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Student Food Security: the (Dis)connection Between Student Food Experiences, Sustainability and Green Spaces from the Lens of Food Security

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Declaration

I know the meaning of plagiarism and declare that all of the work in the dissertation, save for what is properly acknowledged, is my own.

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Abstract

The food security of university students in South Africa is an area of research which is becoming increasingly researched and recognised. Internationally, there has been research into university student food security, recognition of student food insecurity and the links to academic success, and the idea of secure campus food systems. Approaches documented in the literature from the global North include the establishment of food banks and pantries, and the use of university green space in order to feed university students and decrease student food insecurity. Limited research on food security of university students in South Africa has been conducted, but this is increasing. Universities around the world are becoming increasingly aware and active in examining their ecological impacts as universities, and placing sustainability on the university agenda.

This research explores the current narratives of student food security, campus food initiatives and the (dis)connection between green spaces and student food security responses at a university in South Africa. In order to achieve the research aim, three objectives were identified. The first objective was to review the global literature of university student food security, the use of green spaces on university campuses as a food security response. The second objective investigated student food security dialogues, and the third objective included the examination of university based food initiatives and university policy documents and reports, and assessing the integration of aspects of student food security. This exploratory research used a mixed methods approach, using a mixture of quantitative and qualitative data, by way of literature review, document analysis, online quantitative surveys and semi structured interviews in order to explore the narrative of student food security in South Africa, as well as the link between university campus sustainability and student food security.

Dominant themes which arose from the research include food costs and affordability, in addition to food quality and health. It was found that there is a disconnection between student food experiences, sustainability and green spaces. While the links between green space and student food security may be relevant in Northern contexts, more pressing systemic issues require attention in the context of South Africa, thus adding to the complexity of how student food security is approached in the country. This exploratory research highlights the need for further research to be conducted in the area of student food security.

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List of Acronyms

CHE – Centre for Higher Education

DAFF – Department of Agriculture and Fisheries

DDS – Dietary Diversity Score

DoHE – Department of Higher Education

DUT – Durban University of Technology

DSA – Department of Student Affairs

EBE – Faculty of Engineering and the Built Environment

FANTA – Food and Nutrition Technical Assistance

FAO – Food and Agriculture Organization

GCI – Green Campus Initiative

HDDS – Household Dietary Diversity

HR – Human Resources

IFSS – Integrated Food Security Strategy

MAHP – Months of Adequate Provision

NFNSP – National Policy on Food and Nutrition Security

NSFAS – National Student Financial Aid Scheme

NMU – Nelson Mandela University

RDP – Reconstruction and Development Program

SAHRC – South African Human Rights Commission

SANHANES-1 – South African Health and Nutrition Examination Survey

SRC – Student Representative Council

UBC – University of British Columbia

UCT – University of Cape Town

UCLA – University of California, Los Angeles

UFS – University of the Free State

UKZN – University of Kwa Zulu Natal

UP – University of Pretoria

WITS – University of the Witwatersrand

1. Introduction

1.1 Introduction to the research

There are multiple food system challenges that we face around the world today. There are problems of food insecurity, under and over-nutrition, inequalities spanning economic and racial lines and so-called "big food" challenges, amongst others. These issues span and transcend different scales both spatially and temporally. In 1996, the Food and Agriculture Organization (FAO) defined food security as existing 'when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life' (FAO, 2016a). This definition is widely referred to and accepted as a general definition for food security, but there are other definitions, such as those of the World Bank and different humanitarian organisations. These definitions have a number of similarities, which address availability, accessibility, utilization and stability (FAO, 2016b). The FAO definition has not been without criticism. Some researchers argue that food security should address more than whether or not people suffer from hunger (Rocha, 2008; Khan and Marshak, n.d). Rocha and others advocate a wider understanding of food security, a definition that also addresses agency and appropriateness (Rocha, 2008).

The food security definition adopted in South Africa as outlined in the 2012 Food Security Policy is very similar to these definitions and states that national food security can be defined as 'the right to have access to and control over the physical, social and economic means to ensure sufficient, safe and nutritious food at all times, in order to meet the dietary food intake requirements for a healthy life by all South Africans' (Department of Social Development (DSD) and the Department of Agriculture, Forestry and Fisheries (DAFF), 2013: 8). Many of South Africa's citizens are considered to be food insecure (Shisana *et al*., 2013) in both the rural and urban context.

A dialogue of food security issues amongst university students in South Africa has emerged, and has been voiced on social media platforms. Issues voiced include hunger, problems of students being able to access sufficient quantities of food, particularly amongst non-residence students, sharing of food between students, and the idea of gardening (Figure One). This dialogue reveals aspects of food security and has informed the proposed research path, as this is perceived to be a problem warranting further research. Internationally, there has been research into university student food security (Martinez *et al*., 2016; Chaparro *et al*., 2009) some recognition of student food insecurity and the links to academic success (Cady, 2016) and the idea of secure campus food systems (Rojas *et al*., 2007). Approaches documented in the literature from the Global North include the establishment of food banks and pantries (Martinez *et al*., 2016; Twill *et al*., 2016), and the use of university green space (Dalhousie University, 2016; Anderson, 2016; Ahmed, 2013; Sarwal, 2011) in order to feed university students and decrease student food insecurity. Limited research on food security of university students in South Africa has been conducted, but this is a growing area of research. Food security

studies have been undertaken in various forms at the University of the Free State (Meko and Jordaan, 2016; Van den Berg and Raubenheimer, 2015) and the University of KwaZulu - Natal (Gwacela and Kolanisi, 2015; Kassier and Veldman, 2013; Munro *et al.,* 2013). These studies explored aspects such as the levels of food insecurity amongst students, implications of student food insecurity, and responses to student food insecurity (Meko and Jordaan, 2016; Van den Berg and Raubenheimer, 2015; Kassier and Veldman, 2013).

Figure 1: An example of student food security as voiced on public social media pages

Universities around the world are becoming increasingly aware and active in examining their ecological impacts as universities, and placing sustainability on the university agenda (Venetoulis 2001). Some universities have pledged a set percentage of green space as a part of their campuses, and many universities have sustainability policies, and have signed associated pledges (Rhodes University, 2016; University of Cape Town, 2013). These sustainability initiatives focus largely on transport, energy use, recycling and food waste.

Sustainability of university campuses and food production projects can be linked to green spaces. Green spaces are an integral part of people's lives in many cities around the world and have the potential to provide a multiplicity of benefits for people. Green spaces are diverse in their form, use and perceived importance (Barbosa *et al*., 2007). Not only are they considered to be places of relaxation, recreation, community integration and social cohesion, but they provide meaningful benefits in relation to health and well-being across generations (Madureira *et al*., 2015; Groenewegen *et al*., 2006). Green spaces are relied on for a range of ecosystem services in addition to socio-cultural services, such as temperature regulation, food provision, animal refuges, and pollution mitigation (Lovell and Taylor, 2013). Research also extends to investigating

green spaces of university campuses, and they promote many of the same benefits as green spaces do in cities or private spaces (Speake *et al*., 2013) with one of these being food production for universities in the Global North (Dalhousie University, 2016; Anderson, 2016; Ahmed, 2013; Sarwal, 2011).

This research thus aims to contribute to the growing literature of student food security within South Africa by using food as a lens through which to explore a variety of issues. This research is of relevance as it contributes to filling a gap in the student food security literature within the South African context, at a university where this type of research has not previously been conducted.

1.2 Research Aim

To explore the current narratives of student food security, campus food initiatives and the (dis)connection between green spaces and student food security responses with a focus on the University of Cape Town in South Africa.

1.3 Objectives

1. Review the global literature of university student food security, and the use of green spaces on university campuses as a food security response.
2. Investigate student food security dialogues – perceptions, understandings and experiences.
3. Examine university-based food initiatives and university policy documents and reports, and assess integration of aspects of student food security.

1.4 Research focus

The main focus of this research was the University of Cape Town (UCT), for reasons of accessibility, possible available networks and lack of previous research in the area of student food security. UCT was the focus of Objective Two, and where an online questionnaire and a number of semi-structured student interviews were based. The examination of food related initiatives and university policy and reports were also largely focused within the context of UCT, and this forms a part of Objective Three.

UCT is one of the three public universities situated in the city of Cape Town in the Western Cape of South Africa. In 2016, there were 29074 students registered, comprising 18421 undergraduates and 10653 postgraduates (UCT, 2016). Of the 2016 student population, 5278 were international students from 112 different countries, including 39 African countries (UCT, 2016). Approximately 6800 students live in UCT residences, which include both catering and non-catering accommodation (UCT, 2016). The campus is spread over six main campuses within Cape Town. These are Upper, Middle and Lower campus in Rondebosch, UCT Medical campus in Observatory, Hiddingh Campus in Cape Town city bowl, and the Breakwater Campus at the Waterfront.

1.5 Outline of dissertation

This thesis is divided into six chapters, in addition to a number of supporting documents in the form of appendices. Chapter One introduces the overall research, providing the motivation for this research in addition to outlining the research aims and objectives. The literature review (objective one) forms Chapter Two, and introduces different definitions, and discusses food security, university food security, responses of universities to student food insecurity, food and sustainability of universities, in addition to food and green space at universities at the international and national contexts. Chapter Three is the methodology chapter, which provides further insight into different methods used, and describes the data collection and analysis for each of the three objectives. Ethical considerations and researcher positionality are also discussed in this chapter. Chapter Four includes the results for objectives two and three. The themes teased out in this chapter will be discussed in the following chapter. Chapter Five presents a discussion of the results, according to main themes common to Chapters Two and Four and reflects on research limitations and the potential for further research. Chapter Six is provides a summary of and concludes the research.

2. Literature Review

2.1 Introduction

This chapter aims to expand on the themes presented in the introduction. The main themes explored include food security, university food security, responses of universities to student food insecurity, food and sustainability of universities, in addition to food and green space at universities. These different areas of focus are examined to tease out the differences between the Global North and Global South, in addition to a focus on the context of South Africa, and specific universities within the country.

2.2 Food security

In order to examine and best understand university student food security, it is important to first understand food security as whole, and thus the following section aims to look further into different understandings of food security, nutrition, and food system issues. Thereafter, the food security context of South Africa is discussed. This context is important: although this research focuses solely on university students, nothing happens in a vacuum, and food security of the South African population as a whole is an important factor influencing food insecurity levels at a university level.

The food security definitions presented in the introduction to this research as defined by the FAO (FAO, 2016a) and South African government (Shisana *et al*., 2013) provide a context and basis for the food security definition used for the purposes of this research. This definition is that *food security is not just about food being available, and you being able to gain access to it; it is that you are able to benefit from a stable food system where you are able to prepare and consume that food to ensure optimal nutrition and health, in a way that is socially appropriate to you* (FAO, 1996; Haysom, 2017). A base definition was needed for this research so that research participants could have a reference point and understanding. This definition goes beyond the food production narrative which still dominates much of the food security literature including the UN Sustainable Development Goals (United Nations, 2017) and highlights the importance of a stable food system, touching on issues of access, the importance of nutritionally acceptable food, and on the importance of social and cultural acceptability. It was also important to attempt to create a definition that speaks effectively to the target audience, university students, who may or may not have engaged with food security definitions before deciding to become a part of this research.

Despite the ambitious United Nations Sustainable Development Goal Two of ending hunger and malnutrition by 2030, 795 million individuals around the world are still considered to be undernourished, with the majority of these individuals living in developing countries (United Nations, 2017). According to the World Health Organisation (WHO), nutrition can be defined as "the intake of food, considered in relation to the body's dietary needs" (WHO, 2017) whereby good nutrition leads to good health, and poor nutrition leads to

malnutrition, which can be due to over- or under-nutrition and the incorrect levels of micronutrients (Steiber *et al*., 2015). As highlighted by Branca and Lartey (2016), malnutrition encompasses all forms of nutritional challenges, which includes overweight and obesity (Ng *et al*., 2014).

The impacts of these nutrition and food security challenges are being felt in countries across the world, including South Africa (FAO, 2014; Vorster *et al*., 2013). Undernourishment, incorrect levels of micronutrient absorption, and over-nutrition, known as the triple burden of malnutrition (Fan, 2014), in addition to chronic food insecurity, create further complexities and challenges at the global and South African national level (Global Panel on Agriculture and Food Systems for Nutrition, 2016). A nutrition transition to an increasingly Western, ultra-processed diet (Vorster *et al*., 2013) and increasing urbanization further contributes to the problem (Global Panel on Agriculture and Food Systems for Nutrition, 2016). Malnutrition does not discriminate, in that it affects people in all countries (developing and developed), and across socio-economic backgrounds (Steiber *et al*., 2015; FAO, 2014). As universities are not insular places, these challenges cannot be excluded at the South African university level.

A recent article by Tumusiime and Machel (2017) is part of the recent and more visible calls for a shift in focus and placing importance on the quality of food, and not just the amount. Their main focus is on prioritizing nutrition for vulnerable groups such as women and children (Tumusiime and Machel, 2017). While this focus is undeniably important and well documented (FAO, 2014), it can be argued that it should be extended to include university students. If countries are to rely on university graduates for future economic growth and productivity, these students need to be able to perform well academically and have the support to reach their potential in order to become productive members of the national work force (Bruening *et al*., 2017; FAO, 2014). The economic costs of malnutrition globally are well known, and according to the FAO (2014) the global economy suffers a loss of $3.5 trillion per annum due to malnutrition, with a large proportion of this attributed to undernutrition and micronutrient deficiencies ($2.1 trillion) and the remaining attributable to obesity and overweight ($1.4 trillion). Thus, beyond the moral obligation and reasoning for addressing malnutrition for all, there is also an economic cost argument that should not be ignored (Pereira and Drimie, 2016; Fan, 2014). Any government investments into health and education are unlikely to achieve the full extent of intended results if a country's food system is compromised (Pereira and Drimie, 2016). With these figures in mind, it is perhaps fitting that the United Nations General Assembly declared the decade 2016 to 2025 the decade of action on nutrition in an attempt to speed up and pursue meaningful progress on decreasing hunger and improving the nutrition status of people worldwide (United Nations General Assembly, 2016).

As a departure point for exploring food insecurity at the national scale, it is interesting to look to the 2017 Global Food Insecurity Index (Economist Intelligence Unit, 2017), where South Africa is placed 44th out of 113

countries. This index is a food security measurement tool at the country scale, and examines aspects such as affordability and availability in its attempt to provide information on risk and underlying factors for food insecurity in each country (Economist Intelligence Unit, 2017). When comparing South Africa to other sub-Saharan countries, it has a much higher overall score, the closest being Botswana placed 52nd, and Ghana placed 76th (Economist Intelligence Unit, 2017). South Africa is considered to be food secure at the national level, as a result of a combination of own agricultural production and ability to secure food imports (Ramkissoon, 2017; Republic of South Africa, 2013). This is however, based on calorific sufficiency, and fails to consider aspect of food security as outlined by the FAO (1996).

Although South Africa is considered to be food secure at a national level, this is not necessarily the case at household or individual level (Hendriks, 2013; Shisana *et al.*, 2013). According to the 2013 South African National Health and Nutrition Examination Survey (SANHANES-1), only 46% of South Africa's population is considered to be food secure, and nearly a quarter of the population is at risk of experiencing food insecurity, which leaves about a quarter currently experiencing hunger (Shisana *et al.*, 2013). These figures do vary according to geographic location (province, urban/rural and formal/informal) as well as according to race group (Shisana *et al*., 2013). In terms of nutrition, the average South African diet has a low Dietary Diversity Score (DDS) (4.2) as it contains a considerable amount of energy, but is lacking in terms of micronutrients (Shisana *et al*., 2013), which is indicative of poor nutrition (Ramkissoon, 2017). In its constitution, South African citizens have the right to have access to sufficient food (Republic of South Africa, 1996), however, in referring to the above statistics, this right is not being realised for all. The government is also mandated to, within its resources, take measures to ensure the realisation of these rights (Republic of South Africa, 1996), however, it has been stated that the government has maintained a fairly distant approach, rather relied on economic growth (Ramkissoon, 2017). As universities in South Africa are publicly funded, this right also extends to students.

The South African government has approved number of government policies that have played a role in shaping food security in South Africa (Ramkissoon, 2017). These include the Reconstruction and Development Program (RDP) wherein food is referenced 19 times, in the contexts of employment, affordability, nutrition education, subsidies, data collection, social safety nets and welfare, small scale and large scale farming and agriculture, and the development of an early warning system for food security (African National Congress, 1994). The Integrated Food Security Strategy (IFSS) of 2002 aimed to (rather unsuccessfully) eradicate hunger and malnutrition by 2015 by creating a less fragmented overall strategy for government implementation (Republic of South Africa, 2002). However, institutional challenges greatly hindered the IFSS (Pereira and Drimie, 2016). The IFSS focused on areas similar to those identified by the RDP, and went further in that it defined food security, looked at its origins in the country, current trends and challenges, as well as the creation of an implementation plan (Republic of South Africa, 2002).

The 2013 National Policy on Food and Nutrition Security (NFNSP) is a replacement for the IFSS, with a focus on synergy (DAFF & DSD, 2013). The NFNSP was gazetted on August 22nd 2014 (DAFF & DSD, 2013). The South African Human Rights Commission (SAHRC), which has monitored the realization of the right to food, recently published a report 'The Right to Access to Nutritious Food in South Africa' which examines the NFNSP, in addition to providing additional insight into the state of food security in the country (Ramkissoon, 2017). In short, the report labels the NFNSP as lacking and limiting in relation to the reality of the South African food system, as well as raising concern as to if it is even being implemented, and by who (Ramkissoon, 2017). The report concludes that the country's entire food system needs to be rethought, with goals including better legislation, control of media and advertising, rethinking the school nutrition programme menu, and encouraging household agriculture (Ramkissoon, 2017). In addition, the lack of non-governmental stakeholders, and subsequent exchanges between the government and these stakeholders has been raised as a concern which needs to be addressed (Pereira and Drimie, 2016).

The Household Food and Nutrition Security Strategy and the Fetsa Tlala Food Production Initiative were both approved at the same time as the NFNSP (Nkwana, 2016; Hendrinks, 2014). The main aim of Fetsa Tlala, which means 'eradicate hunger' (Hendriks, 2014), is to ensure food availability, by focusing at the local level on increasing food production capacities, access, value chain development and agricultural job opportunities (DAFF, 2013). The issue of lack of consultation has been highlighted in the media (Gonzalez, 2015; Moyo, 2015), and picked up by Ramkissoon (2017) as discussed above. To date, there is no official Implementation Plan publicly available, apart from a December 2014 draft version which lists multiple government departments involved and notably the Department of Higher Education does not feature prominently (RSA, 2014). Interestingly, one of the references is a paper by Munro (2013) which focuses on food security of university students, however, there is no mention of university students in the NFNSP, strategy or implementation plan.

This overview of food security, nutritional challenges, and national level response is useful for providing insight into the context of where university student food security is situated. It must be noted that none of the documents consulted make mention of university students. Each of the challenges outlined has the potential to play out in specific ways and have implications for students within a university context. The following section aims to further investigate university student food security both internationally, as well as at a national level.

2.2.1 University student food security

This section examines the origins of university student food security in academic literature. It also provides an overview of the current state of university student food security and areas of focus for previous research,

internationally and more specifically in South Africa. How university student food security is defined and viewed in different contexts is discussed, in addition to factors influencing student food insecurity, and links to academic success both internationally and within South Africa.

The expansion of university student food security research and literature and the subsequent emerging research field have largely stemmed from research done by Chaparro *et al.* (2009) which built on the findings of an undergraduate research project investigating the prevalence of food security at the University of Hawai'i at Manoa (UHM) which they felt warranted further research. The researchers also felt at the time that there was limited knowledge in this focus area, subsequently confirmed by a simple web search using the search terms 'food insecurity', AND 'college students" OR 'university students' between 1950 and 2007, which is just after Chaparro *et al*. (2009) completed their field work (2006). The search revealed that at the time of their research, there was no research with direct links to food insecurity amongst university or college students, and no use of surveys to quantify student food security.

Chaparro *et al*. (2009) thus conducted research into the prevalence and possible indicators of university student food security which revealed the level of food security problems among university students at University of Hawaii Manoa. Chaparro *et al*. (2009:2099) found that of the students they surveyed, there were fairly high levels of food insecurity, especially for students who either lived on campus or off campus with roommates. They also found a possible correlation between higher student food insecurity and certain ethnic groups, which mirrored findings of national surveys, and thus was a likely predictor of food insecurity (Chaparro *et al*., 2009:2099). Recommendations for addressing food security, based on their limited sample were to establish campus food banks and student gardens although there is no further substantiation for or reasoning why these specific responses were chosen (Chaparro *et al*., 2009:2102). The research by Chaparro *et al*. (2009) provides an understanding of the origins of subsequent university student food security research, especially within the Global North.

Since the publication of the Chaparro *et al*. (2009) paper, there has been an expansion of research published internationally investigating university student food security (Martinez *et al.*, 2016). Figure four below illustrates the subsequent papers citing Chaparro *et al*. (2009). Chaparro *et al*. (2009) has been cited 21 times by papers within the Web of Science database, and 81 times by papers in Google scholar. Possible reasons for the higher number of papers cited according to Google Scholar include that some papers were not in English and some were books, in addition to the fact that Google Scholar is not curated by humans, and thus errors may occur and lead to errors in number of actual citations. One citation with no link, and another citation that didn't actually cite Chaparro *et al*. (2009) were removed.

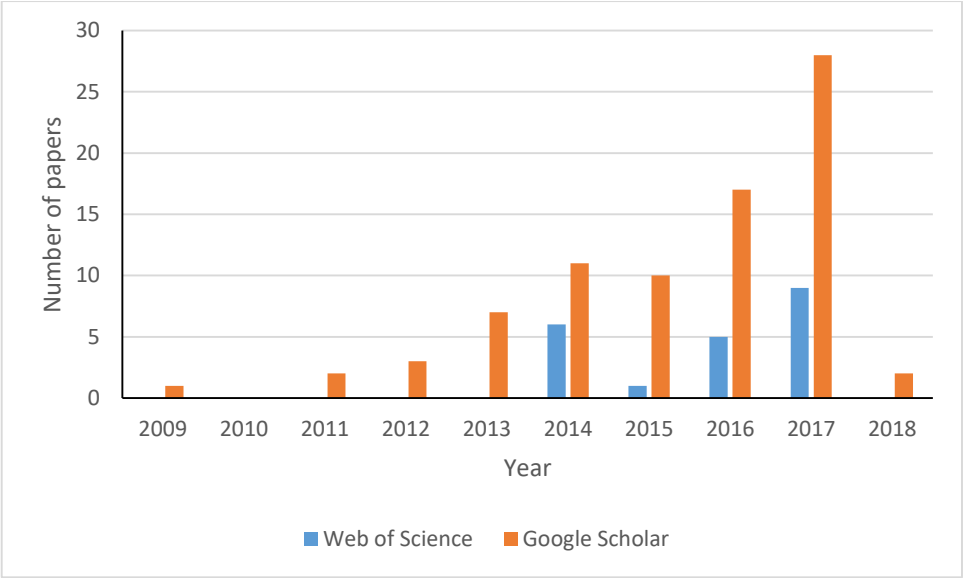

Figure 2: Research citing Chaparro et al. (2009)

Of the English language international literature consulted, most of the articles consulted for the purpose of this research have their origins in universities in the USA (Halfacre *et al*., 2017;; Hillmer *et al*., 2017; Holland *et al*., 2017; Bruening *et al*., 2016; Buch *et al*., 2016; Cady, 2016; Martinez *et al*., 2016; Maroto *et al*., 2016; Morris *et al*., 2016; Twill *et al*., 2016; Goldrick *et al*., 2015; Silva *et al*., 2015; Cady, 2014; Gaines *et al*., 2014; Hanna, 2014; Patton-Lopez *et al.,* 2014*;* Chaparro *et al*., 2009), Canada (Farahbaksh *et al.,* 2017; Hanbazaza *et al.*, 2017; Farahbaksh *et al.* 2015; Jesri *et al.,* 2014; Rojas *et al.,* 2007), and Australia (Gallegos *et al*.,2014). The most common focus of the international literature examined is to ascertain the levels of food insecurity at individual universities (Hillmer *et al.,* 2017; Martinez *et al*., 2016; Gallegos *et al*., 2014), followed by questions around food banks (Hanbazaza *et al*., 2017; Buch *et al*., 2016; Twill et *al.*, 2016; Jesri *et al*., 2014), examining different possible factors that influence student food security (Holland *et al*., 2017; Gaines *et al*., 2014), and lastly, looking at the awareness of student food security (Cady, 2016; Cady 2014).

