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RESEARCH REPORT

Investigating Nature Relations in the Urban Context: Influences and Implications for Designers

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DECLARATION OF ORIGINALITY

I declare that the mini-dissertation, Investigating Nature Relations in the Urban Context: Influences and Ramifications, which has been submitted in fulfilment of part of the requirements for the module of DIT 801, at the University of Pretoria, is my own work and has not previously been submitted by me for any degree at the University of Pretoria or any other tertiary institution.

I declare that I obtained the applicable research ethics approval in order to conduct the research that has been described in this dissertation.

I declare that I have observed the ethical standards required in terms of the University of Pretoria's ethics code for researchers and have followed the policy guidelines for responsible research.

Signature:

Date: 24 July 2023

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Acknowledgements

As part of a module of the Masters postgraduate degree in Landscape Architecture, the following research report was done under the guidance of Dr. Ida Breed at the University of Pretoria. The fieldwork, ten semi-structured interviews, was conducted by myself together with a fellow student, Phumzile Konile, who worked on a similar research topic. The transcripts were done by each student and shared in order to increase the sample size of the study. All research and writing was done individually and edited by the supervisor.

Abstract

Through investigating nature relationships in the South African urban context of the City of Tshwane, this study aims to find insights into community perceptions and opinions as well as the type of nature relationships that exist in the context. Ten one-on-one interviews were conducted guided by two research questions that firstly focus on the existing relationships and influences and secondly on local informants and specifically functional nature relationships. The research makes use of in-depth analysis and understanding of human-centred, context-specific relations with urban nature. People in the city relate with nature in various different forms often driven by relational values and recognised nature benefits. These benefits and relations include, but are not limited to food, energy, water, healing, cultural significance, economic opportunities, trade and agriculture. The influences and aspects, affecting these relationships locally, are important to understand the context that impact on nature relations. Family interactions, childhood experiences, exposure to nature and traditional environmental knowledge acquired during formative years contribute to the existence and development of functional nature relationships. Understanding these nature relationships requires a comprehensive understanding of value systems, community dynamics and contextual realities. In unpacking some of these relations, this paper sheds light on the intricacies of nature relationships existing in the City of Tshwane, providing valuable insight for urban planners and designers to create sustainable and meaningful human-environment interactions in the community's context and beyond.

1. Introduction and background

Introduction

Humankind and nature - are two entities that have existed, grown and evolved alongside each other for over three million years. The entire existence of humans has been housed and in some way connected to nature; from the Paleolithic, Neolithic, Ancient and Medieval, to the Modern, and Contemporary ages, nature has been present. Consequently, humankind has developed a rich and complex connection to nature. This connection has been studied over many years and has been given various names; for the sake of this research report, the connections will be explored in terms of nature relationships. From early nature dependencies in the hunter-gatherer era to intricate climate activist relationships today, the bond between humans and nature has aged over time. "Man [sic] is as much attached to nature as a tree, and though he walks freely on two legs and is not rooted in the soil, he is by no means a self-sufficient, self-moving, and self-directing entity." (Watts, 1959). As phrased by the philosopher Alan Watts, humans are linked to nature as much as nature is linked to itself.

Many acclaimed articles have explored the role of nature and the benefits it provides to human life. In a study on the agenda of ecosystem services, Braat & De Groot (2012) present linkages between nature and human well-being in terms of ecosystem services acting as constituents of benefit. These comprise of *security, basic material for a good life, health, social relations,* and *freedom of choice and action* (Braat & De Groot, 2012). Although societal policies and regulations exist in the realm of the previously mentioned constituents, it is important to note that nature, in its mere existence is a self-sufficient source of benefit to humankind. The knowledge of this is important to be considered by policymakers as well as individuals in the contemporary world. Throughout the discourse, nature has been proven to have a range of psychological benefits. According to a study done at the University of Minnesota (2023), nature "reduces anger, fear, and stress and increases pleasant feelings... it makes you feel better emotionally, it contributes to your physical wellbeing, reducing blood pressure, heart rate, muscle tension, and the production of stress

hormones." This intricate link to human beings and the impact it has on emotional well-being proves the relevance and importance of this study. Through understanding nature and its benefits communities can build foundations for nature relationships, aiming for a shift in mindsets, towards "conserving life and have a fairer future for people on this planet" (Diaz et al., 2018). The understanding of nature relationships and how they can be enhanced, will not only provide a future fairer for people, but also for the environment as a whole. Therefore the importance of this study is revealed through the impact it could have on future cities and urban contexts toward more informed, human-centred and sustainable decisions.

Over the past few decades, human connection with nature is believed to be in decline. Kesebir (2017), in studying the works of popular culture in the English language, found that in the 20th and 21st centuries, a shift away from nature has been identified. He argues that a pattern of decrease in references to nature in published works ranging from books to song lyrics and film storylines proves this (Kesebir, 2017). A more recent study by Beery et al. (2023) argues that contemporary people grow more and more disconnected from nature due to institutional, socio-cultural, and power dimensions. This proves problematic as the disconnection with nature often results in the disregard of nature. Understanding these nature relationships in the context of Sub-Saharan Africa is important because the disconnect poses a threat to both people and the environment they depend on. Human society pollutes and destroys vital natural resources that are essential to their own survival, such as fresh water, air, food and energy resources. These impacts are especially true in the Sub-Saharan African context, as global warming manifests more drastically in these areas as a result of the vulnerability of people where relevant infrastructure and economies are not in place (Shackleton, 2021). Nature remains equally vulnerable to human decisions and interventions in terms of ecological health and species survival. According to the Convention on Biological Diversity (2006), a global data resource tool, value added to the South African economy by nature in 2004, in terms of ecosystem services, added up to R73 billion per annum. This formed approximately 7% of South Africa's GDP at the time of the study. Although nature relationships are hard to quantify through monetary valuation, this statistic is

relevant to South Africa as it is a developing country facing social but also many economic challenges. This reiterates the importance of the project to develop an understanding of social and economic challenges and how these can be successfully addressed in design. Güneralp (2018) argues that the lack of access to data that generates a monetary value for biodiversity, ecosystem services, and urbanisation, results in Africa's failure to see the value in it. This shows a green value gap in nature relationships and presents urban nature spaces of extreme vulnerability and a high risk of human domination and the subsequent degradation of natural environments.

To understand these relationships and relational values is it important to define the terms and what they refer to in this context. Relationships refer to the connection between two entities, whilst relational value talks about the importance of desirable, meaningful, and often reciprocal relationships (IPBES, 2017). In order to guide the focus of this study, two research questions were used: *Which nature relations exist in the South African urban context and what influences these relations locally?* and *Which physical environmental and/or demographic aspects inform the functional nature relations and priorities in the City?* as a second focus question. The purpose of answering these questions is to gain a richer understanding of how people and nature are connected in the South African urban context. This comprehension can contribute to urban planning, architecture and other design professions to make environmentally sustainable choices driven by and intricately intertwined with human cultures, individuals and communities. Unpacking local nature relationships will allow for a human-scaled honing into the value of nature resulting in closer connections with our environment towards more sustainable lifestyles. As a result of cultural, societal, and economic influences such "lifestyles" differ largely across the world. Therefore, this study will focus on residents in the City of Tshwane and add to the conversation in its field of the Sub-Saharan African discourse toward an improved understanding of the urban community.

1.1 Background

This study has been done by previous master students, however as the collection of data and literature was carried out individually, the findings show original thoughts and arguments.

1.2 Research problem

The disconnect between humans and nature has become a major topic in the research field in the past couple of decades. Beery et al. (2023) argue that contemporary disconnects between people and nature are growing due to institutional, socio-cultural, and power dimensions. This proves problematic as the disconnection with nature often results in the disregard of nature posing major risks to the environment that humans also depend on. Therefore, the need to understand nature relations is as critical as ever, in order to recognise nature's extreme vulnerability and to prevent the risk of human domination and the subsequent degradation of natural environments.

1.3 Research questions

The associated research questions are as follows:

1) *Which nature relationships exist in the South African urban context and what influences these relationships locally?*

and

2) Which physical environmental and/or demographic aspects inform the functional nature relationships and priorities in the City?

1.4 Limitations, delineation and assumptions of the study

Although this study has introduced and echoed many existing findings, it is important to note some of its shortcomings in the analysis of information. As the sample size was ten people, the representativeness could not be guaranteed. The high levels of education represented by the sample are not representative of the South African population and the gender was also slightly unevenly distributed. Other limitations that the data collection posed were of time constraints and lack of interest- the interviewer could not predict the interest of a person's contribution to this field or their time available, therefore some answers might have been

rushed and generic. However, as this study has a qualitative approach, the information collected by individuals proved to be sufficient/meaningful in giving insight into some individual and collective views in the City of Tshwane and existing nature relationships.

