qotole, Xali, and Barchiesi, 2001). In a study which was carried out by Kolbe (2014) it was found that due to the disposal of solid waste in open areas, the quality of

the water was being affected, leading to challenges of sustainable water supply (Kolbe, 2014). However, generally the residents in Mpophomeni lack information on waste collection within their area and they do not know the consequences of solid waste pollution in water resources.

Due to the concerns about the continuous pollution of the Midmar Dam, the local government (UMDM) and NGO's (WESSA and DUCT) formed a partnership and launched the Project "Save Midmar" campaign which gathered substantial momentum. The following section provides an introduction to the project.

3.2.8 Save Midmar Dam Project

The **Save Midmar Dam Project** started from October 2015 to April 2017. The project was implemented so as to address the persistent discharge of raw sewage into the local streams (uMthinzima) from a dysfunctional local sewage system and solid waste. In an effort to address this issue in a human-centred manner Sbu Khuzwayo (UMDM Municipal Manager), Mdu Mchunu (Working for WESSA and DUCT) and Liz Taylor (DUCT) established the Enviro-Champs in 2011, through DUCT and supported by WESSA, as an effort to provide a bottom-up and top-down mechanism to change the situation for the better. This was potentially a powerful intervention to work towards transforming society, and the economy, towards a healthy interaction with the ecological infrastructure within the catchment.

The project included a number of activities:

1. Monitoring of manholes (This monitoring record includes when or where the spillages were, who was notified, how long the call-out time took, who fixed the leak, how long before it spilt again, and so on).
2. Door to door education.
3. Environmental Education training days
4. War on leaks. Fixing water leaks in resident's houses.
5. Mpops Kids club every second Saturday
6. Youth Clubs every second Friday
7. War room meetings (Sukuma Sakhe)
8. Drama plays to educate the public (children and adults).

3.2.9 Social Media use in Mpophomeni

The Save Midmar Dam project relied heavily on communication mechanisms and channels which included both face to face and the use of social media platforms. The face-to-face

activities and interactions strengthen the social fabric of communities while the use of social media such as “WhatsApp Groups,” sms messaging, Facebook and community blogs strengthen the social cohesion of the activities. The social media use within Mpophomeni township provided a suitable case study for this research to explore how information sharing using social media facilitates learning for the management of water resources.

The rest of the chapter is dedicated to a description and discussion of the overall research design approach which this study followed, the selection of research participants, the collection and analysis of data and the trustworthiness of the data.

3.3 Research paradigm

According to Bezuidenhout (2014), a research paradigm can be defined as wider perception of something. Paradigms are frameworks or models for observation and understanding which shape what we see and how we understand it. In this study, I adopted an interpretivist approach. Du Plooy-Cilliers, Davies and Bezuidenhout (2014) states that an interpretivism type of study focuses on understanding the way people interpret and make sense of their experiences and the world in which they live. This paradigm fits in this study because I sought to explore how information sharing using social media facilitates learning for the management of water resources; therefore, the views of the participants were of much value. Willis (2007) opines that, the views of participants are shaped by their historical and social background which creates a social construction of reality.

3.4 Research design

Uma (1984) suggests that all researchers and research projects need to follow a research design process. According to Yin, (2008) the research design is the blue print of the study. A research design is more than just a work plan because it crucially assists in overcoming situations where evidence does not address the initial research questions. As the main purpose of this study was to explore how information sharing using social media facilitates learning for the management of water resources, the research design for this study was purely exploratory and descriptive.

According to Neuman (2011b), exploratory research happens when little or no research has been done in a field and the reasons for carrying out the research is to gather new insights or data aimed at developing new claims or hypothesis to explain the data. Furthermore, Du Plooy-Cilliers et al., (2014) suggest that exploratory research gives the researcher the ability to get an understanding of an unknown research area, and is particularly useful when wanting to explore

the following: to obtain new insights, to identify key concepts, identifying key stakeholders and to become familiar with unknown situation, conditions, policies and behaviours (Saunders, 2012). For the purpose of this study, I wanted to have a deeper understanding and explore how information sharing using social media facilitates learning for the management of water resources, particularly since little research has been conducted in this specific field.

Exploratory research aims at exploring a research topic with varying level of depth and does not aim at providing conclusive answers to the research questions. It is worth noting that exploratory research is normally the initial research that forms the basis for a more conclusive study by laying the foundations for research. In this context, case study research is most often used in exploratory research. As a research design, case studies claims to offer a richness and depth of information not usually offered by other methods. By attempting to capture as many variables as possible, case studies can identify how a set of complex circumstances come together to produce a particular manifestation. Crowe et al., (2011) also stated that case study approach is viewed as a good design to use when challenging theoretical assumptions. It is a highly versatile method and employs any and all methods of data collection hence this design was the most appropriate in exploring the how the use of social media for sharing information facilitates learning on the management of water resources within Mpophomeni Township.

However, the criticism of the case study approach is the limited generalizability of what may be observed in a single instance of phenomenon (Babbie, 2014). Cresswell (2013) also notes that one of the disadvantages of a case study is being in a position to clearly outline the rationale on the selection of both the case and the data collection procedure. To overcome this criticism, I clearly outlined the case selected and the data collection procedures employed supporting my rationality.

3.5 Qualitative research

I adopted a qualitative research design in this study. As noted by du Plooy- Cilliers (et al 2014: 74), “qualitative research involves an exploration where the researcher pursues to get in depth insights and understanding of a phenomenon in its natural setting”. Qualitative research design was the best suited in this study because it attempts to understand the situation in its original state. This means that this type of research is interested in studying people’s experiences and developing a deeper understanding of their life. The assumption is that people are conscious of their behaviour and can interpret their own existence. This view is also supported by McLeod

(1994) who proposes qualitative research as a method of system inquiry into the meanings employed by people to make sense of their experience and guide their actions.

This research approach was compatible with the topic in question because it helped me in understanding how information sharing using social media can facilitate learning in water resource management. Hadley and Mitchell (1994), state that qualitative research is concerned with behaviour and this was important for this study when I was exploring the indicators of learning within the context of study.

Whilst there are several advantages of qualitative research Collis and Hussey (2003) suggest that qualitative data might be influenced by the information which is gathered from the participants. This is because it might be biased. This is also supported by Bryman (2001:84) who suggests that biasness from the participants or the researcher can influence the worthiness and value of the data if the researcher and the participants are not truthful with providing the relevant information.

The selection of participants for this study was therefore very important.

3.6 Gaining access and rapport

Before a researcher goes into the field for data collection he or she should gain access and rapport Creswell (2013). With this in mind, in November 2016 I managed to carry out a weeklong field scoping exercise of the study area with the assistance of the Water Node Research at Monash South Africa. Gaining access to the proposed study area was not a problem because the Water Research Node already had relationships with two of non-governmental organisations (WESSA and DUCT) who are the key stakeholders and gatekeepers in the area. During this period, I was introduced to these organisations that are also the backbone of the Save the Midmar Dam Project running within the Mpophomeni Township.

After being introduced to the non-governmental organisations, a relationship was built and I managed to explain to them the purpose of my study which was exploring how the use of social media for sharing information enhances learning on the management of water resources. When they saw my study fitting in their project they then acted as the gatekeepers in providing me with access into the Mpophomeni community. During one of their weekly meetings, which are conducted at the Mpophomeni Community Hall, I managed to meet and interact with the Enviro-Champs who are the citizen science volunteers who reside within the township and are hands on with the project. I made sure that I clearly explained to them the purpose of my study

starting with how participants would be selected, the nature of how the data would be collected and how the findings of the study were going to be used. After explaining my study, I managed to identify some of my potential participants because within the group there were those people who were specifically responsible for sharing and collecting information with social media then disseminate it to the rest of the group and other community members. I also managed to have a tour of the community and the places where they were working (monitoring). After gaining access and rapport I then managed to prepare my data collection tools and procedures which I used when I carried out my field research between May and June 2017.

3.7 Selection of participants

Since this study was a case study approach, a non-probability sampling technique was found to be suitable for the purpose of this study. In support of this study, being based on a case study approach, I adopted purposive sampling which is a dominant technique in qualitative research Patton (1990).

3.7.1 Purposeful sampling

Purposeful sampling is defined by Patton (1990), as the maximum variation technique that involves purposefully picking a wide range of variation on dimensions of interest. In the opinion of Kothari (2004) the strength of purposive sampling lies in the fact that it only selects cases that are typical of the population needed. Purposive sampling was mainly utilised in this study due to its strength in recruiting cases with required information. Participants were drawn from non-governmental organisations (DUCT and WESSA), Enviro-Champs and other residents who were not part of the Save Midmar Dam Project.

With the assistance of gatekeeper institutions like WESSA and DUCT I was referred to participants who volunteered to be part of study. Besides the non-governmental organisations all the participants for the study were people who resided in Mpophomeni the only difference between them was that three quarters of them were Enviro-Champs (the backbone of the Save Midmar Dam project) and the other quarter were just community residents. The Enviro-Champs also assisted in purposefully identifying community residents who were suitable for my study. I carried out seventeen interviews in total, two participants were from the non-governmental organisations, ten participants were from the Enviro-Champs and five participants were from the community.

I used semi-structured open ended questions to explore the social media being used, the type of information being shared, the form in which the information is shared, how the information is disseminated or diffused to other people and the indicators to show that learning is taking place.

3.8 Data collection techniques

Both primary and secondary data collection tools were used in this study.

3.8.1 Primary data collection techniques

According to Mason (1996) primary data refers to data that the researcher collects in the field specifically for the project at hand. Field research information was obtained through interviews. The purpose of carrying out the field research was to get first-hand information on social media use.

Primary data have some advantages which include; data is gathered specifically for the purpose for the research at hand (Creswell, 1994). This provides more reliable information as it is first-hand information collected from the target respondents.