At the South African level a limited but growing body of research into university student food security has been conducted at a number of universities, namely the University of KwaZulu Natal (Gwacela and Kolanisi, 2015; Kassier and Veldman, 2013; Munro *et al.*, 2013; Gwacela, 2013), the University of the Witwatersrand (Dominguez-Whitehead, 2015), the University of the Free State (Meko and Jordaan, 2016; Van den Berg and Raubenheimer, 2015), the University of Cape Town (Spertus-Melhus, 2016) and more recently, the University of Pretoria (du Rand *et al*., 2017). As this research is situated in South Africa, a brief summary of research at this level follows.

Research into food insecurity of students at the University of KwaZulu - Natal by Gwacela (2013) and Munro *et al.* (2013) revealed problems of food insecurity and the lack of access to nutritious foods. Issues identified included limited financial aid and the emotional aspects of experiencing food insecurity, all of which can have

a negative impact on academic performance. Kassier and Veldman (2013) focused on the links between a student's food security and academic success, and limited their study to students on financial aid. Gwacela and Kolanisi (2015) explored possible approaches for universities to be a part of decreasing the food insecurity of their students, and put forward the possibility of food banks that are built upon collaborations with local stakeholders. One of their reasons for foodbanks is that it has the potential to also address food system sustainability by making use of food waste (Gwacela and Kolanisi, 2015:8). Dominguez-Whitehead (2015) focused on bringing student narratives to the fore, by organising focus groups to investigate the food acquisition struggles of students.

The University of the Free State has also been active in investigating student food security. Van den Berg and Raubenheimer (2015) investigated food insecurity amongst the students, and it was found that there were high levels of food insecurity amongst the sample population. These findings were also linked to academic success issues and that some students are more prone to being food insecure and experience hunger than others (Van den Berg and Raubenheimer 2015:163). The University of the Free State has run a program called No Student Hungry since 2011. The focus of this programme is students who excel academically but who are food insecure, and once a part of the program, they receive a small daily food allowance (UFS, 2015). Research conducted by Meko and Jordaan (2016) examines certain aspects of this program. They investigated the university food environment for students on this program, which included examining the quality and diversity of food available to these students. One approach was to compare the nutritional value and sugar levels of the foods accessed by these students (Meko and Jordaan, 2016:116).

There has been limited research conducted and published situated at other South African universities. As a part of the same narrative focused study with UKZN students, Dominguez-Whitehead (2015) conducted research with WITS University students, focusing on student food acquisition struggles. Research has been conducted at the University of Pretoria, which investigated factors linked to student food security at the university (Du Rand *et al.*, 2017). This research has not as yet been published, but was presented at a recent South African Association for Food Science and Technology conference in September 2017. The extent of research which has taken place at UCT is an unpublished 2016 student project, which examined UCT campus foodways, and investigated the lived experiences of students (Spetus-Melhus, 2016). It was learnt while in attendance at the Roundtable Discussion on Access to Food for Students in South African Tertiary Institutions (hosted by the Socio-Economic Rights Project at the Dullah Omar Institute situated at the University of the Western Cape) that research into student food security has recently been conducted at UWC. Previous to this public roundtable discussion, which was held on the 5th of October 2017, one other gathering has been held, and this was a South African Higher Education Colloquium on food insecurity held at the University of the Free State in 2015. Research presented here was that from UFS, WITS and UKZN. There is a national

colloquium proposed for early 2018, which is perceived as the next step following from the 2017 UWC Roundtable.

2.2.2 Talking about food: how is food security defined?

Bruening *et al.* (2017) conducted a systematic review of international English language literature in the field of food insecurity amongst university students and other tertiary level education institutions. There is considerable overlap between the literature they analysed and the literature examined in this research, thus indicating that the literature examined and consulted for this research is relevant and in line with current research in the field. This international and national level literature explores aspects such as the levels of food insecurity amongst students, implications of student food insecurity, and responses to student food insecurity. Many studies focus on a single university, quantifying levels of student food insecurity (such as Van den Berg and Raubenheimer, 2015 and Martinez *et al*., 2016), while other studies focus on food banks, which is a common strategy put in place to address some of the challenges of student food insecurity (Hanbazaza *et al.*, 2017; Buch *et al*., 2016, Jesri *et al.,* 2014). How student food security is defined across these papers will be explored, in addition to drivers of and responses to student food insecurity, as well as common themes which arise, such as links between student food insecurity and academic success.

There is some variation in the ways in which food security is defined. Food security or food insecurity are the terms most commonly used. Hunger or referring to students as hungry is found in most papers. Research conducted by Peltzer *et al*. (2014) which examined overweight and obesity amongst university students in different countries was the only paper examined that did not refer to food security, food insecurity or hunger. The term food sovereignty is not used. Of the literature which defines food security, the most common definitions used are the FAO (1996) food security definition (Spetus-Melhus 2016; Gallegos *et al*., 2014; Munro *et al*., 2013), Anderson's (1990) food insecurity definition (Goldrick Rab *et al*., 2015; Gaines *et al*., 2014), Maslow's hierarchy of needs (Dominguez-Whitehead, 2015), in addition to Sen's work on entitlements, which is referred to by researchers such as Munro *et al*. (2013).

2.2.2.1 Food security estimates

Of the literature examined which directly attempted to ascertain levels of food insecure students within different universities, percentages vary according to each study, which in part reflects the range of methods used. Some studies use one estimate of food insecurity, while others distinguished between very low and low levels of food insecurity (Martinez *et al*., 2016). Another way of reporting food security levels, used by Micevski *et al*. (2014) is to focus on levels of food insecurity with and without hunger. These numbers, although not always directly comparable, still provide an indication of student food insecurity levels. At universities within the USA, levels of food insecurity range from 14 % (Gaines *et al*., 2014), up to 59% (Paton-

Lopez, 2014) of students classified as food insecure. In Australia, levels of food insecurity among students ranged from 12.7 % to 46.5% (Hughes *et al.*, 2011), depending on the approach used.

At universities within South Africa, food insecurity has been measured in different ways and with different sample sizes. Of the studies at UKZN, Munro *et al.* (2013) reported food insecurity of 20.8%, and Kassier and Veldman (2013) reported food insecurity levels to be 12.5% and a further 53.1% classified as moderately food insecure. Gwacela (2013) reported the majority of students in her research (first year academically on probation) were considered to be food insecure, with 80% of students experiencing anxiety around food access, and more than half of the students having experiences of times without food. Timeframes, measures used and survey population are different, which may explain the differences in levels of food insecurity amongst students at UKZN. At UFS, Van den Berg and Raubenheimer (2015) reported food insecurity levels according to two different measures. Food insecurity was reported according to their one item measure to be 65%, and with their 10 item measure 59% food insecure with hunger and 25% food insure without hunger. At UP, it was reported that most of the students who took part in the study were considered to be food secure, but 21.73% of students reported that they had financial problems, and thus could not afford to buy food (Du Rand *et al*., 2017).

2.2.3 Drivers of and barriers to food security

Although drivers of food insecurity for university students can be similar to those influencing the general population, such as poverty (Dominguez-Whitehead, 2015), there are other factors that have the potential to further negatively impact university students and exacerbate problems (Gaines *et al*., 2014). In addition to factors such as such as low income levels, unemployment, and neighbourhood and transport barriers, financial barriers such as limited income, high costs of tuition and student accommodation, increased reliance on loans and credit cards, not being eligible for government food assistance programs, and possible lack of money and food management skills may have an impact on the food security of university students internationally (Hanbazaza *et al*., 2016; Cady, 2014; Gaines *et al.*, 2014:377; Gallegos *et al*., 2014). Uncertainties around student housing and the potential for homelessness not only increases stress levels of students, but also can affect students in other ways, such as not being able to store or prepare food (Goldrick Rab *et al*., 2015). The amount of time available to a student can also be restrictive, and thus drive them to making bad food choices, or not being able to prepare a sufficient amount of food. (Spetus-Melhus, 2016).

Internationally and within South Africa, university populations are transforming socio-economically, with higher numbers of students who are from a low income background now attending university (Buch *et al*., 2016). This, coupled with the ever increasing university fees, makes it increasingly difficult for students to ensure their food needs (Buch *et al.*, 2016), and is a signifier that universities must transform in order to accommodate their changing student community. There has been a shift in some South African universities

from providing student accommodation inclusive of catering, to self-catering accommodation and this change has the potential to make it more difficult for student to meet their food needs and ensure that they are food secure (Dominguez-Whitehead, 2015).

There is a uniting theme across the literature for increased financial support, and the review of current financial support systems for students, for example the living stipend in Australia (Gallegos *et al.*, 2014) and the National Student Financial Aid Scheme (NSFAS) system in South Africa (van den Burg and Raubenheimer, 2015; Gwacela, 2013; Kassier and Veldman, 2013; Munro *et al*., 2013). This call is not surprising as financial barriers are considered to be main drivers of student food insecurity, as discussed previously, and further reiterated by Goldrick Rab *et al*. (2015) and Jesri *et al*. (2014). Not unlike previous years in South Africa, the USA education system has also suffered financial cuts in government support which has left financial shortcomings in terms of student funding (Martinez *et al.*, 2016). For South African students who are on NSFAS, the funds received are very limiting and have to be spent on a multitude of aspects of their life, such as food, textbooks, toiletries and, given the high levels of unemployment and poverty in South Africa, students even use NSFAS grants to support other family members (Van den Berg and Raubenheimer, 2015; Kassier and Veldman, 2013).

There is also the potential of certain barriers creating specific times of the year when students experience food insecurity. This issue was discussed by Munro *et al.* (2013), with specific reference to students who are on financial aid. Cyclicity of need was also picked up by Buch *et al.* (2016) who examined the development and usage of a university based food bank. There were usage patterns that varied across the semester (Buch *et al*., 2016). Hanbazaza *et al.* (2016) also notes that students are more likely to approach the university food bank at the beginning of the academic year, possibly due to lack of finances and having to spread money thinly across fees, accommodation, and new study materials in addition to food. These cycles of hunger are also likely to occur at times during the academic year such as during the exam periods when optimal energy and brain functioning is needed most (Dominguez-Whitehead, 2015), which links us to the next discussion around food and academics.

2.2.4 Food and academic success

The link between student food security and academic success has been established and acknowledged (Buch *et al*., 2016; Cady, 2016:28; Gaines *et al*., 2014:374; Kassier and Veldman, 2013; Munro *et al*., 2013). Within the definition of food security quoted above, access to nutritious foods is highlighted. This is very important for students, as the lack of access to proper nutrition negatively affects how much energy a student has available to them to focus and process information and thus in turn negatively affects their studies and the academic success (Buch *et al*., 2016; Cady, 2016:28; Martinez *et al.,* 2016). Research on the relationship between food security and academic performance has focused primarily on primary and secondary education

levels. Increasingly it is understood that this focus requires expansion to include tertiary students. An increasing number of studies have revealed how university students perceive it to be a considerable problem and barrier to better achievement in their studies (Buch *et al*., 2016; Goldrick Rab, *et al*., 2015). UCT students interviewed by Spetus-Melhus (2016) talked of food as an energy source that is an enabler of their academic work, which does indicate that students are aware of what and how they are eating.

Although they concede that their results are not statistically significant, Kassier and Veldman (2013) noted that of the students in their study, there was a tendency towards weaker academic performance for students who were food insecure. As argued by Dominguez Whitehead (2015), universities and society at large cannot expect students to do well academically when they are lacking one of their basic fundamental needs. By developing strategies to decrease university student food insecurity, it is possible that the academic success and pass rates of students would increase (Gallegos *et al*., 2014:507). Food security and being able to eat balanced meals is also very important for students being able to continue their studies, and for a university that is trying to decrease their attrition rate (Buch *et al*., 2016), which is alarmingly high for South African universities (van den Berg and Raubenheimer, 2015; Gwacela, 2013). Van den Berg and Raubenheimer (2015) state that student food insecurity is a likely contributing factor to attrition rates. South Africa's university graduation rate of 15% (in 2001) is argued to be reflective of the country's inequalities and levels of poverty (Letseka and Maile, 2008). A 2016 report on the state of higher education in South Africa reveal that this 2001 rate has not increased much since (Council on Higher Education, 2016:41). In terms of helping students to focus when they need it most, it could be of use to focus food initiatives especially at the beginning and end of each semester (Dominguez-Whitehead, 2015; Munro *et al*., 2013). Students have developed coping strategies in order to better navigate their way through these drivers of and barriers to food security, and these will be explored in the following section.

2.2.5 Coping Strategies of students

There are numerous coping strategies which students make use of when they are experiencing differing levels of food insecurity for different periods of time. Within the South African context, if students are experiencing time constraints, they may alter their food acquisition strategies and make use of vending machines instead of standing in long food vendor lines (Spetus-Melhus, 2016). If students do not have sufficient money to buy food on campus, which is often argued to be prohibitively expensive, they will venture further away from the campus in order to obtain cheaper food (Dominguez-Whitehead, 2015) or contribute money to a pool among friends and buy food together (van den Berg and Raubenheimer, 2015). When students have run out of food and cannot afford to obtain more, some students go to sleep on an empty stomach without supper, skip meals, borrow money from friends and family, drink fluids, sell possessions, or steal (Dominguez-Whitehead, 2015; Kassier and Veldman, 2013).

2.2.6 Responses of universities to student food insecurity

Approaches in addressing student food security documented in the literature from the Global North include the establishment of food banks in order to aid university students and decrease student food insecurity (Martinez *et al.*, 2016; Twill *et al*., 2016). In the United States and Canada, it has become increasingly common for universities to open their own campus food banks or pantries, often in response to barriers faced by students within the national food bank system (Buch *et al*., 2016; Hanbazaza *et al*., 2016; Twill *et al*., 2016:3; Jesri *et al*., 2014). These food banks can act as a bridging mechanism between students and other support for chronic food security (Twill *et al*., 2016), but may not be able to address the wider systemic problems associated with food security (Cady, 2016:30). A food bank is generally intended to be a short term solution, but it seems that they are increasingly becoming a more permanent solution (Hanbazaza *et al*., 2016). There is also the potential for concern, depending on how a food bank is set up and managed, that the private sector can benefit from student problems, with the potential advantage of advertising (Buch *et al*., 2016). The same can be argued for the food bank initiative at UWC who received food parcel donations from brand giant Tiger Brands (Tiger Brands, 2017). It is also important to consider the type of foods provided at food banks, as one needs to be able to eat food which meets one's nutritional requirements instead of just making one feel full. Jesri *et al.* (2014) investigated the nutritional value of food bank parcels at the University of Alberta in Canada, and they found that although students are able to save financially by acquiring these food packs, they are not able to receive all the nutrients they need, in addition to the potential lack of culturally appropriate foods for some students. Programs aimed at addressing food insecurity can also inadvertently create further food challenges (Meko and Jordaan, 2016). At UFS, when attempting to solve financial barriers for students, the resultant food options were limiting, as many foods were higher in sugar than acceptable (Meko and Jordaan, 2016). This shows that whatever response is chosen by a university, it must be examined in all possible ways so that all dimensions of food security can be achieved.

In addition to the establishing of campus food banks, the creation of student food gardens was one of the recommendations arising from the research by Chaparro *et al*. (2009:2102) and which is further recommended by Gallegos *et al*. (2014). The use of university green space is another response developed by some universities, with well documented examples situated in the US and Canada (Dalhousie University, 2016; Anderson, 2016; Ahmed, 2013; Sarwal, 2011). These initiatives do however focus more on increasing the sustainability at the local food system (university) level (Anderson, 2016; Ahmed, 2013).

Other approaches to help students include making information of support services for students available and better known, as well as changing or introducing new policies that decrease barriers to food security (Cady, 2016:30). The creation of partnerships to link many different parts of a university together, in addition to the creation of a platform that helps students navigate their food challenges is very important when considering

long term responses and solutions (Cady, 2014). Potential recommendations include ensuring that there are affordable and healthy food options, subsidized healthy meals, access to food co-operatives, food education and budgeting, adequate areas for food preparation and ensuring that no food monopolies exist on campuses (Dominguez-Whitehead, 2015; Gallegos *et al.*,2014; Kassier and Veldman, 2013). The University of California, Los Angeles (UCLA) has an extensive multi campus food initiative which is a part of their vision to create a sustainable campus food system, whereby each campus was given finances to address student food insecurity in the best way that they see fit (Martinez *et al*., 2016). The diverse ways in which the campuses used their money shows how important context and really understanding a university's specific student community and food environment (Martinez *et al*., 2016). Munro *et al.* (2013) advocate for the involvement of stakeholders beyond the realm of Higher Education, and thus span to NGOs and the private sector. UFS in South Africa decided after investigating levels of food insecurity on their campus, to create the 'No Student Hungry' campaign, which is currently being implemented (Kassier and Veldman, 2013). It is a program where students with strong academic records are able to receive a small amount of money each day to buy their meals at one of the vendors on campus and in return the students have to commit to public duty (UFS, 2015). This approach has the potential of stigmatizing the food insecure, however.

2.2.7 Stigma

Stigma is a recurring theme in the literature. There is the real potential that because students may fear to speak up about their food challenges for fear of stigmatization, the problem of food insecurity is bigger than is actually documented (Buch *et al.,* 2016). Stigma is also something that is paramount to consider when developing how a university responds to student food insecurity problems, and how they shape their food environment in the future. For example, individuals are likely to have a stigma associated with accessing food aid, and therefore future strategies need to ensure that dignity is maintained for individuals (Gallegos *et al*., 2014). The UFS 'No Student Hungry' example that places conditions upon food insecure students reflects the complexity of engaging in such issues and how solutions that are assumed to be straight forward are complex in a place like a student campus. Another way in which stigma can be perpetuated is through the process in which students gain access to help for their food challenges. One such example is from the Durban University of Technology (DUT) student counselling website which has a student food security program (DUT, 2017). Students have to prove that they do indeed need help, and must submit documentation to show that they qualify. This can be an uncomfortable situation that students find themselves in, due to the fear of being stigmatized.

2.3 University Sustainability

This section of the literature review aims to gauge how universities are engaging with the issues of sustainability, and the extent to which this differs according to context. The extent of the connection of food

and student food security with university sustainability dialogues will also be explored. These findings then allow for comparison with the policies of the University of Cape Town and what this means for university student food security at the university.

A shift in how the world viewed sustainability and sustainable development stems from the 1987 Brundtland Report which defined sustainable development to be that which meets the current needs of the population without negatively impacting future generations and the natural environment (International Institute for Sustainable Development, 2012). Universities around the world are becoming increasingly aware of and active in examining their ecological impacts, and placing sustainability on the agenda (Venetoulis 2001). There are multiple declarations that are linked to the sustainability of universities and that can play a role in framing how universities define their sustainability visions (Wright, 2002). One such example is the Talloires Declaration of 1990 which is one of the declarations that the University of Cape Town has committed to (Rippon, 2013:3). According to Velazquez *et al.* (2006:812), a university working towards being sustainable is one cognisant of the impacts resulting from the running of its academic project, and one that works towards decreasing these environmental, social and economic impacts, thus prompting the shift to increasingly sustainable operations and ways of living. There is no one definition, and thus universities working towards achieving sustainability need to define what sustainability means for them, in addition to creating a vision of sustainability for the university community (Velazquez *et al*., 2006:812). Calculating carbon footprints is a common act of universities striving for increased sustainability, and these efforts focus largely on transport, energy use, and food waste (Rippon, 2013; Venetoulis, 2001).

An increased focus on secure and sustainable campus food systems has also emerged (Rojas *et al*., 2007). University food systems can also be linked to sustainability (Duram and Williams, 2015; Pothukuchi and Molnar, 2014). Rojas *et al.* (2007) describe the University of British Columbia (UBC) food system project, which emerged from the recognition that the food system is insecure and unsustainable not only environmentally, but also economically and socially. A food system sustainability assessment identified barriers to sustainability, allowing for changes (Rojas *et al*., 2007). UBC has a vision statement for how the food system is imagined to be and includes aspects of using resources sustainably, focuses on local food, composting and recycling, in addition to food being affordable, available, accessible and appropriate for those linked to the food system (Rojas *et al*., 2007:93). This is a connection between student food security and sustainability. This paper exemplifies the ability to connect campus food security with broader sustainability visions of a university.

Duram and Williams (2015) discuss student gardens and university sustainability, documenting a separation between initiatives addressing university student food security, and initiatives addressing university sustainability. Although in the grey literature, examples of the use of green space for food security initiatives

are documented, with green spaces are more likely to be used to promote the engagement of students with sustainability (De Young *et al*., 2016). There may be indirect ways in which these projects also benefit students' food security, but this remains to be seen.

2.4 Green space use at universities

Linked to a university's environmental sustainability is its green space. This following section examines the concept of green space, in addition to its perceived importance and use. Green spaces are also examined within the context of the university space. A main objective of this section is to see how extensively these spaces can be connected to food and their possible use in addressing university student food security. The literature drawn on, particularly in the area of university green space, originates predominately from the Global North, and consists of both journal articles and grey literature.

2.4.1 Green space: definition, use and value

Green space is generally considered to be any space that contains vegetation (for example grass, flowers, shrubs and trees), whether it be naturally occurring, or modified by humans (Wright-Wendel *et al*., 2012; Azwar and Ghani, 2009) in the urban context. Green space can be publically accessible (physically or visually), such as city parks, cemeteries, and green belts, as well as private, such as private household gardens (Wright-Wendel *et al.,2012*) As the definition for green space is broad, green space has the potential to be diverse in form, in addition to use and perceived importance (Barbosa *et al*., 2007).

People can benefit considerably in many ways from access to green space, and within the context of urbanization, it can be used as an indicator of well-being and quality of life (Wright-Wendel *et al*., 2012; Azwar and Ghani, 2009). Some researchers have even referred to green spaces as 'Vitamin G', with the aim to signify green space as having positive impacts on health and well-being (Groenewegen *et al*., 2006). These benefits include those of relaxation, recreation, exercise, behavioural improvements, community integration and social cohesion, health and well-being across generations (Madureira *et al*., 2015; Wolsch *et al*., 2014; Irvine *et al*., 2013; Azwar and Ghani, 2009; Groenewegen *et al.,* 2006; Takano *et al*., 2002). The link between access to green space and health benefits has been noticed by some governments (Schipperijn *et al*., 2010).

In emphasising their importance ecologically, GreenSpace Scotland refers to green space as green lungs (Greenspace Scotland, 2011). Beyond their psychological, health and other socio-cultural benefits, green spaces are also needed and relied on for a range of ecosystem services, such as biodiversity promoters, animal refuges, and pollution mitigation (Lovell and Taylor, 2013). Green spaces can also act as air filters, water filters, and temperature regulation as a part of the urban heat island effect (Wolsch *et al*., 2014; Lovell

and Taylor, 2013). Another ecosystem service that green spaces are known for is food provision (McLain *et al*., 2014; Yates, 2014; Clark and Nicolhas, 2013; Groenewegen *et al.,* 2006).

From the papers examined that have a focus of green space and food, food production is talked about less as a food security response, and more as a way of reconnecting with nature and the community and increasing well-being through the act of foraging for food or gardening in an allotment (Poe *et al.,* 2013; Groenewegen *et al.,* 2006). Groenewegen *et al.* (2006) state that food production is only one of many results of allotment gardens (a form of green space), and are more interested in the outputs of reduced stress, physical activity, mental health and community integration. Poe *et al*. (2013) argue, that food foraging in urban green spaces can result in food accumulation and which may be useful for livelihoods and allow for food justice, but place more emphasis on the importance of foraging for the retention of more intangible values, such as cultural practices and knowledge, quality of life, rethinking connections to food, and achieving social justice. Food foraging in green spaces can in some cases be instrumental in making a meaningful component of a household diet, a way to make ends meet at the end of the month or a way in which to supply food banks with fruit (Poe *et al.*, 2013). Urban agriculture also makes use of green space, and is promoted by some governments and cities for many reasons, one of them being as a way to decrease food insecurity (Battersby and Marshak, 2013). However, urban agriculture's success and relevance in different contexts such as that of South Africa or Cape Town is debated (Webb, 2015; Battersby and Marshak, 2013; Battersby, 2012).

2.4.2 University campus green space

Much of the literature around green spaces is focused on the green spaces in urban areas, but this research into green spaces does extend to that of university campus green space. Origins of university green space research include the United States (Hipp *et al.,* 2016; Seitz *et al*., 2014; Mcfarland *et al*., 2008) and United Kingdom (Hipp *et al.,* 2016; Speake *et al*., 2013), but extends to other parts of the world such as Canada (Windhorst and Williams, 2015) South Africa (Liprini, 2014), Ghana (Asamoah *et al*., 2016), China and Australia (Lau *et al*., 2014), Qatar (Mogra and Furlan, 2017) and Thailand (Tiyarattanachai and Hollmann, 2016). These spaces share many of the same characteristics, use, and benefits with green spaces in cities or private spaces (Speake *et al.*, 2013).