2. Literature review

Introducing nature relationships

The dynamics of nature relationships within urban contexts have become a subject of significant research focus. The term *relationship* is defined as *the way in which two entities behave toward each other or deal with each other* (Oxford Dictionary, 2023). Literary definitions of *nature relationships* on the other hand, describe the way people relate to their environment and its philosophical and historical roots. (Flint *et al.*, 2013). Human behaviour towards nature has been researched in several studies in the past; these have considered some demographic or socio-cultural characteristics of the people but what has proven problematic is the failure to "represent the demographic, social and cultural diversity of modern urban societies" (Botzat, Fischer and Kowarik, 2016). The 'modern human society' is extremely diverse as a result of various contextual, historical, and place-specific factors that influence the relationships of humans with nature. Therefore, to find answers in the South African context, it is necessary to identify specific relations and their influences in the local urban community. To identify influences, it is important to understand that this study will follow the definition of influence as the "capacity to have an effect on the character, development, or behaviour of something, or the effect itself" (The Oxford English Dictionary, 2023). The *capacity to effect* is driven by various local factors which will be explored throughout existing literature as well as local interviews to achieve a meticulous understanding of the influences on nature relationships.

Several recent studies (Döhren & Haase, 2015; Chan et al., 2016; Díaz et al., 2018; Constant & Taylor, 2020 and Shackleton et al., 2021) claim that perceptions of- and relationships with nature, are shaped by sociodemographics; interrelated socioeconomic, spatial, temporal and political contexts; by local cultures, individual values, and norms. The

above list proves that relationships are personal and extremely context-specific. This ultimately emphasizes the value of a site-specific approach, such as on-site interviews with individuals, in research when trying to understand relationships that exist in the South African Urban context.

Nature relationships and their influences have been investigated in several studies. Taking former findings into consideration is important when approaching new studies and study contexts such as this one. Therefore the following section will be presented in paragraphs that consider relevant literature in the discourse, identify types of nature relationships and what influences them. This will manifest under the two research questions as well as 4 relevant subheadings as seen in Figure 1.

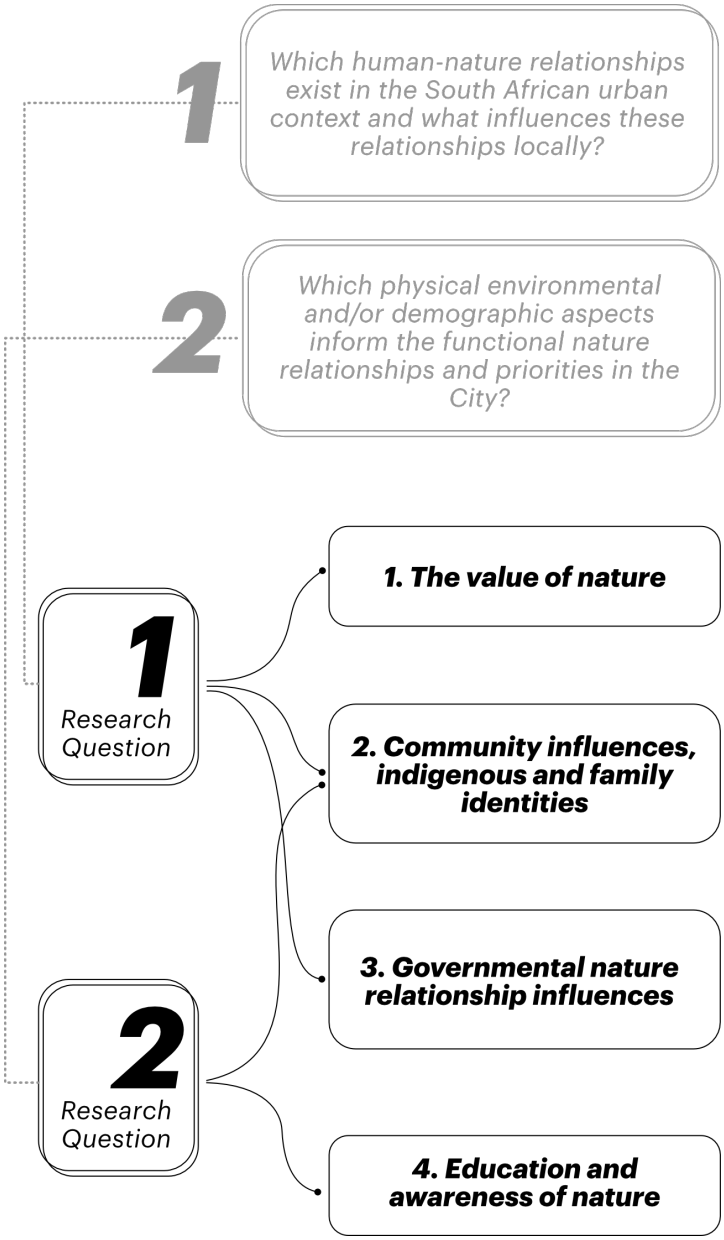

Figure 1: Framework for literature presentation, Author, 2023

Which nature relationships exist in the South African urban context and what influences these relationships locally?

1. The value of nature

1.1 Nature as a provider

In a study on community perceptions of natural open spaces through qualitative interviews conducted in a similar South African metropolitan area, Wessels et al. (2021) connects relationships and relational benefits of nature with "exploitative material uses, access concerns and (mis)management". These benefits describe nature relations to be provisional as well as of service to the community. The study starts to hint at some of the influences on these relations emerging from the local urban contexts such as accessibility and management concerns that often weaken the chances of stronger relations. Inadequate maintenance of natural open spaces in the city results in antisocial behaviour such as crime, land invasion and dumping (Wessel et al., 2021). Contrary to the benefits described earlier, nature connections and relations can thus have negative consequences for society and the environment as a result of perceptions created by inadequate maintenance and care.

1.2 Nature as a necessity

In a similar literature review study, Lapointe et al. (2019) unpacks relational values of ecosystem services among urban and rural dwellers. Ecosystem services are defined as "outputs, conditions, or processes of natural systems that directly or indirectly benefit humans or enhance social welfare" (Britannica, 2023) and form a large part of nature in any urban context. As relational values often inform relationships, this supports the focus of this study in understanding human-nature connectedness and influences. In their findings, Lapointe et al. (2019) determined that urban dwellers value ecosystem services less than rural dwellers as a result of the individual's different experiences in nature, uses and needs of ecosystem services. Urban dwellers are less evidently linked to nature in terms of visible, routine needs than rural dwellers, such as collecting wood for fire or using river water for farm irrigation. A similar study in Grahamstown, South Africa, argues that people on the

outskirts of urban centres find meaning in natural vegetation as they provide spiritual, cultural and restorative importance to their Xhosa-speaking township dwellers (Cocks, 2016). Nature is given meaning as a result of its necessity in social practices. Taking this into consideration, it is evident that nature relations are often determined by daily needs and routines of people. In turn, the relations are influenced by the uses of-, experiences in- and the resulted meaning given to nature.

Comparing the findings of the above mentioned studies, the literature makes it evident that nature is valued by individuals and their respective urban contexts as a result of the roles it plays, the necessities it meets and its purpose in everyday lives. Purpose is defined as "the intention, aim, or function of something" (The Oxford English Dictionary, 2023). As assigning purpose is always personal (Moran, 2014), therefore giving nature an *intention, aim or function* will always differ amongst humankind and their contexts. This means that finding relevant and meaningful purposes of nature in the South African urban context, will need to be investigated further on-site.

2. Community influences, indigenous and family identities

2.1 The moral tie to nature

Relationships between humans, but also between humans and non-human entities have been studied by- and in various peoples and cultures. The idea of a person being embedded in and being part of a web of relations is prevalent in many indigenous and traditional, mostly non-western narratives (Jax *et al.*, 2018). In their investigation of how caring for nature affects people's well-being as well as the overall protection of nature, Jax et al. (2018) explore existing connections and relational values between humans and nature. Focussed on indigenous communities, these studies prove relevant as existing discourse is saturated with Western world views, but lacks alternative perspectives from the global south. In the investigation of case studies from South (and North) America, Australia, New Zealand, and African countries, the research presents findings amongst indigenous communities such as "good social relations with other human beings, and also with the natural world, ...respect for

and responsibility to the land as an important belief and a moral tie". This means that relationships with nature often exist collectively in communities and is driven by morale and not always mere personal decisions. Although not every person in the South African urban context today, can be classified as an 'indigenous person', much can be learnt from indigenous knowledge as it covers topics and presents solutions to many problems/ realities barely covered by the current dominant western world view. As defined by the World Bank (2023), Indigenous Peoples are "distinct social and cultural groups that share collective ancestral ties to the lands and natural resources where they live, occupy or from which they have been displaced. The land and natural resources on which they depend are inextricably linked to their identities, cultures, livelihoods, as well as their physical and spiritual well-being." (The World Bank, 2023). This touches on strong relationships that exist with nature and how decisions related to nature are influenced by community, ancestors, families, and cultural origins. On the other hand, nature valuation has been proven to be guided by both subjective and objective processes (Himes and Muraca, 2018) arguing for the individuality of relationships. Taking both into consideration, it is difficult to draw conclusions in a study for every individual but rather aim towards finding collective views and truths of a community based on individual's meaning responses (Breed, 2022).

2.2 Nature as a social construction

In their paper published on articulating values in urban nature, through various case studies in Stockholm and Cape Town, Ernstson and Sorlin (2013) describe nature as a social practice and how values are constructed through relations existing in the social practice. They detach the thought of nature being an "objective biophysical reality" (Ernstson and Sorlin, 2013), but rather as being tainted and almost defined by the social context. Reiterating the ideas of Jax et al. (2018), nature relationships are complex individual, but also community entities formed by rich histories, political processes and social influences.

Therefore in understanding relationships and influences, it is important to realise that the origins of these are based on "processes influenced by power, inequality and social

dynamics, where diverse communities continually construct meaning and attach value to nature" building on existing nature relationships (Wessel et al., 2021).