For the purpose of this study the primary data collection technique used were semi-structured in-depth interviews and field observations.

Steps followed during the interview

I followed the steps outlined by Du-Plooy-Cilliers, Davis and Bezuidenhout (2014) in conducting these interviews:

1. I made sure that the questions which I asked moved from a broad to a narrow focus. By doing this when the participants were responding I managed to stem other questions from the responses which I got. This helped me to get as much detailed information as possible.
2. Though I had pre-planned questions I did not permanently rely on them but I allowed our interaction to progress and flow in a natural, conversational manner as this helped me to even ask questions which were not on the interview guide due to the responses which I was getting.
3. I made sure that I formulated my questions very clear and simple to ensure that my participants knew exactly what I was expecting them to answer. My questions were structured in a way which allowed all the participants to communicate clear and precise answers.

4. I avoided asking leading questions.

5. I made sure that the questions which I asked were addressing one aspect at a time as this helped me to avoid double-barrelled questions.

6. I made sure that that all my questions were truly open-ended questions as this helped the participants to give varied opinions and responses that were not influenced by any predetermined cues.

3.8.2 Secondary data collection

According to Dey (1993) secondary data is defined as the data that has been previously gathered, printed and published by other researches or statisticians on other topics that are directly or indirectly related to the research. For the purpose of this I also made use of secondary sources which includes journals, textbooks, websites, government publications, unpublished sources (theses), newspapers and statistical records. The secondary data was retrieved from Monash South Africa library and from the relevant participants (WESSA, DUCT and Enviro-Champs). Secondary data was obtained in written form as suggested by Bowen (2009). Flick (2009) asserts that that the researcher needs to know the relevance of information which is in the documents as some of the information will not be necessary for the study. I made sure that the secondary data I gathered was relevant for the purpose of my study.

3.9 Use of a translator

Since Mpophomeni Township is dominated by Zulu speaking people and I am not from South Africa, I acquired a translator to assist me because I did not understand the local language. In research, a translator should be someone who really understands both languages which will be used because if the translator translates information wrongly then it means that the whole research purpose would not have been accomplished (Murray and Wynne 2001). The gatekeepers (non-governmental organisations) assisted me in looking for a translator who they knew was fluent in both English and Zulu. The translator was part of the Enviro-Champs and this was an added advantage when I interviewed the general community who are not part of the Enviro-Champs because they already had an existing relationship. This allowed the participants to engage and freely answer the questions because they felt comfortable with one of their own and not someone from outside the community.

I made sure that I explained the purpose of the research to the translator and how the interview will be conducted. Before each interview I made sure that we did a recap of the interview

procedure together. The translator also informed me about the customary traditional protocols which were important to consider when we were meeting with the participants.

3.10 Data analysis and interpretation

Analysis of data is a process of inspecting, cleaning, transforming, and modelling data with the goal of discovering useful information, suggesting conclusions, and supporting decision making (Babbie, 2000). For this study I made use of the six thematic data analysis steps by Braun and Clark (2006). Thematic analysis emphasises, pinpoints, examines and records patterns or themes within data (Braun and Clark, 2006). Themes are models which are within data sets that are vital to the explanation of a problem and are related to a detailed research question. The themes become the groups for the analysis of data. I followed six phases of analysing data which are explained below:

Phase one: Familiarising yourself with data

I familiarised myself with the data which I had collected. I did this by reading the data collected thoroughly and repeatedly so as to make sure all the content gathered was understood well and no information is missed out (Lapadat and Lindsay, 1999). Familiarising myself with the data was important because it allowed me to search for meanings and patterns which were emerging (Edwards, 1993). Moreover, I made sure that I transcribed the verbal data which was collected through audio recording. This process was very time consuming because I had to familiarise myself with data collected as soon as possible. I made sure that I had good interpretive skills so that I transcribed the verbal data correctly (Braun and Clark, 2006).

Phase two: Generating initial codes

While familiarising myself with the data, codes were also generated through this process (Tuckett, 2005). At this stage initial codes were generated and produced. I assessed the data in a more meaningful way (Braun and Clark, 2006). I placed features of the data into initial categories.

Phase three: Searching for themes

After generating codes, I searched themes in the initial codes. At this stage I started to analyse data on a broader level of themes rather than codes. Codes were sorted into potential themes. Different codes were put into themes. I did this through the use of tables, mind maps and

rewriting of the codes (Bryman, 2001). At this stage I also sorted out the relationship of different codes.

Phase four: Reviewing themes

At this stage the refinement of theme began. I started to scrutinise the themes produced and at this stage I notice that some themes do not qualify to be themes and I phased them out (Braun and Clark, 2006). I put out some of the themes which were separated to make them one theme and some of the themes I separated them to become two different themes. I also considered the Internal and external heterogeneity. At the end of this phase I was able to make sense and find meaning on the different themes and to see how they fit together.

Phase five: Defining and naming themes

When I was satisfied with the reviewing of themes which I conducted at stage four I then started defining and naming of themes again. By defining themes, the researcher will be identifying what each theme is all about and to decide what each theme constitute (Braun and Clark, 2006). I did this by reviewing again the data provided in each theme and organising them to be more logic. At this stage I was able to identify what will be interesting in the themes and explain why. I made sure that names of the themes should give any reader a sense of what the theme is all about.

Phase six: producing the report

I started the last stage after making sure that all themes were defined and named correctly. The write-up of the report will be done. I made sure the analysis of this report provided all the data which is constituted in the themes within the data provided (Hollaway and Todres, 2003).

3.11 Research rigor

When researchers engage in qualitative research they have to make sure that in their study there is a part of some trustworthiness, so that the feasibility of the study will be considered (Collins and Hussey, 2003). In qualitative research the reliability and validity of the study is divided into dependability, conformability, transferability and credibility (Klopper 2008).

Transferability

As stated by Collins and Hussey (2003) transferability, is the ability to make the findings of the research to be applicable to other similar researches and provide related results or findings.

The results of the research can be used to other studies. I made sure that I explained all the steps which I did when conducting the study clearly and intensely, so that another researcher from any place is also able to carry out the same study and produce similar results.

Credibility

Credibility refers to how precise and accurate the researcher is able to interpret data which is collected from the participants (Collins and Hussey, 2003). In this study, the researcher is going to make sure that the information gathered is credible by taking a generous amount of time with the participants during the interviews in order to get a deeper and richer understanding of their opinions and outlook.

Dependability

Dependability refers if there is a relationship between the data which have been collected, analysed and the theories which have been used (Du-Plooy-Cilliers, et al 2014). The main purpose of dependability is to assess whether the data gathered can bring meaning and sense. The researcher is going to certify the dependability of the information gathered by evaluating if the study can be done again in a similar context and provide findings which are related (Klopper, 2008). I made sure that I provided a clear explanation on the theories used, how data was collected and analysed.

Conformability

Conformability refers to how the gather which was gathered supports the results gathered and how the researcher interpreted it (Drew, et al 2008). The researcher is supposed to explain and illustrate the whole research process well without leaving any important information, clearly describing how results of the research are derived from the data (Du-Plooy-Cilliers, et al 2014). The researcher is supposed to provide data with utmost truth without any bias.

3.12 Ethical considerations

Ethics are codes or rules which govern that practice of a profession and indicate how information and clients' relationships should be managed (Du-Plooy-Cilliers, et al., 2014). Ethics for research seeks to protect the participants in terms of their rights to independence; privacy; safety from anxiety; harm; autonomy and confidentiality, obtaining informed consent and the ethical approval authorised by the institution (Klopper, 2008). Before the study was

carried out, I completed and submitted a low risk ethics application to the Monash University Human Research Ethics Committee (MUHREC). Appendix B.

For this research study, I protected participants by guaranteeing confidentiality and giving out an informed consent form that they were requested to sign before taking part in the interview.

Confidentiality

Confidentiality is important in maintaining ethical integrity as it creates a setting which shows respect for people and they can trust you and feel comfortable enough to tell you any concerns they may have (Klopper, 2008). I made sure that information gathered was kept secure by putting security measures in place to limit the accessibility of the gathered information. No names of participants were published anywhere but rather acronyms like Ngo1, Ngo2, EVC 1, EVC 2 were used instead of the real participants' names (see appendix D).

Consent form

Before taking part in the study the participants had to read an explanatory statement and then provide consent agreeing to participate in the study. The consent form also provided detail that the interviews would be audio recorded. All participants were issued with an informed consent form before they took part in the interview. The participants filled in and signed the form. By filling in and signing the consent form it confirmed that they had read and understood the nature of the study, also the consent that there will be video recording during the interview process (Du-Plooy-Cilliers, et al 2014). The participants for this study were all above 18 years old and were able to make decisions on whether to take part in the study or not after reading and understood the contents of the consent form (Cohen, 2000). (See appendix C for the consent form).

No harm to participants

This research did not intend to cause any harm to the participants in any way either emotionally, physically or socially. The explanatory statement had a thick description on the purpose and the aim of the study, how data will be collected and the procedures to be followed. I made sure that if in any manner the participants did not feel comfortable to continue in to be interviewed they had the right to stop and withdraw from the interview process (Cohen, 2000). (See appendix D for the explanation on no harm to participants).

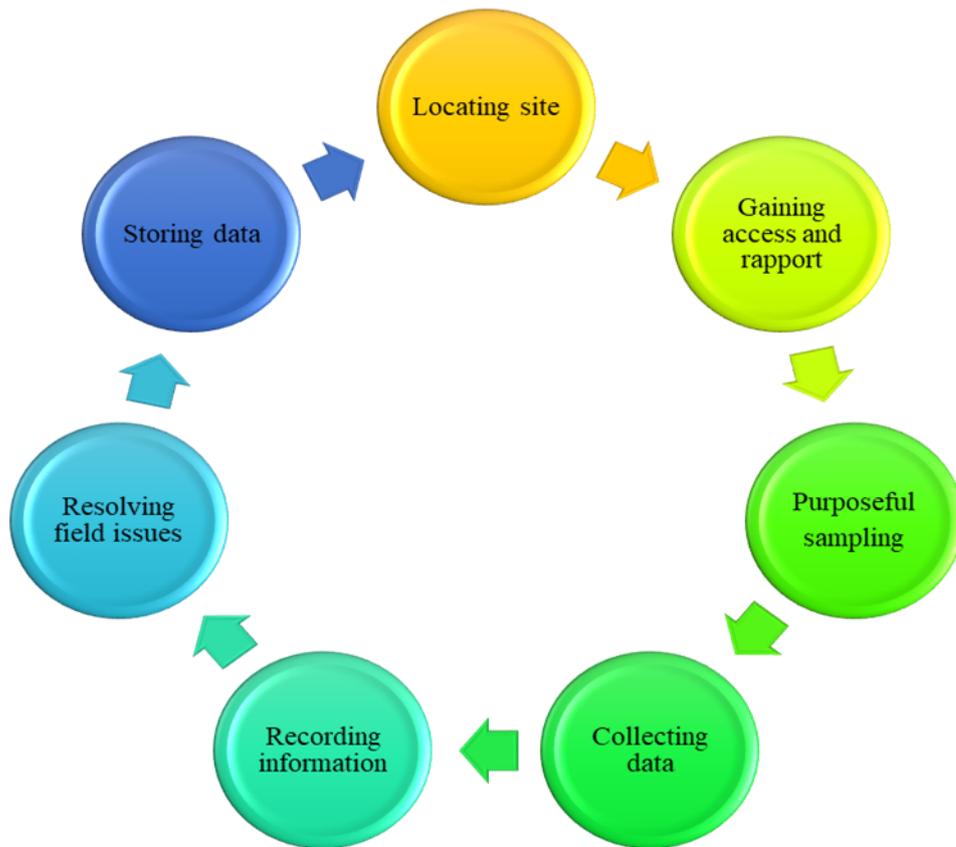


Figure 6: A schematic of how research was executed (Creswell, 2013)

3.13 Limitations of the study

There are limitations to this study which the researcher recognised. The major limitation to this study was that the researcher was not able to include the municipality members who serves in Mpophomeni as part of the participants. The municipalities which serves in Mpophomeni were supposed to be part of the key participants because they play a major role on the management of water resources within the community. The municipalities are also major stakeholders on “Save Midmar Dam”, the project which was implemented so as to address the persistent discharge of raw sewage into the local streams (uMthinzima) from a dysfunctional local sewage system and solid waste. The views from the municipalities on how information sharing using social media facilitates learning was going to provide valuable insight to this study. The municipality members failed to be part of the participants due to the time constrains associated with receiving informed consent from such stakeholders.

Another limitation was that some of the referred residents were also not enthusiastic to be part of the study for private reasons so we sought other potential participants. Despite having an interpreter, some of the residents questioned why I was not able to speak a South African language if had stayed in South Africa for such a period.

Regardless of the mentioned limitations, the aims and the objectives of the research were achieved as the researcher managed to have an understanding on how information sharing using social media facilitate learning for the management of water resources.

3.14 Summary

The chapter presented the selection and justification of the study area. The research design and methodology for the study was also presented in this section. The next chapter will be centred on the presentation of results from this study.

CHAPTER 4: RESULTS

4.1 Introduction

The purpose of this study was to explore how sharing information through social media can facilitate learning in the management of water resources. However, it should be noted from the onset that the case study presented herein is neither meant to be comprehensive nor exhaustive; rather it is only designed to be exploratory and illustrative. While the use and application of a rigid analytical framework could perhaps have provided valuable insights, lack of previous similar studies and logistical constraints limited the study to a pure descriptive narrative. Nevertheless, the case study is still instructive particularly in illustrating why and how sharing information through social media can facilitate learning.

To further provide proper context, it should also be noted that the information which was being shared by participants using social media in this case study relates to the Save Midmar Dam Project which was initiated by The Duzi Conservation Trust, a non-governmental organisation concerned about the deteriorating quality of water stored in the Midmar Dam. Elsewhere, studies had shown that water draining from the Mpophomeni Township, located immediately above Midmar Dam, contributed significantly to the deterioration of water quality mainly through untreated sewage from surcharging sewers reaching the dam. Sewers were becoming blocked because inappropriate materials were being disposed of into the toilets. The initial intention of the Save Midmar Project was thus to educate residents on the proper use of toilets and more broadly about the consequences of water pollution. The approach was based on establishing active participation in a Citizen Science project through which volunteers would learn and in time help other residents to also learn. It was envisaged that achieving this understanding would bring about the collective behavioural change necessary to stop sewers from surcharging.

4.2 Developing local understanding of the use of social media

The Save Midmar Dam Project was founded using a citizen science approach in which selected volunteers (Enviro-Champs) would receive training on ecological infrastructure rehabilitation through the Wildlife and Environment Society of South Africa (WESSA). To achieve this, WESSA used the Environmental Practices Skills Programme, NQF Level 2 covering modules 1, 2, 3, 6 and 7 (UMDP 2017). By receiving this training, the Enviro-Champs were expected to be better positioned to become part of a learning network in which they could engage and

exchange information with professionals, government and other interested participants. A citizen science approach provided both a shared context for exchanges of information and a sense of professionalism as illustrated in these statements by Enviro-Champs recorded in Rimau (2018):

“Now as an Enviro-champ, I now have a qualification in the ecological infrastructure” (Interviewee EC6)

“Yes I have learnt a lot of citizen science tools.” (EC 8)

“The first skill I gained as an Enviro-champ was using excel.... I collect the data for the manholes for all the groups and I load it onto the excel sheet and I formulate graphs of that information so that it can show the changes” (EC 3)

“But doing the miniSASS, I also found out some things” (EC 1)

While engaging citizen science contributed to a shared context and the knowledge and understanding to be able to engage the network, the weak link was communication, as evident from this quote:

“Yes in the beginning we were just using cell phones for phone calls and text messages but we found that we need to strengthen these mediums of communication” (Interviewee NGO2).

This response suggests that the modes of communication which were being used to convey information were not adequate in a citizen science project like “Save the Midmar Dam”. This can largely be attributed to both the growing complexity in the type of information that needed to be exchanged and to the need for rapid response (see above quote from EC3 cited in Rimau 2018). A report by The Conservation Volunteers (2013) suggests that for the progression of learning and skills development in citizen science projects to happen, there is need to encourage eagerness and enjoyment. The report goes on to imply that this is associated with the usefulness of the activities. While the quotes from Rimau (2018) suggest eagerness and enjoyment, they clearly indicate a sense of emerging opportunities among Enviro-Champs.

4.3 Selection of suitable social media platforms

Acknowledgement of the need to strengthen the mediums of communication (interviewee NGO2 above) would require identification and selection of suitable platforms. This was particularly so given the emerging complexity of information that was to be communicated and responded to (interviewee EC3 above). This prompted an NGO involved with the project to conduct research into which platforms would best serve the intentions of the project for enabling dialogue and to provide guidance on use:

“We did a careful review of social media before we started using it to see the strengths and weaknesses of each platform. We have tried to work to the strengths of them. For example, twitter turns to be one direction and you can trouble people with messages and for me that are a very weak approaches because it does not engage people and it does not support dialogue. Whereas if you use Instagram you can encourage dialogue rather than just feeding people with information” (Interviewee NGO 1).

“We have done a research project, where we involved social media experts and got their opinion on what is better to use than the other and we also did an educational review of them and developed a position paper for WESSA to guide us in the use of social media” (Interviewee NGO 2)

These observations gain support from the report titled **“Social Media Insights First draft for further input by: Catherine Ritchie, Jim Taylor, Ntswaki Dtlhale and Jenna Dohne”** (See appendix E) in which different social media platforms were identified explaining the advantages and disadvantages of using these social media platforms. The selection and categorising of these social media platforms was done as a way to assess which social media platforms were suitable to implement for the project so as to encourage learning. Several types of social media platforms were considered. However, at the time of this study, only two types (WhatsApp and Facebook) were being used, together with phone calls and word of mouth (particularly when communicating with members of the community). This is evident from the quotes in the following table:

Table 1: Selected comments depicting why WhatsApp is prevalently used for information sharing

<i>“We communicate first on our group as the enviro-champs, and also we communicate with community members, and also we put on Facebook and WhatsApp” (Interviewee EVC1).</i>
<i>“So the very first channel of communication will be a phone call, SMS text or WhatsApp message that there is something which is happening on the ground” (Interviewee NGO 2).</i>
<i>“We mainly use word of mouth but within us as a group we do use our WhatsApp group and phone calls sometimes” (Interviewee EVC 2).</i>
<i>“Now I even share pictures, GPS co-ordinates on WhatsApp when I am reporting an issue” (Interviewee EVC 5).</i>

Based on the responses in Table 1 above, it is evident that WhatsApp is the social media platform which is being prevalently used to share information. However, a few participants mentioned the availability of Facebook which was mainly used by the Executive Committee

of the Enviro-champs. In the next section I present findings on the reasons advanced by the Enviro-Champs for using these social media platforms. It is important to interpret these in the context of Mpophomeni Township because of its history and socio-economic state.

4.4 Reasons for using social media platforms

The use of social media can have a lot of benefits including: transparency, effectiveness, quick responses, cheaper, enables people to learn, encourages networking, communication with anyone at any time, high interaction between people and two-way communication (Smith and Wollan, 2011). The interviews conducted for this study elucidated a number of reasons why the use of social media has been adopted within the context of Mpophomeni Township. The quotes that follow show that among these reasons are: the use of social media is cost effective for those who can access internet and have data, quick, messages are not distorted, those that have access to internet receive the message at the same time, cheaper than calling, reaching to a lot of people, networking, being able to send evidence for example, a picture of a manhole spillage or taking GPS co-ordinates of different manholes and sharing important information rather than waiting for meeting days.

“It is because it is an easy way to communicate and it allows us to visualise more things with the sending of images and the exact location where a problem is. It just makes our lives easier than walking from one person to another all the time” (Interviewee EVC5).

“You know what we are also using social media when sharing information about our work because yes it uses data but that is cheaper than calling, people will not lie or distort the message because everyone will just receive the same message and you get to communicate and reach to everyone within the group at one time than calling one person per time and sometimes you will not have enough to call everyone but with the use of WhatsApp you can achieve this issue of sharing information at once reaching everyone at the same time” (Interviewee EVC9).

“So if there are any issues but I cannot go to their houses sometimes I send a WhatsApp message or a text message with the message which I would like to pass to them. Also those who are on social networks they assist us the Enviro-Champs with spreading the messages on the environment, water quality, water pollution, what to put and what not put in the toilet so that it will not block the toilets and cause manhole spillages which will then flow and goes to pollute the rivers making our water dirty” (Interviewee EVC1).

Hastings and Saperstein (2010) observed that when one-way communications form modes of dialogue, this changes the enterprise’s demand creation activities significantly. They argue that it enlivens, energizes, and stimulates the value-creation network. The Save Midmar Dam Project, and more specifically the Enviro-Champs initiative, set out to develop dialogue around

the issue of water pollution and water resource management. In this way, dialogue can be viewed as a condition to create engagement (Elving and Postma, 2017). Social media was implemented in the project specifically because it allows feedbacks and enables dialogues. Learning and consequent behavioural change can be regarded as outcomes of dialogue as they represent the value generated in the network. That this understanding underpins the adoption of social media platforms in the project is evident from the following quote:

*“We found out that there is need for education that seeks to change others so that their behaviour will change, but we found it to be very weak and problematic when it is top-down. So to avoid top-down education we found the use of using social media to share information as an approach which is more co-engaging, yah that is an important term in our work, co-engage rather than telling people so **“we work with people not on them”**. The famous research which leads to this understanding was from Rowan and Reason it said we should work with people not on them or at them. So I think that was a turning point for us. So if we use social media platforms it will be for a dialogue with people and this allows feedback which in turn lead to learning” (Interviewee NGO1).*

Elving and Postma (2017) refer to the ‘dialogue myth’ to suggest that companies are missing opportunities of using social media to create engagement. This raises the question of whether use of social media in the Save Midmar Dam Project, and more specifically in the work of the Enviro-Champs, is creating the intended engagement. To address this question, I examine the type of information that is shared using social media and with whom it is shared.

4.5 Information sharing using social media

In the context of the Save Midmar Dam Project, information was shared through social media among the Enviro-champs, NGOs and Local Government (see Table 2) in the form of texts, pictures, audios, geo-tagging and videos (see interview quotes below):

“WhatsApp have been useful for two reasons, (1) you can put GPS coordinates of where you are standing (2) you can take photographs” (Interviewee NGO 2).

“We will also be able to upload the clips and pictures which we take” (Interviewee EVC 7).

“Using GPS made it easier to tell the plumbers the location where the manhole spillage is (Interviewee EVC 12).

‘For example you are with kids for a Mini SASS and you have forgotten other steps to be taken you can just ask on the group either someone can tell you what you want or even send you a video of how it is done’ (Interviewee EVC2).

Table 2: Stakeholders among whom information is shared and the type of information shared

Different Stakeholders	Type of information shared
Local government and Enviro-Champs	Professional information (Reporting on service delivery and fixing of manholes)
NGO’s and Enviro-champs	Professionalism (Planning, Decision making, Trainings, Meetings), Capacity building , Understanding the environment
Enviro-Champs and other citizen	Capacity building (educating other citizens on the correct things to put in the toilets and sinks, fixing simple leaks, the consequences of illegal dumping)
Enviro-Champs amongst themselves	Professionalism (Planning, Decision making, Trainings, Meetings)

While these interview quotes support the view of Solis (2010) that social media involves the sharing of content or information in form of pictures, words, audio diagrams and chatter, they do not clearly indicate active dialogue (conversations). To seek clearer understanding, I examined further the sharing of information in the contexts of various topics: capacity building, service delivery, training and meetings and environmental awareness. The following examples of quotes illustrate these topics:

Capacity building

“We also share videos on how to fix leaking taps because someone might be doing door-to-door and find a leaking tap but have forgotten how to fix so we send videos with steps to it. Also when we do Mini-SASS we can also use videos to see how it is done. These videos we also share with the community members who are willing so that they will be able to fix things on their own without calling us for assistance. Also sharing of pictures on problems, blockages or spilling manholes and we assist each other on how to handle that through WhatsApp” (Interviewee EVC 1).

Reporting on service delivery and activities done

“Sometimes I use it lets say, we are having a problem with water spillage I will take a picture of where the spillage is and send the picture to Liz. Maybe I was having an Enviro-Kids Club where we will be teaching children about the environment also doing Mini-SASS with the children so I need to send pictures to Liz as evidence that I was with the kids doing something also these pictures will help us to compare after if there is an improvement happening with what we will be doing, so yah that is the reason why I use social media. I will send the picture with a little description of the purpose of the picture and what was happening there” (Interviewee EVC 3).

“We also send GPS coordinates of a spilling manhole to plumbers. This makes it easy for them to find the location.” (Interviewee EVC 5).

Trainings and meetings

“Also when the Enviro-Champs go for an outing they do de-brief on the group about their day and sharing their experiences” (Interviewee EVC 2).

“But since I am involved in door-to-doors Enviro-Champs work I also use it to communicate with Liz and other group members. Maybe let’s say there is a training that will be happening at WESSA either Liz or other group members will post on the group that there is a training happening on so to so date and the time also the purpose of the meeting.” (Interviewee EVC 2).

“The WhatsApp group is for us the enviro-champs. Normally we remind each other about the meetings, plan on activities which we would want to do and debriefing or sharing things from our door-to-door activities.” (Interviewee EVC 12).

“We started the group so that we plan, make decisions on the things which we do.” (Interviewee EVC 8).

Environmental awareness

“We do share environmental issues on WhatsApp though, e.g. sending a photograph a spilling manhole, things polluting our rivers like dead cow” (Interviewee EVC 5).

“And remember Midmar Dam is the source of water supply to the whole of KZN so we should reach a lot people in our community educating them about this so that the water is not polluted, through social networks” (Interviewee EVC 7).

Although not explicitly stated, there are indications in these quotes that the respondents do engage in conversations, particularly as they relate to assisting each other, planning and decision-making, and in debriefing. It is through such conversations and engagement that social cohesion and group identity are constructed.

4.6 Social cohesion and Group Identity

Laurence (2011) has drawn attention to the effects and disadvantages of diversity on social cohesion. The historical disadvantage that characterises residents of Mpophomeni Township can determine who can or cannot engage in, and the extent to which they can engage social media such that some may feel alienated, thereby fuelling diversity. Thus, in the context of this study, it is necessary to consider what would constitute a Group within which social cohesion and an identity may be constructed. Social cohesion arises when different individuals are able to work collectively as one so as to achieve a mutual goal (Hamizah Sahharon and Jusang Bolong, 2014). In this study the focus is on the Enviro-Champs working toward a shared goal with support from personnel in NGOs. The success of the project would require that the Enviro-Champs develop social cohesion and an identity that is meaningful and influential to their wider community of Mpophomeni Township. The following quotes provide insight into how the Enviro-Champs view themselves as members of a group and the relationships they have.

“This constant communication and sharing information on the WhatsApp group has built a strong group who are obviously very fond of each other and look out for each other. It has also created a strong sense of ownership of the activities linked to the Enviro-Champs” (Interviewee EVC 5).

“So us as the Enviro-Champs we create a link between the community and the authority because we cannot blame people that you are doing this, this is wrong but we have to educate people” (Interviewee EVC 8).

“We are the eyes and ears of the community” (Interviewee EVC 4).

The respondents' use of the term 'we' indicates a sense of belonging and concern for each other. Given that the name 'Enviro-Champs' conveys the idea of an identity, the use of 'we' is also evident when they describe themselves as the 'eyes and ears of the community'. Their identity is reinforced through 'constant communication and sharing of information' related to the purpose of the project. In this context, one can argue that the use of social media has contributed to social cohesion and identity that positions the Enviro-Champs to be an influential group among the residents.

4.7 A mix of media platforms

The people of Mpophomeni Township are diverse (in terms of education, age, income etc.) to an extent that many may not have ready and frequent access to social media, thus precluding them from actively engaging in the conversations. As such, it is not surprising that the Department of Government Information Communication Systems of the Republic of South

Africa (2011) indicates that there is need to employ an integrated campaign that Utilises the full potential of both traditional and social media platforms. Included here is the need to identify traditional communication and community engagement activities that could be enhanced by social media, rather than be solely dependent upon its use. An effective and meaningful mix of various platforms, including traditional media, will help to reach a much wider audience and will take into account the needs of those who do not have access to these new platforms. The implication is that for the Enviro-Champs to effectively engage the wider community, they would need to augment use social media with for example, ‘face to face’ engagement. Using this medium of communication, the Enviro-Champs can ‘act out’ situations making them responsive and ‘real’, thereby helping to engage and present issues in a way that is familiar and to which people easily relate:

“Such face-to-face activities strengthen the social fabric of communities and with the support of social media such as “What’s App Groups,” sms messaging, Facebook and communities’ blogs strengthen the social cohesion of the activities” (UMDM report, 2017).

The Enviro-Champs used three approaches to engage and share information through face to face and word of mouth activities: youth and children clubs, street theatre, and door to door campaigns. The Enviro-Champs educated youths and children during the Friday Youth Clubs and Saturday Mpopo Kids Club. During these sessions, the children were taught about reporting on monitoring and reporting spilling manholes, what should not be put into the toilets, water recycling, how to fix and report leaking taps, reporting and monitoring illegal dumping and Mini SASS (UMDM 2017):

“Msilinga School visited Mpophomeni Enviro-champ for education on environmental practice work they come in morning we take kids to educate about seven stand water leak, report manhole, solid waste and illegal dump site, door to door education and we go to do Mini SASS at Umthinzima upper stream Mashingeni” (Interviewee EVC 5).

Although this form of formal classroom education is constructive and can convey information accurately, it generally lacks the drama that can be conveyed through for example, street theatre, particularly when it encourages engagement. The Enviro-Champs have used theatre to engage with and share understanding with the residents, particularly the children (see Figure 6). To reinforce the messages, they wished to convey, Enviro-Champs performed in the street, at schools and at community meetings:

“When we do dramas in schools with children we will try and act what happens when wrong things are put in the toilet and sinks, how to monitor the spilling manholes and where to report if there are any problems” (Interviewee EVC 3).

“We normally do plays of what we teach them during the door to door activities, youth and children club” (Interviewee EVC 5).



Figure 7: Enviro-Champs drama group members in action at a school (photograph from Ward 2016)

During the week the Enviro-Champs visit homes to educate residents. At the time of this study, 6811 households were visited as part of the door to door campaign and there were 1052 follow-up visits. The topics covered included (see Appendix F) for the flier distributed during the home visits):

- Sewage-related matters: Good care and use of the toilet to prevent blockages; Reporting sewer leaks and spilling manholes
- Water conservation: Reporting and fixing leaking taps and pipes
- Waste management: Illegal dumping, recycling, and waste collection
- Developing a cleaner, healthier town.

4.8 Learning and behavioural change

Given the intention that the Save Midmar Dam Project would lead to improved water quality, one must question if the learning associated with these initiatives of the Enviro-Champs is leading to behavioural change. To address this question, let's consider sewage management in Mpophomeni that has been identified as one of the leading causes of pollution affecting the water quality in the uMthinzima River and eventually the Midmar Dam. According to a study by Kolbe (2014), spilling manholes within the Mpophomeni community was as a result of lack of knowledge and awareness on the proper use of infrastructure. The Enviro-Champs through their door-to-door campaign acted to provide the much needed education on proper sanitation use and management as well as reporting of spilling manholes. The impact of the door-to-door campaign and street theatre by the Enviro-Champs can be gauged through change in the number of spilling manholes. A reduction would indicate behavioural change leading to responsible use of sanitation infrastructure.

While the recording of the number of spilling manholes has been done since 2012, the fact that the Enviro-Champs started to actively engage the problem in 2015 suggests that probably this had an effect on learning. Their success is illustrated in Figure 7 which can be interpreted as an indication of behavioural change.

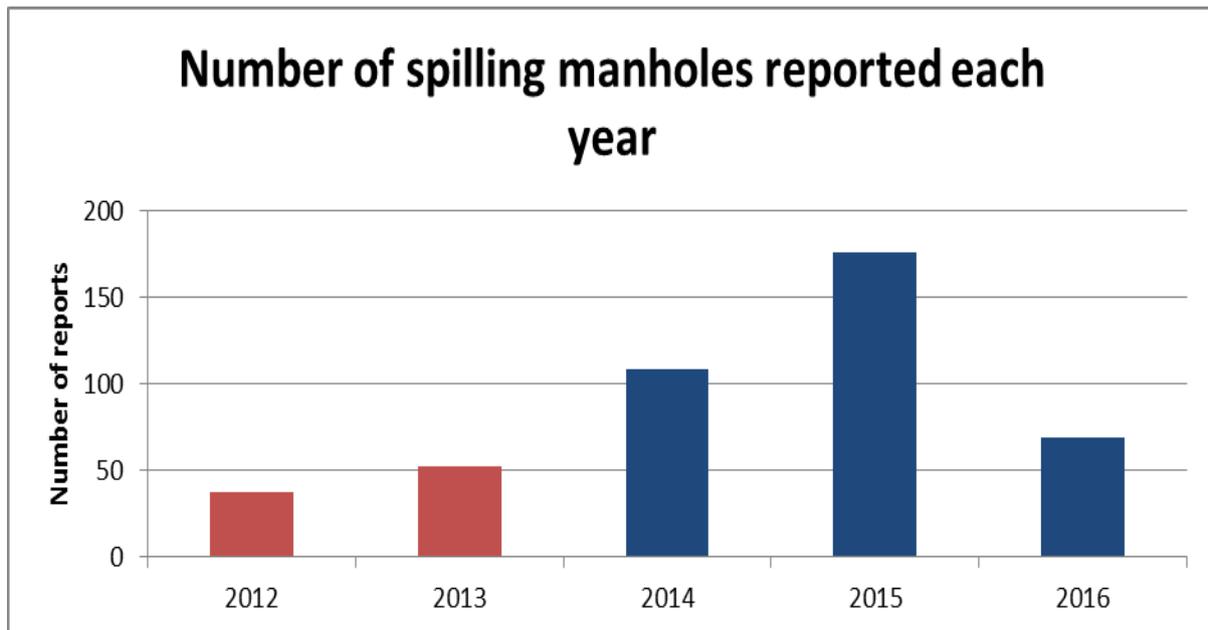


Figure 8: Number of spilling manholes reported each year (2012 – 2016) in Mpophomeni (UMDM 2017)

Sustained engagement may be required for people to internalise behavioural change so that the new behaviour becomes a norm. To this end, the Enviro-Champs continue to monitor water points for leaks and manholes to check for spilling. This information is recorded and used in communications to reinforce behavioural change both among residents and the municipal officials who are now responding more quickly to reports.

In each Ward there are people who are assigned for sewer monitoring and we make sure that every day we go and check what is happening there and we fill this details of what we would have found on the reporting sheet (Interviewee EVC 5). (See appendix G for the manhole reporting sheet).

From the time the project started there are people who are responsible for the monitoring of the manholes and if there is any problem like a surcharging sewer they then report it to the municipality so that it can be fixed. Some of them visit the sights they are monitoring three to four times a day. But these days we are having less reports of spilling manholes and it is showing that people are aware of the things which were blocking the manholes (Interviewee EVC 2).

4.9 Skills, learning and behavioural change

The Enviro-Champs initiative was conceptualised as Citizen Science through which selected volunteers would become aware of environmental issues and acquire skills that would enable them to catalyse behavioural change. I have illustrated above how the Enviro-Champs have used their growing awareness and new skills (such as drama) to engage residents. Although the

principal motivation for the Save Midmar Dam Project was deteriorating water quality, attention was also directed to minimising wastage of water through early detection and repair of leaking taps and pipes. While awareness of the need to minimise water loss was raised through the campaigns reported above, the challenge was to enable repair without having to call on help from outside of the village. While repairing the leak was important, the message to be conveyed had to give emphasis to wastage. The Enviro-Champs were trained to determine for how long the leak had been evident, and to measure the rate of water loss. They were thus able to calculate and convey to residents how much water can be saved when a leak is repaired promptly and the seriousness of even small leaks when left unattended. In the UMDM (2017), it was reported that in 2016, a period during which the Save Midmar Dam Project was being implemented, the estimated number of leaks fixed was 316 and the estimated number of litres saved within a year constituted as much as 10 million litres.

The impact of developing a new skill, fixing leaks for example, and being able to apply it, can lead to a wider awareness of water resource issues that leads to behavioural change. One respondent outlined his experience in this way:

Despite being shown how to fix a leaking tap, there are stages which I could forget all the time but when (x) shared the video with us on how to fix a leaking tap I am now a pro. I can now fix leaking taps without facing any problems. If (x) brings the rubbers when you are still with me I will show you how it is done because there is a house where I am supposed to go and replace the rubber water is just flowing from their bathroom tap (Interviewee EVC 11).

What is particularly striking in this response is the confidence expressed as “I am now a pro”. This sense of competence reinforces the respondent’s commitment to engage residents in water resource issues. The following quotes provide further additional insight into the relationship between awareness created through the various media and behavioural change:

I did not know that throwing my rubbish in the stream will affect the water in the dam and a lot of people are going to be affected with dirty water or even water shortages. Now I am aware of the impact I make sure that when the refuse collection truck comes I rush with my garbage there and if it is not collected I dig a hole and bury the rubbish than throwing it in the river (Interviewee EVC 9).

Due to kids’ clubs and dramas kids are now aware of what to put in the toilet and that they should not play with water. Now a days even if they see me passing in the area they will say Malume water is for drinking not to play with, no papers and card box in the toilet it will block (Interviewee EVC 7).

4.10 Summary

The results suggest that while use of social media has played an important role in learning and behavioural change at this stage of the project, this has largely been evident among the Enviro-Champs. They use social media platforms effectively in many aspects of their engagement among themselves, with the professional staff of supporting NGOs, and in sending information to the municipality. This has helped them establish a collective identity and a sense of professionalism that has played an enabling role as they engage with the residents of Mpophomeni Township.

It cannot be assumed that all residents of a township like Mpophomeni have ready access to social media platforms. And, even if they could, the subject, water resource management, may be both unfamiliar and seem to have little relevance in daily life. The Enviro-Champs turned to other ways of engaging and communicating, using face-to-face discussion and drama presentations. This helped to reinforce their collective identity and gain recognition among residents, young and old. The results present evidence these engagements have resulted in behavioural change and that these successes reinforce the identity and commitment of the Enviro-Champs. In the contexts of Mpophomeni Township and the Save Midmar Dam project the results suggest that success requires a mix of communication and learning platforms and that each of these requires specialised skills.

CHAPTER 5: DISCUSSION

5.1 Introduction

The Save Midmar Dam Project was motivated on two premises: pollution emanating from the Mpophomeni Township was contributing significantly to the deterioration of water quality in Midmar Dam, and that this was a consequence of the uninformed abuse of sanitation infrastructure and uncontrolled waste disposal (Kolbe, 2014). The Enviro-Champs initiative was established to leverage behaviour change among residents that would reduce incidence of blocked sewers and surcharging manholes, and create wider environmental awareness. Thus, there would have to be two steps: establish a group (the Enviro-Champs) the members of which would be skilled and knowledgeable and have a recognisable collective identity. They would then be able to confidently engage, inform and encourage behavioural change among residents. In the Save Midmar Dam Project social media would be used for quite different purposes in each of these steps.

5.2 Establishing a group identity

Citizen Science can be used to establish a platform for multiple stakeholders to work collectively towards addressing a mutual challenge (Cohn 2008, Bowser and Shanley 2013, Shirk and Bonney 2015). It has been used to develop skills, raise awareness and facilitate learning, and promote pro-environmental behaviour change that further increase content knowledge (Overdeest et al., 2004; Bonney et al., 2009). This is particularly so when those engaging actively participate in the design of a project and contribute to data analysis and the dissemination of results and interpretations (Bonney et al., 2009, Grossberndt and Liu 2016). The adoption of Citizen Science as an approach for developing the skills and understanding among the volunteers provided both a shared field of endeavour and a demand for communication. The Enviro-Champs were required to collect, analyse, distribute and communicate interpretations of their data. This was accompanied by an increased sense of competence and growing recognition of individuals and the group which are known to increase motivation (Ryan et al., 2009).

In a sense, the Enviro-Champs were to become ‘activists’. Social media can be an important way for activists to network and communicate better with one another to make community activities more visible. To become an activist, there has to be a ‘cause’ that compels engagement. A report by The Conservation Volunteers (2013) draws attention to the

importance of identifying the usefulness of the activities and the opportunities for progression in learning and skills in developing eagerness and enjoyment for citizen science projects. While the 'cause' in the minds of the NGOs and government was improving the quality of water reaching Midmar Dam, the prospective Enviro-Champs would need a personal cause; something that brought more immediate and more personal benefits and this would help secure their ongoing engagement (Nerbonne and Nelson 2004, Shirk and Bonney 2015). Engaging citizen science offered these marginalised young people opportunities to gain new skills, perhaps improving opportunities for employment, and gain recognition both within their community and beyond.

Two skills would be necessary to establish this eagerness and enjoyment: The Enviro-Champs would need to be able to collect and analyse data, and they would need to be able to exchange information and interpretations and engage in dialogue. River health monitoring using mini-SASS (<http://www.minisass.org/en/>) provided the flow of data, and social media provided the platform for communication. But, there was an added advantage given the growing relevance social media platforms in society.

Rotman and collaborators (Rotman et al. 2012, Rotman et al. 2014) suggest that self-interest provides the initial motivation for most volunteers to participate in citizen science projects. This can be served through engaging learning opportunities and acquiring new skills (Raddick et al., 2010, Nov, Arazy and Anderson 2014 and Gollan et al., 2012) but it can also be served when participation is enjoyable and satisfies curiosity (Eveleigh et al., 2014; Jennett et al., 2014).

Despite the powerful influence of self-interest in shaping behaviour, Wellman et al. (2003) noted that networked individualism should have profound effects on social cohesion. More recently it has been suggested that the use of social media can enable community building (Zulkefli and Sulaiman 2009, Bolong 2011 and Samah et al.' 2013). Nyman (2013) reported that when space (both real and virtual in the context of this study) is created for participants to engage and interpret, other people become a socio-cultural resource and this can facilitate meaningful experiences; those who engage become part of an on-going unfolding story that enriches a sense to togetherness. In this study citizen science and the use of social media created space that facilitated meaningful experiences for the Enviro-Champs in Mpophomeni Township; it started what is becoming an on-going, unfolding story characterised by their sense of 'togetherness'.

Hyun-Jun et al. (2014) reported a significant correlation between emotional words used in messages and users' relationship in a social network. Although none of the respondents used emotional words, one suggested that they have 'built a strong group who are obviously very fond of each other and look out for each other'. The Enviro-Champs commonly use the pronouns 'we', 'us' and 'our' thereby signifying that they identify with the group. They hold a sense of belonging to the group and the group belonging conferring cohesiveness to the group (Bolong 2011).

5.3 Inform and encourage behavioural change among residents

Equipped with relevant skills, understanding and an identity, the Enviro-Champs were positioned to engage the residents of Mpophomeni Township. As explained earlier, because they would be engaging residents whose experiences were of marginalisation and poor service delivery, they could not rely on communication using platforms such as Whatsapp; they would have to engage face to face. Because self-interest is such a powerful motivation (Munnik et al. 2011, Rotman et al., 2012, Miller 1999), the Enviro-Champs would first have to make a difference to the lives of individuals and families and develop trust in their ability to resolve problems facing the residents. They achieved this largely through reduction in the number and frequency of surcharging sewers. Trust brings people together to work and socially unify so that each member of the community performs their individual duties (Bolong, 2011). But, to engender trust, the Enviro-Champs would have to make a difference through their engagement with residents. Kietzmann et al. (2011) suggest that 'Reputation' is the extent to which users can identify the standing of others. Perceptions of the standing of the Enviro-Champs were conveyed in statements such as these taken from Rimau, 2018):

I could see that for the community members to most of them I was a pillar that they say if we see EC8 definitely he will solve this for us". (Interviewee EC8)

"Being an Enviro-champ has changed me when I walk on the road I put my head up high because I am known" (Interviewee EC7).

Reflecting back to Nyman (2013), the results suggest that bringing residents into the communication network, albeit using face-to-face engagement, has created a new 'space' for them, positioning the Enviro-Champs as a socio-cultural resource that is facilitating meaningful experiences and including them in the 'on-going unfolding story' that has the potential to 'enrich a sense to togetherness'. And that could, in the longer term, lead to the changed behavioural norms that will be required to achieve the intentions of the Save Midmar Project.

5.4 Revisiting the theme of learning

This study is particularly important in illustrating that social learning, as with most concepts in behavioural sciences, has so many meanings that its significance has at times been reduced to a vague slogan. The study demonstrates that indeed learning essentially entails the detection and correction of error and involves searching for a strategy where something goes amiss in human interventions. This searching process requires the identification of determinant variables which affect the nature and type of strategies as well as the consequences of particular interventions. Implicit in the Save Midmar Project is that learning consists of two meanings: the acquisition of know-why, which implies the ability to articulate a conceptual understanding of an experience; and the acquisition of skill or know-how, which implies the physical ability to produce action. In the same vein, the use of social media in this project suggests four levels of learning: cognitive knowledge (know what), advanced skills (know-how), systems understanding (know-why) and self-motivated creativity (care why). As such, one is able to recognize that learning occurs at multiple levels.

As the Save Midmar Project demonstrates, individual learning was primarily concerned with the perceptive and cognitive processes of the participants. Given that all learning processes take place through individual actors, the project illustrates that individual learning forms the basis for all learning processes. On the other hand, collective learning in the project focuses on groups of individuals who orient their behaviours towards some shared goals and problems. It entails a social process of building, upgrading and enriching of the knowledge and skills of participants in the project and surrounding communities. In a sense, collective learning denotes the learned ways by participants of behaving in the project by aligning and fostering their competences to deal with emergent water quality issues and problems. From the perspective of social media use, one would argue that the project participants were able to sense what might arise in the future so that they can respond appropriately

While the implications of learning necessarily remained the same at individual level, the learning processes at the collective level were however essentially different. As one moves from a single human being to a large collection of diverse participants, the level of complexity in learning processes increased. Also, learning processes that foster efficiency was not the same as those that foster strategic renewal and transformation. Thus, one can argue that collective learning on the Save Midmar Project was more dynamically complex than individual learning.

5.5 Summary

Clearly, the use of social media in the Save Midmar Project emphasises the iterative learning dimension and the nature of the social relationships among an interest group operating at multiple spatial-temporal scales. The attributes of these relationships were epitomized in learning processes which denoted the degree of connectedness among the participants. The degree of connectedness, however, was not simply a matter of attitudes but of behaviour, which resolved itself into a question of the degree of acceptance among the participants in the Save Midmar Project. Collaborative behaviour characterised the nature and degree of connectedness among the participants involved in the use of social media. To that end, I suggest that the need to understand the dynamics underlying the social relationships among the participants has great implications for the learning systems that underpinned the sharing of information.

CHAPTER 6: CONCLUSION

The proposition that provided the foundation for this research was that “sharing information through social media facilitates dialogue, learning and community engagement in the management of water resources.” The intention was to go beyond using social media to share information by investigating how information was shared before the use of social media was implemented in the Save Midmar Dam Project; the justification for and selection of suitable social media platforms; how information is shared; the type of information shared; the role which social media has played in the diffusion of information; the learning that has resulted, and how this may have facilitated behavioural change that would lead to improved management of water resources.

6.1 Summary of the findings

The exploration of information sharing trends in the Save Midmar Dam Project has revealed that water quality management takes place in complex socio-hydrological context. It is perplexing, however, to note that most of the studies of water quality management do not consider this complexity when dealing with emerging problems. It was in the same vein that this study undertook to explore through a descriptive approach the centrality of social media in water management. As earlier stated, the study was motivated from the postulation that sharing information through social media facilitates dialogue, learning and community engagement in the management of water resources.

From the foregoing and building on the findings in chapters 4, there is sufficient indications to argue that this study has contributed, albeit through a descriptive approach, towards highlighting the centrality of social media in water quality management. The concept of learning as used by the study has contributed to providing new insights into the dynamics of social medium in water management in general. This contribution provides the necessary guidance for the development and promotion of various social media platforms, processes and structures. Significantly, it can be constructively used to explicate emergent problems as they relate to behaviour change in water management.

This contribution notwithstanding, a number of strengths and weaknesses of the study can be identified. The study has two main strengths that are of critical importance to the conclusions contained here. The first lies in its ability to address the interrelationship between learning and

social media use. This ability enabled the study to draw distinct lessons through identifying and analysing issues and concerns related to behavioural change. Importantly, it allowed the study to address the critical interrelationships between learning and social media use. This is important, as behavioural change issues will continue to play a central role in water management. By positioning social media use as its core variable, the study offered a lens through which learning processes and structures that guide the behaviour of social actors in the management water quality can be perceived.

The second strength of the study stems from its treatment of the concept of information sharing. This concept is seen as an explicit process that includes many actors including governmental and non-governmental in the management of water quality. Such an approach is important especially for facilitating systemic insights into ill-structured, complex problems associated with water quality. Importantly, it offers the study the strength of going beyond the political power exercised by a government in water management. This is vital as it implies that water quality issues and concerns are not primarily a preserve of government. In essence, this treatment underscores the need for a more robust approach to water quality management. Such an approach recognises the diverse interests in society.

Despite these strengths, the study carries with it some weaknesses. Firstly, it uses aggregations such as the Save Midmar Dam Project in its approach. Although such an approach is more encompassing than in most studies, it has two main weaknesses. Firstly, the approach does little to address the fundamental intra- and inter-group dynamics within the Save Midmar Dam Project. This is because it is a common feature to find participants in such projects holding divergent views on policies and operations. This is also true with NGOs that do not also hold unified views as to what constitutes the 'best' policy. Given such settings, this study may not be adequately used to deal with intra- and inter-group dynamics within aggregations. Hence, one needs to be extra pre-cautious when applying the lessons to specific institutional settings.

Secondly, by using the Save Midmar Dam Project as an aggregation, the study may not be better able to make predictions about individual behaviour. For instance, the personalising behaviour of local elites may not be easily predicted if this aggregation is used. Therefore, users of lessons from this study might have a difficult time in explaining the outcomes of such individual behaviours. This study recognises that individual persons are critical to the success of social media use as well as water quality management, and their exclusion could distort the assessment of particular management systems. However, recognition of this weakness does not

mean that the study fails to conceptually capture the many interesting and unique features of social media use in water management. In any case, few projects such as the Save Midmar Dam Project can in practice be linked to individual persons.

Drawing on the foregoing, it is asserted that this chapter has broadly explored the challenges and opportunities of applying social media platforms in water management. The exploration has shown that the use of social media in this sector accords well with the new trends in technological development. Furthermore, it has illustrated that social media can be positioned within the broader realm of water quality management as a tool for enhancing social learning. From this exploration, it can be argued that social media in water management requires the development of systems-based tools to guide policy formulation, implementation and analysis.

6.2 Research recommendations

The following are some of the key research questions that need to be further explored and addressed using the understandings developed through this study:

- How do different constituencies perceive the value and use of social media in water management?
- What kinds of social media platforms have been established to promote broader social learning processes at larger scales than communities?
- To what extent are these platforms viewed as legitimate by differing constituencies?
- To what extent can the flow and provision of official information be changed by changing social media platforms?

6.3 Policy implications

Within this context the policy implications of this research are:

- The intentions of Enviro-Champs are not being supported by research that will inform policy-making in respect of the use of social media
- Informed policy-making on social media use is not possible because of significant weakness in understanding of the concept
- A programmatic rather than a project approach to research on social media use will be required to establish the necessary policies

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APPENDICIES

Appendix A: Interview Guide for data collection.

INTERVIEWEE.....

EMPLOYEE POST.....

DATE.....

Good Morning/Afternoon it is my pleasure to meet you and I do hope you are going to help me in the best way you can. I am a student at Monash University South Africa undertaking my Master of Philosophy degree in Integrated Water Management. My name is Elsah Nomsa Dhliwayo. The information you are going to provide will be used for academic purposes only and will be treated with high confidentiality, so feel free to express your own views in the best way you can. Your cooperation will be greatly appreciated.

1. Before the implementation of social media how was information shared amongst different stakeholders?
2. What are the available social media platforms you have adopted for sharing information pertaining the project?
3. Why did you choose the available social media platforms?
4. Who was responsible for the selection of the suitable social media platforms?
5. How do you share the information? (In which form)
6. What type of information is shared?
7. What role has social media played in bring social cohesion and group identity within different stakeholders?
8. How do you reach to other people who do not have access to social media? (Is there a mix of media platforms for diffusion of information).
9. Is there any learning happening from the information which is being shared? If so how has this facilitated in behavioural change which might/ would lead to improved management of water resources.

Appendix B: Human Ethics Certificate of Approval.



Monash University Human Research Ethics Committee

Approval Certificate

This is to certify that the project below was considered by the Monash University Human Research Ethics Committee. The Committee was satisfied that the proposal meets the requirements of the *National Statement on Ethical Conduct in Human Research* and has granted approval.

Project Number: 7945
Project Title: THE ROLE OF SOCIAL MEDIA IN ENCOURAGING LEARNING AS A WAY OF IMPROVING WATER SECURITY: A CASE STUDY OF MPOPHOMENI TOWNSHIP
Chief Investigator: Dr Bimo Nkhata
Expiry Date: 02/05/2022

Terms of approval - failure to comply with the terms below is in breach of your approval and the *Australian Code for the Responsible Conduct of Research*.

1. The Chief Investigator is responsible for ensuring that permission letters are obtained, if relevant, before any data collection can occur at the specified organisation.
2. Approval is only valid whilst you hold a position at Monash University.
3. It is responsibility of the Chief Investigator to ensure that all investigators are aware of the terms of approval and to ensure the project is conducted as approved by MUHREC.
4. You should notify MUHREC immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.
5. The Explanatory Statement must be on Monash letterhead and the Monash University complaints clause must include your project number.
6. Amendments to approved projects including changes to personnel must not commence without written approval from MUHREC.
7. Annual Report - continued approval of this project is dependent on the submission of an Annual Report.
8. Final Report - should be provided at the conclusion of the project. MUHREC should be notified if the project is discontinued before the expected completion date.
9. Monitoring - project may be subject to an audit or any other form of monitoring by MUHREC at any time.
10. Retention and storage of data - The Chief Investigator is responsible for the storage and retention of the original data pertaining to the project for a minimum period of five years.

Thank you for your assistance.

Professor Nip Thomson

Chair, MUHREC

CC: Ms Elsh Dhiwayo

List of approved documents:

Document Type	File Name	Date	Version
Explanatory Statement	EXPLANATORY STATEMENT FOR NON-GOVERNMENTAL ORGANISATIONS AND LOCAL GOVERNMENT	23/02/2017	1
Focus Group questions	Interview and Focus Group Guide Questions for Elshah	23/02/2017	1
Explanatory Statement	EXPLANATORY STATEMENT FOR THE MPOPHOMENI COMMUNITY	23/04/2017	2
Consent Form	Focus Group Discussion Consent form for Elshah Dhiwayo	23/04/2017	2
Consent Form	Interview Consent form for Elshah Dhiwayo	23/04/2017	2
Supporting Documentation	Letter of Invitation for Mpophomeni Community (2)	01/05/2017	2
Supporting Documentation	Letter of Invitation for NGO's and Local Government (2)	01/05/2017	2

Appendix C: Consent Form.



MONASH South Africa

A campus of Monash University Australia

Title: SOCIAL MEDIA AND LEARNING: A STUDY OF WATER RESOURCE MANAGEMENT IN MPOPHOMENI TOWNSHIP, KWAZULU-NATAL, SOUTH AFRICA

Investigator: Ms Elsah Nomsa Dhliwayo

Chief Investigator: Associate Prof Bimo Nkhata

I have been asked to take part in the Monash University research project specified above. I have read and understood the Explanatory Statement and I hereby consent to participate in this project.

I consent to the following:	Yes	No
To be part of the semi interviews for the research study	<input type="checkbox"/>	<input type="checkbox"/>
To provide honest and truthful information	<input type="checkbox"/>	<input type="checkbox"/>
The use of audio recording by the researcher	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none">The data that I provide during this research may be used to implement more comprehensive programs at our organisation and other organisations which provide similar programs with our organisation	<input type="checkbox"/>	<input type="checkbox"/>
That I may not answer questions if I feel uncomfortable to do so	<input type="checkbox"/>	<input type="checkbox"/>
Participation to the study is voluntary	<input type="checkbox"/>	<input type="checkbox"/>

Name of Participant

Participant Signature

Appendix D: Explanatory Statement



MONASH South Africa

A campus of Monash University Australia

EXPLANATORY STATEMENT FOR NON-GOVERNMENTAL ORGANISATIONS AND LOCAL GOVERNMENT

Project: SOCIAL MEDIA AND LEARNING: A STUDY OF WATER RESOURCE MANAGEMENT IN MPOPHOMENI TOWNSHIP, KWAZULU-NATAL, SOUTH AFRICA

Chief Investigator's name: Associate Prof Bimo Nkhata **Student's name:** Elsah Nomsa Dhliwayo

Water Research Node

Phone: [REDACTED]

email: [REDACTED]

Phone : [REDACTED]

email: [REDACTED]

You are invited to take part in this study. The title of the study is "SOCIAL MEDIA AND LEARNING: A STUDY OF WATER RESOURCE MANAGEMENT IN MPOPHOMENI TOWNSHIP, KWAZULU-NATAL, SOUTH AFRICA" Please read this Explanatory Statement in full before deciding whether or not to participate in this research. If you would like further information regarding any aspect of this project, you are encouraged to contact the researchers via the phone numbers or email addresses listed above.

What does the research involve?

The purpose of this research is to explore how information sharing using social media facilitate learning for the management of water resources. The study attempted to answer this question by investigating: how information was shared before the use of social media was implemented in the Save Midmar Dam Project; the justification for and selection of suitable social media platforms; how information is shared; the type of information shared; the role which social media has played in the diffusion of information; the learning that has resulted, and how this may have facilitated behavioural change that would lead to improved management of water resources.

As a participant in this study you will be interviewed by the researcher so as to fulfil the aims of the research objectives. The researcher will make use of semi-structured interview questions and each participant will be interviewed for about 30 - 45mins.

Why were you chosen for this research?

You have been chosen to participate in this research because of your involvement and knowledge of water management issues in the study area.

Consenting to participate in the project and withdrawing from the research

The participants will be asked to read and sign the consent form before the interviews are conducted. The consent form will have information on how the interviews will be conducted, where the interviews will be conducted and the use of an audio recording tool. The researcher will make use of semi-structured interview questions and each participant will be interviewed for about 30 - 45mins. As this research involves voluntary participation, if at any point the participant feels uncomfortable he/she will be allowed to withdraw from the study.

Possible benefits and risks to participants

The findings of this study will add to the existing body of knowledge regarding how information sharing using social media facilitate learning for the management of water resources. Moreover, the results of this study will contribute to the development of more comprehensive social media tools which can be used to share information on the management of water resources.

This research will not have any risks. Participant's names will not be published and participation will be voluntary.

Confidentiality

No names of participants will be used during the writing and reporting of the research. The researcher will ensure that information gathered is kept secured by placing security procedures to limit the accessibility of the gathered information. Only the researchers will have access to the information.

Storage of data

Data will be stored on campus in a locked storeroom. Electronic data will be stored with the use of security codes and passwords known to the chief researcher and student researcher. All data will be destroyed after 5 years.

Results

A de-identified report on the findings and recommendations will be provided to the organisation.

Complaints

Should you have any concerns or complaints about the conduct of the project, you are welcome to contact the Research Coordinator at Monash South Africa:

Ms Hester Stols

Office of the Academic President,

[Redacted]

Tel : [Redacted]

E-mail [Redacted]

Thank you,

[Redacted]

Bimo Nkhata and Elsay Nomsa Dhliwayo

Appendix E: Social Media Platforms Document (WESSA)

Social Media Insights

First draft for further input`

By: Catherine Ritchie, Jim Taylor, Ntswaki Dtlhale and Jenna Dohne

Insights from across all social media platforms

Profiling activities across all social media platforms certainly helps raise awareness particularly if water is the focus of the profiling. It is important to encourage project participants and beneficiaries to tell their stories and speak about their experience with water and the project partners. What is significant here is that not only do the social media platforms share awareness of water related issues but they also enable people to grow in understanding of the work they do as they seek to express it in the various media. The learning is therefore strengthened not only in people who may read the post but also in those who submit them.

Coordinating across various social media platforms is also proving useful. We find that at a local level township residents are very active at sharing on platforms such as What's App but they need access to email for more detailed sharing. When used in a complementary manner the different platforms strengthen each other.

Instagram – Few people are using Instagram in a water management related context. There is thus an opportunity to the water field to develop the Instagram usage so as to visually communicate messages. Instagram can be linked to geotagging. Essentially with geotagging one is able to add ones location to any photo that is uploaded, which in turn will create a photo map of your posts. This shows you on a map where all your photos have been taken. By adding your location, it doesn't only create a map; it also displays that location above your photo in each post that has been geotagged.

Since people can click on geotagged locations and see all of the posts in that area, this can be another great way to gain followers and interactions. Followers who live and work nearby may be more likely to interact with you or do business with you if they see that you are nearby. You can toggle your location on and off before posting an image. This comes in handy if, for example, you want certain posts to be added to your map but wants others to be left off. You can also search for nearby locations like restaurants, tourists' attractions and other businesses.

Twitter – Although Twitter is popular and we have used it in the context of this project we are finding that the content is short-lived. Perhaps one should only use Twitter as a secondary platform, for immediate and very topical news rather than general posts. In one notable event where WESSA supported the WWF “Journey of Water” ten celebrities (including television personalities and other luminaries) were taught about water and catchment management over a three-day period. The learning included practical field-work and even included a hike from Midmar Dam to Mpophomeni township, six kilometres away. During the learning experiences and immediately afterwards it was calculated that 22 million tweets were made about the experiences! Although this awareness raising sounds spectacular it is still felt that the content on Twitter is short-lived and does not support an engagement process which is so necessary in the context of social change towards a more sustainable water use model.

YouTube

YouTube video is a powerful tool and it could be used much more in the water field. It is particularly useful when one develops a short video that reflects a once-off event or as an instructional video on how to apply a particular water related practice. One should focus on posting engaging content (quality) rather than on the frequency (quantity) or length of posts.

LinkedIn

LinkedIn could be used much more in the water field. It not only connects fellow professionals but we found it useful to advertise our water capacity building courses on LinkedIn. LinkedIn is also an appropriate space to about successful project partnerships so as to attract further support.

WhatsApp

WhatsApp is a popular free social media tool and it’s popularity is growing very fast in South Africa. It was found to be very useful when connecting groups who are water monitoring in townships (eg: Mpophomeni in the KZN Midlands) and in affluent areas (eg: Durban Kloof).

Since up to 100 people can be in a WhatsApp group, and up to 256 if the newly developed Android App is used, this social media has much potential for connecting people and sharing information. In Mpophomeni What’sApp groups monitor surcharging sewers, fly-dumping, alien invasive tress as well as general township issues. Such is the power of these social media groups that the government is seriously thinking of developing free wireless zones in RDP and

other informal settlements (Guy Preston DDG for DEA NRM). Where people can share issues, such as flooding or fire warnings, it can save lives and property.

In a recent research evaluation of a community project Ward (2016) found that where relationships are strong with local government and the water authorities it becomes possible to use social media, most notably WhatsApp, to document and share issues and risks and these can then be addressed by the most appropriate authority or organisation.

FaceBook

Facebook is undoubtedly a really powerful media and is a popular for sharing information.

We found Facebook to be of limited value in communicating with water authorities or with government and local government, however. Where groups on courses jointly formed Facebook or WhatsApp Groups, we found that it strengthened their learning and cooperative work a great deal. Social media can, therefore, play a strong role in supporting the development of professionalism in the water field most notably through developing “Communities of Practice.”

Skills development training

We are finding that social media can strengthen skills development training a great deal. Of course it is important to complement the news with quality, engaging images. Group shots of participants, or room shots showing backs of heads facing forward are generally of limited use only. Acknowledging posts is critical to building relationships.

Managing Social Media

The management of social media platforms is extremely difficult. This is due to the multiple media platforms, at times massive traffic in many different directions and the constantly evolving nature of the field and technologies. It is recommended that should an organisations wish to optimise the use of social media they should consider purchasing a platform management dashboard such as Hootsuite. Platforms such as this help track, manage and monitor multiple platforms on a daily basis as well as the distribution of content. There is a ‘lite’ version which is free but offers limited functionality.

It would seem to be helpful to group the use of social media platform according to the following categories:

1. PROFILING (raising the profile of water and wise water management)
2. SUB PROFILES (sharing stories about tools, activities and services) and
3. LEARNING OPPORTUNITIES and CALLS TO ACTION

Appendix F: Door to Door Flyer



<p>PLEASE DO NOT THROW THE FOLLOWING THINGS IN THE TOILET:</p> <p>1. Plastic 5. Condoms</p> <p>2. Newspaper 6. Sanitary Pads</p> <p>3. Cardboard 7. Nappies</p> <p>4. Rags 8. Food items</p> <p>These things cause blockages. Blockages then cause sewage spillages in the street and we all suffer.</p> <p>Please be responsible.</p> <ul style="list-style-type: none"> • Report sewage leaks to 0800 864 911 	<p>SIZA! UNGAFAKI LOKU OKULANDELAYO ETHOYILETHI:</p> <p>1. <u>Ucwazi</u> 5. <u>Amakhondomu</u></p> <p>2. <u>Iphephandaba</u> 6. <u>Amaphedi abesifazane</u></p> <p>3. <u>Ukhadibhodi</u> 7. <u>Amanabukeni</u></p> <p>4. <u>Amasaka</u> 8. <u>Ukudla</u></p> <p>Lezi zinto ezibalwe ngenhla ziyavimbanisa, zenza indle igxagxaze emgwaqweni futhi sonke siyathinteka.</p> <p>Bamba iqhaza ngokwenza kahle.</p> <ul style="list-style-type: none"> • <u>Bika indle ephuphumayo ku-</u> [REDACTED]
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Appendix G: Manhole reporting sheet

ENVIROCHAMPS REPORT SHEET – July 2016



Name: [REDACTED] Cell Number: [REDACTED]
 House Number: [REDACTED]
 Ward: 2 Call centre sewage: 0800 864 911, Collect Rubbish: 033 239 9245
 Councillor: Mrs Zine Dlamini
 Manhole number: AL1, AL2, AL3, AL4, AL5, AL6, AL7, AL8, AL9, AL10

DATE OF SPILLING MANHOLE *if spilling from last month	MANHOLE NO.	DATE REPORTED	NAME OF PLUMBER. CELL NO.	DATE FIXED	DAYS SPILLING AFTER REPORTING	CAUSE OF BLOCKAGE					COMMENT (OTHER ITEMS, METHOD OF REPAIR)
						nappies, rags, spoons, towels, plastic bags	building material (sand, stones)	vandalism (rocks)	scrap metal	animal parts	