Common uses of campus green space by students are socialising, relaxation, eating and drinking, study, sports, and to use as meeting places (Mogra and Furlan, 2017; Hipp *et al.,* 2016; Asamoah *et al*., 2016; Seitz *et al*., 2014; Liprini, 2014; Speake *et al*., 2013; Mcfarland *et al*., 2008). The availability of seating was found to be an important factor for the enhancement of campus green space (Mogra and Furlan, 2017; Asamoah *et al*., 2016; Liprini, 2014; Lau *et al*., 2014; Speake *et al*., 2013), in addition to the value of multi-functionality (Speake *et al*., 2013) and proximity to wireless internet (Asamoah *et al*., 2016).

The concept of students being able to make use of campus green space for the purpose of restoration from their stressful lives as university students, increase their quality of life and thus act as a health resource was also discussed (Hipp *et al.,* 2016; Tiyarattanachai and Hollmann, 2016; Liprini, 2014; Mcfarland *et al*., 2008). Campus green space was also discussed to be important for the overall image enhancement of a university, in relation to attracting potential students (Speake *et al*., 2013), and in competitive rankings (Tiyarattanachai and Hollmann, 2016). The idea that green space can also be used for education purposes was also discussed, in terms of ecology and biodiversity, food, sustainability and being able to recreate connections between students and their natural world (Lau *et al*., 2014; Speake *et al*., 2013).

Of these papers analysed, only one makes any reference to food beyond using green space as a place to eat and drink (Lau *et al*., 2014). In the work by Lau *et al*. (2014), which examined strategies for the creation of open green spaces on university campuses, they mention the fact that campus green space can also be used for food gardens. They refer to the use of rooftops for rooftop farming, which provides food to a vegetarian campus café (promoting a sustainable food environment) in addition to being an education and awareness tool that can benefit students so they can learn about food origins, nutrition and agriculture (Lau *et al*., 2014). Although this paper acknowledges the potential for green spaces to fulfil the ecosystem service of food provision, its focus is not from the position of food security, but rather the position of sustainability.

2.4.3 Food and green space use at universities

Although literature using a green space lens does not particularly focus on campus green space food production as seen in the previous section, there is other literature stemming from a sustainability grounding that does. The following is an overview of this literature, which doesn't make strong reference to the phrase of green space, but does focus on growing food at university campuses. One is able to find most of this literature in the grey literature, such as student theses, and university food program web pages.

In their systematic review of food insecurity at postsecondary education campuses, Bruening *et al*. (2017) do not discuss the use of green space for interventions, or the creation of vegetable gardens, but it is listed in passing in their table of interventions for addressing university food insecurity within the context of the creation of community gardens. The majority of examples where green spaces has been linked to food and possible student food security interventions have originated from universities in the Global North (Dalhousie University, 2016; Anderson, 2016; Ahmed, 2013; Sarwal, 2011). Chaparro *et al.* (2009) made passing reference to food gardens as a solution to student food security in their concluding statements, but make no substantiation for this claim. Bruening *et al.* (2017) state that the effectiveness and usefulness of different interventions have not been investigated, and this also extends to the use of university green space for addressing university food insecurity.

When linking food and green spaces, multiple viewpoints can be found. The first can be aligned to the idea of green space acting to provide the ecosystem service provision of food (such as the examples of interventions compiled and investigated by Bruening *et al.* (2017)), and the second is linked to the socio-cultural benefits surrounding food generation in green spaces (such as that discussed by Lau *et al*., 2014). Although some programs are attempting to position green space food production as a food security intervention, the majority of literature seem to rather use green space food production as an educational and informative vehicle (Cheang *et al*., 2017; Lau *et al*., 2014). An implied feeling from this literature is that food gardens are there to change people's minds about food sustainability, instead of a means of food production to feed directly into food insecurity of university students. This can be compared to McClintock's (2008) arguments on the transformative potential of urban agriculture, which he views as more than a means of food production, with the potential to promote relationships, preserve knowledge and culture, and speak to policy. Thus, they are aiming to elicit change in a certain aspect of the campus food system, possibly more ideological in nature than actually making a sustainable difference to food insecure students.

2.5 Conclusion

This review of the literature has explored the main areas of food security, university student food security, university sustainability and green spaces. A general understanding of each of these has been provided, in addition to linking them to university food security and the research question. Similarities and differences between the global North and global South, in addition to a focus on the context of South Africa, and specific universities within the country have been highlighted. The document analysis established current associations between food and sustainability. This literature review has also served as a way in which to investigate the current levels of knowledge relevant to this research, university student food security in particular. By having a better understanding of previous research, the research in this thesis can be better informed and situated. The review of this literature indicates that there are gaps in the literature. Within the context of UCT, minimal research has been conducted into student food security, which makes this research relevant and important. Research that investigates connections or disconnections between sustainability, green space and university student food security is lacking in South Africa, and thus this research has the potential to spark and further initiate this conversation at a South African level. Objective One, to review the global literature of university student food security, the use of green spaces on university campuses as a food security response has been achieved in this chapter. The knowledge gained from Objective One provides a substantial departure point for addressing Objectives Two and Three, in Chapters Four and Five.

3. Methodology

3.1 Introduction

For this thesis a mixed methods approach was used, including quantitative and qualitative data, by way of literature review, document analysis, online quantitative questionnaire and semi-structured interviews. A mixed methods approach is applicable as it enables the integration of the different methods to generate a broader and more robust picture of their strengths (Creswell, 2009; Johnson *et al*., 2007). The literature focusing on university student food security reveals that both quantitative and qualitative methods have been used, thus demonstrating the relevance of these as suitable for this research (Du Rand *et al*., 2017; Hillner *et al*., 2017; Martinez *et al*., 2016; Dominguez-Whitehead, 2015; Van den berg and Raubenheimer, 2015; Gaines *et al*., 2014; Gallegos *et al*., 2014; Kassier and Veldman, 2013; Munro *et al*., 2013; Chaparro *et al*., 2009). Qualitative data forms a considerable component of the data collected in order to achieve the research objectives. It is important that qualitative data was used, so that the depth of the information is fully grasped. Quantitative data has also been collected, and cross referencing of the different sources and types of information has been done where possible.

In order to approach research into student food security, specifically when investigating student food security and student narratives (Objective two), it was imperative to establish an understanding of previous research in this area. Thus, literature which documented previous student food security studies were consulted prior to the creation of the student food security questionnaire. A summary of the main ways in which university student food security has been measured follows which was important for contextualization of the questionnaire and interviews in addition to question creation (Objective two).

The majority of research conducted into student food security that has been examined falls into two main categories. These are: research that has investigated food security levels at a particular tertiary education institution or institutions (such as Van den Berg and Raubenheimer, 2015) and studies that have focused on food banks (such as Hanbazaza *et al*., 2017). Other categories include student narratives of experiences and perspectives (Dominguez-Whitehead 2015) and campus food environment research (Meko and Jordaan, 2016 and Spetus-Melhus, 2016). A paper published during the course of this research differs, in that it conducted a systematic review of literature on food insecurity at the tertiary level (Breuning *et al*, 2017). These papers provided insight into the types of questions asked of students within a food security context.

Questionnaire design has been influenced most by research conducted within the South African context, where this research is situated. Van den Berg and Raubenheimer (2015) include aspects such as basic demographics, perceived levels of food insecurity, food access and barriers, and possible response strategies they employ. Questions and approaches used by Kassier and Veldman (2013); Munro *et al*. (2013) and Gwacela (2013) also proved useful, even though this research does not focus on all aspects examined by

these researchers, such as financial assistance, or first year students for example. Themes that arose from this South African research were also useful, in order to ascertain whether the same themes were also relevant to students at the University of Cape Town. One example of this is the reoccurring theme of the cost of food on university campuses.

The Food and Nutrition Technical Assistance (FANTA) methodology and methods similar to it were encountered during the review of the literature, and has been used for example in the research by Shisana *et al.* (2013) in their investigation at the national level. The FANTA methodology is comprised of the Household Food Insecurity Access Scale (HFIAS) Measurement tool which focuses on the respondents past four weeks (Coates *et al*., 2007). In spite of shortcomings linked to this methodology, as outlined by Haysom and Tawodzera (2018), at this time, there are no other such tools available. As such, these tools are useful in providing an indication as to a measured level of food insecurity (as opposed to perceptual levels), but should be examined in conjunction with the perceptual, the Household Dietary Diversity Score (HDDS), the narratives and other physical limitations in order to better understand the real dynamics of food security and related challenges (Haysom and Tawodzera, 2018). The reason for this is due to the multidimensionality of food insecurity and importance of context, and thus by combining different measures, allows for gaining a better understanding of what is going on (Haysom and Tawodzera, 2018). Using the FANTA methodology also allows for the potential of comparisons with other research. The HDDS is a way to measure household food access, and focuses on the number of different food groups consumed over a 24-hour period (Swindale and Bilinsky, 2006). Months of Adequate Household Food Provisioning (MAHP) is a measurement that focuses on the last 12 months, and looks into aspects that influence food security, such as sufficient fuel for cooking (Bilinsky and Swindale, 2010). Further links between question type used in this research, and by previous research can be found in Appendix Six.

3.2 Objective 1. Review the global literature of university student food security and the use of green spaces on university campuses as a food security response

3.2.1 Data Collection

The methods undertaken to achieve Objective one include a review of the literature and examination of previous research. Due to the difference in methods as a result of different lines of enquiry (in relation to inputs for the database searches), Objective one has been divided into two sub-objectives.

3.2.1.1 Objective 1.1: Review the global literature of university student food security

The first part of the literature review focuses on the research about university student food security at the international, national and university context. Databases and platforms were used to search for journal articles. These include JSTOR, WorldCat, SAE Pubs, Greenfile, Scopus, Web of Science, Science Direct,

Springer, OneFile and EbscoHost. Search phrases used in various combinations included 'food security', 'university student food security', 'food banks', 'campus food systems', and 'campus/university food security responses'. Search alerts were also set up in order to make sure that any new and relevant literature could be examined. The search alert phrases were "food insecurity" and "university student food security".

3.2.1.2 Objective 1.2: Review the use of green spaces on university campuses as a food security response

Objective 1.2 aimed to investigate and review the use of green spaces on university campuses as a food security response, by using similar literature sourcing methods as previously outlined. However, the different research inputs have been used, such as 'university food production' and 'campus food gardens'. In addition, as this food security response could be a fairly recent one, examination of 'grey' literature is also key in order to gain deeper insights into this response.

3.2.2 Data Analysis

A thematic analysis of the literature was conducted. Main keywords were searched for across the documents. These include 'food security', 'food insecurity', 'hunger', 'hungry' and 'food sovereignty'. After an initial scanning of the literature, tables were constructed and different aspects of the literature were grouped together. The focuses were: article authors, date and origin, main subject matter and objectives, presence and absence of the aforementioned keywords, how food security was defined, methods used, academics, drivers and barriers, student coping mechanisms, university responses, and any other relevant information.

3.3 Objective 2: Investigate student food security dialogues – perceptions and understanding and experiences

3.3.1 Data Collection

The methods for Objective two are twofold, in the form of quantitative online questionnaires and qualitative semi-structured interviews. The focus of the quantitative online questionnaires and qualitative semi-structured interviews were full time university students of University of Cape Town who were between second year and PhD in 2017 and had not recently transferred. The online questionnaire was designed on and deployed through an online platform called KoboToolbox and accessed by a link provided in an email to the students. The questionnaire was divided into different sections, each with an explanatory section. The sections were an Introductory section (which included a compulsory consent section), General information, Your food history, Food security, Months of adequate provisioning, Academics and food, Dietary diversity, You, food and coping strategies, and a final section on background details in addition to an invitation to be interviewed. A copy of the online questionnaire can be found in Appendix Six. The email research invitation (Appendix Four) was sent out through the university's Department of Student Affairs (DSA) twice and was open to UCT students from August 31 2017 to October 31 2017. The use of alternate avenues to increase

student awareness of the research was pursued such as posters around the university campus, however, only email invitations were authorized by the DSA. All questionnaire questions contained the option to choose not to answer, so as to not pressure a participant into answering anything they did not want to, in line with the commitment made in the informed consent process. Text based questions were not compulsory. It must be noted that the online version of the questionnaire is easier to follow and less complicated than the copy in Appendix Six.

The questionnaire was piloted with 12 university students outside of the target population with a range of study levels, and improved upon prior to deployment. Pilot studies can be very important for the research process, as they enable the researcher to understand how the target population may understand and react to the questionnaire. Munro *et al*. (2013) made use of a pilot study in their research, and this showed how problems and constraints relating to questionnaire design can be highlighted. Running a pilot proved to be useful in picking up small wording issues, to ensure each question was understood in the way it was intended, and to provide an estimate of how long the questionnaire could take to complete (in addition to seeing if the length was acceptable).

The questionnaire also served as a way to invite students to be further involved in the research by way of anonymous interview. Students who agreed to engage further with the research, by way of semi-structured interviews, were able to notify the researcher by selecting 'yes' in the questionnaire and providing their contact details. These details were separated from the questionnaire data, stored separately and not linked to the questionnaire submissions. It was hoped that a small pool of about 10 – 15 students would want to engage in this way, and 15 students were interviewed, before research saturation was reached. Themes guiding these interviews were based not only on major themes presented in the literature, but also on the questionnaire, so that the two methods flowed. A deeper understanding of lived experiences of the students was sought.

Each interview was held in a space where the participant was comfortable, such as a library study room, which allowed for quiet, and privacy as no stigma is attached to students meeting in a space meant for meeting up and working with other students. After introductions were made, simple questions were asked in order to make the participant feel at ease. Once they were comfortable, a review of the consent form was done, where the researcher explained the research again, emphasizing that their participation was voluntary and anonymous, as well as asking if they had any questions before beginning the interview.

Interview themes included a review of their questionnaire experience and discussing what made them decide to become further involved in the research, discussions around food and sustainability (sourcing of foods, green space) and their perceptions, experiences and opinions of their food environment as a student on and

off campus, their view on food and on university student food security beyond the questionnaire, and any food related initiatives they may know of that include students. The question about their knowledge of initiatives was partly asked in order to gain an understanding of options available to students, how they may navigate their food challenges, but also as a way to expand the researcher's knowledge and gain potential leads to enable further interviews from others involved in the university food environment. In order to understand the students' perspectives on how food and hunger at universities should be approached, a brief overview of different responses to food insecurity at other universities around the world was provided. Their opinions of these initiatives could then be uncovered, as well as acting as potential sparks for further discussions that the interviewees may not have thought of or made connections to previously. When it felt that the interviews were naturally coming to an end, the students were encouraged to voice any other opinions and comments they may have had and wanted to talk about which they felt were not covered, and were thereafter thanked again for their engagement with the research and for their time.

3.3.2 Data Analysis

The analysis tools on KoboToolbox allowed for real time quick analysis of questionnaire data during the data collection phase. Prior to analysis, the data was cleaned, by examining aspects such as timing of questionnaires, and duplicate questionnaire responses (Kvale, 2009). Thereafter, Microsoft Excel was used for further analysis of questionnaire data. Interviews with student respondents were transcribed (if recording was agreed to). NVIVO was used to aid the thematic analysis of interviews, according to main themes that arose (Kvale, 2009). Initial coding took place, and many possible themes emerged. Upon further consultation of the interviews, more concise themes were created, and sub-themes grouped. Thematic analysis was relevant for the analysis of interviews because different themes arose during the course of the research, such as from the review of the literature, and therefore provided a good departure point for examining the interview (Kvale, 2009). In order to ensure anonymity, participants were assigned a random code for their quotes. Questionnaire participants have been referred to as Q1, Q2 when quoted, and quotes from student interviews are referred to as S1, S2 etc. Quotes from interviews about initiatives are referred to as Int1, Int2 and so on.

3.4 Objective 3: Examination of food initiatives and university policy documents and reports to assess integration of aspects of student food security

3.4.1 Data Collection

A review of selected past and current proposals, plans and initiatives involving food and green spaces at different universities was conducted. In addition, individuals who are involved or have been involved in these proposals and initiatives were contacted, in the hope of conducting in depth semi-structured interviews to gain a better understanding of each of the proposals or initiatives and why they have or have not been put

into practice, and the extent to which they have been successful. These interviews looked into the main objectives of each of these programs, and covered themes of food security, sustainability and university campuses, green space use within a university campus space, the influence of sustainability declarations and frameworks, amongst others. These overarching themes remained the same for each interview, but some questions differed or were worded differently, depending on the context. The number of individuals interviewed was eight.

The second part of this objective consists of a document analysis, which aims to examine a variety of university policies related to the research. The majority of these documents can be found on university websites, however, some were accessed as a result of semi-structured interviews conducted. Semi-structured interviews are a useful method to employ as they allow for in depth understanding of topics (Kvale, 2009). For each of the documents, the most common words used (with their associated word count) were found and compared. Specific words or phrases such as food, food system, food security, food waste and sustainability were searched for and their presence or absence compared between documents. Main themes arising from the documents were also recorded. When looking at counts of words, it may be misrepresentative to compare the numbers, as some documents are lengthy and go into great depth, whereas others act as summaries.

2.4.2 Data Analysis

The initiatives were analysed systematically according to a set list of questions drawn up beforehand, for consistency, and relevant individuals linked to the specific projects were consulted, for example in terms of clarification, and to gain a deeper understanding of the documents and initiatives. Interviews with individuals were transcribed (if recording was agreed to), summarized, analysed using NVIVO. Themes which arose from other areas of this research were also taken into consideration during the analysis process (Kvale, 2009).

3.5 Ethical Considerations

Food security is a sensitive and loaded topic, and thus must be treated as such. Ethical considerations have been followed in accordance to the university guidelines, with regards to the online questionnaires and semi-structured interviews. Ethical clearance was sought and obtained for this research from the UCT Faculty of Science Research Ethics Committee: approval code: FSREC 14 – 2017 (Appendix One) and access granted by the UCT Department of Student Affairs (Appendix Three) in addition to the UCT Human Resources (HR) Department (Appendix Two). Anonymity of all participants was ensured, unless the participants themselves asked that their names be used. Informed consent was obtained from each of the participant.

The electronic informed consent (found within Appendix Six), a part of the online student food security questionnaire, was developed to ensure that no participant could access the rest of the questionnaire without reading through the information and clicking 'OK' to show that they understood and agreed with each aspect of the informed consent. If they did not agree with these aspects, they could not continue the questionnaire. The image below (Figure Three) shows that participants were unable to proceed to questionnaire without accepting each of these aspects of informed consent. If one was left out, it would show up with a red background and with the text 'This field is required'. Informed consent was also obtained for all interviews conducted, and a copy of this form can be found in Appendix Five.

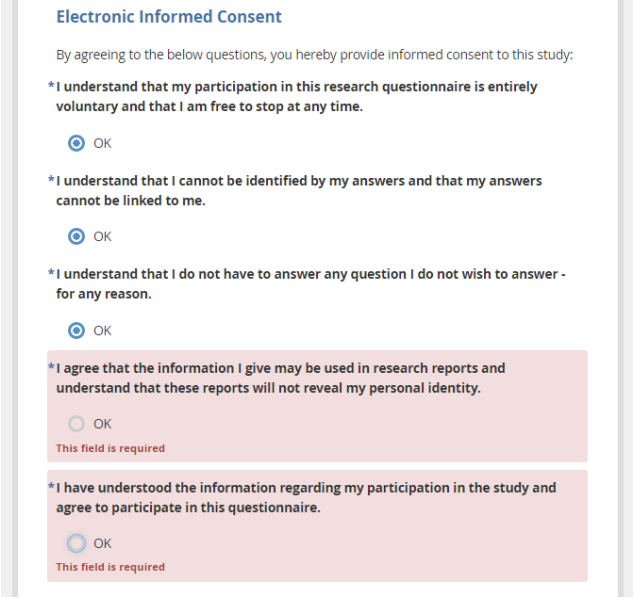

Figure 3: Online Questionnaire informed consent

3.6 Researcher Positionality

This research was conducted on a campus where transformation and decolonisation of the university are at the fore. The researcher is aware that being female, privileged, and a white student in South Africa, may have unintentionally influenced how this research was viewed by the student body, the information participants felt comfortable sharing, and in addition the extent to which students felt comfortable contacting the researcher for an interview. The researcher also identifies as being more introverted than extroverted, and shy which may have influenced the flow of the interviews. This shy disposition was actually often used as an icebreaker upon meeting the participants, as it was found that sharing this information made participants more visibly relaxed and comfortable.

3.7 Limitations

Limitations of this research include the short and limiting time frame of an MPhil coursework-thesis masters, institutional bureaucratic processes that took long periods of time, and the difficult of working with the DSA in terms of how the researcher was allowed to contact students, as the subject of food security is sensitive

in nature. As research invitations were only sent out via student email, the actual reach to students who would take notice of invitations via email was potentially limiting. It was hoped that social media or posters could be used in order to create more awareness of the research, in a more popular way. This was however not authorized. If this research was to be expanded upon, email invitations would most probably not be sufficient.

Another possible limitation is that the students who chose to engage with the online questionnaires and possible in depth interviews may not be representative of the majority of student views. This leads into the delimitations of this research. This research is exploratory in nature, and aims to investigate the emerging narratives of food security. It does not aim to provide generalised statistics UCT. Instead, it aims rather to explore different perceptions, understandings and lived experiences of food security of South African university students. This research does not aim to force an agenda of green space use to 'solve' university student food security, but rather explores the possible connections and disconnections and reasons thereof between a green spaces narrative picked up from the Global North and how this plays out in the context of South Africa and its universities.

3.8 Chapter Conclusion

An understanding of the approaches and methods used by previous student food security literature was established. This chapter explored the methods approach, drawing from methods used in university food security literature. The data collection and data analysis were described for each of the three research objectives. The quantitative questionnaire as a part of Objective Two was not representative and used for generally indicative data. The student interviews which also form a part of Objective Two provide a greater depth and insight. Ethical considerations for this research were outlined and the positionality of the researcher and how this can influence the research outcomes was reflected upon.

4. Results

4.1 Student Questionnaires

4.1.1 Introduction

This first section serves to provide a general profile of the students who decided to be a part of this research and complete the online questionnaire. The sampling approach was to invite via email through the DSA office any full-time UCT students between second year to PhD population for 2017 who had an interest in food, their food environment and food security of students to take part in an online questionnaire. Ninety-five students completed the online questionnaire, which is not a large enough sample to be considered representative. However, as indicated previously, this research is exploratory in nature, with narratives from interviews as the key focus point. It was never the intention of this research to reach a representative sample. Information from the questionnaires serves to provide more insight into and further explore different themes and links. Just over half of the respondents were undergraduates (51%), over a quarter were honours students (27%), a smaller number were masters students (17%) and 5% of the students were PhD students (99% response rate, with one respondent choosing to not answer this question on academic level). This spread of academic level is comparable with the UCT student population. The majority of students who took part in this research identify themselves as white (57%), which does not reflect the demographics of UCT. Of the respondents, 14% were the first in their family to study at university.

During the academic terms, the majority of the respondents lived with their families (40%), followed by living off campus with housemates (26%), on campus – catering (11%), on campus – self-catering (8%), off campus with spouse or partner (8%) and off campus alone (6%). Respondents were asked questions linked to the Reported Lived Poverty Index, and it was found that the majority of students have not experienced difficulties in the last 12 months with electricity and clean water supply, had sufficient fuel to cook their food, had enough food to eat, were able to make ends meet, and have not gone without medicine or medical treatment. The levels of deprivation differ across the six categories. Over the past year, 1% of students surveyed could often not make ends meet, in addition to often not having sufficient food to eat.

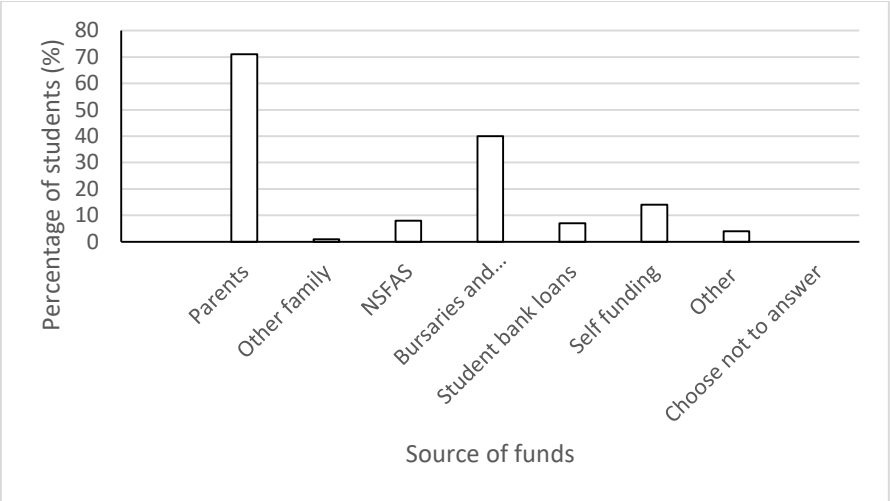

Figure 4: Sources of funds for tuition and student costs (Multiple response options; n=95)

As seen in Figure four, the majority of students who took part in this questionnaire received funds for their tuition and studies in 2017 from their parents, followed by bursaries and scholarships. Those who are funded in other ways indicated they are funded by their partners. 62% of students received their funds from one source, 31% of students received their funds from two different sources, and 7% of students received funds from three different sources. Of those who received funds from a singular source, the most common was parents (40 individuals), followed by bursaries (13 individuals). Of those who received their funds from two different sources, the most common combination was parents and bursaries/scholarships, followed by NSFAS and bursaries/scholarships, and student bank loans and self-funding. Other sources include a private institution loan and rebates. Only 2% of students work full time, with 39% of students working part time, and 56% not working while studying. 96% of students do not support others while studying.