3. Governmental nature relationship influences

3.1 Management Practices affecting the value of nature

In reviewing literature on people's perceptions and valuation of urban biodiversity, Botzat, Fischer & Kowarik (2016) identified critical knowledge gaps about the people-biodiversity interface in cities. Defined as the variety of living species on earth (National Graphic Society, 2022), biodiversity and the people-biodiversity interface can add value to the understanding of nature relationships. The study critically analysed the existing interface and found various influences thereof in the urban context. One of these influences found, is the management regime and how it affects the valuation and relations humans have towards biodiversity and ultimately nature (Botzat, Fischer, and Kowarik, 2016). According to Hoffmann et al. (2012), and Özgüner and Kendle (2006), managed natural urban spaces are favoured over naturalistic and wild urban spaces. However, people are open to accepting and appreciating ‘the wild’ if individual or collective care is present and maintenance and accessibility to the natural open space is provided (Hofmann *et al.*, 2012). Lampinen et al. (2021) argue the contrary, stating that wild open spaces are favoured over the maintained. Preferences will always be personal and cannot be generalised. However, the previously mentioned findings of Jax et al. (2018), Botzat, Fischer and Kowarik (2016) are relevant as they argue that the people-biodiversity interface and indirectly, nature relationships, exist within a political context and will be influenced by management practices and the repercussions thereof.

3.2 Spatial upkeep towards stronger nature relationships

The governance of public open spaces and the influence this has on human-nature perceptions has been studied in many parts of the world, including in the city of Bangalore, India. Focussed on the issues regarding governance of urban social-ecological commons, Nagendra and Ostrom (2014) have found that human perceptions of public natural open spaces are highly affected by city governments. As limited financial and administrative

resources result in an inhibited ability of the government to effectively maintain public open spaces (Nagendra and Ostrom, 2014), stakeholder engagement and partnerships are pivotal in sustaining natural open spaces and the relationship people have towards them. Accordingly, it can be said that nature relationships are extremely vulnerable to governmental action and ultimately influenced by the states of maintenance present in the urban natural environment. Partnerships however, also play a role (Nagendra and Ostrom, 2014), meaning that community response and engagement are crucial in sustaining healthy nature relations. Therefore, nature relations not only need governmental intervention but also good will and community commitment.

3.3 Municipal budget allocations as a limitation of nature relationships

Do the above-mentioned findings of Nagendra and Ostrom (2014) also apply to the South African urban context? In the study, mentioned earlier in this research report, Wessel et al. (2021) investigate community perceptions of natural open spaces in a South African metropolitan area. Aside from finding unmaintained natural open spaces to attract antisocial behaviour, they have also found that reduced municipal budgets reflect inadequate maintenance of open natural spaces in the city (Wessel et al., 2021). The paper argues that fragmented governance and focus on open space improvement (resulting in a lack of knowledge of nature-based benefits and ecosystem services) as well as governmental decision-making has a large impact on the incorporation of nature in South Africa's urban contexts. This ultimately affects the nature relationships as a lack of nature incorporations in the city hinders the possibility of such relationships existing, and by extension becoming stronger.

The above-mentioned discourse outlines nature relationships in the urban context and how they cannot exist separately from their relevant governmental realities. In terms of management, maintenance, and budgeting, existing relationships are extremely vulnerable to municipal and governmental regimes and involvement. As a democratic state, South Africa is extremely dependent on its governmental decisions and therefore this concept of influence

has to be grasped before trying to understand functional nature relationships specific to the South African urban context.

Which physical environmental and/or demographic aspects inform the functional nature relationships and priorities in the City?

Nature relations exist in various realms as a result of the diversity of people and their urban contexts. These realms include but are not limited to local place-identity, spiritual, visual, therapeutic and functional nature relationships (Juntti, Russel and Turnpenny, 2009). For the sake of this study and to find specific solutions in context, the research focus was selected to represent functional nature relationships, as function has been proven to be an important attribute in the valuation and relationship to nature (Güneralp, 2017).

4. Education and awareness of nature

4.1 Limited Knowledge Systems

In addition to the fragmented governance, Wessel et al. (2021) also identified limited knowledge has an influence on nature relationships. 'Limited knowledge' in this context describes a lack of understanding of the services and functions nature can have in the city, therefore education and awareness are aspects that inform functional nature relationships. In the paper, Wessel et al. (2021) present various other local and international studies supporting this idea: "The lack of understanding of the values of urban nature in sub-Saharan Africa, and Africa more broadly, is a barrier to the provision of sustainable ecosystem services from urban green spaces" (Wangai et al. 2016, du Toit et al. 2018, Lindley et al. 2018). Functional-, in this case, ecosystem service nature-relations are hindered because of the knowledge gap that exists in the understanding and awareness of nature and its benefits in the city. This aspect informing functional nature relationships may be attributed to the education systems, the media and social discourse but also reflects the values and priorities that are being passed onto younger generations by their elders or surroundings. Later findings of the study also mention that a lack of awareness and the apparent absence of

positive relationships with nature can be linked to the country's history of restricted access to natural resources, public rights being non-existent (Colding et al., 2013), cultural inequities and socioeconomic issues. Therefore, in South African urban contexts, functional nature relationships might not be as substantially present as they should be because of the knowledge gap created by historical events and current educational systems.

4.2 Restricted access to nature in urban environments

Building onto the above-mentioned argument of accessibility as an aspect informing functional nature relationships, Cocks et al. (2016) presented a case study conducted in Grahamstown, South Africa which proves various kinds of contributions and impacts nature has on humankind. In the case of this study, these contributions are seen as functional nature, as they have an influence on humans and in turn their relationship with nature. According to the findings in Grahamstown, "the ability to access and move through such places" (areas of natural vegetation in municipal commonages) "...contributes to people's well-being, identity formation, and shared heritage." (Cocks *et al.*, 2016). This means that even if natural open spaces exist in a city, it does not automatically influence the urban people. Accessibility can act as hurdles in the formation of human-nature connectedness and is therefore an important aspect to consider in the South African urban environment.

4.3 Exposure to nature experiences

Later in the case study, Cocks et al. (2016) widen the argument of human-nature connectedness informants to the exposure to nature attained through cultural initiation processes. In understanding the isiXhosa initiation rite and medicinal harvesting (which are of spiritual, cultural, and socioeconomic importance to residents) and comparing these to opinions voiced by the community, Cocks et al. (2016) draw a pertinent conclusion. "The exposure to nature experienced in the initiation process can instil and retain a lifelong sense of significance for human–nature connectedness" (Cocks *et al.*, 2016). This statement proves early life experiences, such as cultural initiation processes in the isiXhosa tradition, to be of value in the formation of functional nature relationships and priorities in a community.

Experiences do not have to take place in the form of initiation, but can also be the mere act of going to the park, spending time outdoors and experiencing nature regularly in the childhood years.

Therefore we can conclude, that functional nature relationships are informed by the aspect of exposure to experiences in nature and ultimately the memories that are ingrained thereof. These are factors that can be influenced by purposeful awareness and educational campaigns among the youth which provides opportunities for urban design interventions towards stronger nature relations in the contemporary city landscape.

3. Research Methodology

The geographical focus selected for this study is the Pretoria National Botanical Gardens in the City of Tshwane, South Africa. The garden, situated in the eastern suburbs of the city, spreads over 76 hectares and serves as an exhibition garden of various indigenous and exotic plant species (South African National Biodiversity Institute, 2023). It also acts as a park for recreational benefits. The people of Tshwane travel to the park as a natural getaway as well as to visit occasional outdoor festivals. Schools take their learners to the park to learn about the outdoors and corporate companies host meetings in the provided venue (South African National Biodiversity Institute, 2023).

The following diagram shows the botanical garden in the city context and further information of its facilities. For the sake of this study, data collection was done in the grassland section of the park with a few exceptions. This is to position interviewees in the most 'natural' setting, with controlled access to avoid external influences and variables that might affect perceptions and opinions, such as safety aspects, other human activity or social happenings.

The research done in this study forms part of the interpretivist paradigm. This is appropriate to the research as these social constructivist approaches directly address aspects of demographics and relations in order to interpret the relevant social realities. Furthermore this

will allow for an extensive understanding of existing values and relations in order to gain local insight of the community.

