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Diarising climate change: Johannesburg youth's outlook on their future

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Diarising climate change: Johannesburg youth's outlook on their future

Research report by Schalk Mouton

M.Sc. (Global Change and Sustainability)

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Declaration

I declare that this Research Report is my own, unaided work. It is being submitted for the partial fulfilment of the Degree of Master of Science at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



(Signature of candidate)

_____8th_____ **day of** __February_____ **20** ___19_____

Abstract

While the youth has been named as one of the most important target audiences to communicate the challenges and future implications of climate change, very little has been done globally to engage with them on the issue and include them in the conversation on how to mitigate against, and adapt to climate change. The youth of South Africa faces a highly uncertain future, with various challenges such as high levels of inequality and unemployment as well as an uncertain political and economic future. With such pressing, immediate challenges, it is doubtful that an issue such as climate change – which for most societies is a very distant challenge, both in time and space – would be an issue that South Africa's youth would be concerned with. Communication practices for climate change have largely been ineffective to spark a change in behaviour amongst most communities. Yet, it is in the youth that we find both a challenge and an opportunity to overcome this 'wicked' problem. If we can engage the youth, we can help to empower them as change agents in their households, their communities and, in future, in their workplaces. In order to do this, however, we need to gain their trust, and encourage them to become partners in the challenge against climate change. In order to do this, it is crucial to understand the values, beliefs and norms that they hold dear. It is also important to understand who influences them the most, and who they would trust to engage with respect to climate change. This qualitative study is an attempt to understand what some of the youth at the University of the Witwatersrand in Johannesburg, South Africa, think and believe about climate change; how their behaviour towards climate change is shaped; who are the people that they trust, and who would influence them the most. It also is an attempt to

gain an understanding of how this knowledge could be used effectively, empowering the youth to become the agents of change that we need to overcome one of the biggest challenges of our – and more importantly – their lives.

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1 Chapter one: Frames of reference

1.1 Introduction

The youth, as a collective, make up an important part of the climate change audience today (Narksompong and Limjirakan, 2015). Climate change and its effects is probably one of the biggest challenges that they will face in their lives (United Nations, 2010). The youth, however, do not seem to be actively engaged, in some platforms and areas of the world (Woollcombe *et al*., 2001; United Nations, 2010). In South Africa, the youth make up 36.1% of the population (Stats SA, 2017), with youth defined as people between 15 and 34 years old (National Youth Development Agency, 2015). In order to ensure a sustainable future for the next generation, it is vital to not just get the youth to engage with issues about climate change, but also to get them actively involved, and, perhaps, to become change agents themselves. In order to do this, it is important not just to inform and educate them about climate change, but to go one step further and to consult and involve, and actively engage young people and to establish partnerships with them to take forward the message that it is their future that is being threatened by our impact on the planet (United Nations, 2010).

But, how do you actively engage the youth and facilitate change? How do you reach out to teenagers and early career university students and impress upon them the importance of climate change? It is their world and their future that is being ruined. How do we empower them to take charge of their own future? After all,

climate change does not have to be all negative. It could also present a host of opportunities such as simulating entrepreneurship, as well as green skills and jobs (Fankhaeser *et al*., 2008).

As media professionals all over the world know, and as emphasised by science communications scholars including Nisbet and Scheufele (2009), for effective communication to take place, it is vital to know your audience. The two scholars emphatically state the importance of knowing one's audience:

> *"Across each of our recommendations, we emphasize the following basic premise: any science communication efforts need to be based on a systematic empirical understanding of an intended audience's existing values, knowledge, and attitudes, their interpersonal and social contexts, and their preferred media sources and communication channels" (Nisbet and Scheufele, 2009, p. 1767).*

In an effort to understand the youth as an audience, it is vital to understand how they interpret and what they may believe about issues such as climate change; who or what influences them; what do they think of things such as sustainable living; and what values do they hold dear? The only way to do this, is to initiate a conversation with at least some members of the youth, and, through various interactions try and understand what they feel and believe about climate change, and how they see their role in mitigating against it and also adapting to climate change. The result of these questions would hopefully provide a snapshot – or, to use the more scientific term, a "mental model" – of how South Africa's youth see their world in relation to climate change.

1.2 Focus of the study

The focus in this study is to explore and better understand the extent to which young people in South Africa are aware of and engage with "climate change". Globally, the "youth" are usually targeted as a "stakeholder" group often with little active engagement that enables and or empowers them to engage deliberatively in climate change actions (United Nations, 2010; *Visions for Change Country Papers*, 2011; Government Gazette, 2018). Very little information is available on what the youth of the country think about these critical issues, and how best to communicate climate change and sustainable behaviour to them (Seager, 2007; Guenther and Joubert, 2018). During their lifetimes, the youth will most probably be the section of the community who will be most affected by climate change.

In an effort to understand the youth – both as an audience for climate change communication, as well as to examine possible ways to effectively enrol the youth's almost inherent inclination to act as change agents – this study attempts to establish how the youth think about issues surrounding climate change; how they behave in terms of sustainable lifestyles; and who they most likely would listen to, when it comes to communicating the importance of climate change and adapting their behaviour to. By creating a mind map of the study group, the paper finally explores some of the most effective ways to communicate with the youth, and suggests some ways in how to use them as change agents for the future.

1.3 Aim

This study seeks to answer two critical questions:

1. By interviewing a small sample of some of South Africa's youth that are pursuing higher education, to try and establish what the South African youth's attitudes, perceptions and beliefs are about climate change. The research also investigated behaviours towards mitigating their possible impacts on climate change and also probing adaptation to climate change? In asking this question, the aim is to create a mental model representing a portion of the population of the youth of Johannesburg, in order to better understand ways to communicate with them on matters relating to climate change.
2. How can we put this mental model to use, and find ways to engage with the youth on climate change, and, ultimately, enable them to become agents of change in their households, communities and future lives?

1.3.1 Research questions

This research project attempts to answer the following research questions:

1. What do some of the youth of Johannesburg think of climate change?
4. How do they behave towards mitigating climate change?
5. Who or what would influence them in changing their behaviour?
6. What would be the best way to communicate issues of climate change to them?

1.4 Scope of the study

Through in-depths interviews of 20 students at the University of the Witwatersrand in Johannesburg, South Africa, this study begins to probe what the youth think and believe about climate change, and how they behave to mitigate against climate change and related sustainability issues. The students interviewed are all between the ages of 18 and 25 and study a variety of courses at the University.

While touching on the psychology of the importance and the way we form habits (Verplanken and Wood, 2006), and how this affects the choices we make, and subsequently our behaviour, this study is not an in-depth study into the psychological mindsets of students, where it comes to making choices on sustainable behaviour. The study aims to create an understanding of how students think about climate change, and sets out to create a simple mind map of this sample of students, in order to find more effective ways to communicate climate change to them. This study is one of the first attempts to paint an in-depth picture of the minds of some of the youth of Johannesburg, where it comes to climate change. As far as the author is aware, no other academic work has attempted to understand this critical sector of the South African population.

1.5 Ethical considerations

As this study needed to comply with the ethics code of the University of the Witwatersrand, an ethics application was lodged to the ethics committee of the School of Animal, Plants and Environmental Sciences (APES) at the University. This process included getting permission from the University registrar's office to undertake the research among students at Wits University. This application was successful and permission was granted on 4 August 2017 (Potgieter, 2017). The ethics clearance process also required a full explanation of the aims and methodology of the research and required that the process be fully explained to the participants of the study. This was done by drawing up a document that fully explained the goals of the study, what the process involved, how information would be treated and what would be done with the information (Mouton, 2017). It also guaranteed the participants complete anonymity and that their information would be treated as confidential. All participants of the study received a copy of this document, and returned a signed copy, granting permission to participate in the study, to the researcher. An example of this document that included a list of sample questions was submitted to the ethics committee of APES. Ethics clearance for the research was confirmed on 8 August 2017 (Sanders, 2017).

1.6 Structure of this research report

This research report will follow the following structure:

- **Chapter one** will outline the frames of reference, background, scope, focus and aims of the study;
- **Chapter two** will discuss current and existing literature on the subject of climate change communication;
- **Chapter three** will outline the methodology and reasoning behind data collection;
- **Chapter four** will detail the results and findings from the interviews;
- **Chapter five** is the discussion of the results, while **Chapter six** will follow with a short conclusion and final remarks.

2 Chapter two: Theoretical considerations and literary review

2.1 Climate Change

The International Panel on Climate Change (IPCC) defines climate change as:

> *"a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use" (IPCC, 2014, p. 120).*

While climate change has occurred naturally since the Earth's existence, the impact of humans on the planet's systems has accelerated the rise in the atmosphere's average temperature by 2 W m^{-2} since the industrial revolution, largely due to the increase of Green House Gasses (GHG), such as carbon dioxide (CO_2), methane and other gases (Mitchell, 1989). Climate change is widely cited as being one of the biggest threats to future generations (United Nations, 2010; Erikson, 2016), with possible impacts on food security (Parry *et al*., 1999; World Food Programme and Met Office Hadley Centre, 2012), human health (Bosello *et al*., 2006; Haines *et al*., 2006; World Health Organization, 2017) and even possible escalations to violent conflict (Barnett and Adger, 2007; IPCC, 2014b), to name but a few. Stressing all the aforementioned risks and vulnerabilities, the latest IPCC assessment on impacts, adaptation and vulnerabilities also list various other impacts, such as changes to the Earth's hydrological systems (including rainfall amounts and patterns that might affect runoff water resources; melting snow and permafrost; increased frequency and magnitude of extreme weather events; and a loss of biodiversity as possible impacts (IPCC, 2014b).

South Africa's National Adaptation Strategy, as well as the newly published Climate Change Bill, which, at the time of writing, were both out for public comment, make it clear that the country will be impacted by climate change. The official documents also acknowledge that climate change, as stated in the IPCC, is caused by anthropogenic emissions (Department of Environmental Affairs, 2017; Government Gazette, 2018). Due to the country's geographic location and its economic reliance on primary sectors such as agriculture, the country is highly vulnerable to the effects of climate change. What is remarkably absent in both these official government documents is any reference to the youth of the country, or any mention of including them in the conversation on climate change.

South Africa is not only confronted by the challenges of climate change. South Africa is one of the countries with the highest levels of inequality in the world with a Gini-coefficient of 0.63 (where 0 is no inequality and 1 is total inequality) (The World Bank, 2017). While climate change is expected to affect all sectors of society (Watson *et al*., 1996; Scholes *et al*. 2015), it is the poor who will be most vulnerable to climate change (Bohle *et al*., 1994), affecting large numbers of the country's citizens.

South Africa's average temperature has increased by 2 °C per century, especially in the western and the north-eastern parts of the country (IPCC, 2014b; Department of Environmental Affairs, 2017). This figure is more than double the rate of global warming. Increased extreme weather events, such as floods, and the likelihood of

dry spell conditions, the duration of dry spells, and the intensity of the rainfall are projected to increase (Department of Environmental Affairs, 2017).

Even in the face of these serious risks, however, scientists, the media and climate change communicators have been unsuccessful in advocating for – and more critically, enabling – behaviour change in the general public (Center for Research on Environmental Decisions, 2009; Hulme, 2009; Whitmarsh *et al*., 2011; Ballantyne, 2016) who remain largely apathetic regarding the seriousness and possible impacts of climate change (Moser and Dilling, 2007; Hulme, 2009; Whitmarsh *et al.*, 2011; Erikson, 2016).

While climate change relates more to the physical changes in the atmosphere, Hulme (2009) also argues that climate change is an "idea" that needs to be debated, discussed and adapted, in order to understand and mitigate the challenges that surround climate change. Writing in the Carbon Yearbook of 2009-10, Hulme stated "climate change is not a problem that can be solved in the sense that, for example, technical and political resources were mobilised to 'solve' the problem of stratospheric ozone depletion or asbestos in our buildings" (Hulme, 2009, p. 43). Instead, he argues that societies should adapt to the realities of climate change and find new ways to think about climate change adaptation. The challenge of climate change offers new opportunities to creatively view our world, and find new social, technological and political solutions to the world that we live in.

Callison (2014) also sees climate change as posing a double challenge for those interested in communication, engagement and understanding of climate change as a science. While climate change is mostly presented as a set of scientific data (as articulated by the IPCC) that the general public needs to trust and understand, it is also an issue that needs to transcend the set of scientific IPCC facts and become socially relevant in order for the public to actively engage with it, in order to make difficult lifestyle changes (Callison, 2014):

> *"Climate Change offers an opportunity to look more deeply at how it is that issues and problems that begin in a scientific context come to matter for wide publics and to rethink emerging multifaceted interactions among different kinds of knowledge and experience, evolving media landscapes, and claims to authority and expertise" (Callison, 2014, p. 3).*

2.2 Climate Change communications

Moser defines effective climate change communication as "any form of public engagement that actually facilitates an intended behavioural, organisational, political and other social change, consistent with identified mitigation or adaptation goals" (Moser, 2006, p. 4). This definition goes further than merely putting information out there and hoping that it would be picked up by the intended audience, but requires some form of outcome or change amongst the intended audience, in order to be declared effective. Effective communication requires communication practices that generate dialogue, builds trust, creates relationships and foster public participation across a variety of social settings and media platforms (Nisbet and Scheufele, 2009).

To date, climate change researchers and practitioners have been largely unsuccessful in achieving effective climate change communication (Hulme, 2010; Whitmarsh *et al*., 2011; Erikson, 2016; Young *et al*., 2017). To solve Climate change is relatively easy, says Erikson (2016). All you need to do is "Cut emissions of CO_2 by restricting or stopping the use of fossil fuels and restricting other Green House Gas (GHG) emissions that come from human activities" (Erikson, 2016, p. 217). However, while the message is simple, and formal science presents the evidence supporting this message, in practice it is easier said than done. The fact that greenhouse gas emissions are still on the increase points to a failure in communicating and effectively mainstreaming this message with and for society, including policy and proactive communities.

If the message – and the implied risk – is clear, why is it that scientists cannot get the public to engage with climate change? Hulme (2010), quotes Moser who commented on the deliberations of an expert workshop of climate change scientists, advocates and communicators held in the USA in 2004, as showing her frustrations on this problem:

> *"If only they (the public) understood how severe the problem is ... if only we could explain the science more clearly, train to be better communicators, become more media-savvy, get better press coverage ... The science of global warming is clear – why are we not acting as a society to combat the problems? Why are they not listening? Why is no-one doing anything?"* (Hulme, 2010, p 219).

Moser's frustrations point to the fact that climate change is a global problem (Erikson, 2016). It is not something that scientists, or governments can fix themselves. Households and individuals play major roles in making every day

decisions that impact on the environment, GHG emissions and natural resource sustainability, and by engaging them to consider their actions might make a significant impact on reducing emissions (Dietz *et al*., 2009; Whitmarsh *et al*., 2011). Individuals also play multiple roles in promoting "green actions" as well as in making decisions in their various personas, where they act as members of a household, employees, team leaders in the workplace, or various roles in religious, cultural or political groups that they are a part of (Whitmarsh *et al*., 2011). Due to a series of barriers, however, it has up to now been all but impossible to get the message delivered and taken up.

2.2.1 Barriers

There are two sets of barriers in engaging the public with climate change. The first relates to communication (Erikson, 2016) – in getting the message out there – while the second relates to getting the public to respond positively to the message (Lorenzoni *et al*., 2007).

In examining the reasons why efforts to communicate climate change to the larger public is problematic, Erikson (2016) says that part of the reason is that the language that we use to refer to climate change does not really reflect the problem. "Global Warming" is an inaccurate phrase and presents the idea that if we can temper the Earth's atmospheric temperatures the problem could be solved. The "Greenhouse Effect" points to a physical process of heat by atmospheric gasses, while the more accurate term "climate change" can be problematic as the climate

has changed due to natural processes throughout history (Erikson, 2016). As will be shown in the results of this study, the term climate change ends up confusing the general community into thinking that climate change is something that should or could be seen in daily variation of weather events.

Erikson further points to the problem that climate change science is mainly produced by – and for – the science community, but for change to happen, the science needs to be communicated to, and more critically *with*, the general public. During this process, both the meaning of the science and the role of the scientist changes, where the scientist is not only a data collector and analyser any longer, but an advocate and co-producer and creator of change behaviour (Moser and Dilling, 2007; Hulme, 2010; Callison, 2014; Erikson, 2016). Scientists also speak a different language than that of politicians, policy-makers, journalists, civil society and the general public, which makes it difficult for scientists to make their research meaning to these communities (Boykoff, 2017). In making this point, Boykoff quotes Canadian scientist and politician Andrew Weaver from his book *Keeping our Cool: Canada In a Warming World* as saying:

> *"For the average person, the scientific jargon emanating from [scientists'] mouths translates into gobbledygook" (Boykoff, 2017, p. 13).*

To further complicate the matter, the "communication" models used to traditionally communicate science to the broader public are not always suitable. Previously, science communication was practiced through the "Public Understanding of Science" (PUS) model. This model is based on what is called the information deficit model, where it is believed that if you supply the general public with more

and better scientific information, they will understand the science better and engage more with the issues. The model assumes that the 'public' is a passive recipient and that they have no useful knowledge of their own with which to make informed decision about climate change. It is this lack of knowledge that the term "deficit" refers to. This model has largely been proven to be ineffective (Moser and Dilling, 2007; Erikson, 2016; McDivitt, 2016) and scholars of science communication have largely moved on to other approaches, that involve more of a dialogue between scientists and the general public, as well as models that place more focus on a partnership between the scientists and the public (Burns *et al*., 2003; Cheng *et al*., 2008; Nisbet and Scheufele, 2009), together co-creating scenarios and plans for change.

While various models of science communications such as the PUS, "Public Engagement of Science and Technology" (PEST) (Erikson, 2016), and the "Public Communication of Science and Technology" (PCST) (Bucchi and Trench, 2008) to name a few examples, have evolved in recent years, these models can largely be organised under three overarching models, namely the Deficit, Dialogue and Participation models (Bucchi and Trench, 2008; Cheng *et al*., 2008) (see Table 1 below):

- *Deficit Model* – Largely out of favour in recent years, the Deficit model describes the communication relationship between scientists or experts and a public that is typically perceived as ignorant and even hostile towards scientific practice or knowledge. In this model, it is believed that

the ignorant public can be convinced to become more receptive to and understanding of scientific knowledge, by merely transferring as much knowledge from the scientist/expert to the public as possible. The public is seen as a passive receptor, who does not interact with the scientist (Cheng *et al*., 2008).

- *Dialogue Model* – In this model, science is communicated between scientists or experts and the public in two-way communication, through dialogue, conversations or even consultation. These conversations are often on how scientific knowledge can be shared, or how science can be applied in different situations. In general, there is a feedback loop between the scientist/expert and the public. However, there is still a knowledge gap between the scientist/expert – who is seen as the custodian of knowledge – and the public, where there is a deficiency of knowledge (Cheng *et al*., 2008). The PEST model is an example of the Dialogue model, where the aim is to build a relationship between science and the public, where scientists regularly consults with the public on scientific matters (Erikson, 2016).
- *Participation Model* – In the participation model, the knowledge is shared between the scientist/expert and the public, with both participants contributing (and owning) portions of the scientific practice, debate and outcomes. This is a much more modern outlook on science communication, and this approach shares its principles with trans disciplinary research practices and citizen science (Bucchi and Trench, 2008; Cheng *et al.*, 2008; Nisbet and Scheufele, 2009). In this model, both

> parties play an important role in the scientific outcome. A good example of the participation model in science is Cornell University's Cornell Lab of Ornithology's bird monitoring project, where thousands of birding enthusiasts upload their sightings of birds on a daily basis (Cheng *et al*., 2008). Cornell University's scientists then use these data to track bird behaviour such as migration, breeding and long-term changes in bird numbers ("What we do - citizen science," n.d.).

Trench (Cheng *et al*., 2008) and Bucchi (Nisbet and Scheufele, 2009) believe, however, that while the deficit model is out-dated, it should not be completely discarded. The various forms of science communication have a space to co-exist and, in fact, while ineffective as a tool to affect behaviour change, Nisbet and Sheufele (2006) showed, that the deficit model was effective in the 1950s to inform a "scientifically illiterate America" (Nisbet and Scheufele, 2009, p. 1768) of the value of science in the space programme. Using data derived from surveys during the era, it was found that even though very few of the respondents in surveys had an understanding of the science behind the space race during the time, 90% of the respondents believed that science was improving their health and comfort, and was contributing to building a better society – as a direct result of the media coverage of the space race (Nisbet and Scheufele, 2009).

Table 1: Analytical Framework of Science Communication Models (Cheng *et al*., 2008, p. 131)

Base Communication Models	Ideological and Philosophical Associations	Dominant Models in PCST	Variants on Dominant PCST Models	Science's Orientation to Public
Dissemination	Scientism	Deficit	Defence	They are hostile They are ignorant
	Technocracy		Marketing	They can be persuaded
Dialogue	Pragmatism		Context	We see their diverse needs
		Dialogue	Consultation	We find out their views
	Constructivism			They talk back
			Engagement	They take on the issue
Conversation	Participatory democracy	Participation		They and we shape the issue
			Deliberation	They and we set the agenda
	Relativism		Critique	They and we negotiate meanings

Nisbet (2009) believes climate change has also traditionally been framed in such a way as to create divisions between different thought leaders and role players, while it undermines the wide public concern (Nisbet and Scheufele, 2009). Due to the fact that climate change is also an uncertain science, where scientists can never be 100% certain of the predictions, it is often framed as a debate between scientific communities, where uncertainty is cast in the minds of the general public:

> *"Each time an exaggerated scientific claim is proven false or inaccurate; it risks further alienating those already distrustful of the science and scientists" (Nisbet and Scheufele, 2009, p. 1768).*

Traditionally, climate change communications have also been mainly practiced by natural, physical and earth scientists. Climate change is such an important issue, that Fischoff (2011) argues that climate change communication should be based on the science of communication, because in climate change communication, "the stakes are too high for *ad hoc* communication" (Fischhoff, 2011, p. 702). Moser and

Dilling (2007) seem to have taken a lead from communication – and science communication theory – arguing for a move away from the deficit model, and moving towards either the dialogue or participation model, where the general public is involved in the discussion on mitigating against and adapting to climate change.

One of the earliest critics of the transmission paradigm (or information deficit model – where communications is seen as merely the sending and receiving of a message), Hall (1980) notes that for a message to be effective (to satisfy a need or be put to a use), it first needs to be appropriated as a discussion, and it must be meaningfully decoded (Hall, 1980). This means the receiver in the act of communication plays just as large a role as the sender of the message. Carey (2009) further defines the act of communication as a "symbolic process whereby reality is produced, maintained, repaired and transformed" (Carey, 2009, p. 23).

Examining these definitions, it becomes clear that the "receiver" or "audience", for the lack of a better word, plays a crucial role in the communication process, and one cannot begin to understand the communication process without understanding the audience. Arguing for the need of research into audiences, Livingstone (2015) believes that research must be done into each new generation as an "audience", as the world changes in terms of socio-technological advances (Livingstone, 2015).

Ballantyne (2016) argues that climate change communication in comparison to communication theory is still very much in its infancy, with very fragmented approaches to communication. Where communication theory has moved from the

study of communication as transmission, through communication as interaction to a meta-theoretical approach to the study of communication, climate change is still largely focused on communication as transmission and interaction approaches. This theory was largely confirmed by the current study, as the youth still believe they are – and expect to be – passive receivers of information on climate change, and not active participants in the communication process.

Part of the difficulty in communicating climate change is largely due to two factors. The first is that climate change communication is seen as a wicked problem (Hulme, 2010; Erikson, 2016). Wicked problems are unique problems that are so large in scale and scope that they cannot be defined or solved. Every solution to a wicked problem leads to a new potential problem, and each wicked problem can be seen as the symptom of another wicked problem. There is no right or wrong answer to wicked problems (Rittel and Webber, 1973). Climate change itself is a wicked problem, as each solution might lead to another complex problem. As in the statement from Erikson above (Erikson, 2016), climate change as a physical problem seems easy to "solve", by simply limiting or reducing the GHG emissions in the atmosphere, which in turn will lead to cooler atmospheric temperatures. But the complexity comes in when you consider the range of various questions that this might lead to. How do you decrease greenhouse gasses? What processes would we involve for decreasing these gasses in the atmosphere, and, who would be responsible for these processes? Who gets to make the choices on what needs to be done, and what steps should be taken? Where are the boundaries, and what dare we do, or not do? There are too many role players involved, too many problems to

solve, too many agendas and changes to possible outcomes. Similarly, climate change communication is a wicked problem in itself (Hulme, 2010). Climate change communication is an indefinable problem, there are too many voices, messages, models, and issues to communicate, and there are no right or wrong answers.

The second factor that makes it so difficult to communicate climate change, is that in climate change, communication messages are often designed to solve a particular problem (Ballantyne, 2016). Messages related to climate change are usually designed to solve a problem, so they are mainly designed in the form of one-way communication, where information is fed from the scientist (or science communicator), to the public. It is assumed that the public will engage with the message, and change behaviour accordingly. This – like the frustration shown by Moser in her quote above (Hulme, 2010, p. 219) – is a classic example of the information deficit model of science communication.

To add to the problem, traditional mainstream media has also failed in communicating climate change effectively with inadequate and inaccessible coverage, which often results in counterproductive messaging (Boykoff, 2008). The media still tend to present climate change as a "debate" or "battle" between "believers" and "deniers", thereby casting a doubt in the general public's mind on whether climate change is real or not. By nature, the media also tends to make use of scare or doomsday reporting, focusing more on the problems, risks and challenges of climate change, rather than solutions and opportunities, thereby creating

cognitive dissonance among the public, by making climate change an issue that is too large to solve (Moser and Dilling, 2007).

Hulme (2010) argues that some of the reasons that the media has not been effective in communicating climate change is that the idea of climate change means different things to different parts of the population (Hulme, 2010). Individuals and sectors of the community all have different sets of backgrounds (knowledge, experiences, values and circumstances), and you cannot communicate a complex issue like climate change in a uniform manner. Hulme (2010) cites two other reasons why the media is unsuccessful in communicating climate change. The first reason lies in the information deficit model, as discussed above, while the other lies in the fact that the media does not merely deliver a message, but almost always interprets, frames and filters messages about climate change, and portrays it by using emotive language and images (Hulme, 2010). Boykoff (2004) further argues that the long-held journalistic principle of "balanced reporting" – in which both sides of an argument are provided in order for the reader to make up his or her own mind on an issue – can often lead to "denialism" and public perceptions that the science on climate change is uncertain, and that climate change is not a serious issue (Boykoff and Boykoff, 2004):

> *"The continuous juggling act journalists engage in, often mitigates against meaningful, accurate, and urgent coverage of the issue of global warming" (Boykoff and Boykoff, 2004, p. 125).*

A good example of this in the South African media, is an article published in 2015 in the Herald newspaper in Port Elizabeth (Fig. 1), where a "top scientist rejects [the] view that man is [the] primary cause [of climate change]" (Koen, 2015). In this

article, the scientist quoted is a “self-proclaimed global warming denialist”, physicist Don Mingay, who presented a speech at the Nelson Mandela Metropolitan University. The article provides Mingay’s one-sided argument, where he labels the IPCC as an “alarmist group” that based its decisions on flawed research and data that should not be accepted by the international science community:

> *“This goes along with fiction and does not use scientific fact to argue climate change,” said Mingay (Koen, 2015, p. 5).*

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Rocking climate-change boat

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Top scientist rejects view that man is primary cause

SELF-PROCLAIMED global warming denialist and retired experimental nuclear physicist Dr Don Mingay stirred controversy last night when he suggested humans played a minimal role in rising carbon dioxide levels.

Speaking to an audience of about 300 people at the Boardwalk Convention Centre as part of the 60th annual SA Institute of Physics Conference, Mingay ripped apart allegations that human interference was the primary cause of climate change.

The conference was hosted by NMMU and Rhodes. Mingay, who has held several prominent positions in various nuclear fields, debunked numerous claims that climate change is being perpetuated by humans, specifically using fossil fuels to generate power.

"Nobody denies there is climate change – there always has been; nobody denies humanity has added to carbon dioxide levels – but this is little compared to the natural out-gassing of the oceans," he said.

The Intergovernmental Panel on Climate Change (IPCC), formed in 1988, was an alarmist group advocating that global warming was dangerous and caused by carbon dioxide emissions "and therefore we must shut down all power stations", he said.

"This suggests that we are bigger than nature and that we [as humans] can change the climate – this is impressive," Mingay commented sarcastically in his presentation.

An avid sceptic of the proclamations made by the IPCC, Mingay claimed that the research and data supplied by the international organisation had serious flaws and should not be accepted by the scientific community. "This goes along with fiction and doesn't use scientific fact to argue climate change," Mingay claimed.

There had always been changes to the world's climate throughout the ages, he said, and this could be attributed to the Earth's solar cycle which predates the advent of industrialisation.

Mingay admits, however, that carbon dioxide emissions are rising – but not at such an alarming rate as suggested.

"Carbon dioxide is a minimal driver of global [climate] change," he said.

NMMU physics professor Johann Neethling said Mingay "has strong opposing views which can facilitate appropriate . . . conversations".



SHINING A LIGHT: Dr Don Mingay at last night's Port Elizabeth conference Picture: FREDLIN ADRIAAN

Figure 1: Years after the IPCC confirmed anthropopgenic climate change, the media still presents climate change as a debate (Koen, 2015)

The second barrier to successful climate change engagement lies in the public's willingness and ability to adapt their behaviour. There are a number of challenges and barriers – psychological, social and physical – that prevent behaviour change. People see climate change as something that is too far off in time and space, that it is someone else's problem and that it is not something that will definitely happen (Spence *et al*., 2012; Stoknes, 2014). The physical barriers preventing behavioural change include infrastructure constraints such as recycling or transport options and the cost and availability of "green" options for consumers.

The social context of the audience can be crucial (Ockwell *et al*., 2009; Fielding and Hornsey, 2016) when it comes to affecting behavioural change in issues such as water conservation and challenges such as climate change. One usually learns from and then do what people in your direct social environments – such as parents, neighbours or other people in immediate society do (Verplanken and Wood, 2006; Rabinovich et al., 2012). You learn your behaviours from an early age from those around you, and people who live in close proximity learn their behaviours from each other. As these behaviours and habits are hard to break, they pose another challenge to effective communication (Lorenzoni *et al*., 2007; Ockwell *et al*., 2009; Whitmarsh *et al*., 2011).

2.2.2 How to communicate climate change

Moser and Dilling (2007) highlight nine common myths about climate change communication, including the "information deficit model" (as discussed above) – which is mostly what the mainstream media and newspapers are suited for – that prevents effective communication on climate change. They argue that communicators need to go beyond just providing information; trying to convince people of the problem; scare their audiences; hoping for a good disaster; hoping someone else will fix the problem; making excuses that the science is not certain; that climate change is a unique challenge that we've never needed to deal with before; appealing to people's rational sides or the idea that if you just appeal to good values, you will have good outcomes on communicating climate change. In order for climate change communicators to be successful, they need to focus on creating messages that touch on the emotions, beliefs, values and identities of the people they want to engage with, rather than ones that create apathy, denial and disengagement (Moser and Dilling, 2007). The message content and framing should align with the values and concerns of the specific audiences (Bostrom and Lashof, 2007). In order to do this, it is critical to understand exactly what and how an audience thinks about a subject (e.g. in this case, climate change), and how a specific communication's strategy would relate to their values, preconceived ideas around a subject, their backgrounds, as well as their interests and concerns about climate change in order to gain the most benefits out of the strategy.

To make climate change relevant to an audience, the message also needs to be "localised". In other words, it has to be placed in the audience's "local" context in order for it to matter. Moser and Dilling (2007) believe that one useful way to do this is to start the conversation with the audience's own situational context, and then probing their views and experiences on climate change from their own perspective. Moser (2007) also argues that people are not motivated to adapt by communications that employ scaring tactics, but are more likely to change their unsustainable behaviours when the message paints a promise of a good, prospering future, and when it contains useful ways to get to that point in the future. Communicators also need to tap into values that are culturally relevant, positive and empowering, and that acknowledges the individual's personal aspirations such as innate goodness, responsibility towards their neighbours and environment as well as leadership, innovation, respect, caring and stewardship. In this study, through the discussions with the students, an attempt was made to explore such issues to try and engage the youth and understand their context by asking questions relating to their current perceptions, home environments and belief systems.

Moser (2007) and Erikson (2016) further argue that it is critical to move away from communication techniques that rely on message delivery, and that communicators should rather focus on more engaging forms of communication, that starts a dialogue between the communicator and the audience. "Dialogue offers a forum in which value differences, conflicts, misunderstandings, and the communal visioning and search for solutions can be addressed directly" (Moser and Dilling, 2007, p. 501).

In *The Psychology of Climate Change Communication*, the Center for Environmental Decisions (CRED), based at Columbia University, has detailed a series of principles for climate change communications. In short, they list them as follows:

1. Know your audience
2. Get your audience's attention
3. Translate scientific data into concrete experience
4. Beware the overuse of emotional appeals
5. Address scientific and climate uncertainties
6. Tap into social identities and affiliations
7. Encourage group participation
8. Make behaviour change easier (Center for Research on Environmental Decisions, 2009, p. 43)

As mentioned in the introduction of this study – and in the first point mentioned in the CRED principles above – a thorough understanding of an audience is crucial in successful, effective communication (Sterman, 2008; Center for Research on Environmental Decisions, 2009; Young *et al.*, 2017). Further to this, the general public cannot be treated as a single audience, when it comes to climate change (Hulme, 2010; Callison, 2014). As audiences are much more likely to engage with a message, if it speaks to their current beliefs, attitudes and values (Nisbet and Scheufele, 2009; Whitmarsh *et al*., 2011), communicators need to first understand their audience (such as their context), and then second, create tailored messages for

each audience in order for their method of communications to be effective (Moser and Dilling, 2007; Callison, 2014). It is vital to understand the "mental model" of an audience is vital in order create to effective messages to a specific audience (Sterman, 2008).

In establishing a mind map of the study group, this study aims to establish the ways in which the youth interprets messages of climate change, and how they interact with these messages in order to become part of the conversation. Mental models are based on psychological principles, and are mental constructs of how a particular individual (or group) sees and experiences the world. Much like stereotypes, people use mental models to make sense of how they see the world. As it is impossible for an individual to have an idea of the whole world in his or her mind, the individual interprets and packages slices or images of that information in his or her mind, to refer back to in order to make sense of how he or she views the world (Sterman, 2008; Center for Research on Environmental Decisions, 2009; Biggs *et al*., 2011; Otto-Banaszak *et al.*, 2011; Princeton University, n.d.). Mental models are useful to explain a person's thoughts and behaviour and it provides the basis on which to understand how the person reasons, comes to conclusions and solves problems (Center for Research on Environmental Decisions, 2009; Otto-Banaszak *et al*., 2011). Establishing a person's mental model is crucial for effective communication, as a person is more likely to accept a message that corresponds to his or her own mental model (Sterman, 2008; Center for Research on Environmental Decisions, 2009; Biggs *et al*., 2011). Once established, a mental model can be used to design targeted messaging in order to start a conversation with a certain individual

or group on climate change (Center for Research on Environmental Decisions, 2009; Cone and Winters, 2011).

Biggs (2011) lists various methods that can be used to establish a mental model of a person or group. As paraphrased below, these include:

- The ARDI (Actors, Resources, Dynamics, and Interactions) approach
- Content analysis (of written texts or transcripts of interviews)
- Consensus analysis (the analysis of sharing of words, concepts and information between individuals
- Procedural mapping (aims to characterise the procedures and thought processes of an individual or group to perform a certain task); or
- Scenarios to elicit concepts (researching how a person or group solve a particular problem (Biggs *et al*., 2011).

This study will make use of the content analysis method, through a range of open-ended questions (Cone and Winters, 2011), to gain an insight of what a sample of local youth think, believe and feel about climate change, and how it impacts on their future. These data will then be used to construct a mental model of this portion of the youth in order to develop improved mechanisms to initiate a conversation with them on climate change.

This study is aimed at better understanding the youth of Johannesburg as an "audience" for climate change communication. It is not, a study in communication as

such, but more an attempt to understand a sample of South Africa's youth and their perceptions and sense of agency to take action about climate change, in order to better communicate the issues of climate change to them. The study is an attempt to understand their thoughts, concerns and beliefs around climate change, and to make sense of their behaviour and actions, when it comes to playing their role in mitigating climate change and, hopefully, adapting to it.

In the study, an attempt is also made to understand what and who influence them the most. With the hope of including them into the wider conversation about climate change, it is crucial to know who or what the most important influencers in their lives are, in order to leverage these individuals/groups or institutions to start a conversation with them. It is important to keep in mind that the idea is not to view the youth as a "market" or "audience" but as an important sector of the community, who needs to be included into the conversation on how to mitigate and adapt to climate change.

2.3 The Youth

With high, and increasing levels of unemployment among the youth (StatsSA, 2014) and a number of other, more immediate problems including high levels of inequality, employment, crime, high HIV/Aids, teenage pregnancy and poverty, South Africa's disenfranchised youth has grown a deep apathy for politics and for policymaking and a distrust in political leadership. As shown in the recent *#FeesMustFall* (Everatt, 2016; Satgar, 2016; Shay, 2016) protests at universities across the country, however, the youth are also highly vocal and extremely willing to protest to make their voices

heard (Kersting, 2012; Maphunye *et al*., 2014; Lukhele, 2015). Several studies, as highlighted below, illustrate some potential that exists in youth that could be used in climate change activism and change.

A study among 141 students between the ages of 18 to 29 years old at Rhodes University in Grahamstown (*Visions for Change Country Papers*, 2011), for example, showed that while the students sampled had a strong interest in the outdoors and the environment, this did not translate into a feeling of environmental responsibility. The group of mainly students focussed more on consumerism trends rather than thinking of conserving natural resources when making choices on their lifestyles in their daily lives (United Nations, 2010; Maphunye *et al*., 2014). This study was conducted as part of the United Nations Environment Programme, 2011, the Visions for Change study was based on the Global Survey on Sustainable Lifestyles, where researchers across the world surveyed 8 000 young people from 20 countries, examining what the youth think about their current lives, what they aspire to and what role they see themselves playing in changing their future (United Nations Environment Programme, n.d.).

2.4 Youth connectivity

South Africa's youth is also a highly diverse group, not just culturally, but also economically and politically (*Visions for Change Country Papers*, 2011; Stats SA, 2016), which makes engagement strategies to reach them extremely difficult. They do have one unifying aspect, however. They are all connected via social media. 14 million South Africans are using Facebook, 7.7 million use Twitter and 8.74 million are YouTube users (Goldstuck, 2017). During the past year, Instagram usage has grown by 32% (up from 2.68 million to 3.5 million users). Ten million South Africans (85% of the South African Facebook users, use their smart phones to access Facebook (Goldstuck, 2017). The youth are also highly 'switched on' to what their friends and peers think of them. Various studies have shown that peer motivation is a highly effective way of inspiring education and teaching among youth (Goldstuck, 2017).

2.5 Social media

Social media communicator and activist Deanna Zandt (2010) believes that social media technology has the ability to cause some "tectonic" shifts in how the world operates and provides an opportunity to create the systems for change (Zandt, 2010, p. ix). In her book, *Share This: How you will change the world with social networking*, Zandt notes that social media brings the opportunity to add the voices of previously marginalised people or communities when shaping public conversations. "We no longer have to rely on the old ways of top-down, or even organization-based, grassroots organizing" (Zandt, 2010, p. ix). When we connect with each other – both

in the virtual or physical space – we create bonds of trust and empathy, rather than the apathy that is evident in much of the youth of today (Zandt, 2010).

Social media has been used, and studied, in a number of political and activist campaigns that led to social change (and revolution) in countries, and, especially Twitter, has been shown to be effective as a medium to bring parties involved in a campaign together to debate, organise and strategize their next move, as well as to provide an insight into what is happening in the specific campaign (Segerberg and Bennett, 2011). Social media can also increase political participation and bring people with different perspectives together for discussion (Kushin and Kitchener, 2009; Zandt, 2010; Segerberg and Bennett, 2011). Facebook specifically is unique in its ability to create an environment where political discussion thrives (Kushin and Kitchener, 2009).

As shown in this section, the youth of South Africa is not only highly connected through social media, but social media has the ability to create environments where the youth can connect, not only with each-other, but with various other communities to engage on topics such as politics and climate change. Social media cannot only be used to start a conversation and ignite revolutions, but can also be used to mobilise and organise people during periods of social change. Having addressed the role that social media plays where it comes to the youth of South Africa, attention turns to the role that the mainstream, traditional media (for example print and digital newspapers, television and radio) plays in terms of climate change and the youth.

2.6 Mainstream media in South Africa

World-wide, the mainstream mass media has been instrumental in conveying the story of climate change to the general public and, essentially, bringing the issues of climate change into people's living rooms for the last 30 years (Boykoff, 2007a, 2017). The media (both as institutions and journalists) are instrumental in shaping the way in which the general public sees and views the world (Boykoff, 2017), and over the years it has played a key role in science and policy discourse and in shaping public understanding around various issues (Boykoff, 2007a). It has also been found that the media has the ability to teach the general public a lot about science (Boykoff, 2007a). The South African traditional media has been extensively and increasingly covering climate change issues for a number of decades (O'Neill and Smith, 2014). It was only after the IPCC was established in 1988 by the World Meteorological Organization and the United Nations Environment Program that the first articles on "global warming" and the "greenhouse effect" appeared in South Africa around 1989 (Sapa-Reuters, 1989; Torday, 1989).

2.6.1 News articles

Various topics on climate change have been covered on climate change since then, with the most recent topics in the local news media including the relationship with various extreme weather events to climate change, such as the recent drought in Cape Town, tornados in Gauteng, Free State and Mpumalanga, and floods in KwaZulu-Natal (Bega, 2017a, 2017b; Chernick, 2017; Jadoo, 2017; Kings, 2017a,

2017b; Marx, 2017; News24, 2017; Pretoria News, 2017; Washington Post, 2017)(see Fig. 2). With an increase in extreme weather events, the media usually attempts to link these events to climate change (Bega, 2017a; Farber, 2017; Isaacs, 2017; Kings, 2017a, 2017b). While useful in raising awareness of the dangers and consequences of climate change, news articles such as these do not necessarily contribute to "effective communication" of climate change, as they merely provide information, mainly by shock tactics, aiming to scare the audience into action. As discussed above, this is often counteractive, and leads to cognitive dissonance from the reader (Moser and Dilling, 2007).



Figure 2: South African media highlight climate change through the use of extreme weather events (Sources: Various, including *Mail & Guardian*, *Saturday Independent*, *Witness*, *The Times*, *Sunday Times*, *Beeld*).

Linking the Knysna fires and floods in Cape Town in 2017 to climate change, and describing it as the "new normal", *Mail & Guardian* environmental journalist Sipho Kings nobly warns of the dangers that climate change will be bringing with an

increase of extreme weather events, saying that “once a narrative of the future, of 2030 and 2050, the increase in extreme events is a reality that countries are having to deal with now” (Kings, 2017a, p. 6). In this article, Kings appeals for “solutions, which exist,” to be implemented. These solutions, which are contained in the National Adaptation Strategy (Department of Environmental Affairs, 2017), as well as a local green fund that is established to support green initiatives; Cape Town’s quest for cheaper desalination technologies to sustain its water needs and various “Working For” projects are not enough, writes Kings:

> *“Adapting to climate change is something that the country’s 226 local municipalities, 19 government departments and parastatals must focus on and work together on. Many aren’t” (Kings, 2017a, p. 6).*

Applying the responsibility of dealing with climate change to the authorities further disassociates the general reader from the problem, by presenting the mitigation and adaption to climate change as a problem that the government should be responsible for, thereby making it someone else’s problem (Moser and Dilling, 2007). Another example of this is a statement in the article “Storm leaves Durban reeling”, where the responsibility to deal with climate change is placed at the foot of “authorities” who need to commit to the Paris Agreement (Jadoo, 2017).

2.6.2 Media images

In the previous section, I examined the role that the South African media have to play when covering climate change, as well as manner in which they fulfil their role through the articles they write or produce. I will now move on to the role that visual representations and images play when conveying the message of climate change.

A recent study on the use of images and graphical elements by the Wits Organisational Psychology Masters' class students at the University of the Witwatersrand in the Psychology Department, has found that images of the impact of climate change is effective in both younger and older generations. In the three-part study, students presented a series of visual elements to respondents, in order to establish how effective these visual elements are to affect behaviour change towards pro-environmentalism (Batchelor *et al*., 2017; Davey *et al*., 2017; Mosenene *et al*., 2017).

The studies investigated the effect that various visual representations of climate change had on different age groups, and, whether the visual representations elicited a positive response towards more pro-environmental behaviour among the different age groups. The methodologies and group samples differed between all three of these studies, with the study on images done among two generational cohorts, namely Generation X (people between the ages of 18 and 35) and Generation Y (between the ages of 35 and 54). The sample group of 129 respondents were invited

to participate in the study through various sampling techniques, including social media platforms and the University's online portal (Batchelor *et al*., 2017).

The study on DVR representations consisted of a sample of 137 respondents in South Africa, between the ages of 18 and 60. As this was a visual study, the sample was separated into two groups by using the average age of eyesight deterioration of 40 as a cut-off line, and the groups were separated into two groups of 18 to 39 years old and 40 to 60 years old. The respondents were contacted through direct messages on email and social media to participate in a survey on the digital survey platform, SurveyMonkey (Davey *et al*., 2017).

The third of these studies was conducted among a group of 109 respondents, most of whom were University students at the University of the Witwatersrand. By using the various age categories from Statistics SA, the groups were separated into two groups, namely a younger group of between 18 and 24 years old, and an older group of 25 to 60 years old. The decision to separate the groups was taken to enlarge the "older" group's limited sample size (Mosenene *et al*., 2017).

The combined results of these studies showed that both the pictures and the DVR were effective in eliciting a positive response towards a more pro-environmentalism outlook, together with a higher motivation to change their behaviour, as they elicited emotional responses from the respondents (Batchelor *et al*., 2017; Davey *et al*., 2017). The study on the tables and graphs were less successful in eliciting the same response, as they were more difficult to understand

and make sense of (Mosenene *et al*., 2017). The result of these studies showed, however, that visual material such as pictures and DVRs are effective in eliciting an emotional response from viewers, which make these forms of media an effective tool in climate change communication.

The use of pictures has been widely and effectively used over the years to convey the dangers, impacts and effects of climate change on the planet (Manzo, 2010). However, while photographs are effective in understanding and connecting with climate change, it is ineffective in changing behaviour (Manzo, 2010; O'Neill and Smith, 2014). In fact, using images of melting glaciers and starving polar bears can be counter-productive in communicating climate change. Doyle argues that images such as these increases the psychological distance to the problem in the mind of the viewer, which increases the perception that climate change is someone else's problem to deal with (Doyle, 2007). If images are to be used to depict climate change they should be of local events that the general reader could more easily associate with. With more extreme events occurring in South Africa, there are several opportunities to generate appropriate visualisations of climate change on a local scale (Fig. 3) (Bega, 2017b; Jordan, 2017; Kings, 2017a; News24, 2017).



ON THE EDGE: Thembela Nhuzana looks at the remains of her brother's house after heavy flooding in North Ridge Park, Montclair, this week.



The new normal: Waves crash against the promenade in Cape Town's Three Anchor Bay during the worst storm to hit the Cape in two decades (above left). Homes in the Imizamo Yethu informal settlement in Hout Bay (above right) were among those severely damaged by the extreme weather. Photos: Rodger Bosch/AFP & Jaco Marais/Gallo Images/Beeld



Burning issue: Runaway fires, fanned by storm winds, swept through parts of Knysna last week, underscoring the urgency of adapting to climate change. Photo: Deon Raath/Gallo Images/Rapport





ONSLAUGHT: Tuesday's storm caused destruction around Durban.



Climate modelling shows that South Africa's provinces will be getting drier, with the exception of KwaZulu-Natal. Picture: Khaya Ngwenya

Pictures depicting climate change in the local media in the Mail & Guardian (top right), the Witness (bottom right) and Saturday Independent (left).

Figure 3: The use of images in South African media depicts extreme weather events (Sources: *Mail & Guardian*, *Witness*, *Saturday Independent*).

In this chapter, I have presented an overview of the need to treat the youth as a crucial group that should be included in both the research and the conversation on adapting to and mitigating against climate change. I have also presented a view on why it is so difficult to communicate the message of climate change effectively to the public in general, and to the youth in particular. In short, it is extremely difficult to change our habits and behaviours, as these are ingrained into us too deeply from early ages. Communication campaigns – especially using the information deficit model – are ineffective in changing these habits (Verplanken and Wood, 2006). While the media is ineffective in affecting behaviour change, however, it is effective in creating awareness among various age groups, and is still a useful tool in the fight against climate change. In the following chapter, I will present the methodology of

the current study, explaining how and why the specific research topics were chosen, as well as the design of the research model and selection of the aires that were included in the study. A more detailed look at the study group will also be presented.

2.7 Weaknesses in current and existing literature

One of the main gaps in the existing and current literature regarding climate change communication is that very little work has been done on South African audiences, and specifically on the youth. Most of the work on climate change communication – and science communication, for that matter – has been conducted in the "Global North". Work done scholars such as Boykoff, Moser, Nisbet, Scheufele and Hulme focus mainly on developed nations in Europe and North America (Boykoff, 2007b, 2007a; Moser and Dilling, 2007; Hulme, 2009; Nisbet and Scheufele, 2009), while research on the African continent is largely lacking, with only limited research being done by scholars such as Joubert (Guenther and Joubert, 2018). A significant gap exists between the extent of research conducted in the developed countries and that of developing countries, including countries such as South Africa. This work will attempt to at least start correcting this omission, and, hopefully to find an initiation point to start the conversation on climate change amongst the youth of South Africa.

3 Chapter three: Methodological considerations

3.1 Introduction

In this chapter, the research design and methodology will be described. Firstly, I will discuss the background that informed the methodology, before describing how the study was designed, what the research tools were that were employed, and how this affected the outcomes.

3.2 Background

Even though the youth has been identified as one of the nine major groups to be given a right and responsibility to be part of sustainable development by the United Nations' Agenda 21, which resulted from the UN's Conference on Environment and Development in Rio de Janeiro in 1992 (United Nations, 1992), they have been largely marginalized when it comes to climate change decisions (Narksompong and Limjirakan, 2015). Up until very recently, little research has been done to examine what South Africans know and think about climate change (Guenther and Joubert, 2018), except for a study in 2007 by the Human Science Research Council. In this study, through a survey of 3 164 South Africans, it was found that levels of knowledge about climate change was very low, with 27% of the interviewees not having heard anything about climate change prior to the research interview. With climate change being covered in some subjects at school, the youth (respondents younger than 24 years old) were the most knowledgeable about climate change with about 45% responding that they knew about it (6% saying they knew a lot; 12% a fair amount and 27% a little). The older generations knew even less, with only 40% of

people between the ages of 65 and 74 saying that they had heard about climate change (Seager, 2007). Only 28% could answer more detailed questions on climate change. While no follow-up study has been done recently, these figures are sure to have improved as media attention to the topic increased over the years (O'Neill and Smith, 2014).

Recent studies on climate change perception in South Africa have made use of perception studies and qualitative exploration methods to explore the way in which climate change is communicated to the public, as well as how well the general public understands issues of climate change. The three recent cases mentioned in Chapter 2 on how effective images, DVR and tables and graphs are in inducing a positive response towards the environment, showed that the effective use of images can be a powerful tool in creating awareness of climate change. While these studies did not test the respondents' knowledge of climate change, it did test their motivation to change behaviour after viewing visual elements (namely photographs, DVR and graphs and tables) related to climate and the environment. The underlying foundation for these studies was that visual elements played an important role in forming, completing and adapting a person's mental models, which in turn are used in the decision-making process on a certain topic. Where these cases studied the importance of media in creating and completing a person's mental models, the current study is an attempt to recreate a collective mental model of a small sub-section of the Johannesburg youth, in order to understand their values, beliefs and understanding, where it comes to climate change.

Another recent study examined the support that 310 “born-free” South Africans have for controversial scientific topics such as fracking, nuclear energy and climate change (Guenther and Joubert, 2018). In this study, the term “born-free” was described as South Africans who were born after the country’s democratic elections in 1994, and thus with ages under 24-years-old, the first generation born in democratic South Africa. In this study, 51 students in the “Science communication: An introduction to theory, trends and practice” course at the University of Stellenbosch in South Africa, were tasked to survey 10 “born free” South Africans on whether the respondents supported funding for the various “controversial” scientific topics, including climate change; nuclear energy; mobile phone safety; genetically modified food; medical use of marijuana; traditional healing methods; evolution and fracking. It was found that the respondents largely supported research into climate change, with only 18% either in favour of funding cutbacks for climate change research funding or didn’t know. Climate change had the highest support of all the controversial science topics among the youth (Guenther and Joubert, 2018).

The aforementioned studies were all mostly quantitative in nature, and did not engage with the respondents in order to provide a detailed picture of their thoughts and ideas on climate change. To date, the only qualitative study done on what the South African youth think of climate change is the Vision for Change country papers, which was done in Grahamstown among 141 students between the ages of 18 and 35 years old, and was published in 2011 (United Nations Environment Programme *et al.*, 2011; *Visions for Change Country Papers*, 2011). The respondents, which were mainly students, were asked questions relating to their awareness on issues relating

to environmental and sustainability issues and their willingness to adapt to more sustainable lifestyles. While they felt a strong connection to the environment, and a need to connect with their neighbours and communities, they were less keen to adapt their lifestyles in order to live more sustainably, mainly because of cost, safety and infrastructural reasons (*Visions for Change Country Papers*, 2011).

One study that closely resembled that undertaken in this research is that conducted in an informal settlement in Kenya. In this qualitative study the perspectives of the youth on climate change issues in the Mathare informal settlements in Kenya in 2017 were investigated. This study among a small sample, 24 in number of young people between the ages of 18 and 24, found that there was an acute shortage of knowledge regarding climate change among this group. This was mainly ascribed to a lack of education and the dissemination of information regarding climate change. The group had a very vague understanding of climate change and erroneously linked climate change to short-term weather events. The confusion between long-term climate change and short-term changes in weather is a common mistake among people (IPCC, 2007; Hamilton and Stampone, 2013), who see extremes of hot or cold weather as evidence for (or against) climate change (IPCC, 2007). This poses an added challenge for scientists and climate communicators who need to convince the public of “global warming” on an especially cold and cloudy day (Hamilton and Stampone, 2013). The respondents in Kinoti’s study also felt that there was little that they could personally do to have a positive impact on climate change (Kinoti, 2017). As will be shown later in the results, the latter theme corresponds with the findings of the current study.

3.3 Study Methodology

3.3.1 Research design

The aim of the study is to examine ways in which climate change can be effectively communicated to the youth in order to ultimately mobilise them into being change agents themselves. As the study aims to solve a specific problem, it is conducted from a Pragmatic world view, using a mixed methods approach through the collection mainly qualitative data. A small amount of quantitative data was collected, however, this was mainly done to illustrate certain occurrences (Creswell, 2014). While nested in a pragmatic world view, the study also draws heavily on both the Constructivist, as well as the Transformative world views, as it seeks to both understand the world in which the youth of Johannesburg lives in (Constructivist), but also to find ways in which the youth, as a marginalised group, lives and engages with this world (Transformative) (Creswell, 2014).

The research design takes on a phenomenological approach, as it examines and describes the thoughts, ideas and living experiences of the youth, where it comes to climate change (Creswell, 2014). The research method chosen was to do a detailed investigation of a small number of youth, using a convergent parallel mixed methods approach of both qualitative and quantitative data in order to fully understand the circumstances that the youth find themselves in, and to establish the most effective ways in which to communicate climate change to them (Creswell, 2014). Reasons

being that the interactions and time spent engendered some form of trust and also enabled a richness in responses that was generated.

For the purpose of this study, in-depth interviews with 20 students at the University of the Witwatersrand were undertaken in order to gain a better understanding of their beliefs, perceptions and behaviours around climate change, and who or what are the influencers that would most likely be able to change their attitudes towards climate change. To gain deeper insights into their thought process, the study was conducted over a timeframe of a month, and the survey was done through repeated contact sessions with the students. This process took on the form of a diary, in which the ideas and thoughts of the students were noted, and explored in further detail later on. The bigger aim of the study was to eventually create a mental model of this particular group of the society, in order to find better and more effective ways to communicate with them, and start a constructive conversation on climate change with them. A set of topics that might provide insight on the youth's outlook on their futures, as well as what their perceptions, beliefs and attitudes towards climate change was identified and selected to design an open-ended questionnaire (See **Error! Reference source not found.**).

The questions were selected to probe the students' deeper beliefs and thoughts about climate change and how it affected them on a daily basis. The survey was also designed to probe and 'dig' a little bit deeper, to establish not just what they were thinking at that specific moment, but how their thoughts about climate change connected and did/did not inform their daily behaviour. As social context is also

crucial in developing a person's attitudes and behaviour (Ockwell *et al*., 2009; Fielding and Hornsey, 2016), and therefore the study also examined the students' relationship with their families (and in some cases wider communities), with regards to climate change, in order to establish:

(i) who and what influenced their behaviours;

(ii) whether it would be possible for them (the students) to change their behaviour; and

(iii) whether an opportunity exists to empower the students themselves as change-agents in their families and communities, in order to contribute to larger societal behaviour change.

The questions also interrogated their ideas on whom would be most likely to influence them on topics related to climate change, and what influence the media have on them. The survey questions were categorised under the following headings:

- Their outlook on the future;
- Behaviour (in terms of the environment and climate change);
- Beliefs and perceptions on climate change;
- Family's belief, perceptions and behaviour towards climate change; and
- Media and influencers that might influence perceptions and/or behaviour towards climate change.

A small group of respondents were selected so that in-depth probing could be undertaken through the set of open-ended questions. This allowed for open feedback from the semi-structured interviews. The semi-informal conversations with

the study group, and the ability to receive their feedback, gave rise to the notion of a diary, as noted in the topic of this research. Tuckett (2004), Lopez and Whitehead (2013) note that with a qualitative research approach, there are no formal criteria for setting the sample size in a study. They suggest that there are no rules to determine whether a sample size is big enough, or too small, and that the richness of the data collected in a qualitative study is much more important than the number of respondents (Lopez and Whitehead, 2013). Normally, a sample size for a qualitative study falls between 8 to 15 respondents, however, this number can vary significantly to both sides outside that range (Lopez and Whitehead, 2013). In this study 20 students were chosen as the number to sample, enabling enough scope for difference and similarity to be observed.

Using a list of pre-selected questions for structure, the open-ended questions allowed for no constraints to be placed on the interviewee, in formulating his or her answer to the question (Cone and Winters, 2011). The students were selected through a non-probability convenient sampling design and approached on the campus of the University of the Witwatersrand, in Johannesburg, South Africa. The sample was also selected to reflect the representation of the demographics of the campus, and South Africa. Gender concerns were also considered with half of the interviewees male and the remainder female. As students, the respondents come from across South Africa, with two respondents coming from the rest of Africa (Uganda and Swaziland). There was also a difference in the financial backgrounds of the respondents, as well as the developmental state of the community that they come from. This was also reflected in their responses and beliefs on climate change.

The respondents also had a deep variety in their academic backgrounds and courses that they were enrolled in. However, the majority were studying engineering, with the second biggest group studying accounting science. As most of the students were undergraduate students, the group ranged in ages from 18 to 24.

3.3.2 Data analysis

The data gathered from the interviews were analysed through using a mixture of conventional, directed and summative qualitative content analysis (Hsieh and Shannon, 2005). In conventional content analysis, the themes and coding are derived from the content or text itself (in this case, transcriptions of recorded interviews), while directed content analysis refers to themes that arise from predetermined theories that the researcher is looking to confirm or deny. Summative content analysis involves the calculation and comparing of certain keywords that are used in the text, in order to find various themes (Hsieh and Shannon, 2005). During this study, all three of these approaches were used, as some of the themes included were derived directly as a result of the content resulting from the interviews (conventional); while other themes were followed as a result of a set of theories that the researcher attempted to examine (directed). The themes were also analysed through summative content analysis.

As this research project involved areas where there are existing, but limited literature, and where scholars across the world are still grappling to find their way

around climate change communication, the mixture of using all three content analysis approaches was useful to help deepen the findings of the research. The flexibility of this approach provided the opportunity to allow the results to lead to the development of themes (through conventional content analysis), while at the same time it allowed the examination of pre-determined ideas and theories on what and how the youth think about climate change. Further, it also allowed one to draw an overall sense of what the youth think, by comparing ideas and concepts, shared among them from the results.

3.4 Reflections on methodological approach

The study group was purposefully kept small, in order to carefully probe and understand how and what ways participants in the study were thinking about and understanding climate change. This approach was especially valuable as the researcher was able to connect on a deeper level with the respondents, and gather a deeper insight into what they think and feel about climate change, and who they are likely to trust more, particularly when it comes to learning about climate change – and changing their behaviour. The data gathered from this approach were extremely valuable in painting a picture about what the youth of Johannesburg think of climate change. It must be noted, however, that the sample size is small, and it might be a valuable exercise to repeat this research, and to conduct it amongst a wider, more representative portion of the youth, both in Johannesburg, and nation-wide.

4 Chapter four: Empirical evidence

4.1 Outlook on their future

The youth is understandably concerned about their future, something that is reflected in the responses of this study group. With the survey being done in the latter parts of 2017, before the elective conference of the governing African National Congress (ANC) was held at the Nasrec Stadium in Johannesburg in December 2017, the group of students reflected the air of uncertainty that was hanging over the country at the time (Maserumule, 2017; Plessis, 2017). After being asked to respond using only one word, to the word "future", half of the respondents (10) immediately responded with a negative answer, ranging from words such as "disaster", "doom", "dead", "uncertain," and "limited". Six gave neutral answers, with words that included "working", "soon", and "my life", while the rest gave positive answers, such as "advancement", "exceptional" and "hope". These answers may provide a glimpse into the mindsets of young South African future leaders. With negative news in South Africa in recent years, they are overburdened with worries that range from high unemployment rates, uncertainty in the national politics, crime levels and inequality. When talking about their concerns about the future, these factors were regularly mentioned in discussions during the study, with two of the most mentioned concerns being politics in the country (and the world in general) and personal success:

> *"That is why I am here (at University). I am very concerned. Firstly, because of financial security" (M – 26).*

Another showed his worry in the high unemployment rates in the country:

> *"Just getting a job. Just making it in life." (M – 20).*

With regards to politics, the respondents were worried about the direction that politics in the country was taking at the time of the survey (late 2017), with some also being worried about the politics of the world:

> *"The politics and the direction it is (sic) taking at the moment is very concerning. I think it is difficult to think of the world as a concept without thinking about the politics. Everything is very fractured at the moment" (F – 24).*

Another backed up these sentiments:

> *"Politically, I think there's some dangerous people in power and I feel like there's too many wars going on" (F – 19).*

Yet another respondent said that she would leave the country as soon as possible, had she had a chance:

> *"I am not exactly sure what the future holds in terms of the politics in the country. Every year, it seems to be getting worse. If I were to do things my way, I would get out of the country the first chance I get" (F – 25).*

One respondent was concerned about a culture of entitlement gripping the country, saying that people were still blaming the past of apartheid for what was going on in the country, and that there was a need to move on, and leave the past behind:

> *"Most people, nowadays, they don't take education seriously, especially where I come from. They tend to drop out and they expect everything to be given to them, instead of going out there and striving to create jobs. They are waiting for people to create for them, instead of going out there and striving to create jobs. I don't think it's right, because we are 23 years into democracy, and yet people are still blaming the past, instead of working every day to reach their goal" (F – 22).*

Other respondents were worried about increasing food prices, public health and overpopulation impacting on their futures:

> *"The rising prices of everything. This is really going to add up. When I'm 40 years old, everything's going to be twice the price" (M – 20).*

4.2 Climate change

4.2.1 Understanding of climate change

As one would expect with climate change being high on the media agenda, all the respondents in the study knew about climate change and had heard of it before – unlike the HSRC's 2007 study (Seager, 2007). All except two of the respondents had a good understanding of what climate change actually is, with most describing it as a change in climate conditions over a long-term period:

> *"It is the gradual heating of the climate's atmosphere. You could say it is gradual, but it is quite rapid heating up of the world, in terms of life-span of the world, in comparison" (F – 24).*

Another student described the disastrous effects that climate change would have on the future of the planet:

> *"It has to be our planet getting warmer and warmer and that causing places that were very cold to be very warm and that means the ice will be melting and we will have more storms, floods and what-not? So, the warming up of the planet, having disastrous effects in the long run" (M – 23).*

Reflecting some of the findings in Kinoti's (2017) study, two of the students had only a vague idea of what climate change is, describing climate change as a "change of predictions, change of weather forecast" (M – 19) and the "fluctuation or inconsistency of the weather conditions" (F – 21). While one would not expect students to repeat the IPCC definition of climate change from memory, it is disappointing that future leaders still hold such a vague idea of one of the challenges that is expected to have a large impact on their future.

What is promising, however, is that 10 years after the HSRC study (Seager, 2007), there is definitely an improvement in the understanding of the science – and not just impacts – of climate change amongst the youth. If one follows Seager's theory that, due to the limited knowledge (and variation by age) about climate change, it could be suggested that his respondents accessed information about climate change through the media, rather than through formal education, one could then suggest that the respondents in the current study received proportionally more information on climate change through formal education than in Seager's study.

Four of the respondents linked climate change to human actions without prompting from the interviewer. When starting to answer the question on what she thought climate change was, one of the respondents first said it is a "natural" process, before stopping herself, and asking whether it was a natural process. She then self-corrected her answer, by saying "It is the negative effects of our activities on our environment that impacts on natural things like plants" (F – 19). Another respondent said that climate change was the "change in the environment that we live in, and the climate that change, because of how we live" (M – 20). What makes these answers interesting is the fact that the respondents voluntarily linked climate change to human activities, without being prompted. This shows that even though the media still presents climate change amongst scientists as a debate (Boykoff and Boykoff, 2004; O'Neill and Smith, 2014), the message that climate change is caused because of human actions does appear to have landed:

> *"I think the Earth is kinda (sic) reacting to what people do on a daily basis" (F – 22).*

4.2.2 Is climate change a "first world" problem?

Developed nations like the United States and the European Union, as well as China have traditionally been amongst the highest CO_2 emitters that contribute to climate change (Joint Research Centre, 2016). Figures from 2015, show that between these three regions they contribute the majority of CO_2 emissions globally, at 53%. China is responsible for the largest amount of CO_2 emissions, at 10.7 billion tonnes per year (in 2015), followed by the US with 5.2 billion tonnes and then the EU with 3.5 billion tonnes. This is compared to South Africa's 0.42 billion tonnes emitted per year in 2015 (Joint Research Centre, 2016). Because of the disparities in global emission rates, there have been debates on who should take the lion's share of responsibility where it comes to climate change mitigation (Broto, n.d.; Modi, 2015; Sandel, 2016). This debate, however, is not carried through to the South African youth, who mostly believe that everybody – the whole world, including South Africans – should take responsibility for mitigating climate change.

Only two respondents felt that climate change is a "first world problem", and that South Africans (or the developing world) do not really need to worry about it. One of the respondents connected mitigating climate change in this sense, to "caring for the environment":

> *"(Climate change) is a first world problem, because we don't really care for the environment" (M – 20).*

> *"I think it is a first world problem, mainly, but also because the third world hasn't developed as much. They could develop better than the first world, so that has to be our goal" (F – 22).*

The larger majority of the students (18) believe that climate change is not just a developed world problem, but that it is something that everybody (both developed and developing nations) should be concerned about. A theme throughout was that developed countries had better resources and means to deal with issues of climate change:

> *"I believe first world countries are probably more equipped to deal with it, because in third world countries people won't really think about the environment just yet – when they don't have food and water, or other access to resources. So, them throwing (down) something that they just ate on the floor is not something that is important to them, but people living in first world countries, with access to all those resources, they can go ahead and be thinking of the next step that they can contribute to society, like reducing their carbon footprint" (M – 18).*

Developed countries also did not have the problems that developing nations such as South Africa had, so they were better able to focus their attention on issues such as climate change. None of the students held a view that because the developed countries historically benefited from industrialisation – through the production of large-scale emissions – they should be held more accountable than developing nations. Most of the students felt that humans, as a collective – no matter where you live – have a responsibility to deal with climate change, as irrespective of who contributed to the problem the most, everyone on the planet will need to deal with its consequences:

> *"The majority of this Earth is (made up) of third world countries, so I believe we need to be more educated about it and I think we (developing countries) have more of an impact on climate change than they (developed nations) do. It is true, that a lot of climate change that we see is as a result of some things that also affects us. I think it is our responsibility as Africa and the world at large to do our bit to combat this situation" (F – 20).*

4.2.3 Personally affected by climate change

Sixteen of the respondents felt that they were personally affected by climate change, with most of them referring to perceived increased temperatures; perceived changes in seasonal patterns and rainfall and fears of water shortages and health issues. Only three of the respondents felt that they were not affected and one said he did not know whether he was affected. As mentioned above, one of the respondents mentioned that her knowledge of the impact of climate change impacted her personal decisions of the future, as she had decided not to have children because of it. Another student mentioned that the community in which he lives in was already highly affected by climate change, and that it not only affected their livelihoods, but also their social structures and communal self-esteem:

> *"Where I come from, people love farming, but in the last three years they haven't been able to work, because there is no rain. So, whatever they put down (plant) is not going to yield any profit. It also affected their livelihood. When you are in control of what you put into your body, it gives you a lot of empowerment, so in the last three years they had to go to the shops, so they didn't have that (feeling of empowerment)" (F – 25).*

Seven of the students interviewed said that they saw the effect of climate change on their daily lives, in terms of larger-scale impacts, such as health, food supply and water scarcity. Three mentioned water-scarcities and droughts, as experienced in Gauteng recently and currently in Cape Town, while two of the students said that their health has been impacted by climate change (one due to sensitive skin issues), one of them actually moved countries (from China to South Africa), because of pollution-related problems:

> *"One of the factors that we moved back to South Africa for was because of the air pollution (in China). It is like smoking all the time, so, yeah, I think it has affected me, definitely" (M – 20).*

4.2.4 The effect of climate change on their future

While not all of the respondents felt that climate change impacted their daily lives, almost all of them were concerned that it might have an impact on their future. All except two of the respondents were concerned about climate change on their future, with only one being undecided. While some of the students gave a very superficial answer as to why they are concerned about the impact that climate change might have on their future, for example merely saying "yes, because of the heat" (F – 20), most of the students held very deep and valid concerns about climate change's impact on their future. Some of the concerns raised were personal health issues such as skin conditions; water shortages; dangerous thunderstorms; extreme heat and heat waves and the increased likelihood of diseases like malaria and cancer; and biodiversity loss:

> *"In the sense that we are experiencing changes that are not exactly balanced or healthy. Global warming has changed our environment. For instance, what happened two to three years ago – the drought (in Gauteng), and all that. It just makes, in my opinion, the future so unstable, because I don't know what is going to happen in the next five years, or even two years. It is just a give and take. I really don't know what to expect, as far as climate change are concerned. We've experienced, as Africa, one or two of the harshest years in our continent, last year being one of them. There was a drought, which led to a lot of things. Not just the environment (was impacted), but people as well. People were, like, going hungry, like seriously malnourished. If you're not affected by it, I don't know" (F – 20).*

Students were also concerned about the possible impact of issues like overpopulation, possible food security issues and relating price increases and other economic effects, similar to findings in 2007 HSRC study (Seager, 2007):

> *"Most things are based on agriculture, and everywhere you go, whether in the city or not, you need agriculture. And, whenever you have a huge shift in climate change, when temperatures are becoming too hot or too cold, it is going to affect the output of crops. That is going to affect everyone in the city. Stuff like this eventually starts wars. You know, when*

someone has too much of a good thing and someone else doesn't. So, yes it does affect (me), because there will be a huge shift in terms of good crops and vegetation" (M – 23).

One of the respondents felt so concerned about climate change, that she has made drastic decisions about her future, as a direct response. Due to climate change, she is not interested in having children:

"Yes, I am not interested in having children – in introducing them into this world. I think population is probably our biggest threat. It is not a world that I want to bring children into, but that is a personal opinion ... that's how I feel about climate change in my daily life and the decisions that I'm taking" (F – 24).

Two of the respondents were concerned about how climate change would impact their health:

"I've learnt that with climate change, you can get skin cancer and various other illnesses. That might impact my dreams and goals, so, ja, it is an issue" (F – 20).

"The spread of cancer and malaria is a big concern. So, conditions for malaria containment changes. So, ja, it does affect me and my future because, concerning my skin, I am sensitive to sun, so having increased temperature will affect me" (M – 19).

Only one of the respondents linked climate change to a shortage in resources:

"As an engineer, most of the energy resources come directly from the environment, so, the more we use the resources, the more it affects the climate" (M – 19).

The respondents who said that they were not affected by climate change, showed through their answers that they do not really understand climate change, and linked it merely to changing weather:

"Basically, our climate in SA in the whole is better than in the rest of the world, especially in Johannesburg. It is not too hot, it is not too cold. You can basically dress anyhow and wear what you like" (M – 22).

This finding relates to the study done by Kinoti (2017), where Kenyan respondents who felt that they were not personally affected by climate change showed that they did not really understand climate change (Kinoti, 2017). In Kinoti's case, of the five respondents who said they weren't affected by climate change, one said that he/she did not see its effects in his/her daily life, while three others believed the government had enough regulations in place to prevent climate change to affect them personally. As in Kinoti's study, the confusion between "weather" and "climate" adds an extra hurdle in effectively communicating the idea of climate change to the public. As mentioned in an earlier chapter of this report, it makes it difficult to convince a person of climate change, when he or she only thinks of it in terms of weather conditions.

4.2.5 Extreme weather events

Some of the most dramatic ways that climate change may be evident is in the increase of extreme weather events (Field *et al*., 2012). Like other countries, South Africa has been impacted by extreme weather events in recent years (Bega, 2017b; Chernick, 2017; Kings, 2017a). Most of the students interviewed mentioned that they saw the impact of climate change in their lives mostly through drastic changes in weather events and the impact that extreme weather events had on their lives. Not only is the weather and seasons more unpredictable, but it can also result in more disaster impacts e.g. flash flooding. All the respondents mentioned that extreme weather events were related to climate change, which had a direct impact on their lives, with the recent drought in Johannesburg, the current droughts in Cape

Town and extreme storms, tornados and flooding in Johannesburg, Durban and the Free State mentioned as examples:

> *"An increase in temperature does increase the amounts of evaporation, so, going forward, it causes floods. And, also, high temperature melts the polar ice and then that increases the level of water in the seas" (M – 19).*

> *"I think it is because of this heating process in the atmosphere. It is affecting weather patterns. I think that's maybe how we feel it on a more individual basis and in reality, now. It is that we've got more extreme seasons. The season are shorter, or they're longer in some ways. We've also got higher temperatures" (F – 24).*

4.3 Behaviour towards the environment

While almost all the respondents were concerned about the impact of climate change on their future and on the environment – and some even witnessed the effects of climate change in their daily lives – none of them have taken any steps to change their lives to adapt or help mitigate against climate change. This finding is in line with most other similar studies, which shows that knowledge of a situation does not necessarily result in behaviour change (Hulme, 2010; Moser and Dilling, 2007; Ockwell *et al*., 2009; Whitmarsh *et al*., 2011). While all except one of the students said that they want to do the right thing, and change their behaviour to live more sustainably, they do not turn that motivation into action. Most of the respondents knew that the consumer decisions that they make on a daily basis have an impact on the environment, yet, only one of them has ever considered what impact a product that they bought had on the environment and climate change. Along with this, none of the respondents have changed simple daily habits, such as starting to recycle or reducing their water usage, due to climate considerations. Like in the above-mentioned studies, this shows a large disconnect into how concerned they really are

about the impact of climate change on their future, and their behaviour towards trying to mitigate against climate change:

> *"I can't be selfish about everything, just because I live now. What about the next generation? Like in the next 10 years to come? It might make it harder for them, and me too, so yes, sustainability is something that we have to (be) concern(ed about). We have to conserve as much as we can right now so that things don't get too expensive in the next coming years. If I can afford the costs of sustainable living, (I would change). Also, my life impacts other people, so, if me buying a certain product means I'm cutting someone off from a job, then no, I cannot do that" (M – 23).*

4.3.1 Barriers

The major barriers mentioned, that prevents the youth from changing their behaviour, is a perceived increased cost of sustainable living; consumer prices and costs; a lack of infrastructure; and a perceived lack of understanding about sustainable living and on how to change their behaviour. These findings support similar research undertaken elsewhere in Africa, for example in the Kenya study and the Visions of Change studies (Kinoti, 2017; *Visions for Change Country Papers*, 2011):

> *"I'd love to live in a place where I can give back to the environment, even if it means something small like just having an organic vegetable garden. I believe it doesn't have to be something huge, just those small things people do in giving back to the environment" (F – 25).*

4.3.2 The role of, price and cost of climate change

Being students, the price of consumer items and lifestyle cost is the most important factor that they take into consideration when making consumer decisions. All of the students mentioned this as the first factor that they take into consideration when

shopping, and only one mentioned that he has only recently started looking at how a product or packaging affects the environment while shopping:

> *"I watched a documentary recently, called Food Inc., and it opened my eyes how food is produced. So, it made me conscious as to whether I should buy fruit from a certain farm, or whether I should buy from a person on the street to help them?" (M – 20).*

As explained in Verplanken's work (2006), the second strongest motivation to buy a certain product was force of habit (Verplanken and Wood, 2006), with students buying products that they know and trust. Some of the students admitted that they knew that the products that they buy might harm the environment, but that they just ignore the fact. However, if it weren't for money, most of the respondents said that they would change their behaviour to live more sustainably:

> *"If I had more money (I would change). Some things are just a bit more expensive. I am aware of how much damage the (certain products) cause. I do think I have a conscience" (F – 20).*

4.3.3 The role of infrastructure in helping to build robust behaviour

Another factor raised was a lack of infrastructure or services that enables people to start new habits to live more sustainably. There was a definite disparity in the ability, history and willingness to live more sustainably, which in most instances correlated to their historical, financial and geographical backgrounds. Students who come from rural and usually poorer backgrounds, tended to be less likely to change their behaviour towards more sustainable living, than students from more advantaged (and usually urban) backgrounds. The students who came from rural areas such as

Limpopo and KwaZulu-Natal all mentioned a lack of municipal services as one of the reasons that they and their families do not bother to manage their waste better:

> *"Where I come from (KZN), it is rural to semi-rural, so, you know in urban areas there are services and municipal services that come on a weekly basis and collect those bins. But in our area, there are no such things. They don't come and collect. So, what do you do? You take your waste and dump it anywhere … even if there's a river. A flowing river. So, most people they throw it in the river, so it just spreads all over" (M – 26).*

> *"Because it is in a village, we don't have a landfill, so we burn. That's the problem, we just burn whatever is there. I know it impacts negatively on the environment, but it is because we don't have landfill. So, everyone has to burn their trash" (F – 22).*

The lack of infrastructure and services also plays a role when it comes to more sustainable lifestyles in urban areas, where perceived "richer" suburbs are seen to have better infrastructure and services in order to facilitate more sustainable living:

> *"I think there is some sort of disconnect or gap as to how we do that (live more sustainably). Let's say that you want to eat organically, or live organically, there's so many things that are not in place infrastructurally in South Africa. I have a friend who lives in a very expensive suburb. They have multiple bins. I have only one bin, so I have to like go to my local Pick 'n Pay to throw my batteries or printer cartridges away. I feel the infrastructure is not there yet" (M – 20).*

Another student has been recycling in her parents' house her whole life while growing up in Cape Town. She dropped the habit when she moved to a flat in Johannesburg:

> *"I grew up in Cape Town, and it was part of how we took care of our waste, so, when I moved to Joburg, where often there aren't recycling schemes, I found it hard. I can feel it's wasteful when I throw away cardboard or plastic, and it is not going to be reused in some way or recycled" (F – 24).*

4.3.4 The knowledge gap

Even though all the respondents showed that they have an understanding about what climate change is, some of them showed that they do not have a deeper understanding of the problem and notably what causes it. As cited in Seager (2007), their knowledge about climate change showed that they still relied on the media for information, where they do not necessarily get information on how to change their behaviour (Seager, 2007). While all but one of the respondents said very assertively that they are keen to change their behaviour, using words such as "definitely" and "absolutely" they feel they do not have enough information on how to change:

> *"Knowledge that climate change is real and that I'm contributing to the pollution. I am not helping my environment and that is not how I want to live" (M – 20).*

> *"What would definitely change your behaviour is when there is a culture of caring for the environment and you don't seem like such a freak when you try to save some leftover food" (M – 20).*

The information that they felt that they are lacking is information on how to live more sustainably; information on what impacts their lifestyles have on the environment; how climate change impacts the environment; and how the consumer choices that they make contribute to the problem. As in other studies, for example in (Moser and Dilling, 2007), most of the respondents also believed that they personally would not be able to make a difference to climate change, as the problem is too big, and that the choices that they make will not contribute to a solution. While almost all of the respondents believed that doing small things, like better waste management, recycling, choosing more sustainable transport, and cutting

down on certain foods like meat, might contribute to mitigating climate change – they believed that it will only work if it is done as a collective. Most of them failed, however, to connect themselves to being part of the larger collective:

> *"I love to believe so (that I can make a difference), but I am just one person who is not in a position of power that could influence how people would do things and how they act. I can do it on a personal level, but for it to be felt, it needs to be done on a collective, as all of us" (F – 25).*

The effects of climate change also need to be brought closer to home (Doyle, 2007), as students believe that the problem is still too distant, occurring in the future. It is not a problem they are faced with daily. Some of the students believed that more activism and education about the issues surrounding climate change might make a difference:

> *"It is one of those things 'out of sight, out of mind'. So, eventually, after like two days, I am going to forget, but if ever there was an organisation that drills it into you – or social media, where we can see it every day, seeing what is happening – then it would be something for my concern, but, for now, it is bigger than me" (M – 23).*

> *"I don't care much about climate change because I haven't seen its effects, so I don't care that much" (M -20).*

4.4 Sustainable living

4.4.1 Understanding of sustainable living

The United Nations Environmental Programme defines a sustainable lifestyle as the following:

> *"A sustainable lifestyle means rethinking our ways of living, how we buy and what we consume every day. It also includes rethinking how we organize our daily lives, altering the way we socialize, exchange, share, educate and build identities" (United Nations Environment Programme, n.d., p. 1).*

It became clear in the current study that the understanding of the concept of "sustainable living" confirmed that their knowledge gap around climate change extends into their knowledge of sustainable living. As in the Kenya study (Kinoti, 2017), most of the students attached a very superficial meaning to the concept of sustainable living, with the most of them replying with vague phrases such as "not having a negative impact on the environment", "not wasting", "recycling" or "using solar power". Four of the students perceived the term to mean something about their own financial wellbeing and "having all means you require to live with", while one student said sustainable living was "to be more happy (sic)" (M – 19):

> *"Living within your means … Like, as long as you can survive. I honestly don't know, but I feel like it is living within your own budget means or financial means" (F – 21).*

> *"Just living with enough to get by and using the most of what you can from what you have" (M – 20).*

> *"We can't live all over and take whatever is advertised. We just have to take when you need something. That's where you live longer, because you are not buying, because of peer pressure. You are just buying because you need something" (M – 22).*

What was noteworthy was that three of the students asked to skip this question, as they did not have any answer on what it means to live sustainably at all. This question was the only one out of the whole survey where some of the students chose not to answer a question, or could not think of a relevant answer. This shows the extent of the knowledge gap where it comes to what it means to live sustainably and understand what it may mean.

Not all responses were negative, however. Three of the students felt that sustainable living was not to be wasteful, and to live in such a way that future generations will not be impacted, while another said that it was living in such a way that you always give back where you take something out:

> *"It has to do with living a life that does not impact negatively on the environment, like organic farming. You get something from the soil, but you put back into it, like with compost" (F – 25).*

Only one of the students had a good grasp of what it means to live sustainably, saying that:

> *"Sustainable living is like, reducing your carbon footprint and making less waste that will last longer, as in like, using plastic and things like that. Using less of those, and using materials that can be recycled as quick as possible. Let's start using electrical cars instead of gas producing cars. That's what I think is living sustainable – reducing the impact that we already have been harming the Earth with" (M – 20).*

It is noteworthy to mention that this specific student showed the most knowledge and concern about climate change, and was not only highly willing to make some changes to his lifestyle in order to make a difference against climate change, but he actually has made some changes already, for example, recycling his old batteries and printer cartridges and making conscious decisions on buying more sustainable products.

4.4.2 Making consumer choices

The above-mentioned student was also the only one in the study group that considered the impact of the origins, packaging and production of products on the

environment when shopping. Further to this, this student's decision to be more mindful of the consumer products that he buys was highly influenced by the media.

Confirming the findings in studies like the Visions for Change Country papers (*Visions for Change Country Papers*, 2011), the rest of the students in the study group took no consideration of the effect that a specific product had on the environment and were more concerned about factors like price when shopping (see Table 2 for the factors students consider when shopping). While two of the students mentioned that they were aware of possible negative effects that the products that they buy might have on the environment, both of them said, however, that they do not really take that into consideration when they shop. On the other hand, two other students mentioned that they believe that they know too little about how products affect the environment, to make decisions on that:

> *"Truly speaking, no. Because, to be honest, I know a little about which type of products should we buy and how do they affect the environment, so I can see that I ignore it when it comes to those things. I don't check" (M – 19).*

The perceived notion that sustainable goods are more expensive than normal consumer products is also mentioned as a barrier to making more sustainable consumer solutions. Two of the students in the study group mentioned this perception, saying that they will definitely consider buying more sustainable products if price was not a consideration:

> *"If I was in a position of saying that I could afford what I want, you could consider the products, the packaging, they're in and so on. If price was not a consideration, then yes, most definitely, I have to consider how it is packaged, how it is produced, and what effect it has on the environment" (M – 23).*

Aligning with Verplanken's work (2006) several of the students mentioned habit as one of the other reasons they do not consider buying more sustainable products (Verplanken and Wood, 2006). The habits that they form at home, and later as they move out of their parents' houses have a direct impact on how they choose to live:

> *"I don't have that habit (of shopping sustainably). I think you also get too consumed with your own time, so you feel that there's no space to care about these things. Like, I know that chickens come from factory farms all the time, but I just try to deny it to myself all the time" (M – 20).*

Table 2: Factors considered the most critical in order of the number of references for students in making consumer decisions.

Factor most considered	Number of references
Price	13
Preference	5
Need	5
Habit	3
Quality	3

4.4.3 Cell phone and computer ownership

In a study done to examine how households' consumption contribute to water, material and land usage, as well as their GHG emissions, it was found that widespread consumerism has a large impact on the environment, with household consumption being responsible for over 60% of the total GHG emissions in the world and taking up between 50% and 80% of the total land, material and water usage (Ivanova *et al.*, 2016). Using a multinational input-output database that describes the global economy by using 43 countries, five other world regions and 200 product

sectors, the researchers were able to trace back the origins of products used by households through their global supply chains in 2007. The study showed that the world, including households in South Africa also exhibit high levels of consumerism, with households in the country producing 5.5 tonnes of CO_2-eq (tCO_2-eq) in 2007 and using up 21.5km^2 of land space, 6.6 tonnes of material and having a water footprint of 165m^3. This is compared to a global average footprint of 3.4 tCO_2-eq, 10km^2 land use, 4.9 tonnes material footprint and a global average water footprint of 209m^3 (Ivanova *et al*., 2016). South Africa's usage is higher than the world averages in all the above categories, except for the water footprint. Electronic devices and equipment are highly sought-after consumer goods in South Africa, with South Africans owning on average 2.4 cell phones per household (Lydall *et al*., 2017). Both smartphone and tablet ownership are expected to rise in the next five years. According to PWCs Media and Entertainment outlook, smartphone ownership is set to rise by 160% from 24.8 million units in 2015 to 64.6 million by 2020 (PWC, 2016). These devices pose a large risk to the both the environment as well as the wellbeing of people, after the lifecycles of these devices has run out, and they are discarded as electronic waste (e-waste) (Nnorom and Osibanjo, 2008; Ivanova *et al*., 2016; Lydall *et al*., 2017).

Like most young people, the students in the study group all have smartphones, which they use for daily communications. In every one of the students' households, there was more than one electronic device (smartphone, laptop computer, desktop computer, tablet), per person. In total, the devices owned by the households of all the students interviewed counted up to 153, for a total of 83 people. This calculates

to an average of 1.84 devices per household, which is less than the average number of devices per household in South Africa (Lydall *et al*., 2017). All of the students and their family members changed their phones on average every 2 to 3 years, which correlates with the average lifespan of smart devices (Nnorom and Osibanjo, 2008; Lydall *et al*., 2017). While all the students are quite attached to their communication devices, most of them believed in not merely replacing their phones for the sake of it, but only replaced them when they needed replacing. This might, however, have more to do with affordability than principles, as most of the students did not get their devices on renewable phone contracts, but purchased them as they needed, or got their phones passed down from a family member.

4.5 The role and influence of family

As discussed above, habits formed early on in life, as well as social context plays an enormous role in influencing an individual's behaviour (Verplanken and Wood, 2006; Whitmarsh *et al*., 2011; Rabinovich *et al*., 2012). The findings of this study support the research in this field, as all of the students related their behaviour, experience and outlook back to their lifestyles back at home, as well as the influence of both their parents and their wider communities on them. This holds both positive and negative implications when it comes to effective communications regarding climate change, as these habits and effects of the students' relationships with their parents and communities can act simultaneously both as barriers to change, as well as opportunities for change. The opportunity lies in the ability of these students to act as change agents in their households, communities and, later in life in their

workplace, after their habits, thoughts and behaviours on climate change have been successfully changed for the better.

4.5.1 The generational communication gap

One of the most noteworthy findings in this study of the youth was that most of the respondents does not know what their parents think about climate change and the environment, and have never had a discussion with their parents about climate change. Of all the respondents only four replied that their parents knew about climate change and was concerned about it. One of those four said that they "both acknowledge that it is present, but they do not really acknowledge the seriousness of it". Two of the respondents said that their parents do not really care about climate change:

> *"I have never had anyone in my household say 'oh, climate change this, climate change that', so everyone is just in the dark, or they're ignorant" (M – 23).*

> *"I don't think they think it's a concern. No-one has ever like brought it up. Even like recycling, it is not because they do it because of climate change. It is more out of necessity" (F – 22).*

Eleven of the respondents said that they never had a conversation about climate change with their parents. Of these, seven did not know at all what their parents think about climate change, while four said they did not know what their parents think, but that it was their impression that their parents did not care about climate change:

> *"They don't really discuss it. They just think 'oh, there's not water, there's no rain', but just feel they will get rain when they're supposed to get it" (M – 26).*

4.5.2 Waste: the recycling thing!

Family life also showed an influence in the students' behaviour in aspects such as waste management. The students reflected their attitudes towards recycling, through what they learned doing while growing up. Ten of the respondents said that they did not recycle at all, while six said they were in the habit of recycling. One of the students that recycled, said that he did it at school (University), but that they did not do it at home. Three others said they only recycled specialised items such as batteries and printer cartridges. Except for the one student who changed his behaviour by starting to recycle after leaving home, all the respondents who recycled their waste learnt the habit at home. Most of the others had a somewhat careless attitude towards waste management, with some pointing out the lack of infrastructure in order to better manage their waste (as mentioned previously).

4.5.3 Reduce, reuse ...

While just over half (12) of the students said that their families had done something to reduce their consumption of electricity, water or fuel, nine of them said that the decision to do so was mostly related to increasing prices of the resources, rather than as a consideration of the environment. Two of them said these decisions were both to reduce costs, as well as their impact on the environment:

> *"We have done steps to save electricity and water. Having solar geysers, switching to gas, which is more efficient. To save water, we have tanks that collect rainwater to fill up the pool, so we don't have to use fresh water. I guess it was more not for saving water, but just cutting costs and also the unpredictability of the weather ... The solar geyser was just because we could cut costs with the government giving you a subsidy for a solar geyser" (M – 18).*

> *"No. Only when it becomes expensive. That's where people start to cut their use. But for the sake of the climate, hi, no, they don't. Only when they want to cut costs" (F – 22).*

The rest of the respondents' families have not considered reducing consumption of anything at all:

> *"No, we're just living in the present. We're not thinking about the future, and our actions" (F – 19).*

4.6 Media and influencers

With the large growth of social and other media, as well as an increasingly consumer-orientated world, one would expect the youth to be highly influenced by media sources as well as role models such as celebrities. The media, however, has proven highly ineffectual where it comes to influencing behaviour change (Boykoff, 2007b; Hulme, 2010; Whitmarsh *et al.*, 2011), for reasons discussed in Chapter 2 of this report. While this might be true, at least one student in this study has changed his behaviour where it comes to climate change, due to his engagement with media – with his decisions and behaviour being influenced heavily by the two documentaries *An Inconvenient Truth* by Al Gore, and *Food Inc.* by Robert Kenner. While most of the other students said that they were not really affected or influenced by media, almost all of them reflected back to media sources at various stages during the interviews to either support their argument, or to reflect on what they were saying. While media might not be influential in changing behaviour, as Hulme (2010) argued, it has a definite role to play as a source of information, and creating awareness of climate change (Hulme, 2010).

4.6.1 Main influencers

One of the most surprising and interesting findings of this research project was to learn by whom the students felt they would be most influenced to change their behaviour towards climate change. Contrary to what Kindermann *et al*. showed (that individuals were highly influenced by their peers), the students interviewed did not think that they would be most influenced by their friends and peers. The people that are most influential in their lives, and would most likely be able to change their behaviour where it comes to climate change, were their parents (see Table 3):

> *"I think it's the parents. We learn a lot of things from our parents, and we usually take it as important if we learn it from our parents. If something changes in the environment at home, it is just easier to live it out, doing better, because you are used to doing it at home" (M – 20).*

Table 3: Persons or groups most likely to influence student behaviour where it comes to climate change

Influencer	**Number of references**
Parents	10
Peers (other students/friends/colleagues)	4
Celebrities	3
Lecturers/teachers	6
Individuals with specialist knowledge on climate change	2
Media	1

This view was shared by most of the interviewees:

> *"My mother. She is the one whom I listen to more. Her concerns really mean a lot. If I do something, she is the one who usually guides me and*

teaches me. If she says something, then it means that it is true. She is the one who can change me" (M – 19).

"A parent. Because, I mean, all my life I have actually taken guidance from them, so it would be easier for them to actually impact my life" (F – 25).

"I can get more influenced by my parents. Yet, remember, they are not educated, so if they talk about such things to me, who at least have some education, I value that this person actually feels the effects of this thing, so I can take it seriously" (M – 26).

Others felt that because the University as a whole is a learning environment, they would be influenced by messages of climate change on campus:

"Usually it would be lecturers, because that is where we get most of our knowledge. It is usually on campus, because, there your mind is set to run around, and it must run around to see what's going on, and then you discuss it with your peers afterwards" (M – 20).

4.6.2 The role and influence of celebrities

With the onset and rapid growth of social media, the marketing world has also seen the onset of a new "influencer" industry (Carter, 2016). An influencer, according to the South African Concise Oxford Dictionary, is someone who has "the capacity to have an effect on the character or behaviour of someone or something" (Oxford University Press, 2002, p. 592), with the "power" to influence arising from status, contacts or wealth. Influencers can be both traditional celebrities who have gained their status through their role played in society and popular culture, as well as non-celebrities. The latter would, for instance be individuals who have gained a following through their interaction on social media platforms, such as "vloggers" and "bloggers". The "influencer" industry has grown to such an extent that some

"influencers" are paid thousands of dollars for a single post or video on social media, such as Instagram, in order to promote a product or campaign (Carter, 2016).

Describing the extent of celebrity endorsements in influencer marketing, Carter quotes a marketer that was interviewed in his study saying that: "There are teenage girls that do fashion vlogs and beauty vlogs, and they make $25,000 a video from brands or $50,000 a video, depending on how well followed they are and if they're really a celebrity in their own right" (Carter, 2016, p. 6).

The three top relevant hits in a Google search on "Climate Change Influencers" ("influencers climate change - Google Search," n.d.) provide three internet articles listing the "14 Notable Climate Influencers of 2017" ("14 Notable Climate Influencers of 2017," 2017), the "Top 15 most influential people in climate change" ("The top 15 most influential people in climate change," n.d.) and the "Next generation of climate influencers" ("The next generation of climate influencers," 2015). All three of these websites name South African-born billionaire-entrepreneur Elon Musk as one of the biggest influencers, while German Chancellor Angela Merkel, Pope Francis and US Senator Bernie Sanders and former US Vice President and activist Al Gore are also mentioned. Not one of these "influencers" is under the age of 30, and it could be argued that they would have difficulty relating to a younger generation. In the study group, only one of the students mentioned that he would be influenced – where it comes to matters relating to climate change – by a celebrity, naming Al Gore by name:

> *"Al Gore! I watched that Inconvenient Truth, but I watched it as a child, and I was like 'What? South Africa might vanish! Or, Water is gonna (sic) come!', so I really think someone like Al Gore (would influence me). To this day, that documentary still shakes me" (M – 20).*

Only two other students in the study group believed that they might be influenced by celebrities. One of these students, however, qualified his belief with a statement saying that a celebrity's influence on him might be of short duration:

> *"Celebrities, yes, because we tend to listen to them, because they are celebrities. But, whatever they say, it is like 'tell me now, tomorrow I will have forgotten about it" (M – 26).*

The rest of the students showed no faith in being influenced by celebrities:

> *"Definitely not a celebrity. They are just there to advertise stuff. A lecturer and my parents. A celebrity – I don't care (about them). Maybe my friends" (F – 22).*

> *I think it would have to be my peers. I find it irrelevant when someone external tries, because I don't spend a lot of time with you" (M – 23).*

4.6.3 Social media – a critical game changer

Social media has changed the landscape of the media industry in recent years, becoming more and more influential as a news source. Where the traditional media model is based on "mass communication", social media is more about "personal media", where the reader/receiver is actively involved in what he or she chooses to engage with. Further to this, social media has moved in on the traditional media's space as a news platform, often competing with traditional media outlets in terms of breaking news (Alejandro, 2010). As anyone can post or share content on social media, however, these platforms are susceptible to misinformation, which may either be shared by mistake, or posted on purpose. This presents a challenge to social media (as well as social media users) as these platforms are generally less

credible than traditional media (including social media posts and websites of traditional media outlets) where they serve as news sources (Abbasi and Liu, 2013).

All the students interviewed in this survey are widely connected with social media. However, most of them responded that they still get most of their information on climate change from more traditional media (see Table 4), including from sites from traditional media outlets on the Internet. Other sources of information on climate change included high school, University classes and word of mouth. As a news/information source on climate change, social media only came in at fourth place, with at least one of the interviewees stating that she got most of her information from YouTube channels of some traditional news media outlets that she follows.

Table 4: Media sources cited as a source of information on climate change.

Media	Counts
Television	6
Internet	10
News (paper)	5
Podcast	1
School (High School)	7
University	2
Word of mouth	2
Social Media	4

4.6.4 Social media usage

As expected, all the respondents were active on social media (Table 5). Twitter was the most favoured social media platform followed by Facebook and Instagram.

Table 5: Social media subscriptions amongst study group

Media	Counts
Facebook	8
WhatsApp	3
Instagram	7
Twitter	10
YouTube	4
Snapchat	2

4.7 Traditional media

Like in the rest of the world, traditional media (for example, newspapers – including online news sites, radio, television) consumption in South Africa is in a continuous decline, with the youth showing disinterest in the traditional media. Reasons for their lack of interest in traditional media include a disconnect between news professionals' ideas of what the youth is interested in, leading to a lack of interest among the youth; time constraints in daily lives; competition from other media sources, such as social media and the cost of traditional media (Ndlovu, 2015). While the study group also showed a relative disinterest in consuming news media, they did, however, consume it whenever they had an opportunity to do so, basing their reading patterns more on opportunism, than actively subscribing to a certain media (see Table 6).

All the students interviewed responded that they consume some form of news (on television, radio, printed or online newspapers or magazines) at least once per month, with four of the respondents saying that they read either online or printed newspapers every day, while one consumed news media about three times per

week. The frequency of media consumption for the others ranged from about once a week or on a monthly basis.

Table 6: News media consumed by study group.

News consumed	Platform
News24	Internet News site
Sunday Times	Newspaper
Mail & Guardian	Newspaper
Citizen	Newspaper
Vuvuzela	Newspaper
Radio	Radio
Mail & Guardian	Internet News site
New Age	Newspaper
Mercury	Newspaper
Sowetan	Newspaper
Isolezwe	Newspaper
News channels on YouTube	Subscribed to channels

Even with the lower rates of media consumption among the youth, most (12) of the respondents said that media would definitely have an impact on their behaviour, when it comes to climate change, as it was still a major source of information on the topic for them. Three of the respondents said they did not think it would have any impact on them at all, while two said that they were not sure whether the media would have an impact on their behaviour:

> *"Media is the most influential on me at the moment, and it might just be that I don't live in a community. Yes, I do have friends, but I live on my own, so we don't discuss that sort of thing in like a social group or something. I get my information from the consumption of media" (F – 24).*

> *"Yes, definitely. I mean, as I said, I love the idea of green living, and I wouldn't be aware of it if it wasn't for the media. The media shapes the way I think and look at things to a great degree" (F – 25).*

Even before this question was asked, many of the respondents referred to media (especially television documentaries, with National Geographic Channel being mentioned on various occasions) in order to make a certain point. At various points during the interviews, students regularly related back to media platforms, showing that a lot of their awareness surrounding climate change was created through the consumption of media.

One of the students, who did not believe that messages in the media would influence his behaviour, said that media was creating a barrier between the message that it is conveying and himself, as there was no way to engage with the media. This is one of the critiques on the media as a vehicle for effective climate change communications, as pointed out by various scholars on the subject (Boykoff, 2007b; Lorenzoni *et al.*, 2007; Hulme, 2010):

> *"You can't talk or ask questions or engage on it. Sometimes, with media, they don't have much influence on such things" (M – 26).*

This brings us back to the need to not just "deliver" messages about the importance of climate change, and the reasons to change to the youth and then expect them to change, but, as argued in earlier chapters of this report, to actively engage with them, and to make them part of the partnership in adapting to, and

mitigating against climate change. By involving them in the conversation, the possibility exist that new, exciting ideas and opportunities may arise.

4.7.1 If it's in the news, it must be true

While highly critical about the sources of news items, most of the students also placed a high credibility rate in traditional news media, with only two saying that they do not trust the news coverage in traditional media. Most of the students said that they would actually go out and actively search for a particular topic to verify its credibility by reading it from a traditional media source, after seeing it on social media. This shows that the youth still place a higher rate of credibility in news sources, than on social media (Carter, 2016).

While one of the respondents said he read a number of newspapers regularly (the *New Age*, *Mercury*, *Sowetan* and *Isolezwe*), he continued to say that he only trusts some of the sections in the papers. In general, however, all the interviewees said that they mostly checked who the sources of the news articles were, before believing them, but thought that if an article was published in the newspaper, the newspapers would have checked their sources:

> *"I do (trust news articles) because it seems, mostly it is from professors and they seem pretty well educated, so I trust what they're telling us. We go to news agencies because we trust them. We trust that their facts are verified, but we don't really interrogate that. Yeah, I think they are presented in a factual way" (M – 20).*

4.7.2 What fake news?

When it comes to getting their information on climate change in the news media, however, it was interesting to note and observe that most of the respondents had a high degree of trust in traditional media, where they reported on climate change. Climate change is seen as a "non-political" and "factual" issue, where its facts could not be distorted or misrepresented by the way that it was reported:

> *"As much as the media like to put a spin on everything, there's little that they can do to put a spin on climate change issues and global warming. I think they just have to give it as it is, just give the facts, unlike when they focus on a celebrity" (F – 25).*

Two other students shared this view:

> *"Can there be so much fake news, though, when it comes to climate change? I trust it, because it is not scandalous, there's not much to lie about" (F – 20).*

4.7.3 Media images

It was also interesting to see what type of imagery, that was presented regularly on climate change by the media, influenced the students. Three of the respondents recalled the fate of polar bears and the destruction of their habitat, as an example of the global impact that climate change had. While the local media are using local images and footage when writing about climate change (Bega, 2017a; Kings, 2017a) and also illustrated in a previous chapter of this report, the images of starving polar bears still remain prevalent. As argued by Doyle (2007), the images of struggling polar bears, however, pose a challenge to effective climate change communication,

as it increases the psychological distance of the problem in the minds of the viewer (Doyle, 2007; Manzo, 2010):

> *"I was watching a documentary about the polar bear and it's somehow in a state where it would actually become extinct in 10 or 15 years from now, because of the changes in its environment" (F – 25).*

5 Chapter five: Discussion and analysis

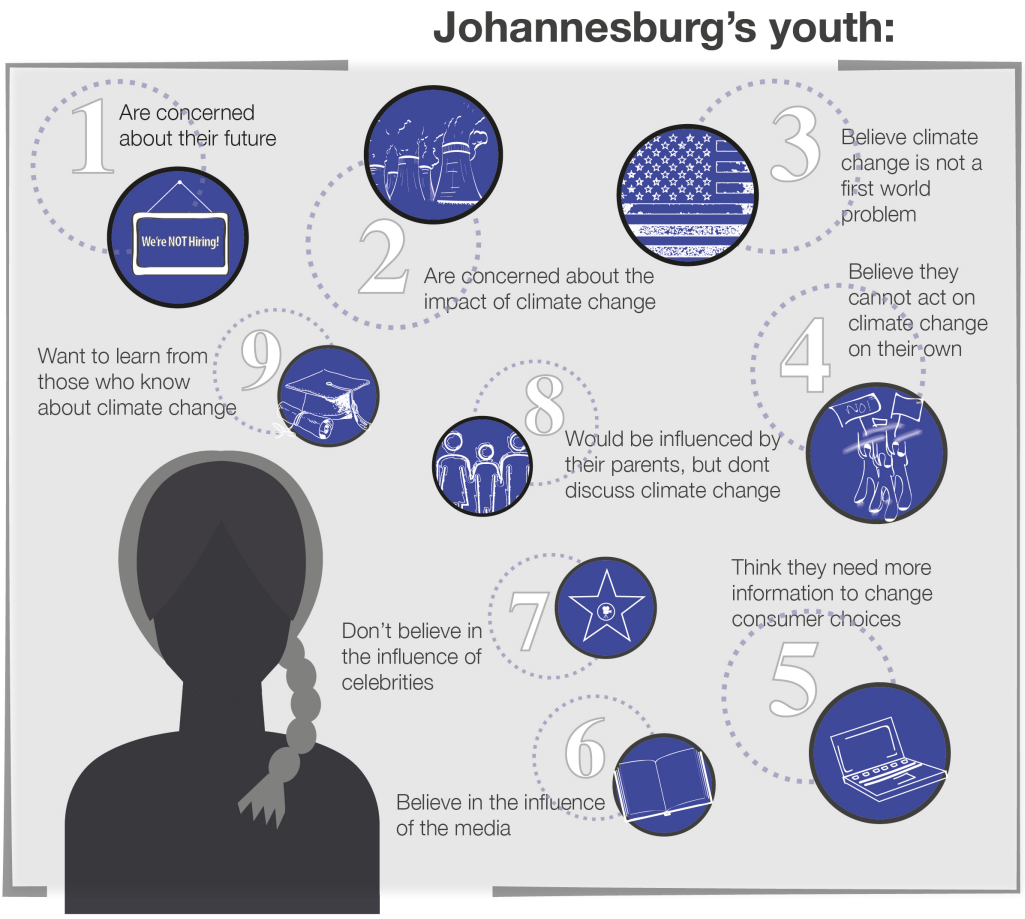
Through content analysis of the transcriptions of the interviews, it is possible to begin to generate a mental model of a small portion of the youth of Johannesburg, on how they think of climate change. This model is shown below.

5.1 Johannesburg's youth – a mental model on climate change

Johannesburg's youth (see Figure 4 below):

- Are concerned about various aspects of their future, such as the politics of the country as well as job prospects
- Are concerned about climate change and its impact on their future
- Believe South Africans should be just as concerned (and involved) as first world countries to tackle the problem
- Believe that climate change is too big for them to tackle as an individual, but collectively they could make an impact
- Believe they do not have enough information or choices to make better sustainable consumer choices
- Want to learn from people with knowledge about the subject
- Believe their parents would have an influence on their behaviour but don't talk to them about climate change
- Don't want to learn from celebrities about climate change
- Have confidence in the media to inform them on climate change

Figure 4: A mental model of a sample of the Johannesburg's youth on climate change.



5.1.1 Knowledge versus behaviour

Just like in previous studies done to better understand the behaviour of the youth and their knowledge and behaviour towards climate change, the study group's perceptions and beliefs on climate change does not, however, correlate with their behaviour towards mitigating climate change. The greater part of the study group were very aware of climate change, and were concerned about the possible impact that climate change might have on their future, yet very few of them actually did anything to do something about changing their behaviour. This correlates to various findings and studies that shows that possessing the information on climate change does not necessarily mean you are going to act on it (Hulme, 2010; Whitmarsh *et al*.,

2011; Erikson, 2016), and supports the criticism to the information deficit model. The study group also believed that climate change is not just a problem that developed countries should be concerned about. However, they also felt that the problem is too big and/or distant for them to do anything about it in their personal capacity. This finding is in line with other studies on why climate change communication is ineffectual to change behaviour, and, why we as a society do not care about what climate change may have on our future (Lorenzoni *et al*., 2007; Hulme, 2010; Whitmarsh *et al*., 2011; Erikson, 2016). Most of the students in the study felt that it is only as a collective that anything could be done to have a positive impact on climate change, and that very little that they can do as individuals will have an impact on climate change (Whitmarsh *et al*., 2011). However, many of them cited that they do not have enough information on how to change their behaviour and or lifestyles in order to have a positive impact on climate change.

Just as Moser and Dilling (2007) argued that effective climate communication should be about actually having an effect on changing behaviour, it is not enough to tell people that climate change is actually happening, but it needs to be supported by enabling messages that would assist the youth in gaining more knowledge on how to make better decisions on how to mitigate against climate change (also see Hulme, 2010; Erikson, 2016). The need for engagement and the opportunity for dialogue also emerged as a critical finding. A better understanding of how to provide information on how to change their behaviour to adapt to, or mitigate against, climate change to this sector of the society might be invaluable. This is discussed in more detail below.

5.1.2 Future leaders

Many of the youth at University today are potential future leaders in their chosen careers. While, at the moment, they do not necessarily realise it, they will have considerable influence on large numbers of people – both in their careers, and in their family lives at home (Hulme, 2009; Whitmarsh *et al*., 2011). This group is of vital importance, in order to get the appropriate messages across. It is especially important to instil the message of climate change on these young leaders – especially those in careers that might involve designing and producing products, buildings or other consumer items (United Nations, 2010). The engineers interviewed during this research study had little understanding and or sympathy for climate change, and one of them was in his fourth year – ready to go out into the workforce soon. Yet, they will in the near future be making critical decisions that might have a direct impact on climate change and the environment.

As mentioned in previous chapters of this report, universities can be a catalyst to empower the formation of new habits and behaviours into students (Verplanken and Wood, 2006). Some of the interviewees in this study highlighted that a University is a place where young minds are open to learning, making it a perfect place to teach new ideas on sustainability. Many of the respondents also indicated that they are more prone to change their behaviour and accept messages on climate change when it comes from either experts in this field, or lecturers. The time spent at University is therefore a great opportunity to teach these future leaders about climate change, and the impact, influence and change each of these students can make in terms of

mitigating climate change in their future. There are, however, many structural, policy and operational barriers at Universities that currently works against the effective teaching of climate change (Shriberg *et al*., 2002; Sterling, 2003; Togo and Lotz-Sisitka, 2013; Lotz-Sisitka *et al.*, 2015; Foss, 2016). Various commentators have been highly critical of the higher education sector to change students' behaviour in terms of climate change and sustainability (see Shriberg *et al*., 2002). Sterling (2003), for one, is highly critical of tertiary education's ability to teach sustainability. In fact, he believes that instead of teaching sustainability, they are doing exactly the opposite:

> *"... most mainstream education sustains unsustainability – through uncritically reproducing norms, by fragmenting understanding, ... by an inability to explore alternatives, by rewarding dependency and conformity, and by servicing the consumerist machine" (Sterling, 2003, 46).*

Universities are usually set up in a "reductionist" and "siloed" manner (Foss, 2016, p. 2) where, traditionally, it was thought best to take things apart in order to see how they work. While this approach has had a highly successful impact on the development of science, it also resulted in the compartmentalisation of the higher education sector, where disciplines were studied in isolation of each-other (Sterling, 2003; Foss, 2016). Due to this fragmentation of disciplines, universities are not configured to deal with so-called "real world" problems, such as climate change, which requires not only scientists of different fields to work together, but that they also have to draw in other sectors of society, such as the public, in order to solve a problem (Foss, 2016). In other words, this requires not only inter- or multi-disciplinary research (where researchers from two or more different disciplines collaborate on a certain topic and the knowledge of all their disciplines are integrated in the product), but transdisciplinary research (where academics

collaborate with various other sectors of society on a shared knowledge basis, to solve a specific problem) to be successful. Sterling (2003) further argues that the academy is set up in such a way that scientists are rewarded not for solving problems, but for publishing discipline-restricted articles in scientific journals. This, he argues, draws scientists away from working to solve real world problems, and further fragments knowledge into siloed disciplines (Sterling, 2003). Lotz-Sisitka *et al*. (2015) believe there is still a lot to do for universities to become relevant in facing the climate change and sustainability challenge, they need to break down their traditional structures of teaching and learning:

> *"In order to transform for the sustainability turn or transition, people everywhere will need to learn how to cross disciplinary boundaries, expand epistemological horizons, transgress stubborn research and education routines and hegemonic powers, and transcend mono-cultural practices in order to create new forms of human activity and new social systems that are more sustainable and socially just" (Lotz-Sisitka et al., 2015, p. 74).*

In studying the way that the engineer Gerard Edenburg, as general manager of his company Edenburg Electrotechniek, experimented (quite successfully) with the organisational composition of his company, Romme and colleagues (1999), pointed to the way Edenburg's "circular structures" were used to solve complicated problems in the company, by including all the employees (Romme and Witteloostuijn, 1999). By setting up a series of hierarchical "circles" in the company on several levels in the organisation, Edenburg managed to include most of his employees in decision-making. Various levels of circles were created, which was based on the existing hierarchical system of the company, but designed to overcome the hierarchical problems of the company. In each circle, members were given full

information on each decision that had to be made, and decisions were made after full discussion, and based on consent, defined as “no argued objection”.

The result was that not only did the circular structure function in solving highly complex problems – including one that saved the jobs of 60 of the company’s 120 employees, with the solution coming from a member of one of the lower-tiered circles – but members in all levels of the circular organisation learned through the decision-making process. Along with this, the organisation also learned about what worked effectively in the circular organisational structure, and what was its shortcomings, and adapted the structure to be more effective (by including better education on the circular structures to members). The circular organisational structure, as implemented by Edenburg is an example of learning loops (Romme and Witteloostuijn, 1999). The circular organisational structure facilitates communication both upwards and downwards in the organisation, and can possibly serve as a model to include university students into decision-making (and learning) on environmental and sustainability issues at university level.

As this research has shown, students will be receptive to information on climate change, should it come from an expert in the field, or some of their lecturers. However, merely providing them with information would not be enough (Moser and Dilling, 2007; Hulme, 2010; Whitmarsh *et al*., 2011). Involving students in research has the double impact of both increasing trans disciplinary research (Lotz-Sisitka *et al*., 2016) and increasing the learning potential by involving them with climate-related work and decisions. For example, in 2013 and 2014 researchers from the

University of Colorado Boulder recruited a group of 64 middle and high school students, between the ages of 9 and 18) from Colorado to produce short videos about how climate change affected their lives. The students were mentored by geoscience graduate students and given introductory video-production training. These students interacted directly with research scientists on their topics and learned about climate change through the video production and interview processes (Gold *et al*., 2015). At University level, students can also be consulted and included in the process to establish a sustainability code and policy for the University, or run interactive workshops on how to make their residences more sustainable.

It is also important to note, that, where it comes to behaviour change on environmental issues, it is not enough to focus on individual values and beliefs in order to change behaviour. Societal contexts and behaviours must also change for behaviour change to be sustainable (Rabinovich *et al*., 2012). Verplanken (2011) proposes a process of creating "implementation intentions" among the target group, where they set intentions on how to act on climate change themselves, thus, making them more likely to actually act on these intentions and kick-start new habits (Whitmarsh *et al*., 2011).

5.1.3 Influencers

One of the surprising findings of this research study was the amount of influence that parents still had on their children. In today's world, one would think that external influencers like musicians, actors, sportsmen and women and other celebrities hold a strong influence on the youth (Carter, 2016). However, the current study showed that students are still much more likely to be influenced by their parents, where it comes to issues like climate change than external influencers. Second in line would be sources that they feel they can trust on a topic such as this, like either a lecturer, or someone who is knowledgeable about the topic.

A lot of our behaviour is learnt from habits (Verplanken and Wood, 2006; Whitmarsh *et al*., 2011), which we pick up early in life, and in most of the cases, it is learnt from our parents at home. This is also true of our behaviour towards the environment. As described above, the society where we come from also plays an important part of our individual self-perception (Whitmarsh *et al*., 2011). As evident in this study, however, very few of the students ever had a conversation about climate change with the adults in their families. In fact, many of them have no idea what their parents think of climate change. This breakdown in communications poses a big challenge to climate change communicators, advocates and activists. There is a need to start the conversation on climate change at home. How to introduce the topic of climate change as a conversation point at home – and how to use the influence of students as change agents in their households and home communities – might, in fact, be a topic for further study in future.

The fact that there is such a communication gap between parents and their children, where it comes to climate change, offers both a challenge and opportunity. Firstly, the challenge is in how to get the conversation going between them. Secondly, the opportunity lies in the fact that this might be a blank canvas as a possible experiment in using the agency of the youth as activists, in mobilising their parents and home communities in adapting to climate change. The engineer, Edenburg, for example, believed that the structure of a society will be the result of the actions of the individuals in the society – as well as its previous members – as well as the broader societal system that it exists in (Romme and Witteloostuijn, 1999). To add to this, Romme (1999) notes that in complex human systems, the best solution to a problem would most likely come from a very local source and from collective knowledge that is formed as close to the source as possible, irrespective of the formal position that a member in the group that comes up with the solution holds in the group (Romme and Witteloostuijn, 1999). For example, when Edenburg's company went through a difficult time, an employee from the lower circles saved a large number of his colleagues from being retrenched by coming up with an alternative to have the employees that were targeted for retrenchment to be moved to a marketing role on a temporary basis, in order to gain more business. The employee who suggested the idea was also temporarily moved to a higher "circle" in order to manage the initiative. This campaign turned out to be successful, and no retrenchments took place (Romme and Witteloostuijn, 1999).

Verplanken (2011) says that while it is virtually impossible to change behaviour through communication campaigns (firstly, as only about 40% of the message

actually reach the audience, and, secondly, people's habits are so well entrenched that they don't concern themselves with new information) (Verplanken and Wood, 2006; Whitmarsh *et al*., 2011; Rabinovich *et al*., 2012), a key moment to intervene would be when an individual goes through a moment of change. People are most susceptible to learning new habits in transitional phases – such as when they go to a new school – which makes the transitional phase of a young person's life through going to and through University the perfect opportunity to instil new, sustainable, habits. By creating transdisciplinary workshops, led by lecturers and University experts on climate change, and involving the students to come up with solutions that relate to their home communities, as well as in their residences at University, this transitional period of a student's life can become a valuable teaching opportunity to instil new, positive and sustainable habits in their lives, that might impact the habits and lifestyles of their parents, their communities, and in future their colleagues, co-workers and the processes that they might be involved with in their professional lives in future.

5.1.4 Products, service delivery and infrastructure

When it comes to products, service delivery and infrastructure, the ordinary consumer often does not have a lot of power in making informed decisions and choices where it comes to sustainable living. Like many other areas of the world, the respondents in this study either feel they do not have enough information (United Nations, 2010) to make the right decisions or they do not have the necessary levels of service delivery or infrastructure to make the right choices (Whitmarsh *et al*., 2011).

None of the students interviewed paid any real attention towards how the products that they consumed affected the environment. While most of the students were willing to change their behaviours, three factors came into play when it came to buying more sustainable products. The first was price, and a perception that more sustainably produced products cost more than mainstream products, and the second was the perception that they didn't have enough knowledge on how to live or shop more sustainably. The third factor was their habits of just buying what they were used to. Verplanken (2006), says that when a person is faced with multiple choices, the force of their habit will take control over their more, slower, cognitive routes (Verplanken and Wood, 2006). In this instance, what they have bought before will be what they buy again and again, without considering further implications of their actions.

Communities also often do not have the necessary resources to live a more sustainable life (Whitmarsh *et al.*, 2011). This was one of the factors brought up by respondents who came from vary different financial, cultural, geographical and historical backgrounds in reasons for not being able to live more sustainably. Where the impact of a lack of service delivery and/or infrastructure was more severe in rural areas, where communities also lacked financial wellbeing, it also played a role in the lifestyles of wealthier, urban communities. Proper service delivery and infrastructure is crucial, not only for communities to live proper, dignified lifestyles, but also to enable them to live more sustainably. Services and infrastructure lacking may include basic sewerage and/or refuse removal and proper water and sanitation

in rural areas, and recycling and refuse removal services in urban areas. At university level, partnerships with municipality, NGOs and other service providers to instil a more sustainable lifestyle at University level can play a role in both providing the relevant information, and providing the necessary infrastructure and services to create a more sustainable environment (Togo and Lotz-Sisitka, 2013).

5.1.5 Media

As discussed above, the traditional mainstream media has failed for various reasons to enable behaviour change towards living a more sustainable life in various communities (Boykoff and Boykoff, 2004; Verplanken and Wood, 2006; Boykoff, 2007b; Erikson, 2016). As a tool to raise awareness about climate change, however, the media has been proven to be successful (Boykoff, 2007a, 2017). The results in this study supports this notion, as all the respondents in this study were aware of climate change. Like youth all over the world, South Africa's youth is highly connected and tuned into various forms of media. And, even where it might not be obvious to the respondents in this study, most of them are definitely influenced by messages in the media – whether it is social media or more traditional media. Even where some of the respondents said that they weren't really influenced by media, in earlier questions they referred to instances where messages in the media had influenced them to highlight certain points.

As argued by Verplanken (2002 and 2011), however, the power of the media to change the lifestyles of the respondents proved to be ineffective. While the respondents were highly connected through various forms of media, and even

purposefully consumed media relating to climate change, this did not influence them to change their behaviour (Verplanken and Wood, 2006; Whitmarsh *et al*., 2011). Verplanken believes this is because informational campaigns are used as attempts to change people's already entrenched habits, which, as described above, relies on a much more holistic approach.

5.1.6 Links to existing literature

The findings in the current study reflect findings of existing literature to a large extent. While various reports, studies and policy documents refer to the youth as being one of the most important "audiences" or target groups, where it comes to climate communication (United Nations, 2010; Narksompong and Limjirakan, 2015; O'Brien *et al*., 2018; Yunita, 2018), very little is done globally to include the youth into discussions on issues that affect them (O'Brien *et al*., 2018; Yunita, 2018). This is also true of South Africa, where policy documents on climate change do not even mention the youth (Department of Environmental Affairs, 2017). This study also reflects and confirms some of the most concerning issues on climate change communications in that while the youth is aware of climate change, and concerned about how it might affect them in the future, only a minority are doing anything to adapt to climate change or to mitigate against it (Moser and Dilling, 2007; Hulme, 2009). It also further suggests that a more inclusive, transdisciplinary approach be taken, by involving the youth in climate change learning opportunities, such as workshops, policy discussions and other learning opportunities, in order to encourage more effective engagement of the youth with climate change, and

possibly mobilise them in becoming the agents of change for their future. This preliminary research points to the need for and enabling environment to foster change such as that made by the United States Environmental Protection Agency on its report on best practices in youth engagement, where it recommends that:

- Youth leaders should be mentored, trained and engaged in decision-making where it comes to climate change;
- More resources should be allocated to build capacity for youth development; and
- Principles for engaging with the youth on climate change should be developed and implemented (National Environmental Justice Advisory Council, 2018).

5.1.7 Further research

It would be a valuable exercise to expand this research project to include more respondents in order to get a bigger sample size. This project already provides a snapshot into the beliefs, perceptions and behaviour of the youth of South Africa, where it comes to climate change, but the small sample size might be limiting.

The research shows that most of the respondents are mostly influenced by either their parents or university lecturers where it comes to behaviour, beliefs and attitudes towards climate change. To enable the youth to change their attitudes and behaviours and those around them, you should start with the people that they trust most – their parents – and secondly, their teachers and lecturers.

It would be invaluable to study the relationships, influences and conversations between parents/adults and their children (and vice-versa) with reference to climate change. A possible study into the effectiveness of transdisciplinary workshops, as described in this study, to instil new habits into students that could also provide great insights into new models of communicating climate change. This study can be expanded further into the student's impact on their homes and home communities. This could be done by tracking a group of students and their parents over a longer-term period (of 2 to 10 years or longer) by using actual diarised observations.

Doing this research at a university such as the University of the Witwatersrand, provides the unique opportunity to interview a wide sample of youth, with very different historical and financial and geographical backgrounds, all in the same location. The results, however, show a highly variable attitude towards climate change, depending on the respondents' backgrounds, contexts and experience.

6 Chapter six: Conclusion

Johannesburg's youth has a great deal to be concerned about. Just like people of similar ages that live in different parts of the world, they worry about whether they will be successful in their careers, and make their parents and loved ones proud. Added to this, they are deeply concerned about the future and stability of their country. During the time when the survey was done, South Africa was undergoing a period of economic and political uncertainty and the youth in Johannesburg were rightly concerned about these more local and immediate issues. Issues of climate change were therefore not their most immediate concerns.

In the previous section of this study, a combined mental model of the youth that was interviewed was presented. Summarising this mental model, Johannesburg's youth:

(1) know about climate change and that it might have an impact on their lives, they are

(2) willing to change their behaviour and lifestyles to do their part against the negative consequences of climate change, but feel that on individual level, they cannot do anything to make a difference. They also feel that they

(3) lack the knowledge on how to change their lifestyles and the necessary infrastructure to do this. They further believe

(4) that they are most influenced by those closest to them, especially parents, teachers and lecturers, and, as they are highly connected to the rest of the world through social and traditional media, their thoughts and ideas are to a large degree

(5) still influenced by media.

While there are definite limits in terms of applying this simple model to a larger cross-section of the population – as this would require the gathering of larger sample sizes and more in-depth studies – the model presented here does provide insights as to what the younger citizens of South Africa believe, think and feel about climate change.

Establishing the mental model of the youth was only one part of the aims of this study. In order to fulfil the second aim, which is to examine how to apply the mental model in efforts to involve the youth in the conversation about climate change, Trench's models of science communication – namely dissemination, dialogue and conversation (Cheng *et al*., 2008) – as set out in Table 1 and described in an earlier chapter of this report, might be applied as a useful guideline.

- **Dissemination** of information follows the information deficit model, which is the traditional model of communicating science. It is also largely the communication role that the traditional media plays. In the simplified version of the mental model as described above, points 1 and 2 shows that the youth is both knowledgeable (at least at a surface level) about climate change and they are willing to change their lifestyles. This shows that even though there are limits to the deficit model, climate scientists and the media have to a certain extent done their jobs. The message of the possible effects of climate change got through to them successfully.

While the media has been criticised – rightfully, in some cases – for its ability to communicate issues such as climate change, both social and traditional media still has a role to play when it comes to building awareness of issues such as climate change (5). However, just to know about climate change is not enough, we need to start a dialogue.

- **Dialogue** is the crucial two-way communication process where you not just inform, but you also get feedback from the other party. This study, for example, can hopefully be the start of the dialogue on climate change between the youth and their influencers. Here, you do not merely provide information and study how much of the information they internalised, but you ask them how they feel and think of climate change, what their needs, hopes and fears are, and what they think we can do about it. As shown in point 3 of the mental model, the youth feel that they do not have the necessary knowledge or resources to make a difference. They further feel that they are most influenced by their parents, teachers and lecturers (4), when it comes to climate change. The youth are already open to accept messages of climate change and willing to engage on them (a door, that could be argued was largely opened by the traditional media, therefore, through the Information Deficit Model). The transition period presented by life at a University presents a powerful opportunity to ignite a dialogue between the youth and the people that they trust most. The opportunity to engage the youth with deep and meaningful dialogue – between, for instance, academics or lecturers and

themselves – about issues such as climate change. This opportunity will not only present them with the information they need to make the important and necessary changes in their own daily lives in order to mitigate and adapt to climate change, but also to start conversations with others, and empower them to become powerful change agents in their communities – and futures.

- **Conversation** starts when our youth become the leaders in their current and future communities that they are groomed to become. With the knowledge and information gained during the dissemination (for example awareness shaped by the media) and dialogue (by for example engagement with University lecturers), the youth are empowered to critically engage with issues such as sustainability and climate change themselves, and become influencers of others. While they are still heavily influenced by their parents and immediate societies, they are also strong influencers of their parents and communities themselves. Many of the youth who are currently studying at University will also become future leaders in their workplace, where the decisions that they make might have both a direct (in the products that they produce) and indirect impact (in the people that they lead) in mitigating against and adapting to climate change. By ingraining the message of climate change at Universities – and engaging with the youth critically on the subject, treating the youth not just as an audience, but an equal partner in knowledge production – the conversations that they start with their

parents, communities and colleagues might play a substantial role in securing a healthy, viable and sustainable future to a youth, that are currently desperately looking for hope.

In conclusion, this study was an attempt to understand what the youth of Johannesburg think, believe and understand about climate change and how they believe climate change might affect their future. It was also a critical examination of how climate change is communicated to the general public through the use of the various communication models discussed above. Through creating a mental model of a sample of the youth of Johannesburg, it was possible to establish their views and understanding about climate change and it became clear that the youth is indeed worried about the impact that climate change may have on their lives, but they are uncertain on how to act or change their behaviour in order to mitigate against and adapt to climate change.

While the youth are also hungry for information on how to indeed change their behaviour, and look up to either their parents, teachers or lecturers to inform them – rather than their friends or celebrities. However, they do not speak about climate change in their households.

Except for the obvious reasons to effectively communicate climate change to the youth – i.e., the future belongs to them, and they are the future leaders in their workplaces, where they will be responsible for decisions on the sustainable manufacturing of materials – effective climate change communication to this group

also provides us with an opportunity to enrol the youth as active change agents on climate change in their own households and communities. They can act as influencers themselves, in changing the behaviour of their parents, friends, and colleagues.

In order to do this, however, it is crucial to approach the challenge holistically, and – even more crucial – to involve them in the process. The youth should not just be targeted as an "audience" or "target market" that could be "influenced" to change behaviour. Through effective communication strategies – using the whole range of communication models discussed above, assisted by carefully reconstructed mental models that informs of their views, values and beliefs – and campaigns that involve them at the right moment in their lives (such as when they come to university), they should be taught, involved and challenged to change not only their lives, but the lives of their parents, elders, communities, friends, and yes … their teachers and lecturers.

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Appendix A: Question sheet

Question sheet

Outlook on their future

1. Give a one word response to the word “future”
2. Are you concerned about the possible impacts of climate change on your future?
3. What are your concerns about the future?

Behaviour towards the environment

1. When you go shopping, do you consider what possible the impact of the products you buy on the environment has?
2. When shopping, what do you consider most? (eg. Style, price, re-usability, materials that the product is made of, packaging?
3. Have you, or would you, change your behaviour or lifestyle to live more “sustainably”? How?
4. What would make you change your lifestyle/behaviour?
5. What do you see as garbage?

Beliefs/perceptions

1. What do you understand by the term “Climate change?”
2. Do you think “climate change” is a First World problem?
3. Do you think you are personally affected by climate change?
4. What do you understand by the term “sustainable living?”
5. Do you think recent extreme weather events like floods or droughts are related to climate change?
6. Do you think there is anything you personally can do to prevent climate change?

Family

1. How does your family get rid of waste?
2. Do you recycle?
3. Wat do the adults in your household think of “climate change?”
4. Has your family done anything to reduce their consumption of water/electricity/petrol?
5. How many cell phones/computers does your family own? (for how many people?)
6. How regular do you and/your family members renew their cell phone contract to get a new phone?

Media/influencers

1. Where do you get most information on climate change from?
2. If there is a person who would most likely be able to change your behaviour towards the environment or climate change, who would it be? (Father or mother, teacher, friend, a celebrity, community elder)
3. Would messages in the media have an impact on your behaviour towards climate change?
4. What media do you consume?
5. What social media do you use?
6. How often do you read a newspapers or news magazines (print or digital)?
7. Do you think the messages about climate change in the main stream media is factual/credible?