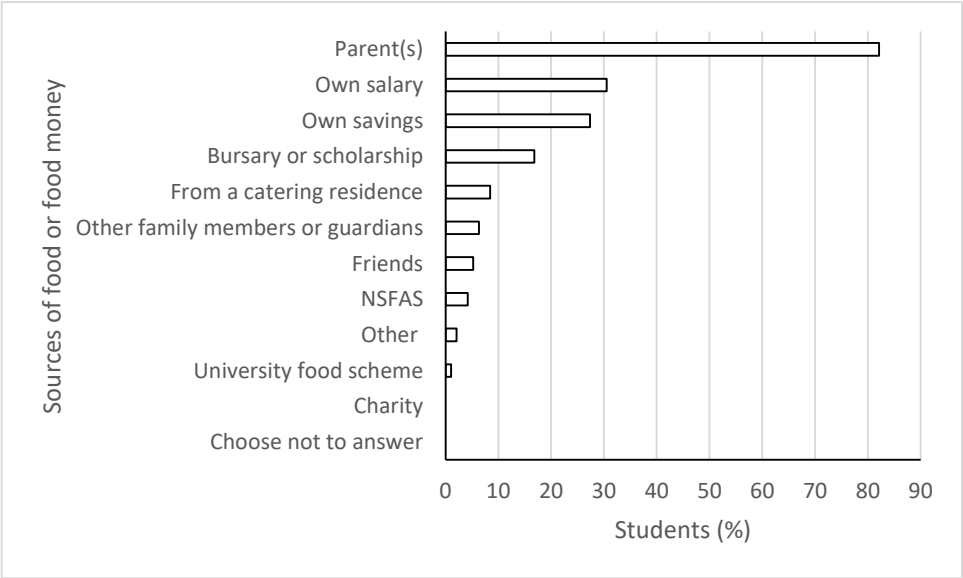

Figure 5: Sources of food or food money for students (Multiple response options; n=95)

Students were asked their sources of food or money for food, selecting all that were applicable to them. The most common sources were parent(s) (82% of students), own salary (31%) and own savings (27%). 2% of students selected 'other' and elaborated further that this was their partner. The least common sources were NSFAS (4%), Other (2%), and university food schemes (1%), with no students indicating that one of their sources is charity.

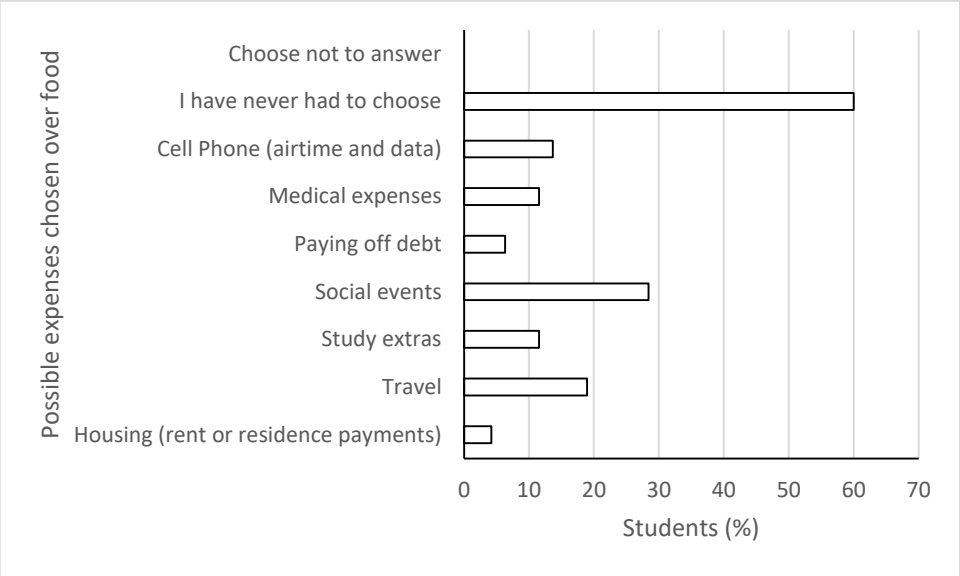

Figure 6: Expenses that were chosen over acquiring food (Multiple response options; n=95)

Respondents were asked if they had ever had to choose between buying food and a number of other expenses, such as housing, travel and social expenses. 60% of students stated that they had never had to choose between food expenses and other expenses. Of the students who indicated that they have had to make choices, the most common is to spend money on social events over food (28%), followed by travel expenses (19%), cellphone expenses (14%), medical expenses and study extras (both 12 %). The least common expense to forgo food is housing expenses (4%).

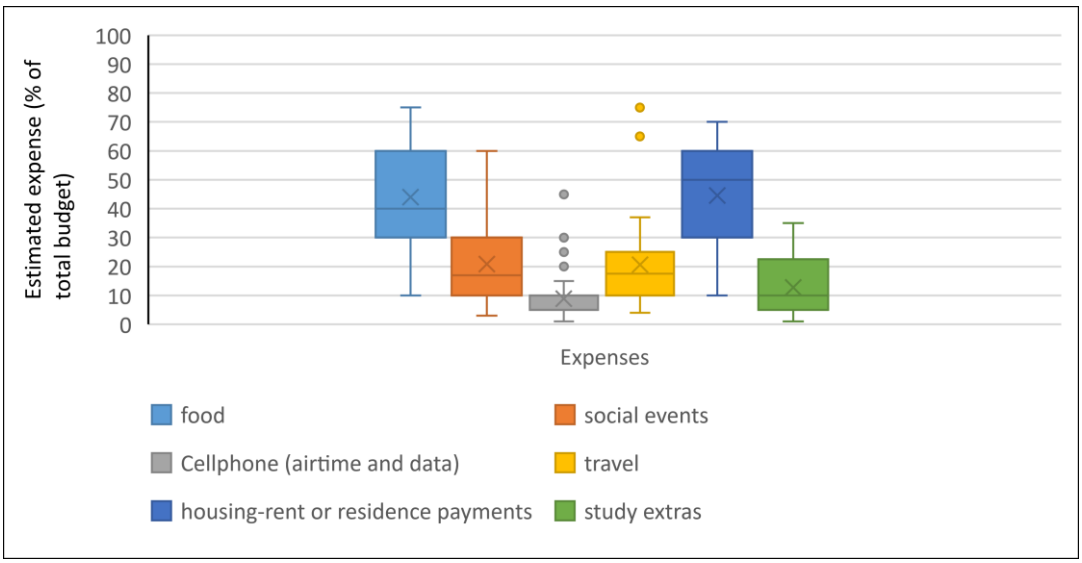

Figure 7: Approximation of monthly expenses, the darker shaded plots the most common expenses, and the lighter plots the less common expenses (Multiple response options, n= 53)

The most common expenses of the options were food (94% of respondents), social events (83%), cellphone expenses (73%), followed by travel (59%). Housing (37%) and study extras (34%) were the least common expenses among the respondents. Respondents were also asked to give approximations on how much of their budget they spent on each expense in percentage, with the total adding up to 100%, thus allocating 100% of their budget. Not all students allocated their full budget, and thus were removed from the calculations.

4.1.2 Household Food Insecurity Access Scale

This question had a 100% response rate. The first HFIAS question asks about worries and uncertainties linked to food supply. Questions two, three and four focus on the quality of food, such as variety and preference. Questions five, six, seven, eight and nine investigate the extent of insufficient food intake (Coates *et al*., 2007). No students went a whole day and night without eating. Of the nine HFIAS questions, question three (having to eat a limited variety of foods in the past four weeks) had the highest number of students indicating this is an experience they have had to endure as seen in Table 1 (42%). The percentages of students affirming that they have experienced these conditions decreased in the later questions (questions five, six, seven, eight and nine) indicating that most students do have sufficient food intake. It is interesting to note that fewer students are worried about not having enough food (question one at 21%), in comparison to the percentages of students experiencing conditions in which their food quality and variety change (questions two, three and four at 42%, 44% and 30% respectively).

Table 1: Distribution of affirmative answer to items on the HFIAS

Because of a lack of resources to obtain food, in the past four weeks…	Yes (%)
1. Did you worry that you would not have enough food?	21
2. Were you not able to eat the kinds of foods you preferred?	42
3. Did you have to eat a limited variety of foods	44
4. Did you have to eat some foods that you really did not want to eat?	30
5. Did you have to eat a smaller meal than you felt you needed?	20
6. Did you eat fewer meals in a day?	16
7. Was there ever no food to eat of any kind?	5
8. Did you go to sleep at night hungry?	7
9. Did you go a whole day and night without eating anything?	0

Figure eight shows the varying levels of each condition that the students experienced within the four-week period. The graph also shows the varying degrees to which the students experienced each of these conditions (rarely, sometimes and often). One can also examine each of the three groupings of the HFIAS questions, as elaborated upon earlier. A higher percentage of students experienced insufficient food quality (39%) over the four weeks, in comparison to anxiety and uncertainty about food (20%), and whether they have enough food to eat (10%).

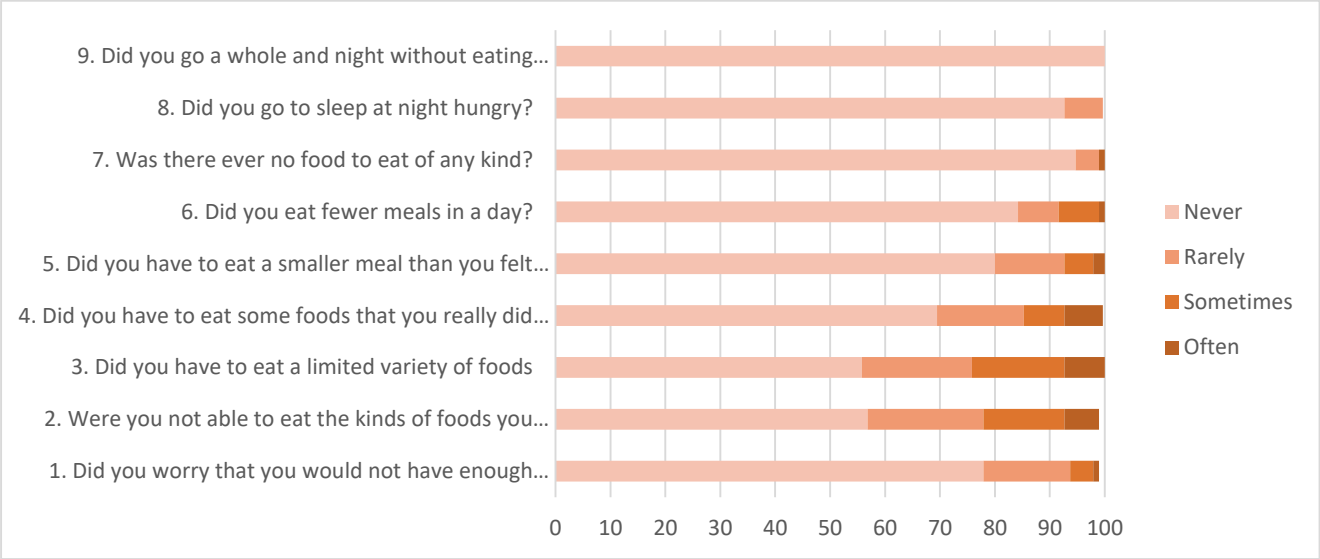

Figure 8: HFIAS conditions as experienced by respondents over a four-week period

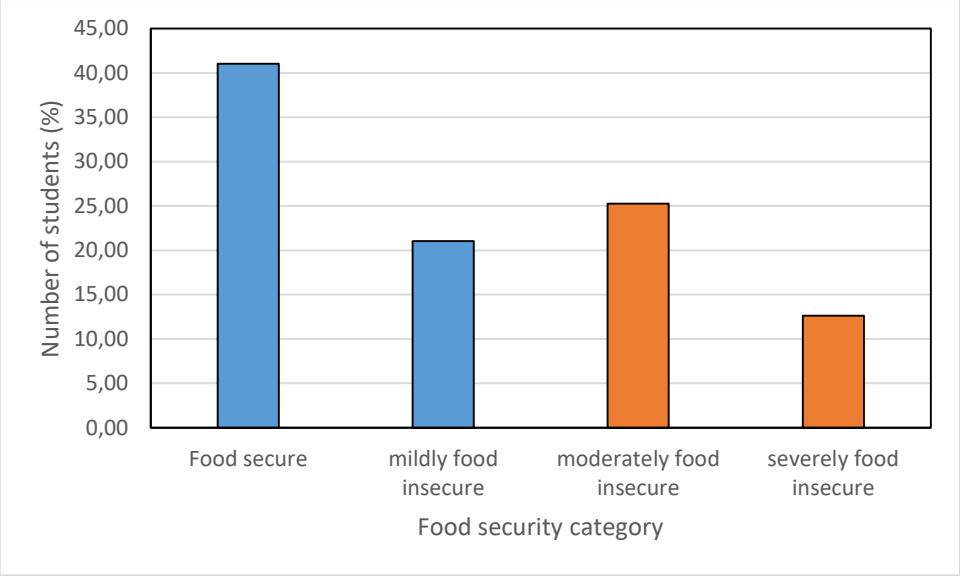

Figure 9: Food security category of respondents over a four-week period

4.1.2.1 HFIA Prevalence

The HFIAS score for the students is 2.9684. The highest HFIAS score is 17, out of a possible maximum of 27. The median score is two. 41% of students received a score of 0 which indicates that they perceive themselves as food secure. Figure nine shows the food security category of student respondents over a four-week period, and following the categorization used by Frayne *et al.* (2010: 29), the final two categories marked in orange are considered to be food insecure. According to Figure nine, more students experience a level of food security than not (62.11% food secure in comparison to 37.89% food insecure).

It also possible to compare levels of food security across different variables. Figure 10 below shows how levels of food security of students change according to where they live. It needs to be noted however, that there are different numbers of students for each residential situation. Those living with family have the highest percentage of food security. One can also compare levels of food insecurity in relation to different levels of academic study (undergraduate and postgraduate) as is shown in Figure 11. There is only a 4.79% difference between the academic study level, in terms of food insecurity, undergraduate students experiencing slightly higher food insecurity than post graduates.

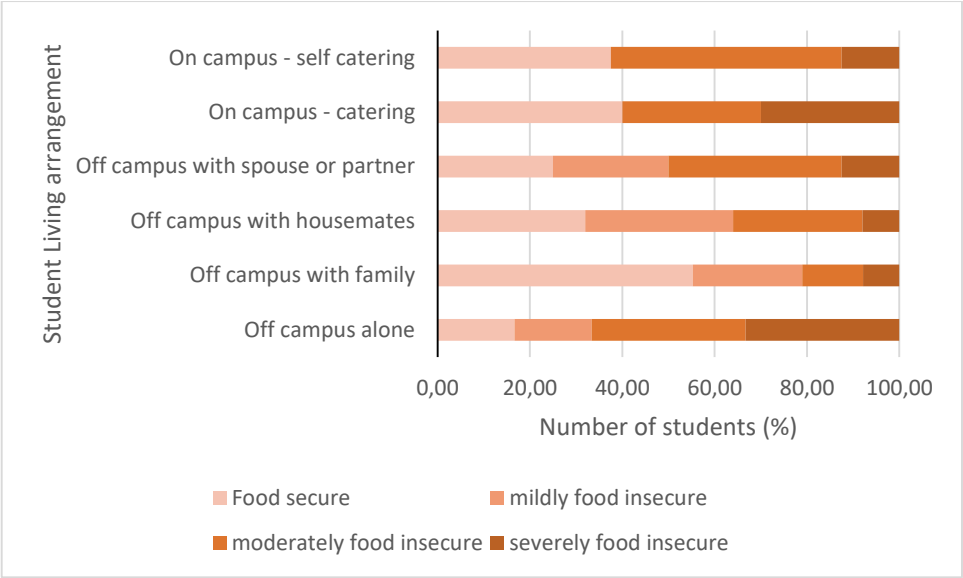

Figure 10: Comparing Food insecurity levels according to living situation

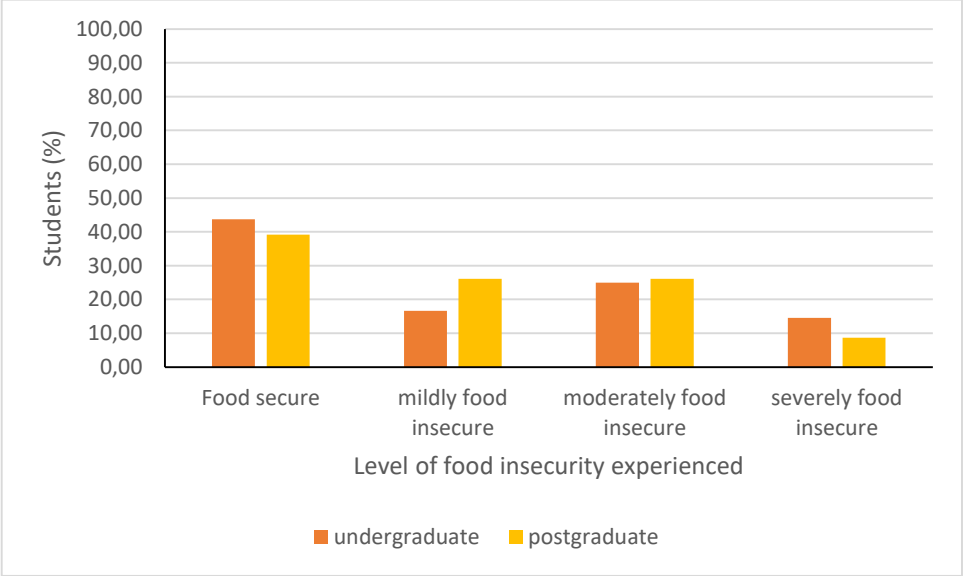

Figure 11: Food insecurity experienced according to study level

4.1.3 Months of adequate provision and academic performance

Of those who answered (97% response rate), only 4% of students indicated that there were months in which they did not have sufficient food to meet their needs. Of these students, one did not have adequate food provision in September, October and November, while the other three students experienced food provision problems earlier in the year, these being May, May and June, and July respectively. 28% of students have experienced difficulty focusing on their studies because of hunger (100% response rate), and 11% (95% response rate) thought that they could have performed better academically during exams if they had felt more food secure.

When asked if they had ever experienced fatigue, worry and decrease in concentration in relation to food, 30% of students answered that they had (97% response rate). When students did not have enough to eat, it made them feel that they cannot concentrate "*Having no food, either due to the lack of food or me trying to save money instead of buying food, leads me to think about food all the time when I should be studying or working and then I cannot concentrate"* (Q4) or become "*The classical Hangry, where you are quick to anger in response to an empty stomach*" (Q12). They also feel fatigued, stressed and less focused, shake and feel faint, experience change in mood, feel tired, feel unwell, inadequate and worried. Of those who had experienced this, some shared that they had experienced fatigue, worry and decrease in concentration due to lapses in time management, not having time to bring food to campus, being stuck in traffic, being busy, forgetting or "*some other privileged reason*" (Q73).

One student shared a familiar experience among the students who took part in the research: *"I don't think my experience was very uncommon. I did not want to buy food on campus because I had already bought too many lunches on campus that week, so I ate just a little snack during lunchtime. I was tired and could not focus on my work, so I went home early. But I could afford to eat food from home and everything, it was just too pricy on campus*" (Q53). Not being able to afford nutritionally balanced food can also be a challenge, as one student detailed: "*I don't make enough money to eat a variety of nutritious foods, so while I don't go hungry, last year I would eat powdered nutrition/cost balanced foods like futurelife (sic) for every meal for many months. It's hard to explain how this felt - I was not starving, but it did not feel good, just a general feeling of "unwellness" (sic)… It also caused me worry, because I didn't know if I was hurting my body for later in life and also I was stressed by feeling inadequate and not being able to eat normal foods"* (Q56). One student had experienced fatigue, worry and decrease in concentration in relation to food on "*Days where I slept hungry the previous night and missed breakfast the next morning without money to buy something on campus"* (Q62). Life changing events outside of the university setting can also play a role in influencing a student's food security, as a student shared: "*After my mom passed away (who was the main bread winner in our house) my dad didn't know what to do. He earned half her salary, and he never bought groceries before. I remember eating cornflakes for breakfast, lunch and supper because there was nothing else at the time. Now my dad does do some grocery shopping and I am grateful to have food to eat, however, he doesn't buy the healthiest things. Only the cheapest. For example, we never have fruit or vegatables (sic) in our house. I had tuna on my bread to school for 3 weeks straight"* (Q2)

4.1.4 Dietary Diversity

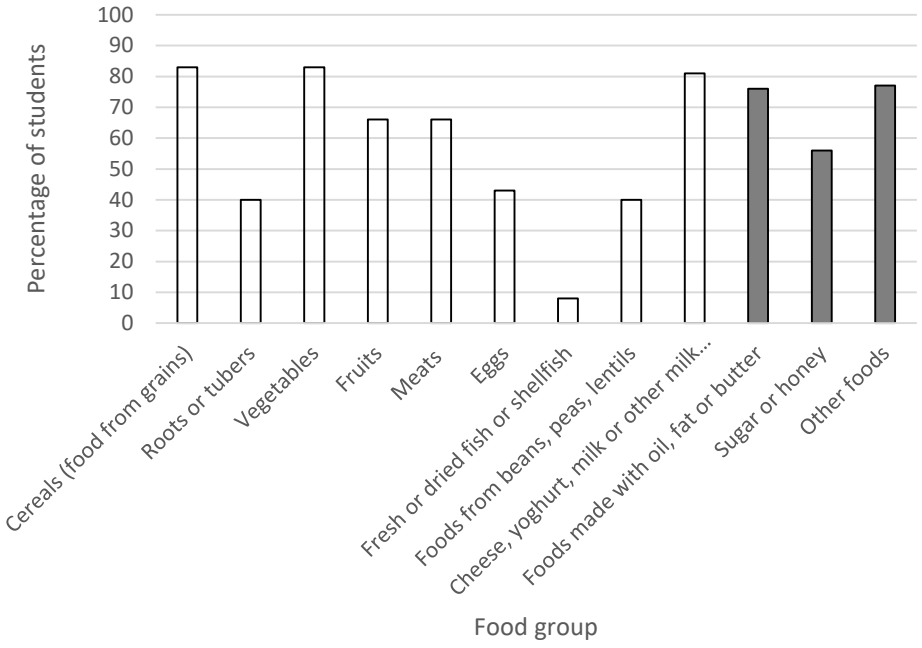

Figure 12: Dietary Diversity of respondents (n=95)

Figure 12 shows the varying proportions of 12 food groups consumed by the students over a 24-hour period, providing a snapshot into student diets. The median and mean Dietary Diversity Score (DDS) is seven, which is considered to be acceptable and sufficiently diverse (Battersby, 2011). One must also look at what the most common food groups are, as although seven is considered to be an acceptable DDS score, if most common food groups are sugars and fats, then the actual diversity can be more limiting (Battersby, 2011). When examining Figure 12, the four most consumed food groups are cereals and vegetables (83% of respondents for both food groups), followed by cheese, yoghurt, milk and other products (81% of respondents) and other foods such as tea, coffee and snacks (77% of respondents). According to Figure 12, the food groups consumed the least are fresh or dried fish or shellfish (8% of respondents), roots or tubers (40% of respondents), foods made from beans, peas and lentils (40% of respondents) and eggs (43% of respondents). A possible reason for the low percentage of students of the sample who consume foods made from the beans, peas and lentils food group, is that these kinds of foods often take longer to prepare, and time was something that was argued by respondents to be limited.