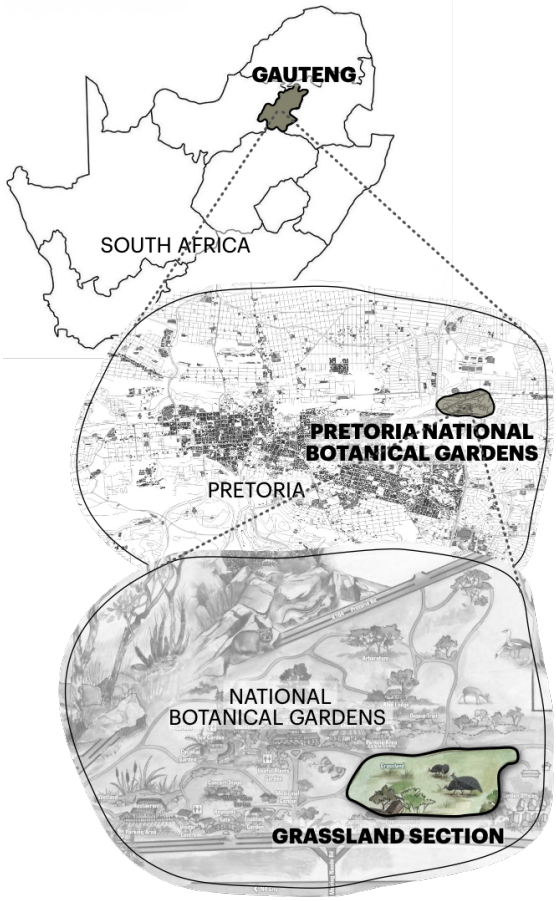

Figure 2: Study focus area: National Botanical Gardens, Tshwane; Author, 2023

The qualitative research approach selected for the study is the ethnographic approach, as it captures social phenomena based on the recording of perceptions and place-specific opinions on the overarching research topic. According to an acclaimed study of this approach to design, ethnography is a tool towards "ways of representing the views and activities of communities of practice outside one's own such that the knowledge would be useful in design" (Blomberg, 1993). In a later study, Blomberg proved that this approach gave access to people's everyday practices and beliefs as members of social groups (Blomberg, 2002) which is extremely relevant when trying to understand human priorities and relationships. An ethnographic approach allows for personal explorations as it utilises techniques of social action, the interviews in context, to critically analyse and understand social realities, in this case, nature relationships.

Linking the ethnographic approach to a suitable data collection tool, personal interviews have been chosen. This provides opportunity for perceptions, opinions and "access to people's everyday practices and beliefs" (Blomberg, 2022), coming directly from the person, towards finding context-specific answers to the research question.

Interviewee	Nationality	Place of birth	Most years spent in	Gender	Age	Education	Income	Religion
1	German & South African	Heidelberg, South Africa	Rustenburg	Female	above 45	undergraduate degree	R20 000 - R30 00 per month	Lutheran Christian
2	South African	Mamelodi, South Africa	City of Tshwane	Female	above 45	diploma	R10 000 - R20 000 per month	Lutheran Christian
3	South African	Rustenburg, South Africa	Kroondal	Male	above 45	undergraduate degree	R30 000+ per month	Christian
4	South African	Thlabane, South Africa	Rustenburg	Female	above 20	postgraduate degree	R10 000 - R20 000 per month	Christian
5	British & South African	Ballito, South Africa	Ballito	Female	above 20	undergraduate degree	student	Christian
6	South African	Vanderbijlpark, South Africa	Vanderbijlpark	Female	above 20	diploma	R10 000 - R20 000 per month	Christian
7	South African	City of Tshwane, South Africa	City of Tshwane	Male	above 20	currently studying undergraduate degree	R5 000 - R10 000 per month	Christian
8	South African	Kwa Zulu Natal	Kwa Zulu Natal	Male	above 20	postgraduate degree	R5 000 - R10 000	none
9	South African	Pretoria, South Africa	City of Tshwane	Female	above 20	currently studying undergraduate degree	below R5 000 per month	Christian
10	South African	Pretoria, South Africa	City of Tshwane	Female	above 60	postgraduate degree	R20 000 - R30 00 per month	Christian

Figure 3: Demographic profiles of participants , Author, 2023

Ten one-on-one semi-structured interviews were done in the grassland section of the Botanical Gardens guided by a set of questions. They were recorded in March 2023. The in-depth nature of the questions asked, the length of the interviews (circa 50 mins) as well as the broadly homogeneous pool of people interviewed justifies the conclusions drawn in this research report. In other words, although it is a rather "small" sample of interviews, the complexity and set variables balance the value. The questions used in the interviews were discussed with the study leader and finalised. In February 2023, pilot interviews were conducted to test the questions and the responses people would have to them. This process resulted in the adjustment of questions towards a more condensed and clear set of questions. With the new set of questions, the ten interviews were done in the space of a few weeks by two researchers, the author contributing to five of the ten interviews.

During the interview and recording process, it was important to ensure the interviewee was comfortable and felt like perceptions and opinions were discussed in a safe environment. This was achieved by explaining the research intent, signing a consent form (before the

interview) as well as polite and friendly approaches throughout the process. All participation was done with consent and voice recordings were voluntary. Six interviewees were chosen at random within the park based on their willingness, as they were already present at the time. Four interviewees were invited to the park, and although known, were not purposively selected based on the topic of the interviews.

Priorities and relationships differ across social status, age and other demographic characteristics, therefor interviewees were chosen to represent a variety of demographics of the urban context. Diversity of representation in terms of education and nationality was limited and outside the control of the researcher. To record this, participants were asked to fill out a short survey. This survey was based on Van Liere and Dunlap's (1978) approach (age, gender and level of education) to capture the most important social information that might affect informants' nature perceptions. Figure 3 above shows the demographics of the participants interviewed. The final respondent profile consists of more women than men and most participants had a degree, including some post-graduate degrees. The age range represented people in their twenties all the way up to the sixties, whilst incomes were also widely diverse. Most interviewees were South African and all, except for one identified as Christian.

After the completion of data collection, non-numerical data was transcribed verbatim from voice recording to text documents. This was done in Otter.ti, a transcription software available online. The transcribed documents were then checked alongside the voice recordings to fix transcription faults that may have occurred because of speaker accents or other sound discrepancies. Next, in order to analyse the data collected via qualitative content analysis (Saldana, 2009), the documents were uploaded to Atlas.ti. This free computer-assisted qualitative data analysis software is used for coding, grouping, and filtration of qualitative data for various types of research. Accordingly, the captured data was coded. A code is a "researcher-generated construct that symbolises and thus attributes interpreted meaning to each individual datum for later purposes of pattern detection, categorisation,

theory building, and other analytic processes." (Saldaña, 2013).

These codes were then analysed to unravel concepts, themes and ideas that emerged in the re-reading of the interview documents. Repeating/ reviewing the coding a few times ensured a more intricate understanding of what was being said. It also allowed for codes to be narrowed down and for possible findings to be strengthened by detecting patterns and similarities across multiple interviewee responses. Throughout the process, it was important to keep the research questions in mind, to code new, but yet relevant insights to the discourse.

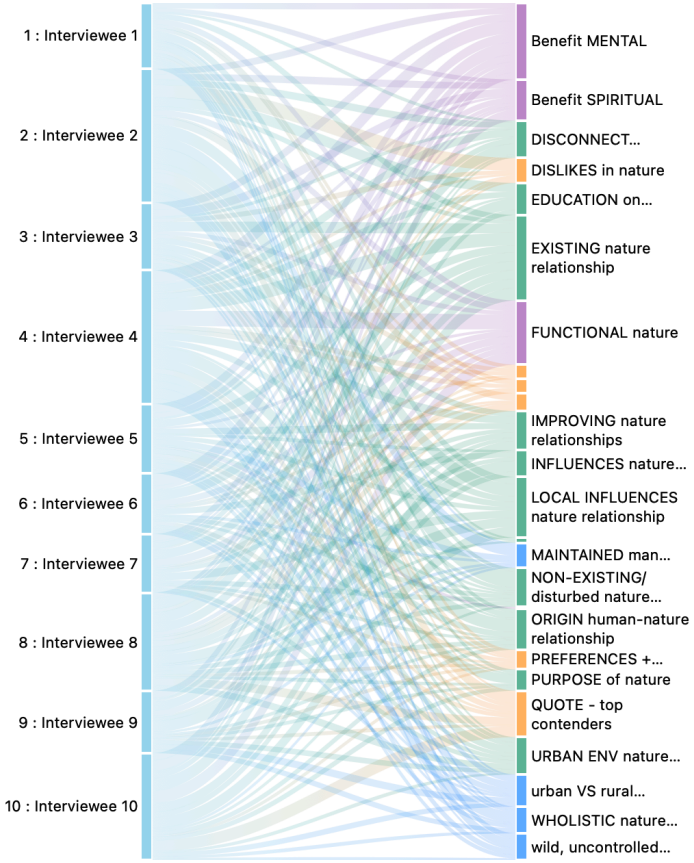

Figure 4: Data analysis - interviews and codes, Author, 2023

4. Results

The aim of this social study is to gain insight into nature relationships, the influences, aspects and informants thereof. The data collected represented the concepts and themes required to understand the realities of the nature relationships of people in the City of Tshwane. In order to show how theory meets the South African urban context, this section is divided into two parts for the two research questions and four subheadings that correspond to those, as seen above, in the literature review. These are: 1. The value of nature, 2. Community values, indigenous and family identities, 3. Governmental nature relationship influences and 4. Education and awareness of nature.

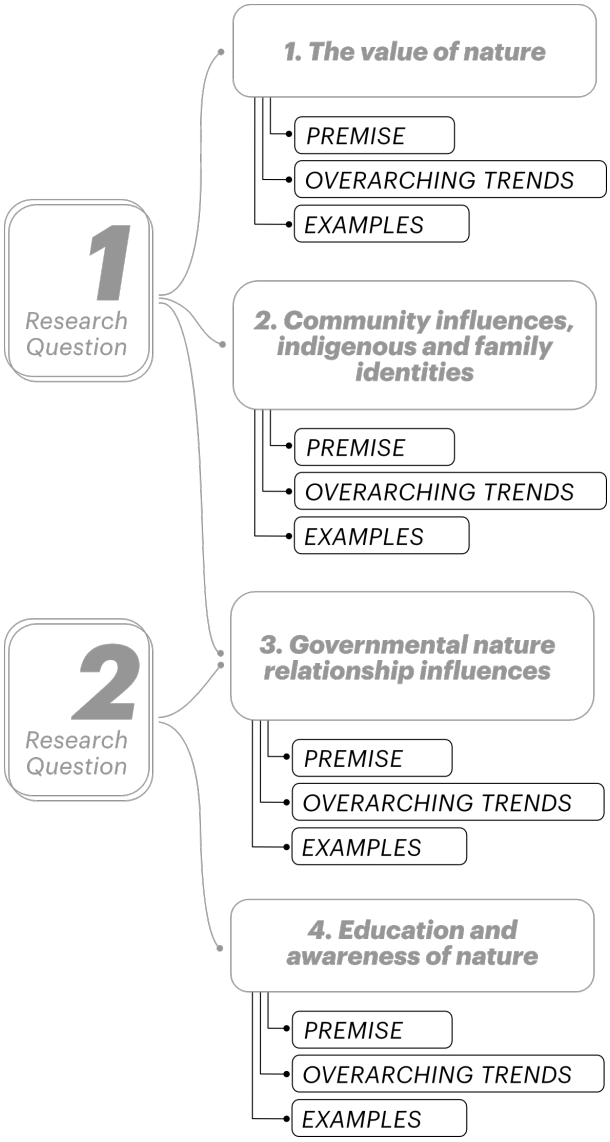

Figure 5: Framework for data presentation, Author, 2023

PART A

Which nature relationships exist in the South African urban context and what influences these relationships locally?

In responding to the first research question, each paragraph in this section will present a premise, themes and examples of interviews to respond to a) existing nature relationships, the first part of the research question. After which the paragraph will end off with the deducted b) nature relationship influences, responding to the second part of the research question.

1. The value of nature

1.1 Fundamental and utility value

a) Existing nature relationships

In the process of interviewing participants, the value of nature has shown to exist in two categories: fundamental value and utility value. These were unpacked further in terms of nature providing benefits to humankind though functional, cultural and physical means. The overarching trends found throughout the interviews include participants expressing value through listing resources and services they get from nature. These include food, energy, water but also objects and settings for the practicing of traditional and medicinal practices in communities. Nature is deemed important as a result of the resources it offers to individuals, utility value, and the benefits for communities as a whole, fundamental value. Nature has been voiced to provide "everything we need to survive" (Interviewee 4, 2023), which supports

the idea of survival as a fundamental value. Further listing of resources such as food energy and water (Interviewee 4, 2023), touch on nature's utility value. Beyond this, nature has been mentioned to provide for traditional and medicinal practices in communities when speaking to various individuals (Interviewee 8, Interviewee 7 and Interviewee 10, 2023). This reiterates nature as a cultural, identity and meaning value, but also utility value through the provision of medicine.

b) Nature relationship influences

Taking all of this into consideration, the influences on nature relationships that can be identified here are cultural, traditional beliefs and also the healing function of nature. This results in a relationship of cultural connection as well as health dependency.

1.2 Economic and service value

a) Existing nature relationships

Furthermore, nature has been expressed to provide for economic needs such as tourism and agriculture. This creates a relationship of economic benefits and sometimes dependence. The overarching trends identified in responses, speak about South African nature and the economic value it brings to the citizens. These economic values include foreign revenue, job creation, economic drivers and transportation. For example, Interviewee 4 (2023) mentions how the majority of South African tourism and foreign revenue originates from nature as a resource. "Nature attracts people, it provides experiences, scents, fresh air... it is good for you" (Interviewee 9, 2023). These people, in turn, act as target markets that can be capitalised on to achieve economic outputs. Another example would be the agriculture industry; although this form of nature is not nature at its wildest or purest, plants still form part of nature, even if they are slightly controlled. Interviewee 10 connects income to this kind of nature: "Agriculture, it's part of nature. We can export and jobs can be created..." (Interviewee 10, 2023). In this case, nature provides job creation and boosts the South African economy, as a functional response, not only locally, but also on an international scale. Another economic value identified in nature is water and how it can aid transport. In response to asking what functional benefits can be found in nature, interviewee

4 (2023) discusses boats and how they form part of the South African economy by transporting and exporting heavy loads.

2. b) Nature relationship influences

In this case, it is clear that nature relationship influences are often based on the economic benefits and outcomes that can be extracted from nature through tourism and agriculture.

In conclusion, the above-mentioned interview case studies show nature relationships and how they are influenced by individual and community needs. In providing physical natural benefits and resources, nature meets the needs, which results in humans ascribing value to it. Consequently, a relationship, with value as a foundation, is formed between humans and nature.

2. Community influences, indigenous and family identities

2.1 Nature relationships growing in families

a) Existing nature relationships

As mentioned before, nature relationships do not exist in isolation from personal realities and beliefs. The nature relationship is clear to be influenced by family, in this case, parents, as well as the moral ties that are instilled in turn. As a result, nature relationships are of psychological benefit, that grow in families and are formed through learning from past generations. The overarching trends in these nature relationships have been found to be connected to parental-guided exposure to nature and activities within. In introducing their child to nature, parents instil a certain morale, which often develops into an appreciation of nature and what it can bring to humankind. Interviewees speak about intrigue and mental clarity which in turn build new- and strengthen existing nature relationships. For example, Interviewee 6 (2023) used to be "forced" to go camping with her family as a child but ended up enjoying it. She was placed in an "outdoor environment where you're supposed to live with other animals and in another ecosystem". This presents an opinion of original discomfort that grew into appreciation and affection towards nature. The idea of camping was not appreciated, but as soon as she was exposed to the ecosystem, and nature, the interviewee

developed a moral tie to nature. It can be termed as moral, as it started off with a concept that was then developed into an opinion and belief, termed as "... you live in another ecosystem, which is quite cool." (Interviewee 6, 2023). Another example was voiced by Interviewee 3 (2023) who talks about his father and how, when he had difficult decisions to make, he would go outside and "find a rock under a tree" and sit on that rock for as long as it took to find an answer and know what to do. In this case nature has established the connotation of being a tool for better decisions which, in turn, developed a stronger relationship as these decisions are part of human life. Today, interviewee 3 (2023) and Interview 6 (2023), still make use of these methods and morals instilled in them to enjoy nature and solve problems in the process.

b) Nature relationship influences

The influence of these relationships is the family figure, ie. the father or grandmother, and how nature can aid in dealing with mental obscurity (difficult decisions). This reiterates a nature relationship growing in families and forming through learning from past generations.

2.2 Human relations in natural settings

a) Existing nature relationships

Nature often proves to facilitate human interactions and in turn inter-human relationships. This results in connections being formed to nature itself in the process, creating new or building stronger nature relationships in community structures. The overarching trends of this concept have included childhood interactions, friendships and connections being formed in a natural setting. These connections include memories of dear persons and connections to others resulting in the development of nature relationships. For example, Interviewee 10 (2023) speaks about playing in streams as a young girl and how the older boys would carry them from one side to the other. In her case, nature was a platform for play, but also for the development of connection with the older boys which was rare in her time as a young girl, she says. At the same time, her relationship with nature also grew stronger, as her new connections and friends made her find new value in nature. Similarly, interviewee 4 (2023) mentions how her trips to the bushveld with her family have developed her love for the

untouched and wild "nature nature", as she put it. She also pointed out a specific tree in the interview setting and said "That tree always reminds me of him because my grandparents had it in their garden" referring to her late grandfather and how she thinks of him when she comes across that specific species.

b) Nature relationship influences

In this case, nature relationships are informed and influenced by human relations in communities and how these often grow in a natural setting.

In conclusion, there is a clear underlying influence that can be found not only in inter-human relations, but also in nature relationships. This is the influence of an individual's family, community, and indigenous context. May it be the family (interviewee 6, 2023), the late father (Interviewee 3, 2023), or the older boys (Interviewee 4, 2023), nature relationships exist in many social realms and are directly influenced by families, communities, and indigenous contexts.

3. Governmental nature relationship influences

3.1. The Management of Nature

a) Existing nature relationships

Urban green spaces and their valuation have a lot to do with individual perceptions and preferences. As all humans have different preferences in nature, the interviews have shown that management and human involvement in natural spaces influence nature relationships and their connectedness. Subsequently, the overarching trends in these nature relationships show how opinions, personal experiences and memories shape preferences and in turn the relationships people have with nature. This could be seen in responses such as interviewee 2 (2023), for example, who talks about urban nature and how it is important that these spaces and the nature in them are managed. About her garden, she says: "I didn't plant just, you know, grass... in a rough way... I used blocks. It is in the form of blocks. So it's so nice... It's not just ordinary grass but its green grass." (Interviewee 2, 2023). This statement uses words such as "just", "rough" and "ordinary" to describe more natural layouts and wild grass.

The interviewee also referred to seeing a snake in a tree and her disappointment in the lodge management for not controlling the animals and keeping them away. Consequently, she pointed to a wild indigenous bush in the Botanical Gardens and voiced a disliked of walking next to that part of the garden because it was not "clean" and it did not feel safe there. Other interviewees, in contrast, mentioned how they were specifically attracted to the wild grass area of the Botanical Gardens because there was "no human intervention" (Interviewee 1, 2023) and it reminded them of their bush camping trips (Interviewee 4, 2023). As a result of individual preference, interviewee 2 (2023), Interviewee 1 (2023) and 4 (2023) have a different relationship with nature based on the management it receives.

b) Nature relationship influences

This reiterates the influence humans and their 'controlling of nature' has on other nature relationships.