Respondents with a low score of six or below, are not necessarily lacking in nutrients, for example their diet may include fruit or vegetables (of which 54% and 59% of these respondents ate in the last 24 hours respectively). However, when the fat and butter, sugar and honey, and other foods (the bars marked in grey in Figure 12) were removed from respondents with an original DDS score of six or below, the DDS score for 95% of these respondents decreased even further, with a mean DDS of 3.9 and median score of four. If one examines respondents with DDS scores of seven and eight, which is considered satisfactory, and then also

remove the fat and butter, sugar and honey, and other foods groups, 8% of the respondents still have a score of seven or above. If these three groups are removed from the original respondent group (n=95), the adjusted mean and median is five, a significant decrease from the original DDS score of seven, thus indicating that the students are possibly as not receiving all nutrients required for a balanced diet, even though they may be calorie sufficient. It is important to note that one student had an original DDS of three, but after the three food groups of oil, fat or butter, sugar or honey, and other foods was removed, they had a DDS of 0.

4.1.5 Students, Food and Coping Strategies

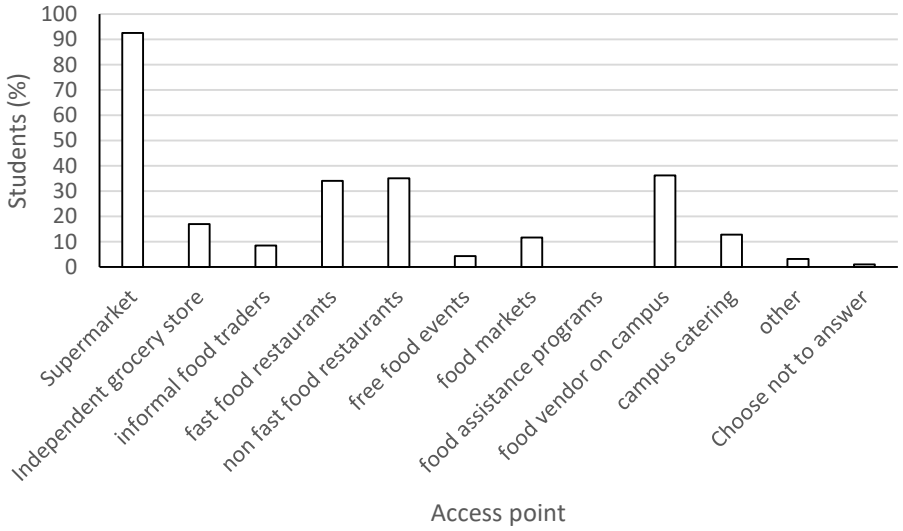

Figure 13: Access points where students have acquired most of their food over the previous month

As indicated in Figure 13, the most common place for students to acquire their food is at a supermarket (93%). The next most common place to acquire food are food vendors on the UCT campuses (36%). Non fast food restaurants and fast food restaurants are frequented by 35% and 34% of the students respectively. Only 3% of students had alternate ways of accessing food, which were obtaining frozen home cooked meals and obtaining food from a partner.

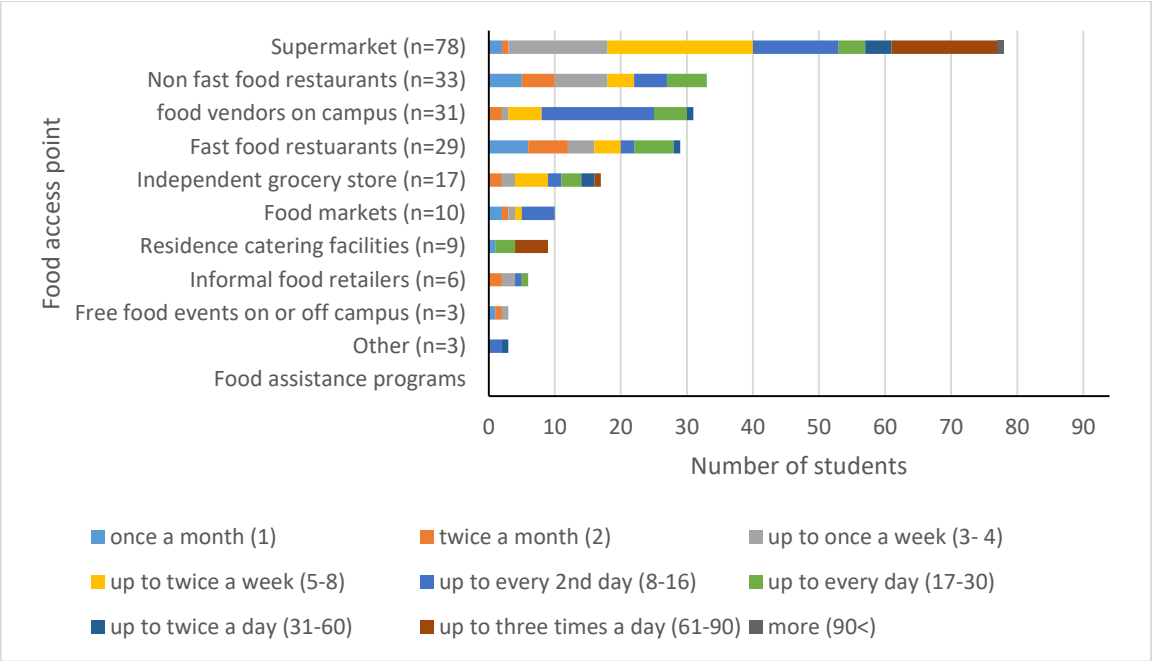

Figure 14: Food procurement points for UCT students (multiple response option)

In addition to indicating where they obtain their food, students were asked to estimate how often they use each of the options chosen in a month. Figure 14 shows the different frequencies at which students frequent each type of food access point in order to procure food. This graph has not made use of percentages, but rather the actual number of students. Supermarkets are not only accessed by most students (Figure 14) but they are also the food access point that has most diverse range in visit frequency by students. A small number of students (two) visit supermarkets only once a month, while the most common number of supermarket visits is up to twice a week (five-eight times a month). Surprisingly, a sizable proportion of students access a supermarket up to three times a day (61/90 times in a month). The reason for the small number of students making use of catering residence facilities is in part due to the small number of students in the study who actually live on campus, in addition to the possibility of some of these students living in self-catering accommodation. Of those who eat in a residence catering facility, students were most likely to frequent these spaces up to three times a day (61-90 times a month). Campus food vendors are visited up to every second day in a month (8 - 16 times a month).

Students were asked to explain their reasons for where they chose to obtain their food. The 81 text responses were analysed for common themes, using the options for a later question, which asked what they think about when they make food choices, as a departure point for this analysis. Financial constraints were a common theme across the student reasoning for why they acquire food where they do (appearing in 29 different comments). Transport was only a reason for two students, but location was an emergent theme which was important for 20 students, in addition to another emergent theme of convenience, which appeared in 25 of the comments, and ease of access which appeared six times. Concerns around health, healthy foods and

cleanliness were mentioned 12 times. Time constraints were mentioned in seven comments. The importance of variety in their food was a justification for five students. For a number of the justifications, personal preference came through as potential reasons. Less common themes include environmental sustainability (used once), time management (used once) and ethics and moral support (two students choose to spend their money at specific places in order to support certain people, as part of a moral, fair and ethical justification).

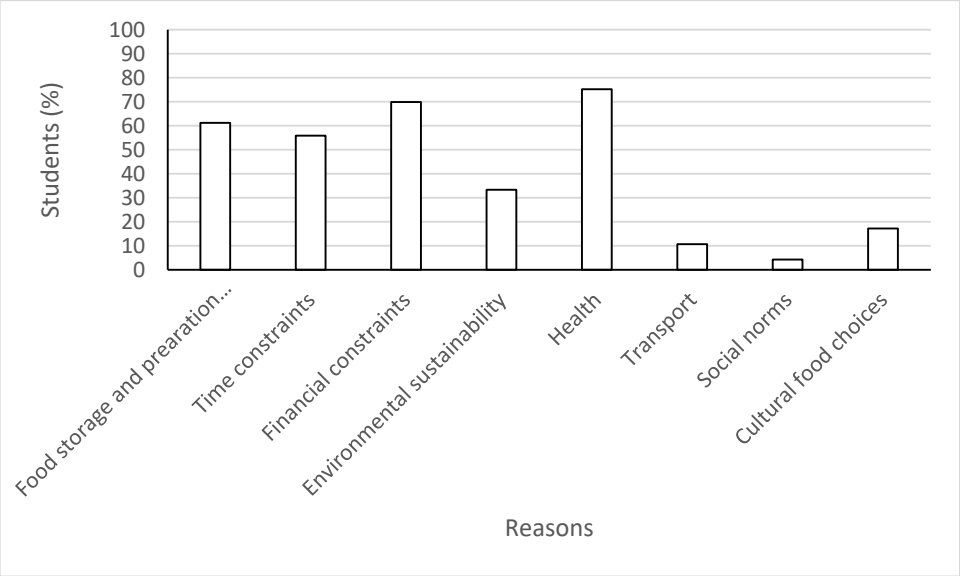

Figure 15: What students think about when they procure food (multiple responses option)

Health is considered by the highest percentage of students when navigating food choices and food procurement (75%), followed by financial constraints (70%), food storage and preparation challenges (61%) and time constraints (56%). Cultural food choices, transport and social are taken into consideration by considerably fewer students (17, 11 and 4% respectively).

When asked what they thought of their cooking skills (a potential barrier in preparing and cooking a sufficient amount and range of foods, as well as being linked to time constraints and convenience), Only 4% of students viewed their skills negatively, with the majority of students perceiving their cooking skills as amazing (11%), good (48%) and can manage (35%). Almost two thirds of students (63%) mostly prepare and cook their meals, while 14% of students eat food prepared by their parents. 11% of students eat in a residence dining hall, 7% hardly ever prepare their food, 4% cook with friends (potentially for social gain, in addition to financial and time constraints) and 1% of students have a partner who cooks for them. Just under half (49%) of the students surveyed never combine money and other resources with other students to buy and prepare food. 26% sometimes combine these resources, in comparison to 4% monthly, 12% weekly, and 9% daily.

4.1.6 Coping Strategies

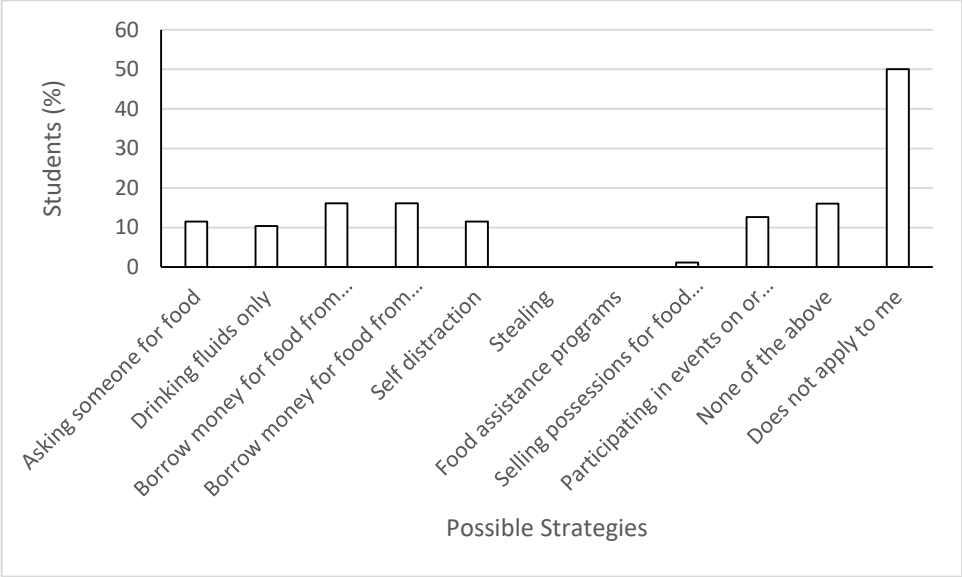

Figure 16: Coping strategies used by students

The use of coping strategies is considered to not be applicable for 50% of students, while a further 16% of students do not use any of the strategies listed. 'None of the above' was meant for students who made use of coping strategies that were not listed in the question, and provided a space for them to elaborate on how they navigate their food challenges. When examining these comments, it was found that this option may have been misunderstood, as many of the comments indicated that the students actually consider themselves food secure and privileged and do not need to make use of any coping strategies. Of the possible coping strategies, the most common were to borrow money from family members and friends (both 16%), followed by asking someone for food (11%) and self-distraction (11%). No students indicated that they resorted to stealing or accessing food assistance programs. The number of strategies used per student was examined for those who have made use of one or more strategies to cope. Making use of just one strategy is the most common, followed by using two strategies. Only one student made use of six out of a possible seven strategies. All except two students (98%) indicated that they do not know of any food assistance programmes available to students. Of the programs mentioned, none were linked to students specifically.

4.1.7 Rethinking the UCT food environment

Students were asked their opinions of what would have a positive impact on student food security. Below is a word cloud providing a snapshot into student thoughts and opinions around this subject. 67% of the students provided insight into how they perceive their food environment, with particular focus on the UCT campus, and how they think things should change. Common words such as the, I, and aren't, were excluded from the word list, in addition to student, university and food which are redundant within this context. After these three words were removed from the word list prior to creation of the world cloud, 'healthy' is the most commonly word used. The most common themes arising from these comments are affordability and cost of

food (21 mentions), the need for healthy and nutritious food (20 mentions), in addition to the need for increased or changed financing of food for students (nine mentions).

Figure 17: Word Cloud exploring student responses to what they think would have a positive impact of university student food security.

4.1.7.1 Affordability and Cost

The call for food that is cheaper and more affordable on campus is strong, and if this change was made, there would be a considerable positive impact for students. There is the sentiment that the food available on campus is overpriced, and that students are being exploited. Suggestions were made about having more non-meat based protein meals on campus, which are still healthy and filling, but more affordable, "for example: bowls of oats; bean stews; vegetable curries. A bowl of those could go for under R20, and help many who have limited budgets" (Q22) Suggestions linked to decreasing costs for students include food discounts for students (which could extend beyond the boundaries of the campus), subsidized or cost-price meals which could be made available in a cafeteria, and cheaper home cooked meals

4.1.7.2 Health

In one questionnaire response, a student describes and highlights dominant themes arising from this research: *"I feel like people learn better and can participate better when they have full stomachs full of healthy foods"* (Q2). This quote highlights not only the need for sufficient and healthy foods for students, but also

creates the important link between food and academic success. Many students made comments about the current unhealthy food environment at UCT and the need for healthier food that is affordable and nutritious: *"As a postgrad who sees students in the cafeteria every day lining up for unhealthy options, I think it would be good to have more affordable, filling, HEALTHY options on campus for university students" (*Q53*).* Another student exclaimed "*Healthy eating, not deep fried food!"* (Q94). Dietary variety was also indicated as important for some students. Examples of foods made up of non-meat proteins were included in addition to plant based meals (Q22, Q28 and Q49) and the provision of food options which are appropriate for and cater for a wide range of dietary requirements was highlighted (Q37).

4.1.7.3 Financing Food

Many students indicated in the comments that there is a need to rethink the financing of food for students, due to high costs and lack of affordability as perceived by the students. It was noted by one student that with insufficient food funds, more time is spent on working instead of studying. Suggestions to better enable students include increasing financial aid and monetary donations, allocating more money to students who receive financial aid, ensuring that bursaries and scholarships adequately cover food expenses, specific monthly food allowances or food grants, food subsidies and better payment for student work done on campus. There were ideas in relation to the payment system for food, such as a token system for food and meal assistance vouchers, in addition to student food discounts on campus and at grocery stores. In addition to these approaches of increasing food funding for students, alternative approaches were also put forward by some. The creation of a food assistance program on campus for students was suggested, in addition to a food bank, cheap cafeterias where healthy cooked food is available, emergency food assistance, a campus feeding scheme, and the creation of a UCT food store where subsidized or low cost food is available for sale to students. The creation of food gardens at UCT was also mentioned by four students, with the possibility of linking these to feeding schemes or a campus food store.

In addition to the main themes of affordability, health and finances; awareness; information; and education were also deemed important by a number of students. Some perceive that there is a need for awareness and education around healthy foods, plant based meals, cooking skills, as well as help with strategic planning around cost effective shopping, food storage and preparation. It was also felt that information about possible support structures for students who are having to navigate various food challenges should be more readily available for students to access, which could be achieved through campaigns and advertisements. Although not discussed by many, the divide between students in residence and those who are not was highlighted, in relation to non-residence students being allowed to access food vouchers and meals in residences.

4.1.8 Conclusion

The quantitative questionnaire provided interesting insights understanding food insecurity at UCT. Although not by any means representative, the questionnaire indicates that the majority of the questionnaire participants are food secure (62.11%). From the snapshot of the DDS, diversity in food groups consumed is fairly low overall, with many students consuming food groups that contain sugar for example. In terms of coping strategies, 66% of the participants do not use any coping mechanism. The word healthy was a common word used by participants when discussing the UCT food environment and student food security. Common themes arise from their comments include affordability and cost, health, and financing student food.

4.2 Student Interviews

4.2.1Introduction

This section has been set out according to the different themes which emerged from the interviews with students who chose to be further involved with this research after completing the questionnaire. Prior to the introduction to these themes, general challenges around food access are introduced. Thereafter, each subheading introduced is a theme which emerged from the analysis. Student narratives have been integrated with the findings to support these themes. Thereafter, more general points are discussed.

To provide some context for the student interviews, academic level and other factors will be provided. Of the 15 student interview respondents, six were at undergraduate level, five were at honours level, three at masters level, and one at PhD level. Ten out of the fifteen identified as women, mirroring the high percentage of questionnaire respondents who also identified as women. 57% of the interview respondents were considered to be food secure, and five respondents had a DDS score below six. When adjusted to remove the fat and butter, sugar and honey, and other food groups, only two students had a score of seven and above. Students shared the following reasons for deciding to take part in an interview: food security is an issue they find interesting and important; previous experience with schooling and school feeding programs; based on their experiences with food and affordability on the UCT campus, they think that the research is "*very relevant to UCT - to the way food resources are made available or lack thereof*" (S7); from observations around food with their fellow classmates; from articles they have read about food in South Africa; and wanting to help other students with research.

When asked about the kinds of dialogues they have had around food as students, most students had only discussed food informally, such as with friends. This research was often the first type of food security conversation they had come across. Some students who have been involved with UCT student society called Vegelicious have been a part of food dialogues around sustainability, and vegan food. Two students have had lectures that are linked to food, in terms of ethics around eating meat and the ethics of marketing food, and

another student had learned about food chains at a different university. Another student said that the only time they have been asked about food by the university is in terms of comments to caterers about the residence food. Another student had thought that until the research invitation to this research, they weren't aware of any food related research at UCT, and they are of the opinion that the university does not bring it up. When asked about their knowledge of any initiatives they are aware of that have a food focus for students, of the 15 students interviewed, 13 had no knowledge of any initiatives. One student had heard of an initiative through the UCT Engineering and Built Environment Faculty, and another was involved in the creation of a food bank at Obz Square, a university's self-catering residence.

A further question was asked about the role of ensuring food security for university students. Most found this a difficult question to answer, as many felt it depended on the financial situation and sources of income of each student. Some also indicated that it was also dependent on if you were living in a UCT residence or not, or if you were undergraduate or postgraduate. If parents can afford to cover food expenses, it was discussed that they should be responsible for this, but if this is not possible, then other external sources of funding must be found, for example in the form of bursaries, corporate funding, and other financial assistance. Others said that the university has the responsibility to ensure the food security of students, and some added that this should be the case, but with input from the students themselves. In terms of how the responsibility is shared within the university, there were opinions that it should be management, that it shouldn't be any one faculty, that it should be everyone in leadership positions. For this case, an example from a residence context was given: that the responsibility extends from the warden, sub-wardens, to the house committee and kitchen representatives. The Student Representative Council (SRC) was another possibility mentioned, in addition to provincial or national government itself.

Some students shared their challenges around food as a student. "*I know last year I struggled because especially in postgrad you don't get, sometimes you don't get funding for everything. Last year I got funding for tuition and res and I was only left with R1800 and I was given that for the whole year. So obviously that's not going to sustain me. I need to buy cosmetics, food, textbooks, everything. And I did struggle last year so I do know that especially in postgrad, people do struggle with like food and stuff"* (S15). The importance of awareness of food challenges that students experience and the difficulties of making healthy decisions was highlighted: "*We can't ignore that people are struggling and can't do that*" (S15). Another student shared that they did not want to bother or worry their family for issues like asking for food or extra money for food while on campus when it came to challenges around food. There are perceptions that people may have about students who are studying at UCT which may not necessarily be true: "*Just because people are studying at UCT doesn't mean they can afford to eat as much as they should everyday*" (S1). The student is referring to the students who are on Financial Aid with bursaries, financial aid and student loans. "*If it wasn't for financial aid, there's no way my family would've been able to afford UCT fees and I'm certain there are many other*

students who are in the same boat as I am. I worked extremely hard in Matric to get into UCT as it was my first choice, even though I wasn't exactly sure how my fees were going to be paid" (S1). The themes most discussed by the students are the cost of food, food quality and health, in addition to financing food. Other themes evidenced from the interviews include availability of food, education, and stigma. These are expanded upon below.

4.2.2 Cost of food

Students openly voiced their concerns and opinions about the cost of food available to them in their everyday lives as students at UCT. One student noted "*Well, we all eat food, basically. It goes without saying. And, food security for me on campus it's - the issue I have is that it's not always affordable. You want to eat healthy and all of that but you check the prices – it's ridiculous, and at the end of the day, what do you do*" (S8). 13 out of 15 respondents discussed the cost of food. "*I don't really buy on campus, because it's expensive for no reason. If you have a meal voucher, then it's fine. But as a student who's not in a catering res, like buying a sandwich for R24 every day is just not…not ok*" (S1). The high cost of food on campus was found to be a common concern raised by the interview participants. Those who felt they could generally afford this food, pointed out that they were very aware that they knew others may not be able to. One student eloquently summarized that the food available to students should be food that "*caters to everybody's tastes or pocket*" (S10). The cost of food was not limited to one particular campus. The difficulty of finding a balanced or healthy meal on a tight budget was emphasized. Concerns for rising food prices was discussed, with a student voicing "*food is becoming more and more expensive. From a grocery bill from last year, I did the calculation for the same food. It's increased by at least 35% for the same food, at the same Pick 'n Pay store.*" (S14)

In order to circumnavigate this challenge, many students shared that they bring their own food to campus when they are able to. Others have to fit time to work during their busy academic calendar in order to afford food: "*I think a lot of students also have to find their own jobs in order to be able to afford food at all … friend of mine. She has to work like three or four times a week in order to be able to afford food. A very good friend of mine ... She has very excellent time management skills, and she does very well, and I look up to her*" (S3).

Frustration was expressed at the dilemma of having to choose between food that is affordable or food that is healthy, as on campus, healthy food and affordable food are viewed as two opposing factors that have to be taken into consideration. "*you have limited access to healthy options because they tend to be more expensive*" (S12). Factors often taken into consideration when navigating their food environment on campus include cost, health and time.

4.2.3 Food quality and health

Student perspectives on cost of food was closely linked to food quality and health. "*I think everyone should have access to nutritious food. And the… well the food, you know, means, you have to provide good quality food, and that can be sold at a price that people can afford it. I think probably it would be a good idea to have subsidized vendors if they are selling food of a high quality or nutritional value. Then, you also need to ensure that… all the students can actually access good quality food*" (S9). Healthy food can be found at UCT, but the high cost of the food has the potential to make it exclusionary, in comparison to other food options. A fear that was raised in the interviews is that if there is pressure to provide cheaper food, the quality and health of the foods may suffer. One student talked of a need to find a middle ground between quality and cost: "*I mean it would be nice to have it cheaper, but is one decreasing the quality or the quantity. So it's kind of either one or the other. So they need to find a middle ground"* (S7).

"*For me, just I'll emphasize it again and I will speak about it again, and a lot of other students will agree with me. If food on campus was like much more, you know, it was cheaper, like especially the health snacks and that. Because I mean you run to a vendor – like a vending machine and you see to get a pack of chips would be R6 and to get maybe a health -I don't know –snack would be maybe R12 or something and you're like Nah I'm gonna just - I mean again, most students, don't have the means so… If the options you know like for healthy eating was here then I think it would be easier for me and for many other students, so ja. So definitely like perhaps UCT needs to look into the pricing and just to make sure it's affordable. I mean, it's not just here – it's at UWC the same thing. I mean you'd go into a cafeteria there and you'd check What! Why is these things so expensive?! And then you wanna try and maybe health snack things – like what this is even more expensive, so obviously you will go for the cheaper most of the time of the two expensive ones.*" This quote illustrates that students are well aware of the types of foods they consume, and the links to health. If students do not have the extra finances to afford healthier options, then they are forced to make choices they otherwise may not have made.

Some discomfort with the food voucher system was mentioned. These concerns included that "*You should be able to get a decent meal for a voucher. And when what you can get for your voucher is again, deep fried something with fries, and a lot of the places that sell relatively healthy food do not even accept the vouchers*" (S13). "*I guess for the long duration we have to be on campus for – nothing is sufficient enough"* (S3) This quote highlights the need for food that will provide sufficient energy to students to enable them function throughout the academic day. The challenge of the effect of food on academic achievement was lightly touched upon. The idea that food is a fuel for energy was raised, and thus food, "*that they rely on to get them through the day so it needs to be good food, it needs to be wholesome food"* (S7). One student shared that they noticed that one of their classmates ate very little. "*The first time I saw him put a sandwich in his mouth was the other day, but he drinks a lot of coke and a lot of coffee. So I assume he's only on caffeine diet. He's*

just joined me this year in postgrad so I don't actually know him from previously and it's just made me think about what levels of sustenance he gets while he studies throughout the day. He sits in the library from about nine o'clock till about...so then we have class from two-six – so library nine to two, class two-six and we stay there until about eight; goes home, maybe he eats there, I'm not sure" (S6). Students are very much aware of the links between food and academic success. The "*brain needs good food to work properly, and like your body needs access to something that is not just carbs or a lot of carbs*" (S13). "*And it affects the person. I mean you can't study if you're hungry*" (15). Another student stated that "*there cannot be effective learning with an empty stomach*" (S1)

The importance of students being able to access foods for different dietary requirements and lifestyles was also raised by many of the participants. One student stated that their ideal university food system would cater for all dietary requirements, including vegetarian, medical related diets, in addition to religious and cultural dietary requirements. The lack of options for people who do not eat meat was also highlighted: "*I think definitely more options would be great for people who don't eat meat, vegans especially because it's not a lot of options and remember the vegan society I was telling you about, that they were trying to really go for – try to get a vegan option in residences which, I'm not sure if – how far that's come, but I think it's a good idea"* (S10).

4.2.4 Financing food

Almost every student interviewed expressed their view as to how the financial aspects of food should play out, and there was a range of different perspectives. The current austerity measures that universities are facing (at the time of interviews in 2017) were acknowledged. Some students had minimal changes they thought should be made, while others called for an "*overhaul of the whole current system*" (S14). The difficulty of balancing the need for more financial aid and subsidized food, without increasing university fees was considered. Ideas for increasing the finances available for food included increased financial aid, meal vouchers, subsidies for students on financial aid, bursaries that make allowances for a realistic food allowance, the creation of subsidized campus food shops or cafeterias, crowdfunding, food on campus that is not for profit, and the potential for sponsorship by corporates and the private sector. As can be seen with this range of ideas, while the students interviewed may not have agreed on how food for students should be financed, they are in agreement that the current system needs to be changed.

Better payment systems were also discussed. Time constraints can make it difficult for students and can have a negative impact on their access to food on campus. "*I don't know if you've ever got coffee from those coffee machines. He was trying to implement a pay with your student card, you would literally just tap your student card against and it would deduct money off it. I don't know how far along they are with it – they've been trying that for ages, and I just can't understand why it can't be done. There just has to be an easier – I mean*

none of the vendors have card machines so it's like, all cash and obviously at 12 o clock everyone's at the bank lines, and then everyone's at the food lines for a long time" (S14).

The food voucher payment system for those who are living in UCT residences was also challenged. "*I think with food vouchers, it's about R29 that you get and that just for lunch, and it's supposed to see students through from morning time through to evening, so that's like a span of – I'm going to say like nine - ten hours that a food voucher is supposed to help you through the day*" (S7). This student elaborated on the challenges with the current food voucher system, and how they are faced with problems of having to spend all the voucher in one instance, at one vendor, and the possibility of losing out on change, as many vendors do not like to give students change. The student advocates for a system where students can use the value of the voucher at multiple locations, at different times of the day, and the possibility for leftover credit to be carried over to future days (if change is not given), as "*having credit available on your student card would be better, because then you carry it over to the next day or the next week*" (S7).

4.2.5 Further prominent themes

In addition to the three main themes discussed above and which dominated many of the interviews, other themes emerged. These include the availability of food, education, and stigma. The importance of access to food was emphasized, and that "*Everyone at least would be able to get, to gain access*" (S8) The importance of making sure that the food available caters for all students was raised: "*We will just have to see if we choose what we're giving, does it cater for most of the people*" (S15), and with this comes the importance of knowing the target population. The importance of having food that is accessible to all was emphasized when a student shared "*I am diabetic so that forms a big part of my food choice, so to say. Ja, especially on campus with the food that they sell here*" (S14). Differences between residence students and day students were raised by some students. Students living in UCT catering residences are able to get food and have breakfast for example. Social connections can be very important, and this was illustrated when a student gave one example that one of their friends in residence would bring extra breakfast for them, such as juice. Therefore, students are looking after one another. The difference in food environment and experiences between students on financial aid and live in a catering university residence, and of those who are on financial aid but were not given a space in residence was also raised. Protests were also mentioned, particularly in terms of how food availability is affected. When residence kitchens are closed, students in residences have to make use of food vouchers, which are likely used at fast food takeaway outlets.

Students were also mindful that peer pressure and stigmatization can play a big role in terms of student food security. "*Some people still do struggle with peer pressure. If you in your kitchen – coz at* [UCT residence] *you will get nine people who share a kitchen – 11 even. And in your kitchen, people will buy stuff from Woolworths – only from Woolworths and…they are always cooking those nice things. Some people end up not going to*

the kitchen, not cooking because they are afraid that "oh they cooking - I don't know – pap today, and those people are cooking nice food and that makes it difficult for people then to come out and say actually I don't have enough money, I don't have food. I know like in most kitchens there is always going to be someone who is buying stuff from Woolworths, and that I know from last year, there was a guy who in my kitchen, just didn't go – he would only go to the kitchen during the day when we're not there. Because he doesn't feel like he fits in with the rest of the people. And that just makes it difficult" (S15). In this shared experience, living situations have the potential to make students feel ashamed or experience stigma. The way in which food is accessed by students who are food insecure can also create stigma. "*Sometimes students (primary and high school) are too ashamed to ask for food at the feeding schemes during intervals because they feel embarrassed knowing that their parents cannot afford lunch for them. I think there would be a similar case if UCT had its own feeding scheme, but as I've mentioned, there cannot be effective learning with an empty stomach" (S1)*. This insight reveals the importance of approaching solutions with sensitivity and diversity in mind, so as to not create negative experiences around student food security.

When talking about examples from other universities around the world in how they have navigated student food security, the students interviewed were concerned about the potential for stigma. Some thought that there may be stigma around food banks. One student thought that if a food bank was somehow linked to a subsidized campus food shop that everyone could access, this could therefore decrease potential stigma (S7). Linked student cards to food assistance programs could also reduce stigma (S7). Although some students welcomed the idea of food sharing apps, others were critical of this example, as the need for a smartphone could create problems. In addition, it was thought that food sharing apps would not work as "*people would be sharing food with the very same people who do have food. Coz like if I have an - two apples and you have two bananas, then we will probably be two people sharing, whereas the one who doesn't have, probably not be able to get involved in the app. But if you… I don't think someone who desperately needs food would want to be given food in that way*" (S11). A food sharing phone application "*also requires a sort of sensitivity…well, people, well the stigmatism between people, because most people will not share food unless they make it themselves or they know the person very well"* (S14). The realistic implementation of food recovery programs was also questioned: "*from the environmental perspective I would totally agree with the redirection of food so there's less wastage. But…I don't know who you would give it to, so obviously if you were to implement this program you would have to find the people who would receive it and actually want to eat the food for it to work"* (S12).

Education around food, nutrition and sustainability was also a theme raised by some students. A particular focus of these education programs were first year students, "*So like especially for maybe first year students, the university should maybe take a little bit of a like guiding role in terms of to teach people how to like – what's good, what's not good. This is where you get that, this is like a recommended budget for food*" (S13)

Another student recommended "*a literacy program or some kind of cookbook. Like a lot of students live off campus and don't get res food*" (S4). Others did not support of increased education around food, as they felt students already have a level of knowledge and they know what is good for them, but it was acknowledged that students choose the easier options. "*I think we know a lot about what's good for us, what's healthy for us and whatnot, but it's just that sometimes we choose just to go with the easier option, so even though we know what's best, we will go with what's easiest or what's most filling*" (S7).

There were also students who considered education around food to be something with more of a sustainability focus. "*There might already be a vegetarian and sustainability society but like it could definitely be a larger swing towards like there's that green – it could be a part of the Green Campus Initiative. Just being conscious of what we eat and how it's actually produced and grown. You could actually compare that to an industry of farming which is like mass produced, mass cultivated, sprayed crops, so that would be very good*" (S4). One suggestion included the creation of posters to be placed around campus "*Trying to tell people how bad dairy and meat products are for the environment*" (S3) in addition to creating awareness around the costs of different diets, as they elaborated that "*A tin of chickpeas is so cheap in comparison to chicken. You don't necessarily have to have nuts. I don't think necessarily that buying fruits and vegetables costs more than buying meat. There is a huge perception that being vegetarian is more expensive than being a meat eater, or being a vegan"* (S3).

4.2.6 Conclusion

The student interviews revealed rich and contrasting responses with valuable insights and experiences. Different world views, and different experiences of hunger (or not) determine responses. Basic food security questions around decent and affordable food access have been raised. Structural issues have also been brought up, such as the structural issues around food vouchers and other UCT systems, inclusive of residence kitchen politics. Catering options, both in residences and on the different campuses have been criticised. There is also a call for education around issues that span more than food, with food offering a lens to further explore and research. There is also evidence of student lack of awareness of their own privileged situation while at the same time, student networks supporting others and sensitivity among students are also present. The students also engaged in and pushed for a general rethink of the wider UCT food system, for example from vending machines to the voucher system. The diversity in narratives reflects the diversity of students and the challenges in responding to their needs.

4.3 Food, Support, Policy and Reports

4.3.1 Introduction

Objective three is the focus of this section, which has been divided into two main parts. The main focus of this section is of initiatives, policies and reports related to UCT and its students. There are other initiatives at

other universities, some of which are summarised below (given space restraints) before a detailed discussion on the UCT initiatives is presented, which makes up the first part of this section. UCT is the focus due to the fact that this was the site of all the data collection for Objective two. The second part consists of a review of documents linked to UCT sustainability and green space use. These documents are examined for how or to what extent they address issues of student food security within the context of sustainability and green space use.

Programs and initiatives, both past and present exist at a number of different universities in South Africa. Common Ground, a student society at Rhodes University in Grahamstown, Eastern Cape aims to create awareness around sustainability and food. Through the gardening at their lot amongst other activities, they aim to promote learning and sharing of knowledge in permaculture and organic gardening, and provide practical educational opportunities for students, and a create knowledge hub for food growing skills to promote future community resilience, with a focus on indigenous and traditional knowledge of edible and medical plants applicable to South Africa (Int5). Although there is some produce grown, this is on a small scale, and the food garden is largely for educational purposes, and the promotion of personal food security (Int5). A small number of staff and students at the George campus of Nelson Mandela University have tried in the past to provide food for students through their permaculture garden for their first year practicals on campus, but with limited success (Int4). There is a clinic providing non-perishables to students, but there has been no collaboration with the food gardens. When there is produce from research sites, this is distributed to students who are interested (Int4).

WITS Inala is a student society at WITS University. They have a very active food garden, and focus on food production for the WITS Food Bank, in addition to structural engagement, policy shaping and public engagement and awareness (Int3). They aim to create spaces for students to engage with food with dignity, no stigmatization, promote food sovereignty and climate justice, in addition to influencing the shaping of university policy (Int3). WITS Inala is very aware of the challenges of hunger on their campus and attempt to actively engage to improve conditions where possible, for example by demanding zero hunger at WITS in 2016 (Int3). They engage with many aspects of student food security, such as access, quality and nutritional status of food on their campus, social aspects of food, demanding transparency about the state of student hunger, as well as linking aspects of sustainability, such as promoting zero waste approach, the creation of food commons as well as promoting curriculum transformation, and decreasing reliance on fossil fuels (Int3).

4.3.1.1 Green Campus Initiative

UCT has a student society and community development agency, Green Campus Initiative (GCI), which is similar in some ways to the WITS Inala and Common Ground in that they promote sustainability. GCI started in 2007, by a group of students at UCT who were interested in environmental awareness and activism. GCI

plays a role of assisting and activating UCT management to implement sustainable practises within the institution, as well as create awareness within staff and students (Int1). As of 2017, GCI was not involved in any particular food security related initiatives, but they have been trying to create a food garden. The aim of the garden would not be particularly food security related, but rather as a way for students to reconnect with where their food comes from, and reconnect students to their food and sparking debates and conversations around food. They do promote sustainable eating were possible, and the vegan student society Vegilicious was once part of GCI (Int1). GCI has not been advised by the university to have a food security element in their agenda, and currently there is none (Int1). GCI welcomed the idea of food programmes on campus, and discussed the work of WITS Inala as an example of how a student society can be involved in food security and related challenges. The GCI representative commented that it would be interesting to gauge the levels of interest and potential for stigma in terms of receiving free food from a food bank, and noted the complexity around what something like this would look like and the image it would portray. They further stated that a food security initiative would need input from the students and the institution itself in order to ensure the sustainability of the programme. GCI's main documents are included within the document analysis that follows, in order to gain a better understanding of the organization.

4.3.1.2 Obz Square Food Bank Emergency Packs

The Obz Square residence at UCT launched a new food bank initiative in the second half of 2017 with the provision of emergency packs to students who are in need. Background to the Obs Square residence and the context in which the Emergency Packs Initiative is situated was provided. The residence is a big residence and has the potential to very isolating "*it's such a big res with 850 students I think and it's a very… isolated res because when you go into your room like you shut down the whole world and you only see people when you go to the kitchen. And if you don't go to the kitchen it means you won't see anyone*" (Int2). They also stated that there are students who struggle with having enough money for food, and with a big, isolating residence such as Obs Square, this struggle can be hard to see. It can also be difficult for people to come out and voice their challenges. "*We – people do struggle at UCT with money or food and, in a res like that, it's very hard to see... that people are struggling. And it's very hard also for people to come out and tell people, coz it's a not a very friendly res unless you are that kind of a person. So, my team and I decided to start this initiative*" (Int2). Postgraduates are especially likely to struggle, due to limited funding that may not cover much beyond your academic fees and potentially your rent. This was a challenge that they had had themselves in the previous year.

The students behind this initiative (the warden is also involved) buy non- perishable items to make a pack, such as *"maize, pasta, rice, sugar, teabags, cereal, milk, all those things*" (Int2). A R100 Pick 'n Pay voucher is also included in the packs for the purpose of buying fresh vegetables and meat, as it is not possible for the initiative to keep perishables items that may go off. A specific email has been set up for the initiative which

is only accessed by the two reps (Second and Third tier). "*the thing is that people obviously – some people are not ashamed to say they are hungry, but some people won't just say it out loud*" (Int2.) In order to receive a pack, a student from the residence must send an email stating which tier they are from, and they must include a reason for needing the packs. *"I understand that can be very intrusive but the only reason I did that was to find out why they need food, just because we need to know the root of the problem, and giving the food is temporary, but we need to know what the problem is. If we can refer the person, we can do that, so that's why we need to know why the person needs food*" (Int2). The funding for the food packs comes from UCT, and at the beginning of the year, each portfolio in the res submits a budget, and motivates what the money received will used for. "*That's how we do house parties and stuff. It's that money that is given to every res. So ja, if I run out of money, then that's it*" (Int2). Currently, there is no possibility of applying for more money later in the year.

In the short time that the initiative has been active they have had a number of students contacting them for help. "*And we've had quite a response from that –like people in postgrad I know mostly - because I handle that, it's funding – they not – it doesn't cover everything, or it's just like at home, they can't give them any money for food*" (Int2). At the time of the interview, 10 students had contacted them about the emergency packs in times of need. In terms of successes and challenges, the #Feesmustfall protests had a negative impact on funding procurement, which resulted in the initiative only receiving their funds this semester, and thus could only start in the second semester of 2017. The fact that they could only start the initiative two weeks prior to being interviewed by the researcher means that they didn't have much feedback, regards successes and challenges. They are aware that there is the possibility in the future that people may abuse the system, which could lead to running out of funds and being unable to help those who really need it. "*The thing is we're afraid that people abuse the system – that always happens, and that can be a problem because I had budgeted R8000 for this and already I think we've got like 10 people already. And I'm not saying they don't need it, but there's always going to be the possibility that someone will need it – will say they need it but they don't. And we were discussing how we can stop that because people were saying maybe we should put a limit and say – 'every week we only give out five', but that's also not possible because what if the sixth person is the one who really needs it, so we can't do that. So, we just - whoever needs – whoever says they need, we just going to give it to them, until we run out of money, then we will say that "we don't have money anymore but that's a challenge that we are going to face, but so far it's been fine*" (Int2). Because the initiative is so new, it was difficult to know exactly how much money to apply for at the beginning of the year. A report will be compiled for the people in charge of the initiative in 2018, outlining possible challenges, so that they can be best equipped to decide on how to run the initiative.

4.3.1.3 EBE Student in Distress Fund

One of the students interviewed (as a part of Objective two) notified the researcher of the EBE Student in Distress Fund, which was launched in August 2015 by the Faculty of Engineering and the Built Environment (EBE) Student council. This fund provides assistance to students who need help with essential academic expenses including books, medical emergencies, and assistance with rent, basic toiletries, food and electricity (University of Cape Town, 2018). A summary of the key aspects and themes of the interview about the fund follows.

One of the reasons the fund developed was because a lecturer found a student sleeping on campus in the labs. Since the fund was launched, they have been able to help 80-90 students. In terms of food, the fund makes the use of Pick 'n Pay vouchers for students. The reason that they use vouchers is that many students would otherwise send money home. The funding is temporary funding until a permanent solution is found. Psychologists and Social workers in student wellness send students to them. The fund is mostly food related, but they have also helped with a few laptops, medicine and transport. They try to work closely with the students. The students don't have to go and fill out forms, so that there is no bureaucratic process to have to deal with, and they just have to write a letter explaining their situation. The interviewee has never felt that anyone has abused the system. There are staff and alumni donations, and student council fundraising. The fund was placed under the student council umbrella, so as to better navigate management, the students' environment and possible tensions.

In terms of success and challenges, the beginning of 2017 was difficult for the fund, with more problems than in previous years, due to the mini semester and many students starting early, without the funding coming through. The fund feels fortunate as they get funding in EBE. Other faculties tried this initiative, but were not as lucky to get it going. People don't realise that actually there are students who are in need. They find that family obligations are considerable, and therefore one can't just focus on the student, but instead one must also take the family into consideration. The responsibility of earning money is so overwhelming "*this black tax is huge"* (Int6) and many people don't understand how they struggle. Another common challenge experienced is in making the R1600 stretch to food and toiletries.

Cycles of hunger have been observed. The demands vary at different times of year. The times that are the most challenging and when students are most likely to experience hunger, are at the beginning of the year before bursaries have come through; then throughout year for those whose circumstances unexpectedly change, for example due to family related challenges, if something suddenly happens, and then also around exam time, which can also be anxiety driven. Other observations include that there should be a platform for students to discuss and access food related initiatives. It has also been observed that catering to self-catering transitions can be difficult. The fund has observed that not many first year students are in need of help. They

have observed that there are more male students than female students who approach them. Male students are more likely to be with them long term, instead of once off, whereas female students generally approach them for once off help.

The fund does not want to advertise extensively and prefers that student affairs, lecturers and friends refer students to them. However, it is on the faculty website so is visible if students are looking for help. There is not a lot of money, and they would like to keep it going as long as possible. One challenge is drawing the line, as there can be difficulties with attachment, and therefore the initiative tries not to make students reliant on them. However, if a particular student really could benefit from more support, the fund will offer support. The EBE Student in Distress fund is also PR in a way, helping to keep students happy, and let them know that the faculty does have the capacity to really care for its students.

The EBE Student in Distress Fund separates sustainability and sustainable food programs from what the EBE Student in Distress Fund does. The representative stated that sustainability is more linked to research, whereas the EBE initiative provides assistance in the present. “Policy must not dictate how EBE is able to help students – as policies can lead to frustration. It would be sad to lose the spontaneity of helping” (Int6) although “policy could make it more fair” (Int6). The fact that this fund is able to help students in a very personal way is a strength of the fund, in addition to its ability to make use of its own discretion, and act instantly as seen fit, instead of waiting for long processes to unfold.

4.3.2 Document Analysis

Reports and documents from UCT form the main focus of this document analysis. The analysis includes reports and research examining the university’s sustainability, food system and ecological footprint. UCT has numerous documents available online such as different signed charters, carbon footprint reports compiled and Green Campus Initiative annuals reports. Following is a summary of each of the selected documents.

4.3.2.1 University of Cape Town Green Campus Policy Framework 2008 (Hall and Murray, 2008)

This 20-page document has a focus on policy for sustainability of the university, with particular focus on energy and water consumption, the university’s carbon footprint, as well as recycling. There is no mention of food security or food systems. The word food is mentioned twice firstly as a part of the background for UCT’s role in sustainable development, and there is a mention of food shortages in Africa and secondly in decreasing food waste.

4.3.2.2 University of Cape Town SRC Students’ Environmental Charter (Students’ Representative Council,2010)

This 10-page document discusses sustainability, environmental justice and working towards the university as a carbon neutral and sustainable. The aim of the charter is to be a guiding document for the SRC in terms of

environmentalism. The document focuses largely on sustainability connected to building infrastructure, academic programs, and behaviour of students in residences. There are no mentions of food, food security or food systems in the document. There is one mention of kitchens, but this is in terms of energy consumption, not food preparation.

4.3.2.3 University of Cape Town 2012, 2013 and 2014 Carbon Footprint reports (Rippon, 2015; Rippon, 2014; Rippon, 2013)

These reports form a part of the university's commitments of shifting to a sustainable campus which requires the measurement of its carbon footprint. This is considered to be a very important aspect for achieving various sustainability goals. In the 2012 report (Rippon, 2013), the food supply of the university was incorporated into the total emissions amount, and was found to make up 7% of the UCT GHG emissions. The phrase food security is not mentioned in the document, but food system is mentioned seven times. The word food appears 38 times. The 2012 report documents the UCT food system. This is the first document in the document analysis to do so. It included a brief outline of the food system (residence system and vendors) and thereafter an explanation of how the carbon footprint for this aspect was calculated, with associated uncertainty levels. Food is engaged with in this document beyond food waste, even though student food security is not discussed.

The 2013 report (Rippon, 2014) also does not mention food security, but it does mention food system seven times. The word food is mentioned 43 times in discussing food supply, food system and food supply chain, food emissions, and adopting a sustainable food program, extending beyond food emissions to include social, ecological and economic impacts of the current UCT food system (supply chain). The idea of adopting a sustainable food system that is not just focused on decreasing carbon emissions is worthy to note. This is the first time where there a possible potential connection between student food security and campus sustainability is present.

The 2014 report (Rippon, 2015) is 27 pages long, and does not contain the phrase food security, but does contain the phrase food system four times. The word food occurs 26 times within the contexts of food supply and purchased goods, food system (briefly explaining the UCT food system) and in food emissions.

4.3.2.4 UCT Green Campus Initiative annual report 2012 (Green Campus Initiative, 2012)

This report is a summary of the work done by the Green Campus Initiative for the 2012 year. It contains information about the different projects, awareness initiatives and institutional changes. The phrase food security is not found in the document, but the phrase food system is found once, when explaining Vegilicious, which was a new project at the time, with the aim of promoting sustainable food culture at the university. The word food appears three times in the report in the contexts of food garden (the planning of a vegetable

food garden for a school as a part of the Green Campus initiative's outreach efforts), and food culture and food system (when describing Vegilicious, and promoting the shift to more sustainable food choices that decrease emissions and include decreasing animal product consumption and increased consumption of local food). There was also talk of creating a responsive and sustainable food system at the university. Although there is no direct connection, there is room for interpretation, and therefore possibilities of links to student food security.

4.3.2.5 UCT Green Campus Initiative annual report 2016 (Green Campus Initiative, 2016a)

This report is a summary and reflection of the 2016 year for the Green Campus Initiative. Updates to each of the portfolios are provided, in addition to other events linked to the Green Campus Initiative. The phrases food security and food system are not found in the document. The word food is found four times in the document with three of these occurrences were linked to the society Vegilicious, in connection to impacts of food on the environment and making sustainable food choices, and the final reference is linked to a documentary screening hosted by the initiative, about reducing impacts to the environment and growing one's own food.

4.3.2.6 UCT Green Campus Initiative WSEN report (Green Campus Initiative, 2016b)

This document is a summary of the World Student Environmental Network Annual global summit conference attended by three Green Campus Initiative members, which brings student organisations from around the world together and has a focus on sustainability at the university level. This document is useful, as it is possible to compare the discussions at this level, in comparison to the singular university level. The document provides summaries of different events attended, such as workshops and presentations. The phrase food security appears twice in the document, in the context of food security challenges, from the food production to consumption. No reference was made to food systems. The word food appeared 30 times in the contexts of food security, food waste, food distribution and consumption, inequalities of food distribution, food packaging, food banks, good food vs nutritious food as a luxury, and barriers to sustainability for example food availability. There is a difference between the UCT documents and this one, in terms of how food is discussed and viewed. In this case, it is higher up on the agenda of sustainability, and aspects pertaining to food security are discussed within the sustainability space.

4.2.3.7 UCT Environmental Transformation workshop

This document is a summary of a group discussion workshop on Environmental transformation at UCT, involving the Green Campus Initiative. Main themes of discussion were waste and consumption, transport, infrastructure and landscape, energy and investments, and education and community engagement. The phrases food security and food system are not mentioned in the summary document. The word food appears

five times in relation to food consumption, shifts to more sustainable food options and for pilot projects for the campus to grow its own food.

4.3.3 Conclusion

This section which aimed to address Objective Three, has provided a brief outline of a number of initiatives at different universities in South Africa, and thereafter focused more extensively on the interviews held with UCT based initiatives or societies that are linked to food or sustainability. From these summaries, it is clear that each initiative related to student food security and sustainability in varying ways. Wits Inala are considered to engage in the most systemic way, with the different aspects of food challenges that they focus on. Of the UCT initiatives, the residence food bank and the EBE Student in Distress Fund both focus on the present and challenges that require immediate attention, and not particularly on changing systemic issues. Although GCI does not currently engage with food beyond a sustainability lens, it seems that there is potential for this to change. The second part of this section consists of a review of documents linked to UCT sustainability and green space use. The document analysis provided a snapshot into how sustainability and food has been thought of or understood and is framed at UCT. The lack of substantial links of sustainability, green spaces with student food challenges and food security for students within these documents reveals a stark disconnection between current policy university sustainability and student food security.

5. Discussion

5.1 Introduction

The aim of this research was to explore the current narratives of student food security at UCT, in addition to examining the campus food initiatives and the connection or disconnection between green spaces, sustainability and student food security responses. Chapter Two provided an overview of the global and national literature of university food security (Objective One), providing a basis for comparison with the findings of this research. Chapter Four summarised the findings for Objectives Two and Three. This included student food security dialogues, food initiatives, and policy document analysis. In this chapter, the major findings of this research will be discussed, and these will be related to the findings from the literature. The relevance of these findings will also be discussed. Reflections about the limitations of the research will be deliberated over, and suggestions for further research will be posited.

The quantitative online questionnaire provided a basis upon which to explore student food insecurity and food challenges as a whole at UCT. One must be reminded that although it is not representative of the overall student population nor statistically significant for the entire UCT population, the questionnaire provides insights into the food environment and food security of a small pool of students wanting to engage with food issues. The issue of unrepresentivity is not unknown to student food security research. In their recent research at UP, Du Rand *et al.* (2017:10) had a demographic profile that was skewed towards women (75.05%) which is also the case for this research (66%), in addition to being 62% white, which is slightly higher than that of this research (57%). In contrast, van den Berg and Raubenheimer (2015:28) had a demographic skewed towards males (61.7%) in their research at UFS, and a representative sample in terms of ethnicity.

As seen in figure 9, it was found that the majority (62.11%) of the questionnaire participants are food secure (moderately and severely food insecure categories combined to become one food insecure category, as was done by Crush *et al*. (2010) in their research into urban food insecurity in southern Africa). This figure is much higher than that of UFS which was 16% (van den Berg and Raubenheimer, 2015:28). Du Rand *et al*. (2017:22) found that the majority of their respondents could be classified as food secure, but not necessarily nutritionally insecure. From the snapshot of the DDS in this research, it was found that diversity in food groups consumed is fairly low overall, with many students consuming food groups that contain sugar for example. This is potentially comparable with the findings from UP (Du Rand *et al.,* 2017:22). In terms of coping strategies, 66% of the participants in this research do not use any coping mechanisms. The most common coping strategy employed was to borrow money from family members and friends (both 16%), followed by asking someone for food (11%) and self-distraction (11%), which some of the strategies documented at other South African universities (Dominguez-Whitehead, 2015; Kassier and Veldman, 2013). No students indicated that they resorted to stealing or accessing food assistance programs. As seen in Figure

10, food security levels differed according to living situation in this research, with students living off campus with their families experiencing the lowest levels of food insecurity, and those living off campus alone experiencing the highest levels of food insecurity. If investigated further, this could have important implications for how the university views its students' living situations, beyond being placed and affording rent. It may also reflect the importance of social networks when it comes to food. Figure 11 which explored differences in levels of food security according to academic level, showed that undergraduate students experienced slightly higher levels than postgraduate students, which was also found by van den Berg and Raubenheimer (2015: 162), although the difference between the food insecurity levels between undergraduates and postgraduates was more substantial. In opposition to this are the views voiced in Interview 2, where it was stated that postgraduates are more likely to experience food insecurity due to less funding being available to them.

Although results indicate that levels of food insecurity are relatively low (Figure nine), in comparison to the findings of other universities, this does not mean that there aren't students who have to navigate a diverse range of food challenges every day as a student (Figure Eight, Figure nine). This is also confirmed by the interviews, where students shared their challenges around accessing food. The challenges shared by the participants in this research around their food challenges, and struggles of affordability, are similar to the experiences and insights which students shared in the WITS and UKZN based research by Dominguez-Whitehead (2015), where students also discussed food acquisition struggles, depletion of food funds.

5.2 Student Narratives

5.2.1 Food costs and affordability

The cost of food and affordability for students was a major theme found throughout the findings, from the questionnaires, and the student interviews. According to the questionnaires, food was estimated to take up between 30 and 60% of a student's budget (Figure Seven). The call for cheaper food is strong, across the questionnaires and interviews. This is not uncommon, when comparing these findings with national and international literature. Similar themes around cost, affordability and not having sufficient funds are discussed in relation to students at WITS (Dominguez-Whitehead, 2015), UP (du Rand *et al.,*2017), UKZN (Kassier and Veldman, 2013) as well as internationally (Hanbazaza *et al*., 2016; Cady, 2014; Gaines *et al.*, 2014:377; Gallegos *et al*., 2014).

5.2.2 Food quality and health

Table One reveals that some of the questionnaire participants have had to adjust their eating habits, such as having smaller meals, or being limited to eating specific foods. The DDS values also indicated that not all participants may be getting sufficient nutrition (Figure 12). This is comparable to research conducted by

Battersby (2011), where if the most common food groups are sugars and fats, the resulting dietary diversity can be very limiting. Health was also the most common aspect participants consider when they procure food (Figure 15). Food quality and health was raised by participants in the open ended question of the questionnaire, as well as with the student interviews. There was a general consensus from these sources that the food available on campus for students leaves a lot to be desired, not only in terms of cost, but also in terms of the quality and health of the food available. The research conducted by Meko and Jordaan (2016) which involved examining the food environment for students at UFS could be a useful starting point when rethinking the food options available on each of the UCT campuses, not only in terms of cost, but also in terms of different food groups present in foods provided (whether for sale, served in dining halls or given away). It was found by Meko and Jordaan (2016) that many foods available for purchase by students were higher in sugar than acceptable. In the same way that many UCT students circumnavigate this problem by bringing their own healthier, and more cost effective meals to campus, students at WITS talked about having to leave campus in order to buy simple foods, such as bananas, for affordable prices (Dominguez-Whitehead, 2015). The link between healthy foods and academic performance is another theme common to both the literature (Buch *et al*., 2016; Cady, 2016:28; Gaines *et al*., 2014:374; Kassier and Veldman, 2013; Munro *et al*., 2013) and the student participants in this research.

5.2.3 Financing food

The questionnaire participants were very vocal about the need for change to how food for students is financed, and this was further reiterated in the interviews. This is yet another theme that is voiced in the national and international literature. As discussed in Chapter 2, financing food and the importance of financial support is a uniting theme, as well as the call for reviews of current systems, for example in Australia (Gallegos *et al.*, 2014) and in South Africa with the NSFAS system (van den Berg and Raubenheimer, 2015; Gwacela, 2013; Kassier and Veldman, 2013; Munro *et al*., 2013). Many suggestions were made and discussed in the questionnaire and interviews in relation to different payment systems that are more efficient and inclusive. Some of the suggestions put forward fundamentally challenge how the food system currently works at UCT, for example using student cards for payments, and the creation of subsidized campus shops where students can purchase healthy food at affordable prices.

5.2.4 Other comparable themes

Stigma is another theme present in both the findings of this research and the literature reviewed. When thinking of ways to address student food insecurity, stigma is very important to consider, and this was not only emphasized by Buch *et al. (*2016) and Gallegos *et al*. (2014) but also by the students interviewed, for example in the case of linking a food bank to a subsidized campus shop where student cards are used, and thus there is no visual difference between the transactions for those with financial support credit on their cards, and those who are able to afford groceries and meals without assistance (S7).

Apart from the research conducted by Dominguez-Whitehead (2015), where rich narratives and discussions are drawn upon, there was no other literature discovered during the course of this research which makes use of student narratives in order to bring student food challenges to the fore. When in attendance at the Roundtable Discussion on Access to Food for Students in South African Tertiary Institutions (hosted by the Socio-Economic Rights Project at the Dullah Omar Institute situated at the University of the Western Cape), a call was made for engaging with students more about their experiences (ironically there were not many students in attendance) and wanting to use narratives of students in order to better understand their experiences and challenges around food.

5.3 (Dis)connections?

When examining the links of sustainability and food, there is a weaker link between student food and university sustainability at UCT, in comparison to universities situated in the Global North. Although UCT has calculated its carbon footprint over multiple years, the reports and policies focus on aspects of sustainability other than food security, such as energy reduction (Rippon, 2015). Although reference is made to the UCT food system, and the call for a sustainable food system was noted by Rippon (2014), no concrete changes have been found to support this desire for a shift in emphasis during the course of this research. GCI, who acts as link between management and staff and students, does not currently have a sustainable food system agenda for UCT as a whole (Int1). Sustainability in relation to food was not a strong theme encountered in this research, with the exception of the WITS Inala forum who advocate strongly for student food security at their university. Although discussed during the course of the review of the literature, the idea of linking green spaces with student food challenges did not turn out to be a major focus point of the research, with students rather focusing on other matters they consider to be of a higher priority, such as affordability, healthy food, and financial support. Thus, it seems that there currently is a disconnect between green space and student food initiatives within the context of the UCT campus. The student food narrative discovered through the course of this research does not really talk to this, and while the links between green space and student food security may be relevant in Northern contexts, it is likely that there are more pressing systemic issues that require attention in the context of UCT and other universities in South Africa. For example, engaging residences and student housing facilities on the differences in food security levels according to a student's place of residence may be a more obvious step then engaging with sustainability and greening at this time. When students were discussing how the food system at UCT may be changed, the majority of students did not focus on environmental sustainability and green space.

5.4 Reflections and Further Research

As a part of the methods chapter, limitations were briefly discussed. It is important that some of these limitations are emphasized again. The views presented by the participants of this research may not necessarily be representative the majority of student views. Indeed, there is a pressing need for more representative research to be undertaken among economically disadvantaged students for whom food security is a pressing need. It must also be emphasized that this research is exploratory in nature and aimed to focus on perceptions, lived experiences and narratives of students in relation to food.

Upon reflection, if this research was to be taken further, approaching the invitation to the online questionnaire differently may result in a larger sample size and better student representation. It is recommended that in order to make research like this more successful, there has to be buy in from management and staff that will better enable the creation of awareness for students. More appropriate and up to date channels should be used, instead of the UCT email, as students get tired of research invitations through this medium. There is also the potential for student societies such as GCI to take a bigger role in creating a food hub, not just around food and sustainability but also about making food challenges transparent. As a result of the Roundtable held on the right to food in tertiary education in 2017, there may also be the potential for research collaborations with other universities in the Western Cape or South Africa, where a common research methodology could be developed (Haysom and Tawodzera, 2018) that is specific to university student food security.

Apart from one document in the document analysis, there is a conspicuous absence of the UCT SRC in this research. It would have been useful to make substantial contact with the UCT 2017 SRC on the topic of student food security, but this was not made possible during the course of this research. The political environment of a university also plays a factor in creating a complex environment in which the food insecurity of students is situated. It has been observed through the student interviews and from student questionnaires that times of protest such as during the #feesmustfall movement towards the end of 2016 have been brought up when students think about their food environment and student food security. Times such as these can result in instability of a student's food environment, and can create additional barriers to food access. This adds yet another layer of complexity to approaching student food security research.

5.5 Conclusion

In this discussion chapter, the major findings of this research were examined and, and were compared to the literature focusing of student food security. Despite slight differences in methodologies, similarities between research conducted at the national and international level were established. Many themes which arose from the literature were common to the student interviews, such as affordability of food, health, financial support and stigma. It was established that there is currently more of a disconnection between student food

experiences, sustainability and green space, than connection. This could be due to the different contexts in which UCT and other South African universities are situated, in comparison to those situated in the Global North, where there is a stronger focus on green space use, food and sustainability. Reflections about the limitations of the research were shared, and suggestions for further research were made.

6. Conclusion

This research explored current narratives of student food security, campus food initiatives and the (dis)connection between green spaces and student food security responses, specifically focussing on students at the University of Cape Town in South Africa. After an examination of the national and global level literature around university student food security, it was found that this research is fairly new in the context of South Africa, particularly at the University of Cape Town and that there is scope for new more research to be conducted. Three main objectives were created in order to achieve the research aim. The first objective was to review the global literature of university student food security, and the use of green spaces on university campuses as a food security response. The second objective investigated student food security dialogues, and the third objective included the examination of university based food initiatives and university policy documents and reports, and assessing the integration of aspects of student food security.

To achieve these objectives, a mixed methods approach was used for this exploratory research. A review of the literature was conducted, in addition to a document analysis, online quantitative surveys and semi-structured interviews in order to explore the narrative of student food security at the University of Cape Town. The connection or disconnection between university campus sustainability, green space and student food security was also investigated. Main themes which arose from the research include challenges relating to the affordability of food, health, financial support and stigma. It was found that there is a disconnection between student food experiences, sustainability and green spaces. Importantly, this research includes a qualitative component, thus going beyond mere statistical analysis and allowing for the voices of students to be documented, offering glimpses into their experiences and points of view. The mixed methods approach to this research revealed that more pressing systemic issues require attention in the context of South Africa, thus adding to the complexity of how student food security is approached in the country. This exploratory research highlighted the need for further research to be conducted. Reflections about the limitations of the research were shared, and suggestions for further research were made.

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Appendices

Appendix One: Faculty of Science Research Ethics Committee Ethics Approval

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

Faculty of Science
University of Cape Town
RONDEBOSCH 7701 South Africa
E-mail: timm.hoffman@uct.ac.za
Telephone: + 27 21 650 5551

3 April 2017

Ms Jessica Drewett
Department of Environmental and Geographical Sciences

Student Food Security at Universities in South Africa: Exploring the (dis)connection between student food experiences, sustainability and green spaces from the lens of food security.

Dear Ms Jessica Drewett

I am pleased to inform you that the Faculty of Science Research Ethics Committee has approved the above-named application for research ethics clearance, subject to the conditions listed below.

- Implement the measures described in your application to ensure that the process of your research is ethically sound; and
- Uphold ethical principles throughout all stages of the research, responding appropriately to unanticipated issues: please contact me if you need advice on ethical issues that arise.

Your approval code is: **FSREC 14** – 2017

I wish you success in your research.

Yours sincerely

Prof Timm Hoffman
Chair: Faculty of Science Research Ethics Committee

Cc: Dr Gareth Haysom (Supervisor)

Appendix Two: UCT HR Approval for Access to Staff for Research

HR194	ACCESS TO UCT STAFF FOR RESEARCH PURPOSES	UNIVERSITY OF CAPE TOWN IYUNIVESITHI YASEKAPA UNIVERSITEIT VAN KAAPSTAD

RECEIVED
03 AUG 2017
ED: HR OFFICE

NOTES

- Forms must be downloaded from the UCT website: http://forms.uct.ac.za/forms.htm
- This form must be completed by applicants who are requesting to access UCT staff for the purpose of research.
- A copy of the research proposal as well as the Ethics Committee approval must be attached.
- It is the **responsibility of the researcher/s to apply for ethical clearance** from the relevant Faculty's Research in Ethics Committee (RiEC).
- If you are requesting staff information, you are required to complete the HR Information Request Form (HR190) and submit it together with all the required documentation.
- The turnaround time for a reply is **approximately 10 working days unless specified as urgent.**
- Return the completed application form and all the above documentation to Joy Henry via email: joy.henry@uct.ac.za; or deliver to: For the Attention: Executive Director, Human Resources Department, Bremner Building. Room 214, Lower Campus, UCT.

SECTION A: APPLICANT DETAILS

Title	Ms	Name	Jessica Drewett
Telephone number	0716407472	Email address	drwjes001@myuct.ac.za or jessjazzcoral@gmail.com
Student number	DRWJES001	Staff number	
Visiting researcher ID / passport number			
Faculty Officer contact details	Faculty Manager: Academic Administration Ms Karen Wienand		
	karen.wienand@uct.ac.za		
University or institution at which employed or a registered student	University of Cape Town		
Faculty or department in which you are registered or work	Department of Environmental and Geographical Sciences, Faculty of Science		
Address (if not UCT)			

SECTION B: SUPERVISOR DETAILS

	Title and name	Telephone number	Email address
Supervisor	Dr Gareth Haysom	0216502028	gareth.haysom@uct.ac.za
Co-Supervisor			

SECTION C: APPLICANT'S FIELD OF STUDY (if applicable) / TITLE OF RESEARCH PROJECT / STUDY

Degree	MPhil Environment, Society and Sustainability		
Research project or title	Student Food Security at Universities in South Africa: Exploring the (dis)connection between student food experiences, sustainability and green spaces from the lens of food security.		
Research proposal attached	☒ Yes	☐ No	
Target population (number of UCT staff)	up to 6		
Amount of time required for an interview and/or questionnaire	an estimated 30 minutes		
Lead Researcher details	Jessica Drewett (same as above)		
Proof of ethical clearance status attached	☒ Yes	☐ No	

SECTION D: FOR OFFICE USE (Approval status to be completed by the Executive Director, Human Resources or Nominee)

Support or approval			Role	Signature	Date
Supported?	☑ Yes	☐ No	Joy Henry (Office Co-Ordinator)		3/8/2017
Approved?	☑ Yes	☐ No	Miriam Hoosain (Executive Director: HR)		04/08/17

Appendix Three: Department of Student Affairs Approval for Access to Students for Research

	RESEARCH ACCESS TO STUDENTS	DSA 100

NOTES

1. This form must be FULLY completed by all applicants who want to access UCT students for the purpose of research or surveys.
2. Return the fully completed (a) DSA 100 application form by email, in the same word format, together with your: (b) research proposal inclusive of your survey, (c) copy of your ethics approval letter / proof (d) informed consent letter to: Moonira.Khan@uct.ac.za. You application will be attended to by the Executive Director, Department of Student Affairs (DSA), UCT.
3. The turnaround time for a reply is approximately 10 working days.
4. NB: It is the responsibility of the researcher/s to apply for and to obtain ethics approval and to comply with amendments that may be requested; as well as to obtain approval to access UCT staff and/or UCT students, from the following, at UCT, respectively: (a) Ethics: Chairperson, Faculty Research Ethics Committee' (FREC) for ethics approval, (b) Staff access: Executive Director: HR for approval to access UCT staff, and (c) Student access: Executive Director: Student Affairs for approval to access UCT students.
5. Note: UCT Senate Research Protocols requires compliance to the above, even if prior approval has been obtained from any other institution/agency. UCT's research protocol requirements applies to *all* persons, institutions and agencies from UCT and external to UCT who want to conduct research on human subjects for academic, marketing or service related reasons at UCT.
6. Should approval be granted to access UCT students for this research study, such approval is effective for a period of one year from the date of approval (as stated in Section D of this form), and the approval expires automatically on the last day.
7. The approving authority reserves the right to revoke an approval based on reasonable grounds and/or new information.

SECTION A: RESEARCH APPLICANT/S DETAILS

Position	Staff / Student No	Title and Name	Contact Details (Email / Cell / land line)
A.1 Student Number	DRWJES001	Ms Jessica Drewett	Drwjes001@myuct.ac.za; jessjazzcoral@gmail.com 0716407472
A.2 Academic / PASS Staff No.			
A.3 Visitor / Researcher ID No.			
A.4 University at which a student or employee	University of Cape Town	Address if *not* UCT:	
A.5 Faculty/ Department/ School	Department of Environmental and Geographical Sciences		
A.6 APPLICANTS DETAILS If different from above	Title and Name	Tel.	Email

SECTION B: RESEARCHER/S SUPERVISOR/S DETAILS

Position	Title and Name	Tel.	Email
B.1 Supervisor	Dr Gareth Haysom	021 650 2028	gareth.haysom@uct.ac.za
B.2 Co-Supervisor/s			

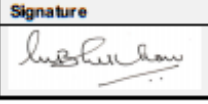
SECTION C: APPLICANT'S RESEARCH STUDY FIELD AND APPROVAL STATUS

C.1 Degree – if applicable	MPhil Environment, Society and Sustainability
C.2 Research Project Title	Student Food Security at Universities in South Africa: Exploring the (dis)connection between student food experiences, sustainability and green spaces from the lens of food security.
C.3 Research Proposal	Attached: Yes ■ No ☐
C.4 Target population	Full time students at UCT who are between second year and PhD and have not recently transferred. In addition, students who are linked to initiatives such as GCI
C.5 Lead Researcher details	If different from applicant:
C6. Will use research assistant/s	Yes ☐ No ■ yes- provide a list of names, contact details and ID no.
C.7 Research Methodology and Informed consent:	Research methodology: Online questionnaires (target of 1000) and semi-structured interviews (10-15) Informed consent: Yes, following the guidelines of the obtained ethics clearance
C.8 Ethics clearance status from UCT's Faculty Ethics in Research Committee /Chair (EIRC)	Approved by the UCT EIRC: Yes ■ With amendments: Yes ☐ No ■ (a) Attach copy of your UCT ethics approval. Attached: Yes ■ No ☐ (b) State date / Ref. No / Faculty of your UCT ethics approval: 3/04/2017 Ref./Faculty: FSREC 14-2017

SECTION D: APPLICANT/S APPROVAL STATUS FOR ACCESS TO STUDENTS FOR RESEARCH PURPOSE

(To be completed by the UCT - ED, DSA or Nominee)

	Approved / With Terms / Not	* Conditional approval with terms	Applicant/s Ref. No.:
D.1 APPROVAL STATUS	(i) Approved ■ ~~(ii) With terms~~ ~~(iii) Not approved~~	(a) Access to students for this research study must only be undertaken after written ethics approval has been obtained. (b) In event any ethics conditions are attached, these must be complied with before access to students.	DRWJES001 / Ms Jessica Drewett

	Designation	Name	Signature	Date of Approval
D.2 APPROVED BY:	Executive Director Department of Student Affairs	*Dr Moonira Khan*		*28 August 2017*

Appendix Four: Email Invitation to UCT students to take part in research

Dear UCT Students

I am a masters student in the Environmental and Geographical Sciences Department at UCT. I am conducting research into university student food security in South Africa. Food security is not just about food being available, and you being able to gain access to it; it is that you are able to benefit from a stable food system where you are able to prepare and consume that food to ensure optimal nutrition and health, in a way that is socially appropriate to you[1,2].

If you are a full time UCT student, and have studied at UCT for at least one academic year, you are invited to participate in this research. During this study, you will be asked to complete an online questionnaire. There are no potentially harmful risks related to your participation in this study. Your participation is completely voluntary, and you may withdraw at any time without penalty, and I commit not to use any of the information provided.

At the end of the questionnaire I ask if you would like to be further involved in this research by way of anonymous semi-structured interview. This is the only time that I request your contact details. If you want to be involved further, and provide this information, anonymity will be maintained and pseudonyms will be used. All information collected in this study will be kept private. This research has been approved by the UCT Faculty of Science Research Ethics Committee (approval code: FSREC 14 – 2017) and access granted by the UCT Department of Student Affairs.

This questionnaire takes roughly 15 minutes to complete.

To participate, please click on the link below: https://ee.kobotoolbox.org/x/#YXOP

If you have already completed this questionnaire, there is no need to do so again, and I thank you for your time. Please feel free to contact me with any questions or request further information, at any time during this research (DRWJES001@myuct.ac.za).

Thank you so much!

Regards

Jess Drewett (Researcher)

DRWJES001@myuct.ac.za

1. FAO (1996) Declaration on world food security. World Food Summit, FAO, Rome

2. Haysom, G. (2017). Climate change, food and the city: Agency and urban scale food system networks, in Thomas-Hope, E. (ed). Climate Change and Food Security: Africa and the Caribbean, Routledge, London.

Appendix Five: Informed Voluntary Consent form for Interviews

DEPARTMENT OF ENVIRONMENTAL AND GEOGRAPHICAL SCIENCES

UNIVERSITY OF CAPE TOWN
PRIVATE BAG X3
RONDEBOSCH 7701
SOUTH AFRICA

RESEARCHER: Jess Drewett
TELEPHONE: +27-71-640-7472
E-MAIL: DRWJES001@myuct.ac.za
URL: http://www.egs.uct.ac.za
https://www.africancentreforcities.net/programme/hungry-cities/

Informed Voluntary Consent to Participate in Research Study

Project Title: Student Food Security at Universities in South Africa: Exploring the (dis)connection between student food experiences, sustainability and green spaces from the lens of food security.

Invitation to participate, and benefits: Hello, I am Jessica Drewett and I am a masters student in the Environmental and Geographical Sciences Department at the University of Cape Town. I am conducting research into university student food security at universities in South Africa. The study aim is to explore the current narratives of student food security, campus food initiatives and the (dis)connection between green spaces and student food security responses at different university campuses in South Africa. It would be greatly appreciated if you participate in this research, as I believe your opinions and experience would be a valuable source of information, and hope that by participating you may gain useful knowledge.

Procedures: During this study, you will be invited to be interviewed by the researcher.

Risks: There are no potentially harmful risks related to your participation in this study.

Disclaimer/Withdrawal: Your participation is completely voluntary; you may refuse to participate, and you may withdraw at any time without having to state a reason and without any prejudice or penalty against you. Should you choose to withdraw, the researcher commits not to use any of the information you have provided without your signed consent. Note that the researcher may also withdraw you from the study at any time.

Confidentiality: All information collected in this study will be kept private in that you will not be identified by name or by affiliation to an institution. Confidentiality and anonymity will be maintained as pseudonyms will be used.

What signing this form means:

By signing this consent form, you agree to participate in this research study. The aim, procedures to be used, as well as the potential risks and benefits of your participation have been explained verbally to you in detail, using this form. Refusal to participate in or withdrawal from this study at any time will have no effect on you in any way. You are free to contact me, to ask questions or request further information, at any time during this research.

I agree to participate in this research (tick one box)

☐ Yes ☐ No _____ (Initials)

_____	_____	_____
Name of Participant	Signature of Participant	Date
_____	_____	_____
Name of Researcher	Signature of Researcher	Date

Appendix Six: Online Student Questionnaire, with notes

Screen 1

This first screen introduces the participant to the research, the aim of the questionnaire and informed consent

University Student Food Security Questionnaire

University Student Food Security Questionnaire

Hello, I am Jessica Drewett and I am a masters student in the Environmental and Geographical Sciences Department at the University of Cape Town. I am conducting research into university student food security at universities in South Africa. The study aim is to explore the current narratives of student food access, and the associated responses to limitations in food access. Food security is not just about food being available, and you being able to gain access to it; it is that you are able to benefit from a stable food system where you are able to prepare and consume that food to ensure optimal nutrition and health, in a way that is socially appropriate to you (FAO, 1996; Haysom, 2017).

If you are a full time UCT student, and have studied at UCT for at least one academic year, it would be greatly appreciated if you participate in this research, as I believe your opinions and experience would be a valuable source of information, and I hope that by participating you may gain useful knowledge.

During this study, you will be asked to complete an online questionnaire. There are no potentially harmful risks related to your participation in this study. Your participation is completely voluntary; you may refuse to participate, and you may withdraw at any time without having to state a reason and without any prejudice or penalty against you. Should you choose to withdraw, the researcher commits not to use any of the information you have provided.

All information collected in this study will be kept private in that you will not be identified by name or by affiliation to an institution. Confidentiality and anonymity will be maintained as pseudonyms will be used. You are free to contact me, to ask questions or request further information, at any time during this research (DRWJES001@myuct.ac.za). You are welcome to request a finished version of the thesis. Based on pilot studies, this questionnaire can take roughly 15 minutes to complete.

FAO (1996) Declaration on world food security. World Food Summit, FAO, Rome

Haysom, G. (2017). Climate change, food and the city: Agency and urban scale food system networks, in Thomas-Hope, E. (ed). Climate Change and Food Security: Africa and the Caribbean, Routledge, London.

Screen 2

Electronic Informed Consent

By agreeing to the below questions, you hereby provide informed consent to this study:

* I understand that my participation in this research questionnaire is entirely voluntary and that I am free to stop at any time.

◯ OK

* I understand that I cannot be identified by my answers and that my answers cannot be linked to me.

◯ OK

* I understand that I do not have to answer any question I do not wish to answer - for any reason.

◯ OK

* I agree that the information I give may be used in research reports and understand that these reports will not reveal my personal identity.

◯ OK

* I have understood the information regarding my participation in the study and agree to participate in this questionnaire.

◯ OK

Screen 3

Screen 3 (and the rest of the questionnaire) only appears once a participant has agreed to all consent questions

Are you a full-time student at UCT and have spent at least one year studying here?

- Yes
- No

As you have indicated you are not a full time student at UCT, unfortunately you are not eligable to take part in this research questionnaire. Thank you very much for your time and interest.

- OK

Screen 4

Part 1: General Information

Welcome to Part 1 of this questionnaire. This section is made up of 10 general background questions such as level of studies, living arrangements and finances.

1. What level of study are you?

- ○ Undergraduate
- ○ Honours
- ○ Masters
- ○ PhD
- ◉ Choose not to answer

2. How many years have you been studying for?

- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ 8
- ○ 9
- ○ 10
- ○ 10<
- ◉ Choose not to answer

3. Have members of your family studied at university before? You may select multiple answers here if applicable.

- ☐ Parents
- ☐ Siblings
- ☐ Extended family
- ☐ First in my family to study
- ☑ Choose not to answer

4. Who pays your tuition and student costs? Select all that apply to you.

- [ ] Parents
- [ ] Other family members or friends
- [ ] NSFAS
- [ ] Bursaries and Scholarships
- [ ] Student bank loans
- [ ] Self-funding
- [ ] Other
- [x] Choose not to answer

Please elaborate below

---

5. Are you working while studying?

- ( ) Yes - full time
- ( ) Yes - part time
- ( ) No
- (•) Choose not to answer

6. Are you supporting others while studying?

- ( ) Yes
- ( ) No
- (•) Choose not to answer

7. During the academic term, where do you live?

- ( ) On campus - catering
- ( ) On campus - self catering
- ( ) Off campus alone
- ( ) Off campus with family
- ( ) Off campus with house mates
- ( ) Off campus with spouse or partner
- (•) Choose not to answer

8. What are your sources of food/ money for food? Select all that are applicable

- [ ] Parent(s)
- [ ] Other family members or guardians
- [ ] Friends
- [ ] Bursary or scholarship
- [ ] NSFAS
- [x] Own salary
- [ ] From a catering residence
- [ ] Charity
- [ ] University food scheme
- [ ] Own savings
- [ ] Other
- [ ] Choose not to answer

Please elaborate

9 You can select multiple answers in the next question. Have you ever had to choose between buying food and:

- [ ] Housing (rent or residence payments)
- [ ] Travel
- [ ] Study extras
- [ ] Social events
- [ ] Paying off debt
- [ ] Medical expenses
- [ ] Cell phone (airtime and data)
- [ ] I have never had to choose
- [x] Choose not to answer

10. This next question is about your monthly expenses and getting an idea of how much you allocate to each aspect. Do you have any individual expenses, such as paying rent, buying food and paying for transport?

- ( ) Yes
- (•) No
- ( ) Choose not to answer

What does your monthly expenditure look like? Select what you spend your money on each month and allocate a percentage (%) value for each below so that they add up to 100% overall.

- [ ] Housing (rent or residence payments)
- [ ] Food
- [ ] Travel
- [ ] Study extras
- [ ] Social events
- [ ] Cellphone (data and airtime)
- [ ] Choose not to answer

Housing

0

The light grey text only appears when certain conditions have been met – in question 10, the grey text only appears if the participants says yes

Food

0

Travel

0

Study extras

0

Social events

0

Cellphone (airtime and data)

0

Screen 5

Your Food History focuses on the past year of the respondent in terms of resource access and food

Part 2: Your Food History

In this section, the following 6 questions I am going to ask you to refer to times during the academic terms when you reside on or near campus.

1. Over the past year, how often, if ever, have you ever gone without enough food to eat?

- (•) Never
- ( ) Rarely (once or twice)
- ( ) Sometimes (3 to 10 times)
- ( ) Often (more than 10 times)
- ( ) Do not know
- ( ) Choose not to answer

2. Over the past year, how often, if ever, have you gone without enough clean water for personal use?

- (•) Never
- ( ) Rarely (once or twice)
- ( ) Sometimes (3 to 10 times)
- ( ) Often (more than 10 times)
- ( ) Do not know
- ( ) Choose not to answer

3. Over the past year, how often, if ever, have you gone without medicine or medical treatment?

- (•) Never
- ( ) Rarely (once or twice)
- ( ) Sometimes (3 to 10 times)
- ( ) Often (more than 10 times)
- ( ) Do not know
- ( ) Choose not to answer

4. Over the past year, how often, if ever, have you gone without electricity in your place of residence?

- ○ Never
- ◉ Rarely (once or twice)
- ○ Sometimes (3 to 10 times)
- ○ Often (more than 10 times)
- ○ Do not know
- ○ Choose not to answer

5. Over the past year, how often, if ever, have you gone without enough fuel/energy/electricity to cook your food?

- ◉ Never
- ○ Rarely (once or twice)
- ○ Sometimes (3 to 10 times)
- ○ Often (more than 10 times)
- ○ Do not know
- ○ Choose not to answer

6. Over the past year, how often, if ever, have you not been able to make ends meet (for example not having enough money for food)?

- ◉ Never
- ○ Rarely (once or twice)
- ○ Sometimes (3 to 10 times)
- ○ Often (more than 10 times)
- ○ Do not know
- ○ Choose not to answer

Screen 6

Part 3: Food Security

Part 3 contains 9 statements about your food consumption over the past FOUR weeks. The past FOUR weeks refers to the current date and day, and 28 days before this date. For each of the following statements, please could you indicate whether this happened rarely, sometimes, often or never in this four week time frame.

1. In the past four weeks, did you worry that you would not have enough food?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ Choose not to answer

2. In the past four weeks, were you not able to eat the kinds of foods you preferred because of a lack of resources?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ Choose not to answer

Part three is made up of a modified version of the HFIAS and HDDS. By using these, this data can be compared to other data sets as they are a part of the FANTA methodology. The HFIAS questions were used by Gwacela (2013), Kassier and Veldman (2013) and Munro *et al.* (2013) but referred to the individual student respondent instead of the household level. The questions asked by Van den berg and Raubenheimer (2015) which were based on a single item response item from the Australian National Nutrition Survey and the 10 item food security scale from the US department of Agriculture community food security assessment adapted for university students are also similar to the HFIAS.

3. In the past four weeks, did you have to eat a limited variety of foods due to a lack of resources?

- ◯ Never
- ◯ Rarely
- ◯ Sometimes
- ◯ Often
- ◯ Choose not to answer

4. In the past four weeks, did you have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?

- ◯ Never
- ◯ Rarely
- ◯ Sometimes
- ◯ Often
- ◯ Choose not to answer

5. In the past four weeks, did you have to eat a smaller meal than you felt you needed because there was not enough food?

- ◯ Never
- ◯ Rarely
- ◯ Sometimes
- ◯ Often
- ◯ Choose not to answer

6. In the past four weeks, did you have to eat fewer meals in a day because there was not enough food?

- ◯ Never
- ◯ Rarely
- ◯ Sometimes
- ◯ Often
- ◯ Choose not to answer

7. In the past four weeks, was there ever no food to eat of any kind because of lack of resources to get food?

- ◯ Never
- ◯ Rarely
- ◯ Sometimes
- ◯ Often
- ◯ Choose not to answer

8. In the past four weeks, did you go to sleep at night hungry because there was not enough food?

- ◯ Never
- ◯ Rarely
- ◯ Sometimes
- ◯ Often
- ◯ Choose not to answer

9. In the past four weeks, did you go a whole day and night without eating anything because there was not enough food?

- ◯ Never
- ◯ Rarely
- ◯ Sometimes
- ◯ Often
- ◯ Choose not to answer

Screen 7

Part 4: Months of Adequate Provisioning, Academics and Food

In this next section of the questionnaire which consists of 4 questions, I would like to ask you about your food supply during different months of the year, while at university, in addition to a few questions about food and academics. These questions do not refer to vacation times when on holiday.

1. In the past 12 months, were there months in which you did not have enough food to meet your needs?

- ◯ Yes
- ◯ No
- ◯ Choose not to answer

Which were the months (in the past 12 months) in which you did not have enough food to meet your needs?

- ☐ January
- ☐ February
- ☐ March
- ☐ April
- ☐ May
- ☐ June
- ☐ July
- ☐ August
- ☐ September
- ☐ October
- ☐ November
- ☐ December

Months of Adequate Provisioning (MAHP) is also a part of the FANTA methodology. Questions linked to academic success are asked in order to test trends picked up in other South African and international research which is a theme further explored in the discussion chapter

2. Have you ever experienced fatigue, worry and decrease in concentration in relation to food?

- ◯ Yes
- ◯ No
- ◯ Choose not to answer

Could you please tell me more about your experiences of this?

3. Have you ever experienced difficulty focussing on your studies because of hunger?

- ◯ Yes
- ◯ No
- ◯ Choose not to answer

4. Have you ever thought that you could have performed better academically during exams if you felt more food secure?

- ◯ Yes
- ◯ No
- ◯ Choose not to answer

Screen 8

Part 5: Dietary Diversity

This next question is about dietary diversity, and I ask you to think back over the types of foods you ate yesterday (day and night), and make a list. Don't forget about any snacks. Each food that you have eaten can be linked to one of the groups below. Once you have assigned each food a different food group (don't forget things like butter on your bread, or the oil you cooked with for supper), please select all the relevant food groups. For example, if you had a banana, some tea with milk and toast and honey for breakfast, you could select groups 4 (banana), 12 (tea), 9 (milk in tea), 1 (toast), 10 (butter on toast) and 11 (honey).

Select all the relevant food groups that match the foods you ate yesterday (day and night):

- ☐ 1 Any grains, mielie meal, bread, oats, rice, noodles, biscuits, or any other foods made from millet, sorghum, rice or wheat?
- ☐ 2 Any potatoes, sweet potatoes, cassava, or any other foods made from roots or tubers?
- ☐ 3 Any other vegetables?
- ☐ 4 Any fruits?
- ☐ 5 Any beef, pork, lamb, goat, rabbit, guinea pig, other rodents, wild game, chicken, duck, other birds, liver, kidney, heart or other organ meats?
- ☐ 6 Any eggs?
- ☐ 7 Any fresh or dried fish or shellfish?
- ☐ 8 Any foods made from beans, peas, lentils, or nuts?
- ☐ 9 Any cheese, yoghurt, milk, or other milk products?
- ☐ 10 Any foods made with oil, fat, or butter?
- ☐ 11 Any sugar or honey?
- ☐ 12 Any other foods such as condiments, coffee, tea?
- ☐ Choose not to answer

Dietary Diversity asks the respondent to recall the types of foods they have eaten in the past 24 hours, and provides insight into the nutrients of their food, and what types of food they have access to. This measure is used in the South African Household Survey (Shisana *et al.*, 2013), and was also used by Gwacela (2013).

Screen 9

Part 6: You, Food, and Coping Strategies

In this last main section consisting of 9 questions, I ask you about your food choices around accessing acquiring, preparing, and eating food as well as about coping strategies.

1. During the past month (during the academic term), where have you accessed/ acquired or procured MOST of your food? Select those that are relevant to you, and fill in how many times a month you access these places.

- [ ] Supermarket
- [ ] Independent grocery store
- [ ] Informal food retailers
- [ ] Fast food restaurants
- [ ] Non fast food restaurants
- [ ] Free food events on or off campus
- [ ] Food markets
- [ ] Food assistance programs
- [ ] At food vendors on campus
- [ ] Campus catering facilities
- [ ] Other
- [ ] Choose not to answer

Please elaborate further about what Other is:

Supermarket

0

Independent grocery store

0

Informal food retailers

0

Fast food restuarants

0

Non fast food restaurants

0

Free food events on or off campus

0

You, Food and Coping strategies looks into food access and procurement, preparation in addition to any strategies respondents may know of or use in relation to their food. These questions can be linked to some of those asked by Van den Berg and Raubenheimer (2015)

Food markets

0

Food assistance programs

0

At food vendors on campus

0

Residence catering facilities

0

Other

0

What influences you to access/procure or acquire your food from these places?

_____

2. What do you think of your cooking skills?

- ◯ Amazing
- ◯ Good
- ◯ Can manage
- ◯ Not good
- ◯ I can't cook
- ◯ I don't cook
- ◯ Choose not to answer

3. Do you usually prepare your own food? Select the answer that is most appropriate

- ◯ Mostly
- ◯ Hardly ever
- ◯ I eat in a residence dining hall
- ◯ Parents cook my food
- ◯ Partner cooks for me
- ◯ I cook with friends
- ◯ Choose not to answer

4. What do you eat the most often (such as meals and snacks)? List up to 3 different things

_____

5. What do you think about when you make food purchase choices? Select those that are relevant to you.

- [ ] Food storage and preparation challenges
- [ ] Time constraints
- [ ] Financial constraints
- [ ] Environmental sustainability
- [ ] Health
- [ ] Transport
- [ ] Social norms
- [ ] Cultural food choices
- [ ] Choose not to answer

Screen 10

6. Do you combine money and other resources with other students or friends to buy and prepare food?

- ◯ Daily
- ◯ Weekly
- ◯ Monthly
- ◯ Sometimes
- ◯ Never
- ◯ Choose not to answer

7. Have you used any of these coping strategies?

- [ ] Asking someone for food
- [ ] Drinking fluids only
- [ ] Borrow money for food from family
- [ ] Borrow money for food from friends
- [ ] Self-distraction
- [ ] Stealing
- [ ] Food assistance program
- [ ] Selling possessions for food money
- [ ] Participating in events on or off campus where there is free food
- [ ] None of the above
- [ ] Does not apply to me
- [ ] Choose not to answer

Please elaborate further

_____

8. Do you know of any student food assistance programs on or off campus?

- ◯ Yes
- ◯ No
- ◯ Choose not to answer

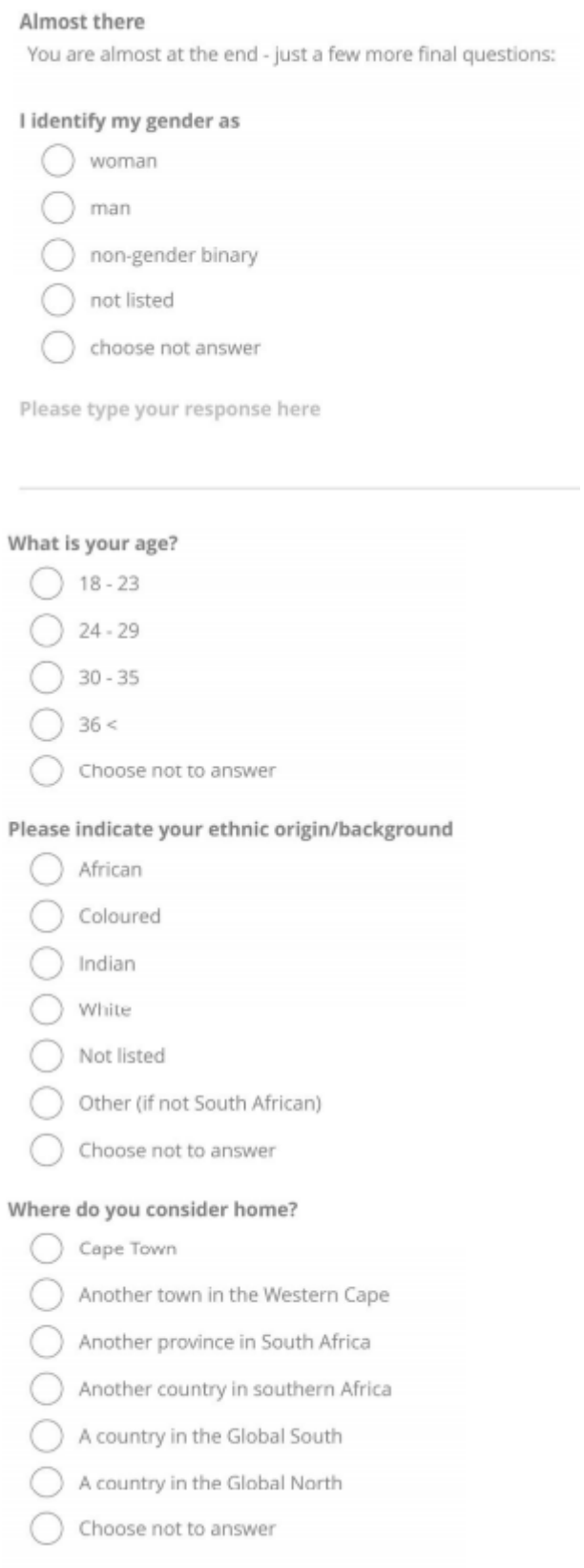
Please briefly list/describe them

_____

9. In your opinion, what do you think would have a positive impact on food security of university students?

_____

Screen 11



This section comprises of a final set of questions such as age, ethnic origin/background distance from campus, which were combined with other questionnaire questions and used to test trends found in the literature. The questionnaire then ended with a reminder to click 'submit' and thanked the participants for their time

How far away approximately (in kilometers) from campus do you reside?

- ◯ I reside on campus
- ◯ 0 -1
- ◯ 1 - 2
- ◯ 2 - 5
- ◯ 5 - 10
- ◯ 10 - 15
- ◯ 15 - 20
- ◯ 20 - 25
- ◯ 25 - 30
- ◯ 30 - 40
- ◯ 40 - 50
- ◯ 50 <
- ◯ Choose not to answer

Where do you spend most of your time on campus?

- ◯ Upper campus
- ◯ Middle campus
- ◯ Lower campus
- ◯ Health Sciences and Groote Schuur campuses
- ◯ Hiddingh Campus
- ◯ Breakwater Campus
- ◯ I do not spend time on campus
- ◯ Choose not to answer

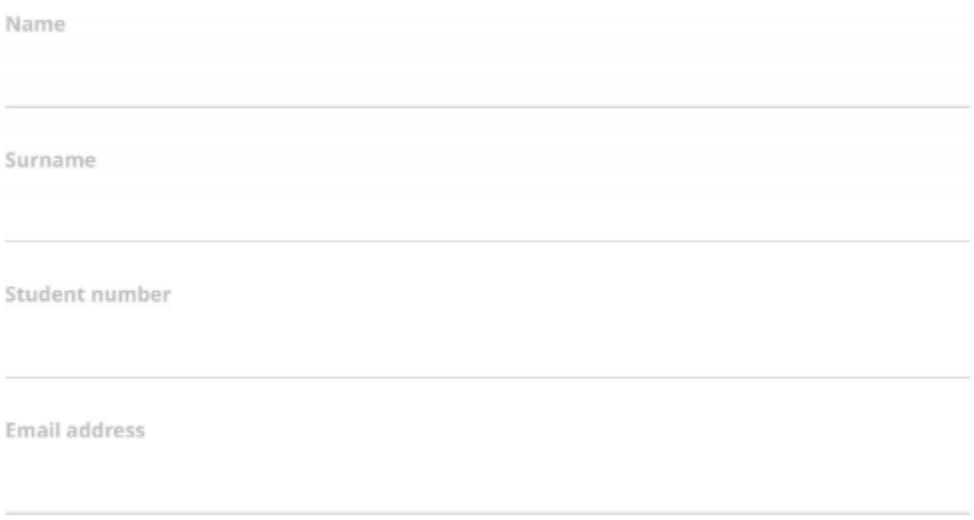
Screen 12

You have now come to the end of this research questionnaire. To submit, please click 'submit' to send in your response. Thank you very much for your time and knowledge! If you have any other ideas and thoughts linked to this questionnaire and university student food security, and would like to be involved further in this research by way of anonymous semi-structured interview, please enter your contact details below. Have a lovely rest of your day!

Would you like to be involved further in this research?

- ◯ Yes
- ◯ No

Screen 13



Screen 13 only appeared if an individual participant wanted to be further involved in the research and be interviewed by the researcher. Those who did not wish to be interviewed were not asked to provide any contact details, thus ensuring their anonymity.