3.2. Municipal and governmental influence

a) Existing nature relationships

The managing and 'controlling of nature' in the urban environment often proves problematic in the South African context. These states of public spaces do not only upset many individuals but also prevents them from forming meaningful relationships with the environment in an urban context. The overarching trends voiced on this topic include municipal intervention and budgeting, successful upkeep, organisation and overall sustainability. The 'controlling of nature' comes with implications at various scales. Municipal budgeting for upkeep and successful maintenance of space to ensure sustainability is one of them. In the South African context, many urban parks and open spaces are owned by the municipality. This has an influence on the state of urban nature and in turn the relationship individuals form with it. For example, "The problem with urban green spaces is they have to be maintained." (Interviewee 1, 2023). In this statement, it is clear that the 'maintaining' of urban green space is deemed problematic. Furthermore, the conversation delves into public open spaces that are not maintained and how this is upsetting. As most public open spaces in the South African context are owned by the municipality, the lack of upkeep can be

attributed to budgeting constrictions – which also reflects the general priority given to this by the government.

b) Nature relationship influences

Therefore, the lack of municipal budget allocations for public green spaces does not only "upset" (Interviewee 1, 2023) people in the urban context, but furthermore influences and prevents them from forming meaningful nature relationships with their environment.

In conclusion, nature relationships are influenced both by the concept of management as well as the management itself within natural environments.

PART B

Which physical environmental and/or demographic aspects inform the functional nature relationships and priorities in the City?

In responding to the second research question, each paragraph in this section will present a premise, themes and examples of the interviews to respond to the c) physical environmental and/or demographic, the first part of the research question. After which the paragraph will end off with the d) aspects that inform the relationship, responding to the second part of the research question.

4. Education, awareness and access to nature

4.1. Political and historical influences limiting nature accessibility

c) physical environmental and/or demographic

Forming a relationship with nature is not a given in many households in South Africa. Social, historical, and political realities result in conditions that limit access and exposure to nature. The themes found on this topic are accessibility, exposure and childhood opportunities in nature that are influenced by social realities. For example, Interviewee 2 (2023), an intermediate phase teacher from Mamelodi, mentions that she has realised that most of her young scholars have limited to no relationships with nature. They do not know the importance of nature and do not know that it is “wrong” to litter (Interviewee 2, 2023). Later

on she explains that most of the scholars stay in informal settlements, "where there is no grass, where there are no trees and they do not know anything about this thing." (Interviewee 2, 2023). Children are restricted from forming relationships because they do not have access to nature experiences and exposure to them because of their social status and location of living.

d) aspects that inform the relationship

This is often a subsequent result of political and historical influences. Children in areas such as these do not know nature (Interviewee 2, 2023). How can you form a relationship with something you do not know or understand? It is virtually impossible.

4.2. Lack of exposure to nature and the functions thereof

c) physical environmental and/or demographic

A lack of understanding and knowledge about functional urban nature is revealed in statements, as many individuals have not been exposed to context-specific examples in South Africa. The overarching trends found to inform functional nature relationships are the lack of exposure to nature and the subsequent knowledge gaps that lead to infringed opportunities of nature relations in the urban context. For example, when asked about the functional benefits of nature, Interviewee 5 (2023) mentions that she cannot "think of those examples in South Africa because they're not here yet in terms of the functionality of how nature can actually provide to the people.". This knowledge gap limits opportunities for nature relations to grow and expand relationships that are already existing. Similarly, interviewee 9 (2023), an undergraduate student in their twenties, mentions "I don't have any other reason why I enjoy plants just because they smell nice. They look nice. Textures are interesting as well because I like to touch things." Although this statement shows affection towards nature, it does also show the extent of the limitations of the existing nature relationship. Nature and the functional benefits thereof are not known and therefore the relationship seems limited to a single sensory level, rather than to a broader deeper understanding of additional ways nature could be functional.

d) aspects that inform the relationship

This relationship is constrained as a result of the interviewee not being aware of the functions urban nature can provide and how it could "actually provide to the people" (Interviewee 5, 2023) as stated by another interviewee.

4.3. Public safety and accessibility influencing functional nature relationships

c) physical environmental and/or demographic

Another challenge raised by interviewees is public safety and the access- or inaccessibility to urban green spaces that result because of it. This dramatically limits the potential for functional nature relationships. The overarching trends found on this topic are the limitations of public spaces as a result of entrance fees and the lack of safety in areas that do not require payment or an entrance fee (associated with security and maintenance). For example, after expressing her appreciation of nature, interviewee 5 (2023) mentions that engagement with nature is something she would like to do more of, but she is often limited by “the urban realities”. In response to asking why engagement poses such a challenge, she replied: "I feel limited with options of places to go... where I feel safe and like free places to go in and, you know..."(Interviewee 5, 2023). This statement poses that South African cities lack safe public spaces and that even if spaces are safe, they usually require some sort of payment or entrance fee to be secure and maintained. Interviewee 4 (2023) describes the urban green spaces she knows, to be "inaccessible" because of feeling "unsafe"; this in turn takes away from nature to be 'functional' as well as ultimately limiting nature relationships. A similar example was given by interviewee 7 (2023) who talks about his favourite place in Nelspruit, Mpumalanga. "So it's basically a waterfall and there's a small river... a lot of trees. So yeah, plus, it's also safe, it's always guarded. Like, it's part of a park, basically. So, so yeah... it's always guarded" (Interviewee 7, 2023). He describes the waterfall briefly but the conversation quickly turns to safety and how the place is "always guarded" and "it's just safe". This shows the value safety and accessibility carry in terms of the relationships humans have with nature. It is also evident that in South Africa safety and accessibility are a widespread need, not only are the 'more vulnerable' women affected (Interviewees 5 and 2), but also the young male in his 20s (Interviewee 7). "Safety is the priority" (Interviewee 2,

2023). This statement was made after this individual, a teacher, mentioned how her scholars are not even allowed in certain places on their own school campus, as the green areas are placed on the peripheries of the school grounds, which threatens the children's safety.

d) aspects that inform the relationship

Therefore the aspect that informs nature relationships in this case is highly dependent on the level of safety and accessibility of functional nature. A reoccurring lack of this often takes away from nature to be 'functional' as well as ultimately drastically limiting nature relationships.

4.4 Experiences and exposure to nature

c) physical environmental and/or demographic

Linking nature relationships back to childhood, some interviews revealed the importance of experiences and exposure to the natural environment to build strong relationships with nature. The overarching trends that have been identified on this topic are memories of childhood, familiarity, knowledge about medicinal and traditional uses and learning from nature. For example, when talking about his connectedness and perspective of nature, Interviewee 8 (2023) mentions how growing up in a rural, more natural area "really helped me or shaped my perspective when it comes to nature. And it just enhanced the love more, even more, because now I'm more familiar with some stuff I wasn't familiar with back then." (Interviewee 8, 2023). Similarly, Interviewee 4 mentions that the inclusion of urban green spaces in cities like the City of Tshwane can "help to bridge this gap between... Well, it can illustrate to people how amazing nature is and how dependent and how everything's connected... and how we are connected to it as well. That can definitely be a function in urban settings to bridging that gap: knowing where everything comes from and why we should preserve the yeah, the environment and nature." (Interviewee 4, 2023). In the conversation, the individual carries on talking about the exposure to nature and how "by looking at nature, we can learn of a lot of things or solve a lot of our problems... looking at that nexus of that ecosystem: water, energy, food together, how they work together and then also trying to apply that to our social systems... our systems of operating." (Interviewee 4,

2023). On a similar note, interviewee 8 (2023) mentions the trees that the people in his village used for medicinal purposes and how this made him see "the value of these trees... the importance".

d) aspects that inform the relationship

As can be seen in the examples above, exposure as a young child is ingrained in humans and can make nature 'functional'. In turn, humans can form a relationship of value and appreciation of nature. Therefore nature can become 'functional' through means of humans being exposed to and understanding some of its processes and systems.

In conclusion, the South African context has revealed to pose a lot of challenges to nature relationships which have to be taken into consideration when trying to analyse nature relations. Social and political realities, knowledge systems, accessibility and exposure play a large role as informants of these relationships and must be understood to grasp the concept of nature relationships in the urban contexts.

5. Discussion

Nature relationships form part of a complex lattice of human-environmental realities and need to be richly investigated in practice and theory to be understood. In comparing the data collected in this study to arguments posed by other local and international papers, the study has the potential to present answers and context-specific findings towards answering the research questions. In order to present these concepts consistently and clearly, the discussion will be divided into the two research questions and the four responding sub-headings that have been used throughout the paper. Each sub-heading will first summarise the overarching findings, then link these to relevant literature towards drawing conclusions relevant to the research field. Every topic will then be concluded with design, planning, management and policy implications that are important to note.

Which nature relationships exist in the South African urban context and what influences these relationships locally?

1. The value of nature

Nature relationships in the City of Tshwane context are often intricately linked to the value people ascribe to nature. Fundamental and utility values alike, provide benefits to humankind through functional, cultural and physical means. Throughout the interviews, value has been mentioned in connotation with various benefits provided by nature. These include, but are not limited to food, energy, water, transportation, healing, traditional practices and beliefs, finding meaning, economic benefits, tourism and agriculture.

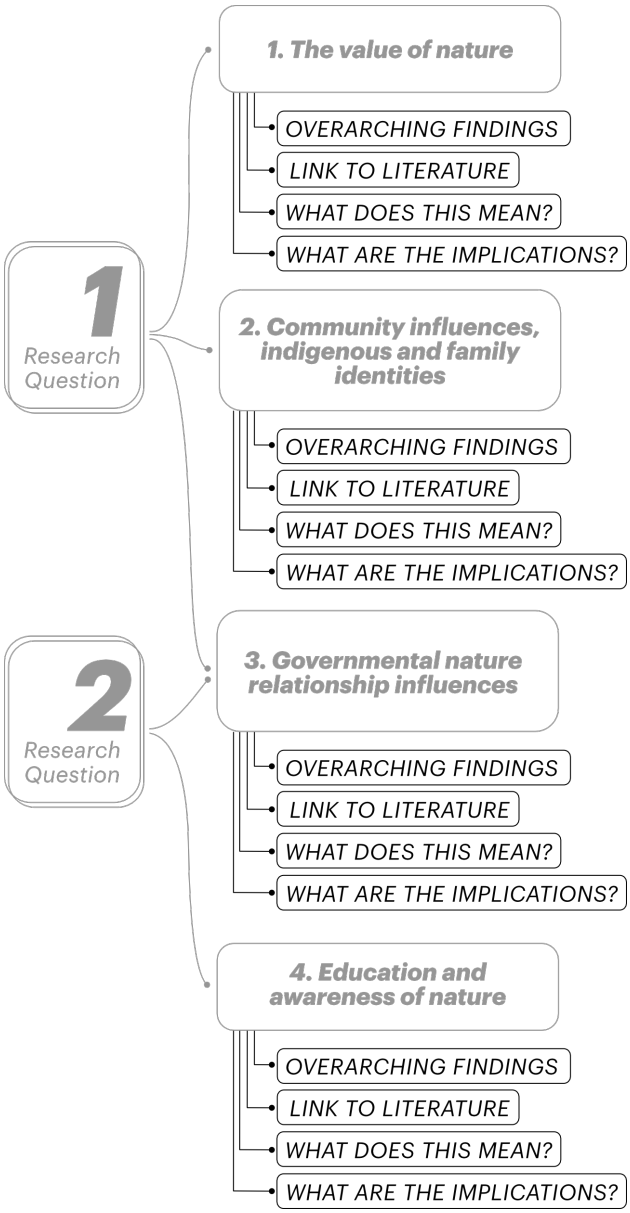

Figure 6: Structure of the discussion, Author, 2023

This means that consequently, fundamental and utility value or benefit play an important role in the existence and influence of nature relationships locally. The people of the city of Tshwane relate to nature as a result of what they get from it, or how it serves them. Echoing the local findings of Wessel et al. (2021), provisional and community benefits from nature influence the local nature relationships as a whole. Tradition also has a big impact on valuing nature as nature often provides resources and settings for traditional practices, such as for Interviewee 7 (2023) in his childhood years. Cocks et al. (2016), similarly explores traditional practices and how they give meaning to natural vegetation which then later develops into an appreciation of nature because of the tradition. Therefore,

functional nature relationships cannot be separated from people's traditions and beliefs, but instead are largely influenced by them. The economic value given to nature has been shown to inform nature relationships. Interviewee 10 (2023) mentions tourism and the agricultural value of nature. Lapointe et al. (2019) studied similar ecosystem services and the relational values ascribed to them as a result of their uses and meeting human needs. Tourism and agriculture as well as other ecosystem services are beneficial to humankind and in turn, build foundations of human-nature connectedness and nature relationships.

The implication this has for design, planning, management and policy is simple. Urban designers and planners should aim to introduce interventions of the highest value to people and communities through green urban design. This can only be achieved through the in-depth analysis of people and communities and a complex understanding of their contexts and needs. Design criteria, especially in the developing South African country context, should be based on concrete value addition rather than mere green aesthetic additions.

2. Community influences, indigenous and family identities

The type of nature relationships existing in the City of Tshwane are often influenced and formed by other inter-human relationships. Influences such as family and community have a large impact on the type of nature relationships that people have. These social realms are slightly different for every individual, but patterns can be seen in communities as similar morals are taught and passed on to the next generations. The influences of these social entities often exist in terms of guided exposure to and activities within nature as well as interactions and connections being formed in a natural environment.

This means that older generations, family and community members play a strong role in the growth of an individual's nature relationships and that this responsibility must not be underestimated. Locally, these relationships have been voiced to be influenced by forced trips into nature (Interviewee 6, 2023) which resulted in an initial strained relationship that later on developed into a fond one. This example shows the fragility of nature relations and

how an individual's surrounding people can determine the direction of the relation. The World Bank (2023) supports this idea by arguing that decisions related to nature are influenced by ancestors, families, communities and cultural origins. This means that humankind's nature relationships cannot be fully understood without knowing the personal context of the people in the City of Tshwane. Himes and Muraca (2018) argue for the individuality of nature relationships; this might be true for various individuals, but the findings of this study, towards finding collective views, as sported by Breed (2022) show the people of Tshwane are mostly connected to and influenced by social and communal values.

By often providing settings to facilitate human interactions and in turn build inter-human relationships, nature relations are formed as by-products. Interviewee 10 (2023), in her playing with older children at the local stream, has formed a stronger connection with nature as a result of the interactions she had with the other children. This illustrates how nature facilitated human connections which spontaneously resulted in the connection to nature itself. Similarly, Ernstson and Sorlin (2013) argue for nature as a social practice and values are constructed through existing relations in the social practice. This means that nature relations are linked to and also influenced by existing local human relations such as friendships, dislikes or other social relations.

Therefore the implications this has for design, planning, management and policy is not that simple. Human opinions, relationships and interactions cannot be controlled or predicted, making the formation of nature relationships vulnerable to individual and communal actions and experiences. However, this premise offers a challenge for urban designers to create new green open spaces that introduce and guide positive human interaction, towards inter-human relations, that can ultimately form a basis for strengthening nature relationships. Well-designed public open spaces that meet community needs and provide safety can also result in connectedness to nature to be instilled in individuals that will pass this onto future generations ensuring stronger nature relationships to come.

3. Governmental nature relationship influences

Nature relationships exist within a political realm and cannot be understood in isolation thereof. They are influenced by the idea of management, as well as the physical act of management itself. Nature relations in terms of the idea of management often depend on the individual's preferences in nature. Management and human involvement in natural spaces have been widely proven to influence nature relationships and connectedness (Wessel et al., 2021). The physical act of governmental management on the other hand also plays a role in nature relationships. Mismanaged public green spaces result in public upset as well as limited opportunity for the formation of meaningful relationships of community members with their environment (Interviewee 1, 2023).

This means that preferences of management, in terms of opinions, personal experiences and memories, often determine the existence and growth of nature relationships. Interviewee 2 (2023) prefers managed nature, whilst Interviewee 1 and 4 (2023) lean towards the appreciation of wild nature. Similarly, Hoffmann et al. (2012), and Özgüner and Kendle (2006) found managed natural spaces to be favoured, whilst Lampinen et al. (2021) found the contrary. Preference cannot be controlled, this means that individual opinions cannot be determined or generalised.

However, nature relationships exist within the context of the physical act of maintenance itself, generally driven by the political context of the government in South Africa (Jax et al., 2018). As a result of infrastructure priority and related budgeting restrictions to green spaces, South Africa seems to face the challenge of maintaining urban green space; it is mostly deemed problematic. As a result of the lack of governmental park upkeep, Interviewee 1 (2023) mentions the upset that comes along with it as well as how this prevents people from forming meaningful relationships with their environment. This means that the lack of upkeep not only influences the community in the present but also stops the growth of future nature relationships as a result of the neglected open space and related access and safety concerns. Wessel et al. (2021) also support this notion in stating that inadequate maintenance weakens the chances of stronger relations and that it also often results in anti-

social behaviour such as crime, invasion and dumping. This means that nature relationships are extremely vulnerable to governmental priorities and constraints which cannot be controlled by the individual.

The implication this has for design, planning, management and policy is complex and intricate. Urban designers and planners must find ways to design spaces that not only appeal to governmental action but also prove to be budget-friendly and sustainable for the possible case of governmental upkeep abandonment. This poses a complex lattice of challenges that can only be achieved through collaborating with a team of multi-disciplinary professionals who understand governmental restrictions but can also find clever design solutions to the day-to-day challenges of local communities and green space maintenance. This will allow for the sustainable creation of urban green space towards opportunity for stronger nature relations in South African city environments.

Which physical environmental and/or demographic aspects inform the functional nature relationships and priorities in the City?

4. Education and awareness of nature

Functional nature relationships are informed by various different aspects in South Africa, as a result of the diversity of people in a community as well as their broad spectrum of social, historical and political realities. These have been shown to be of the largest informants that result in limited access and exposure to nature. This reality has often resulted in weak to almost no nature relationships formed in many South African households. The limited local exposure unfolds into a lack of understanding and awareness of functional urban nature infringing on opportunity for possible nature relationships. Another aspect that repeatedly informs functional nature relationships in South African is the lack of public safety and the access- or inaccessibility that results from it. A further rather large aspect that informs nature relationships stems from childhood exposure, memories and traditional environmental knowledge received in childhoods. Nature experiences lived in their childhoods are often

ingrained in humans and can shape their view of deeming nature 'functional'. Subsequently, functional nature relationships have great potential to develop and grow.

What does this mean for the South African urban context? The lack of care for nature often witnessed in littering and vandalisation of urban green spaces cannot merely be blamed on individuals and mere choice. As a result of living in less wealthy areas, with limited to no access to green space, young South Africans "do not know the importance of nature" (Interviewee 2, 2023). This lack of experiences and exposure results in poor opportunities for building nature relations and connections, all because of the location of living and social status of many people. In a similar study, Colding et al. (2013) state that the lack of awareness and apparent absence of positive relations with nature in South Africa is intricately linked to the history of restricted access to natural resources. This shows that informing aspects of nature relationships stretch deep into South African history. Furthermore, Cocks et al. (2016) reiterate the idea of the ability to move through and access areas of natural vegetation, in municipal commonages, to inform people's identity, shared heritage and relations. As relationships are shown to be highly informed by personal identity in their study, this access to natural vegetation subsequently also impacts the nature relationships. Similarly in this study inaccessibility, such as that experienced by Interviewee 2's (2023) young scholars, can often pose hurdles for nature connectedness and infringe on people's understanding of the value of functional nature in their urban environments.

Functional nature relationships in South Africa are more often than not restricted as a result of limited public safety making urban green spaces inaccessible for large parts of the population. Interviewees of all genders and ages have repeatedly raised concerns about the safety of public green spaces, showing that it is a widespread challenge. Interviewee 7 (2023) mentions the importance of security guards in safe places, which also poses the problem of entrance fees and subsequent inaccessibility to others. Interviewee 5 (2023) raises her desire to engage more with nature, but this proves to be difficult as she feels unsafe in many urban places of natural vegetation. In response to safety, Wessel et al.

(2021) argue that the lack of upkeep of public green spaces in South Africa have proven to attract antisocial behaviour making these places unsafe and ultimately inaccessible to people in the urban context. This argument, together with opinions voiced in the interviews, means that functional nature relationships are extremely vulnerable to the individual feeling safe or unsafe in urban green spaces. Therefore safety should be critically and carefully addressed when designing for communities in the South African urban context.

Furthermore, other aspects that inform functional nature relationships are childhood exposures and experiences, traditional environmental knowledge and memories created in childhood. Interviewee 8 (2023) links his nature connectedness with growing up in a rural, more natural area. The exposure to natural environments has enabled him to shape his perspective of, and appreciation of nature later in life. He also mentions how, in his childhood years he has been taught things about nature that informed him of the values and importance it has. This knowledge has formed a foundation for the functional nature relationship that now had opportunity to grow throughout his life. On the same topic, Wangai et al. (2016), du Toit et al. (2018) and Lindley et al. (2018) argue that a lack of awareness and understanding of the values of urban nature in sub-Saharan Africa and more broadly form a barrier to the provision of sustainable ecosystem services. Subsequently, this influences the strength and existence of nature relationships, as a lack of seeing value will almost always hinder nature connectedness. Interviewee 4 (2023) raises a similar thought and how understanding nature, through exposure, and learning from nature has informed and expanded her nature relationship. Interviewee 8 (2023) also talks about his childhood community and how they would collect branches from trees for medicinal purposes. The knowledge and awareness this has created in him as a child has developed into a stronger functional nature relationship than that would have existed without it. Wessel et al. (2021) echo this thought in arguing that limited knowledge and a lack of understanding and awareness have a large influence on nature relationships and the functional value ascribed to nature. This means that functional nature relationships are built and developed from a young age in a person's life. The memories they have, the exposure they receive and the

knowledge they gain play a large role in the type of nature relationship that people will evolve later in life. Accordingly, a lack of knowledge, education and awareness in this field can result in limited nature connectedness and is often a complex concept to introduce later in life.

What does all of this imply for design, planning, management and policy? It means that designers and urban planners are faced with the challenge of designing for the spreading of knowledge and awareness based on nature, the natural environment and the value thereof. In order to build platforms for the building and strengthening of nature relationships, interventions should not only be valuable in and of itself but also try to educate the community about its value in the process. This means that design and planning interventions should speak to- and educate people about nature in their existence within the urban context.

Although this study has introduced and echoed many existing findings, it is important to note some of its shortcomings in the analysis of information. As the data collection was done in a pool of only ten people, the diversity of individuals is not representative of the whole of South Africa or Tshwane. The high levels of education represented by the pool are rarely the norm in South Africa and the gender was also not completely evenly distributed. Other limitations that the data collection posed were of time constraints and lack of interest- the interviewer could not predict the interest of a person's contribution to this field or their time available, therefore some answers might have been rushed and generic. However, as this study has a qualitative approach, the information collected by individuals proved to be meaningful in giving insight into some realities and collective views in the City of Tshwane and their nature relationships.

6. Conclusion

Concluding the findings and literature gathered in this field of study, it is evident that nature relationships exist in various configurations and conditions with a range of complex context-specific influences. These include, but are not limited to social, political, environmental and other realities such as exposure to nature as a child, the passing of nature valuation between generations or the inaccessibility of nature later in life. Nature relationships are not static entities that exist but rather develop alongside humankind and their respective circumstances, situations and environments. As these aspects cannot all be controlled, it is the responsibility of the designer to create public green spaces that intervene directly in context and speak to the community on a personal level by providing appropriate designs. This will successfully achieve and improve nature connectedness toward stronger nature relationships in the urban environment. In order to understand the existing nature relationships and the gaps that the intervention needs to address, it is important to critically understand individual and communal realities through a rich and in-depth human-centred analysis. As ultimately, the only way to design successfully is to design a valuable contribution rooted in the understanding of the diverse and complex existing community.

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8. Appendix

Appendix A - Semi-Structured Interview Questionnaire

A) This place: Botanical garden

1. Do you know the botanical gardens? How do you feel about this section of the garden - please elaborate on emotions or memories they bring about? (if applicable)
2. How do you feel about the plants and features that you see here? Do they seem familiar/ do you know any of them? Please elaborate
3. Are there any plants/ features that you enjoy seeing? If so, do they provoke any emotions or memories in you?
4. Are there any plants/ features that you do not like? If so, do they provoke any emotions or memories in you?

B) Own garden

5. Do you have a garden at home? (if not - Did your parents/grandparents/guardians have a garden when you grew up?) Can you describe this garden?
6. Do/ did you enjoy this garden or not, and which aspects particularly - please elaborate
7. Do you see gardens as part of nature? Please elaborate

C) Urban Nature

8. Do you think nature belongs in an urban setting?
9. What is the relationship that you have with nature? Is it the same for other people?– please elaborate
10. Which of these relationships exist within an urban context? – please elaborate

D) Nature relations (including place identity)

11. Do you identify with natural landscapes …if so in what way?
12. Which natural landscapes do you identify most with and why?
13. Do you identify in the same way with some urban green spaces? Or how does this differ?
14. Are there any natural environments/ urban green spaces that you prefer because of how they make you feel? If so, which ones
15. Are there any natural environments/ urban green spaces that bring about a sense of home
16. To what extent do you consciously engage with nature? (natural or urban)
17. Why do you or/ why don't you?
18. What about nature do you like or dislike? Please elaborate
19. Do you see yourself as a nature-loving or a nature-neutral person?

E) Nature relations: Spirituality

20. Have you participated in and/or observed spiritual/ religious rituals and/ or activities performed in nature? please elaborate (also where were these held)
21. Which emotions/ feelings do natural environments evoke in you? Is that also true for urban green spaces?

22. [Are there natural environments/ urban green spaces that make you feel restored/ vitalised/ rejuvenated? If so, which ones and why?]
23. Are there any natural environments that disturb you? If so, which ones and why? is that also true for urban green spaces? if so which ones? please elaborate

F) Nature relations: Functional

24. What kind of (practical/ useful/ direct benefits) do/ have natural environments/ urban green spaces offer(ed) you?
25. Can you think of other functional benefits natural environments/ urban green spaces **could** have in your life? please elaborate
26. How did/ could you obtain these benefits? (E.g. made a garden, went into natural spaces.) Did/ would this involve particular **practices**/**rituals**? Please describe these
27. What or who made you decide to do this? (eg. tradition, family, culture, religion, education)
28. Would you say these practices/rituals have influenced your relationship with nature? if so how? please elaborate

G) Nature relations: Functional (South African design urban context)

29. What do you think are functions nature could have within a **South African urban context**?
30. Do you think these functions could strengthen people's relationships (feelings/ connections) with nature? If so, how?
31. What would make it possible for these nature relationships to exist / become stronger in the urban environment?

Appendix B - Ethics Approval

Reference number: EBIT/26/2020

Dr CA Breed
Department: Architecture
University of Pretoria
Pretoria
0083

Dear Dr CA Breed

This is to notify you that the amendments to your application entitled "Native plant communities for increased biodiversity and ecosystem services in the City of Tshwane", have been approved by the EBIT Ethics Committee.

Recommended approval from both reviewers

Kind regards

Prof K.-Y. Chan
Chair: Faculty Committee for Research Ethics and Integrity
FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY