

**IDENTIFYING EXPANSIVE LEARNING
OPPORTUNITIES TO FOSTER A MORE SUSTAINABLE
FOOD ECONOMY: A CASE STUDY OF RHODES
UNIVERSITY DINING HALLS**

**A half thesis submitted in fulfilment of the requirements for
the degree of**

**MASTERS IN EDUCATION
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by

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ABSTRACT

This is a one year half thesis. This research was conducted within the context of the food services sector of Higher Education Institution dining halls and in the midst of the rising global call for food resource management and food waste reduction. The main aim of this research therefore was to identify opportunities for learning and change for a more sustainable food economy, contributing to Education for Sustainable Production and Consumption, and by further implication, Education for Sustainable Development.

To achieve this aim, I used Cultural Historical Activity Theory as theoretical and methodological framework; drawing on the second and the third generations of this theory. Implicated in the above research approach is the identification of expansive learning opportunities from the surfacing of ‘tensions’ and ‘contradictions’. In this case study of the Rhodes University Campus Food Services, such tensions and contradictions inhibiting a more sustainable food economy, involving food waste production were identified.

To narrow the scope of the study, one dining hall formed the focus of the case, with a two phased research approach whereby one research question and three goals were developed for each phase. The former being the exploration phase and the latter being the initial stages of the expansive phase. Methods used in line with the methodological framework included ten individual interviews with food producers (staff members), nine focus group discussions with food consumers (students), observations of the dining hall activities which lasted for over a month and two ‘Change Laboratory Workshops’.

Some of the findings of this research are that food wastage cannot be addressed and appropriately curtailed without an intensive consideration of all the stages of food economy. Multiple contradictions and sources of tensions embedded in the Food Services Sector constituted major causes of food waste. Additionally, the lack of substantial food waste related teaching and learning activities, the presence of disputed rules, institutional structure and traditional practices within the Food Services all exacerbated the tensions and contradictions. More so, prioritizing some of this identified contradictions and tensions hindering a more sustainable food economy and relegating some as unimportant or non-urgent is unproductive. Finally, the non-existence of facilitated deliberation, consultation, dialogue, collaboration between food producers and food consumers has been identified as an obstacle to learning and institutional change.

Recommendations abound in re-orienting, re-educating, and re-informing the constituents of the food economy. Re-visiting and revising of rules and regulations guiding conduct of students and kitchen staff members in the RU dining halls, as well as revision of existing learning support materials and mediating tools in use is needed. Recognition and consideration of the concerns and interests of students and kitchen staff members are also needed. Finally, there is a need to continue to address the tensions and contradictions identified in this case study, to further the Expansive Learning Process if a more sustainable food economy at Rhodes University is to be established.

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DEDICATION

I hereby dedicate this thesis to millions of children, youth, adults and the aged, who have died as a result of malnutrition, hunger and famine across the globe. I also wholeheartedly dedicate this thesis to the Creator of the Earth and its food resources, God, who despite our unsustainable practices of food wastage, still bountifully provides seeds for the sower and food to the eater. I finally dedicate this thesis to those who have developed the agency and capability to live responsibly and sustainably on earth, by ensuring a prestigious life of efficient food resource management. Kudos to you all!

LIST OF ACRONYMS AND ABBREVIATIONS

AAU	Association of African Universities
ACE	Advanced Certificate in Education
AS	Activity System
AWH	Allan Webb Hall
BBC	British Broadcasting Corporation
CHAT	Cultural Historical Activity Theory
CLW	Change Laboratory Workshop
DEADP	Department of Environmental Affairs and Development Planning
DESD	Decade of Education for Sustainable Development
DFID	Department for International Development
ECDC	Eastern Cape Development Corporation
EE	Environmental Education
EEASA	Environmental Education Association of Southern Africa
ELRC	Environmental Learning Research Centre
ESC	Education for Sustainable Consumption
ESD	Education for Sustainable Development
FAO	Food and Agriculture Organization
FSC	Food Supply Chain
GMO	Genetically Modified Organisms
ICFFA	International Commission on the Future of Food and Agriculture

IPGC	International Post Graduate Certificate
IRIN	Integrated Regional Information Networks
ITP	International Training Program
LNH	Lilian Ngoyi Hall
LSM	Learning Support Material
MEd	Masters in Education
MESA	Mainstreaming of Environment and Sustainability into African Universities
NMDH	Nelson Mandela Dining Hall
NMH	Nelson Mandela Hall
PERL	Partnership for Education and Research for Responsible Lifestyles
PGCE	Post Graduate Certificate in Education
REEP	Regional Environmental Education Programme
ROD	Residential Operations Division
RU	Rhodes University
RUCFS	Rhodes University Campus Food Services
SADC	Southern African Development Community
SAIRR	South African Institute of Race Relations
SCP	Sustainable Consumption and Production
UN	United Nations
UNDESA	United Nations Department of Economic and Social Affairs
UNDESD	United Nations Decade of Education for Sustainable Development

UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIFEM	United Nations Development Fund for Women
US	United States
USAID	United States Agency for International Development
USDA	United States Department of Agriculture

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CHAPTER 1: INTRODUCTION TO PROBLEM AND FOCUS OF THE STUDY

1.1 Introduction

This chapter presents the geographical context of the study. It also provides the narrow study site (Higher Education Institution), the narrower study site (Food Services Sector), and the narrowest study site (dining hall). It gives an overview of the contextual profile investigation into the research problem and briefly provides information about the research, its story and interest. It further provides the research questions and goals and finally gives an overview of Chapters Two to Five of this thesis.

1.2 Geographical location of the research

This research was conducted at Rhodes University (RU), Grahamstown, in the Eastern Cape Province of South Africa (see Figure 1 below).



Figure 1: Geographical map of Eastern Cape showing Grahamstown and Eastern Cape (Source: Map of Eastern Cape, n.d.).

1.2.1 Eastern Cape

The Eastern Cape is one of the nine provinces in South Africa with an area of 14% of South African's total land mass—169 580 square kilometres (ECDC, 2011a). Agriculture and agro-processing are two of the major industries in the Eastern Cape (ibid). The provincial estimated percentage of the total population residing in each of the provinces in South Africa from 2001-2011 shows that, since 2003 the Eastern Cape has had the third largest share of the population (Statistics South Africa, 2011). The population estimate of one of South African's poorest province, the Eastern Cape in July 2011 was 6,829, 958 (ibid).

Regarding food and drink consumption, approximately one of every four rand (24.8%) that is expended by rural households is on food and non-alcoholic beverages, while the figure is 12.5% in the urban area (Statistics South Africa, 2008). Amongst the nine provinces in South Africa, households in Eastern Cape Province spend the highest proportion of their consumable expenditure on food, which is 22.1% (ibid). The major component of the food consumed is bread, cereal and meat¹ (ibid). In 2011, good rainfall was experienced in the Eastern Cape and this has resulted in increased supply of agricultural produce (ECDC, 2011b).

1.2.2 Makana Municipality

Makana Municipality is located in the Province of the Eastern Cape and is a Local Municipality under Cacadu District Municipality (Makana Municipality, 2009). This municipality incorporates the areas of Grahamstown, Alicedale, Riebeeck East, Fort Brown, Salem, Seven Fountains and Sidbury (ibid). The total population of Makana area in 2001 was above 110 000, while the total household statistics as per 2001 exceed 17 000 (ibid). Sustainable development can be implied to be part of the mission of Makana Municipality because their vision statement reads thus—"Makana Municipality shall strive to ensure sustainable, affordable, equitable and quality services in a just, friendly, secure and healthy environment, which promotes social and economic growth for all" (Makana Municipality, 2010).

1.2.3 Grahamstown

Grahamstown, a small university town in the predominantly rural Eastern Cape Province is also known as a major educational centre and as South Africa's festival city (Møller & Seti,

¹ This is especially among black African households.

2004). This town boasts of one of the universities recognised as leading in South Africa (RU), and a good number of secondary schools (ibid). Grahamstown according to Møller and Seti is “an island in the midst of poverty” (2004, p. 1). Here, jobs and industries are a far cry from what is obtainable in other parts of South Africa. Rhodes University, the schools and the High Court are the major employers (ibid).

1.3 Study site and context

1.3.1 Rhodes University (RU)

The narrow context of this study is RU. RU was established over 100 years ago as a university college, and later inaugurated as an independent university on March 10, 1951. RU owes its unique character among South African universities to a combination of historical, geographical, cultural and architectural factors (RU, 2010). With an estimated student population of 7000 in 2011, RU is the smallest university in South Africa. With her excellent pass and graduation rates, and postgraduate research achievement, RU is rated among the best universities in South Africa (Badat, 2011; RU, 2012). This commendable achievement of RU is not short of the attainment of her responsibility of providing a stimulating and enabling environment for her privileged few students to develop skills, knowledge, professionalism, intellectual capacity and individuals that are thoughtful and empathetic (RU, 2012). RU is also a cosmopolitan institution with students from about 45 countries (Badat, 2011) with about half of the students living in her 52 residences (RU, 2011).

1.3.2 RU Residences

Residence accommodation at RU is comfortable, attractive and the 52 ‘houses’ or residences are grouped into halls (RU, 2011). These halls have their own dining halls within easy walking distance of lecture halls and town (ibid). There are three female halls, one male hall and eight halls accommodating male and female students in separate houses. In addition, there are other separate post graduate residences (ibid). Each hall to a large extent governs its own internal affairs but certain rules apply to all students in residences (ibid). These are stated in the RU Student Disciplinary Code.

The Dean of Students oversees student affairs in the residences but the hall wardens are in charge of each hall. The hall wardens are assisted by the house wardens who are also assisted by sub-wardens and house committee members. These job designations exist in each residence and they are in charge of the smooth running and welfare of students (RU, 2010;

RU, 2011). The 12 halls in RU are Nelson Mandela, Lilian Ngoyi, Founders, Jan Smuts, Kimberley East and West, St Mary, Courtenay-Latimer, Drostdy, Hobson², Hilltop and Allan Webb (RU, 2011).

1.3.3 Rhodes University Campus Food Services (RUCFS)

The narrower context of this research is located within the Food Services Sector of RU. This department functions under the Residential Operations Division of RU. RUCFS, formerly known as Rhodes University Catering Division and also formerly under the department of finance until 1998, is a sub-division (business unit) of the Residential Operations Divisions within RU (Pillay, 2002). RUCFS employs a staff compliment of about 250 skilled and semi-skilled food service workers from the Industrial Hospitality Sector (ibid). RUCFS operates within the confines of 'Campus Food Services', providing a diverse range of residential dining services to RU residents and Oppidan³ students (Pillay, 2002, p. 4).

The core service of the RUCFS is to offer in-house food services to the students that reside in and outside RU residences. The vision of the RUCFS is taken and considered not just as a statement but informs the objectives or goals of the department; they emphasize a 'customer first' philosophy. The main strategy pursued by the RUCFS is depicted in the vision statement below:

RU Campus Food Services, as part of the Rhodes University Residential Operations Division, provides a support service which complements and enriches the students' educational experience, and in doing so strives to ensure an environment in which students can reach their full potential. On a daily basis, RU Campus Food Services provides convenient and flexible access to a variety of value-for-money, nutritious, tasty and well-balanced meals in an environment that is friendly, hospitable and hygienic (Pillay, 2002, p. 5).

There are 12 kitchens, 12 dining halls and one Hindu/Halaal preparation and distribution point in RUCFS. Inclusive is one Oppidan dining hall that caters for the town dwelling students. Each kitchen staffing structure comprises caterers, cooks and kitchen attendants (Agbedahin, 2011a). These staff members are instrumental in preparing and serving the required meals as laid down according to a two-week cycle menu (Agbedahin, 2011a). Three meals are prepared daily and served in the dining halls to approximately 4000 students. In

² The name has been changed to Desmond Tutu in 2012.

³ The term Oppidan is used to refer to students that are not resident in undergraduate residences but are either residing on Rhodes property or in town.

2010, about 61 percent of the undergraduates residing in (then) 47 residences were fed almost 10,000 meals in 12 halls every day (Rhodes University Senate, 2010).

Menus offered by the RUCFS are compiled after careful consideration and are subject to feedback from food representatives' quarterly meetings wherein students interact with their kitchen supervisors and caterers and are encouraged to express their opinion on the meals served to them in the dining halls (Pillay, 2002). Careful consideration is also given to the diverse cultural food preferences, nutritional factors and the available budget (ibid). Menus are available online and are also available inside the kitchen of the dining halls. Students have the option of choosing from eight available menus for lunch and five available menus for supper (Pillay, as cited in Agbedahin, 2011a). They are able to book or un-book their meals within 48 hours of the intended meals.

The menus comprise: Default, Halaal/Hindu, African, Vegetarian, Health, Fast Food Vegetarian, Fast Food Normal and Fast Food Halaal options, while breakfast options, are Normal, Vegetarian and Halaal (Pillay, as cited in Agbedahin, 2011a). Three meals per day cost R36.14 (ibid). Procurement of fresh bread, dairy, cheese, butter and milk is done on a 'just in time' daily basis to ensure quality. Fresh fruits and vegetables are preserved in the cold room and frozen foods are preserved in the freezer. Groceries are procured and stored in the catering store, where they are disseminated to all kitchens as requested and ordered (ibid).

1.3.4 Nelson Mandela Dining Hall (NMDH)

The narrowest context of this research is NMDH. This dining hall and residence was formally established in 2002, when Nelson Mandela accepted an Honorary Doctorate from Rhodes University. NMDH is shared by two halls namely Nelson Mandela Hall and Lilian Ngoyi Hall. NMDH is basically run on two shifts with represented job descriptions including caterers (senior caterer, assistant caterer and intern caterer), cooks specialised in health platter (HP), vegetarian menus and meat, serverly attendants and other kitchen attendants (Pillay, as cited in Agbedahin, 2011a). NMDH caters for about 650 students from Nelson Mandela Hall and Lilian Ngoyi Hall (ibid). Menus, allowance, timing of meals of the RUCFS apply to NMDH as well as all other dining halls (Pillay, 2002).

Nelson Mandela Hall comprises four residences or houses including Stanley Kidd House, Helen Joseph House, Adelaide Tambo House and Guy Butler House. Lilian Ngoyi Hall also comprises four houses namely Centenary House, Ruth First House, Victoria Mxenge House

and Joe Slovo House. Undergraduate students who reside in any of these residences must take their meals (though not necessarily all meals) in the NMDH. This practice also applies to other halls. Each of these houses is overseen by hall wardens, house wardens, sub-wardens, and senior students who also reside very close to the students. Each residence should ideally have a food representative, but in this case there are only six active students; four from Lilian Ngoyi Hall and two from Nelson Mandela Hall.

1.4 The research problem

1.4.1 Initiating the research

I started this research journey in the field of Environmental Education through my participation in the 2010 RU/SADC REEP International Certificate course in Environmental Education. I commenced what is referred to as a 'change project' (see Appendix 1 and 2 for project correspondence with the RUCFS). This seemingly 'mini' project which aimed at reducing food waste in RU dining halls provided the starting points for this thesis. In the 2010 RU/SADC REEP International Certificate in Environmental Education, I undertook three assignments; the first was to present the biophysical, political, social, cultural and economic perspective of the unsustainable practice of food waste and policy influence at various levels (Agbedahin, 2010a). The second assignment was to describe teaching and learning methods by drawing on Environmental Education and Education for Sustainable Development policy documents to explain their influence on the chosen methods (Agbedahin, 2010b). The third assignment involved the planning and implementation procedure of the change project with a description of the Environmental Education community of practice that will be involved in the project (Agbedahin, 2010c). The evaluation of this project was the grand finale.

1.4.2 Food waste in RU dining halls – Purpose of the research

The RU Environmental Policy aims to reduce general solid waste as much as possible from the waste streams on campus (RU, 1998). The RU dining halls regularly discharge food waste on not just a daily basis but on a 'meal basis'. It is stated in all dining hall rules that students should not waste food. For example, the Allan Webb Hall Rules and Information booklet (Section AW1.17.h) states, "take only what you can and intend eating - don't waste food ... please do not pile up your side-plate with bread or salads at meals" (Allan Webb Hall Committee, 2003). The RU hall rules are governed by the RU Student Disciplinary Code which stipulates that violating any of the rules stated in the hall rules is considered as a

disciplinary offence and would be handled as such (Agbedahin, 2011b). Therefore the hall rules are a subset of the Student Disciplinary Code, which is also a subset of the above named RU Environmental Policy (ibid).

The daily food waste generated in the 12 RU dining halls is given to pig farmers to feed pigs at a minimum administrative fee. In a preliminary study interview, the RUCFS manager expressed concern over the gravity of the food waste produced in the dining halls, by stating that “pig farmers are smiling ... they are very happy ... some pig farmers have got two dining halls [to take food waste from], while some have got one, with an average of three bins ... from three meals per day” (Pillay, as cited in Agbedahin, 2011a). A caterer in a dining hall echoed the magnitude of this food waste during a preliminary study interview by also revealing that “everyday, about three black buckets of food is wasted” (Caterer, as cited in Agbedahin, 2011b).

In 2009, posters were developed to control this food waste in an attempt to solve this environmental, economic, and social problem. According to the developer, this initiative was a strategy to curb the “huge, incredible amount of wastage that was taking place in the residences and in the halls” (McNeill, as cited in Agbedahin, 2011b). The posters were developed to raise awareness concerning food wastage among dining hall users. They were also developed to make known to students that there were rules guiding the use of the dining halls, and to make known that food waste avoidance should be a top priority (Ibid).

The desire of some other hall wardens (who were facing the same challenge of food waste) to adopt these posters, coupled with the readiness of the Dean of Students’ Office to contribute to the cost of printing allowed for mass production of the posters. Pillay and Klazinga, as cited in Agbedahin (2011b) confirmed this. Pillay stated that “the initiative did come from Allan Webb [Hall] but ... the Dean of Students supported...” Therefore the use of these posters has been extended from Allan Webb Dining Hall to other dining halls as a tentative remedial measure to reduce food waste in RU.

From the foregoing, it becomes evident that the misuse of food resources in the RU dining halls need not be left idle. For instance, when food is wasted (e.g. bread, fruit, condiments, juice etc) in the dining halls, it is a direct wastage of all efforts and resources such as eco-system services, transportation, money, fuel, energy, water, time, and electricity that have gone into providing such food. This reality is irrespective of the fact that the meals have been

paid for by students, or the food waste is not taken to the landfill, or it is sustainably ‘recycled’ for pig consumption. Herein lies the heart of my research.

1.5 Further purpose of the research and broad research question

There is evidence of major loopholes in the availability of empirical data in the area of food waste because there exist only but a few instances of such research in the globe, most especially in Africa. This recently published gap by FAO, 2011 creates an impediment to the actual quantification of how much food is lost and wasted in the world today and how to prevent such practices remains a challenge. Of interest to this study is the implication of this knowledge gap to education, and what kind of educational research could potentially address this problem in an effect manner.

On the one hand, the problem of food wastage, especially in the context from which it emanates, requires a careful and concrete approach, if the problem is to be tackled effectively and sustainably. Such an approach must encapsulate thorough, in-depth data collection and analysis from several sources. It also demands a concrete understanding of implicit, explicit and missing factors that have led to the long lasting, ‘seemingly insurmountable’ problem at RU.

On the other hand, I look forward to a situation whereby the findings of this research will not just end up ‘on paper’ and ‘on the shelf’, but that which can be viable enough to create opportunities for individual and collective learning, change and emancipation; hence my interest in an expansive learning research design (see Section 1.7). Furthermore, I intend to create opportunities for social change, human development, and social justice towards a more sustainable food economy and eventual substantial contribution to Education for Sustainable Development (ESD) (see Section 1.7). The above challenge is the crux of this research.

However, as this study was conducted as a half thesis, it requires some boundaries, and I decided to focus on one dining hall, the NMDH, mentioned above. The broad research question defined for the study was: How can Expansive Learning opportunities to foster a more sustainable food economy in university dining halls be identified?

1.6 Brief introduction to the methodology

To address the above mentioned broad research question, within its wider interest of enabling learning and change, I employed Cultural Historical Activity Theory (CHAT) which provides the methods, practice and methodology for Developmental Work Research of this kind (see Section 3.2.1 below). CHAT provided explanatory, descriptive, as well as analytical tools for the research process. Though it was initially a daunting task to comprehend the graphical representations, concepts and what they stand for, I have found it interesting and potent to work with after continuous and repeated readings of various writers.

1.7 Structure of the study, research questions and goals

This research was conducted in two phases. There was a need to do this because the theoretical framework in use entails an initial exploration phase and an eventual expansion phase. Each phase had one research question and three goals answering the main questions as shown below.

Phase one

What is the current situation of food economy, sustainable practices and learning activities in Nelson Mandela Dining Hall, in relation to food wastage?

Goal 1a: To generate data that will be used to explore and analyse the elements of the central food economy activity system in the dining hall, and related activity systems, in order to understand how they shape the current food economy and food wastage.

Goal 1b: To identify and analyse the existing educational and sustainability measures and processes used to reduce food waste in the dining hall.

Goal 1c: To investigate and identify tensions and contradictions inhibiting a more sustainable food economy and food waste reduction in the dining halls.

Phase two

How can Change Laboratory Workshops help to identify possibilities for Expansive Learning Processes that can create opportunities for learning and change in fostering more sustainable food economy and contribute to Education for Sustainable Development (ESD)?

Goal 2a: To present the outcomes of the analysis of phase 1 data collection, as tensions and contradictions that will act as ‘mirror data’ for key stakeholders and research participants to engage with during Change Laboratory Workshops.

Goal 2b: To collaborate with research participants and key stakeholders to choose and deliberate on the most important tensions and contradictions in-depth, as much as possible; and

Goal 2c: To examine and develop possible strategies that can create opportunities for learning and change in practices towards a more sustainable food economy and reduction of food waste in the dining halls.

1.8 A synoptic overview of the chapters in this thesis

There are five chapters in this thesis. The following paragraphs provide a brief synopsis of the subsequent four chapters:

Chapter Two presents literature reviewed within this research. It covers salient ideologies regarding food waste policy and practice at various levels. It examines the nexus between food waste and food economy; education, learning and change in Higher Education Institutions. It also discusses the theoretical framework employed in this research which is CHAT.

Chapter Three highlights the methodological underpinnings and methods used in this research process. It presents details about the research design decisions, data collection process and the analytical process. It explains how the theoretical framework of this research was applied from a methodological perspective. Ethical and validity assurances of this research process are presented, including the justification of each step.

Chapter Four commences with the presentation of six relevant and relating activity systems identified within the context of this research. It provides the raw data generated through interviews, focus group discussions, observations, photographing, Change Laboratory Workshops and personal communications. The data are presented in a form tailored towards addressing the research questions and goals of this research. This chapter also highlights data which speaks to the ‘contradictions and associated tensions’ discovered within the RUCFS.

This chapter ends with the presentation of proposed model solutions, which provides evidence to emerging opportunities for expansive learning and change within the RUCFS.

Chapter Five (the final chapter) is centred on the discussions of the data presented in Chapter Four and literature reviewed and presented in Chapter Two. This chapter highlights eight analytical statements, through which the educational implication of these research findings for the Food Services sector and management at RU are considered, and also explores wider implication of the case for Higher Education Institutions. The conclusion of this research is stated and recommendations are made regarding the findings. It also includes a brief reflexive review of the entire research process so far, and makes recommendation for further research.

CHAPTER 2: CONTEXTUAL AND THEORETICAL FRAMEWORK

2.1 Introduction

This review presents the broader context within which this study was conceptualised. It provides an orientation to the global context of food waste policies and practices, and relates global food waste to global food production and hunger. It briefly links the study to the global and national state of food sovereignty, social justice and food insecurity. It concludes the above sections with its implications for education. This review further considers specific responses to food waste, such as Education for Sustainable Consumption and Production. It provides a justification for incorporating food economy into this study. It considers university students as food consumers, food services sectors as food producers and the efficacy of food waste management practices in their operations. Furthermore, this review covers the different approaches to learning and the rationale behind the choice of Cultural Historical Activity Theory (CHAT) in relation to the research context. Finally, this review focuses on researching learning and sustainable practices in the context of Rhodes University, its Campus Food Services and dining halls.

2.2 Broader context of food waste policies and practices

2.2.1 The issue: Food waste at a global level

Current food waste in the global Food Supply Chain projected in relation to the prospects for feeding the estimated population of nine billion by 2050 (Parfitt, Barthel & Macnaughton, 2010), is cause for concern. There have been attempts to quantify global food waste over several decades. Such attempts were motivated partly by the need to highlight the quantity of food waste generated in relation to global hunger and malnutrition (ibid). It is widely conceded that there is more than enough food produced by ‘struggling’ farmers to ensure a healthy life for the world population; although wasteful human habits; and the political economies of food production have negatively affected products (Lundqvist, de Fraiture & Molden, 2008; Parfitt, et al., 2010; FAO, 2011).

Before 2011, the most often quoted estimate was that as much as half of all food grown and produced, was lost or wasted before and after it reached consumers (Lundqvist, et al., 2008; Lundqvist, 2009; Lundqvist, as cited in Segrè, Gaiani, Falasconi, Bapst, Coates, Connet et al., 2010). However, a recent study carried out by the Swedish Institute for Food and

Biotechnology (SIK)⁴, revealed that about 1.3 billion tons of food, representing roughly one third of the food produced for human consumption per year, is lost or wasted globally (FAO, 2011).

There is need to define what food waste is in the early part of this review. According to Parfitt, et al. (2010) drawing on FAO, food waste is the “wholesome edible material intended for human consumption, arising at any point in the Food Supply Chain that is instead discarded, lost, degraded or consumed by pests” (p. 3065). Stuart (as cited in Parfitt, et al. 2010, p. 3065) buttressed this definition by stating that food waste is also “edible material that is fed intentionally to animals or is a by-product of food processing diverted away from the human food [chain].” Food waste is also referred to as “any food substance, raw or cooked, which is discarded, or intended or required to be discarded” (U.S. EPA, 2011).

Food wastes are also “the organic residues generated by the handling, storage, sale, preparation, cooking, and serving of foods” (U.S. EPA, 2011). Spin-offs of food production and preparation from commercial establishments and residences including institution kitchens, cafeterias, produce stands, restaurants and grocery stores are all considered as food waste (Agbedahin, 2010a). Food is lost and wasted throughout the Food Supply Chain, which begins with agricultural production and ends with human consumption (Lundqvist, 2009; Parfitt, et al., 2010; FAO, 2011).

In the literature, post harvest food waste is often referred to as “food losses and spoilage” (Parfitt, et al., 2010, p. 3066) and this occurs throughout the Food Supply Chain. These food losses are characterised by the decrease in food quantity and quality, which renders food unfit or inadequate for human consumption (Grolleaud, 2002; Parfitt, et al., 2010; FAO, 2011). However, for consistency purposes in this study, I will use food waste as the concept representing food lost and wasted in the Food Supply Chain. I will also use the concept ‘food wastage’ to mean the process or practice of wasting food.

2.2.1.1 Relating global food waste and food production to global hunger

It was Thomas Malthus who first postulated in 1798 that population growth will in the long run overhaul food production leading to war and starvation (as cited in DFID, 2004). According to DFID (2004, p. 6) the attempt to avoid this hazard, referred to as the “Malthusian trap” has led to improved agricultural technologies in order to increase food

⁴ As requested by the Food and Agriculture Organization of the United Nations (FAO).

production. However, in recent times, there is recognition of the potential for increasing food production to withstand food insecurity, global hunger and future global demands (United Nations, 2011) but little attention is given to the substantial amount of food that is lost along the Food Supply Chain (Lundqvist, et al., 2008; Lundqvist, 2008a; Hall, Guo, Dore, & Chow, 2009; FAO, 2011). For example, there are propositions that world food production needs to increase by 70 – 100 per cent in order to provide enough food for the estimated world population of more than nine billion by 2050 (Bleker, 2010; ID2E, as cited in UNEP, 2010a; United Nations, 2011).

Irrespective of the country, food is lost and wasted throughout the Food Supply Chain but in medium and high-income countries, most food waste occurs at the consumption stage (FAO, 2011). However, in low-income countries, food is mostly lost during the production-to-processing stages of the Food Supply Chain because of limited sophisticated equipment. Such discarded food is often considered very suitable for human consumption (Lundqvist, 2008a; FAO, 2011). Kahn (2010) drawing on the findings of Opara's (2010) ongoing research in Africa, revealed that food waste in developed countries occurs mostly in households and eating establishments, while food waste in developing countries does not fit this same pattern.

The per capita food wasted by consumers in Europe and North-America is 95-115 kg/year, while that of Sub-Saharan Africa and South/Southeast Asia is 'only' 6-11 kg/year (FAO, 2011). These figures quantifying food waste in Sub-Saharan Africa seem negligible compared to the former, but the fact remains that the coping mechanisms for hunger, poverty and food insecurity in these continents are drastically different and incomparable. Regardless of the sharp difference in the amount, food waste inevitably also includes waste of resources used in food production—especially water (Lundqvist, et al., 2008b; Lundqvist, 2008a, 2008b; Lundqvist, 2009; Segrè, et al., 2010). Included, but not easily quantified, are also numerous environmental degradation and greenhouse gas emissions incurred during food production and disposal, which have negative impacts, and which need attention (Agbedahin, 2010a; FAO, 2011).

In industrialised countries, food waste generated at the consumer level is about 222 million tons (FAO, 2011). This figure is almost as high as the total net food production in Sub-Saharan Africa, which is 230 million tons (ibid). Therefore the amount of food that consumers in Europe and North-America can afford to waste and 'get away' with, is significant even if much less of such quantity of food is wasted in Africa because of the

continent's political, social and economic status quo. For example in 2003, 23 Sub-Saharan African countries including Angola, Burundi, Cape Verde, Central African Republic, Democratic Republic of Congo, Republic of Congo, Côte d'Ivoire, Eritrea, Ethiopia, Guinea, Kenya, Lesotho, Liberia, Madagascar, Mauritania, Mozambique, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Uganda and Zimbabwe faced serious food emergencies (FAO, 2003).

The emerging global, political and economic food related problems in the African continent including food insecurity, increased food prices, food riots, food crises, and food rebellions (Holt-Gimenez & Patel, 2009) cannot in any way permit the practice of food wastage. Official surveys indicate that every year more than 350 billion pounds (160 billion kg) of edible food is available for human consumption in the United States and of this total, nearly 100 billion pounds (45 billion kg) including fresh vegetables, fruits, milk and grain products are lost and wasted by retailers, restaurants and consumers (YouthXchange, n.d.; Rizvi, 2004). Yet in the United States 35.1 million people did not know where their next meal was coming from in 2005 (Patel, 2007) and in 2010 over 14% of households in America were food insecure (EPA, 2011a).

In Japan alone, 23 million tons of food was reported wasted in 2007 (Kahn, 2010). In Tokyo, the amount of food disposed of daily has been quantified to be worth the quantity of food that can feed 4.5 million people (ibid). In Great Britain, one third of the food purchased by consumers (6.7 million tons, worth £8bn) is thrown away every year (ibid). Within this research context in the RU dining halls, if a little less than three 50 litres refuse bins of food waste are produced daily in one dining hall making 150 litres (see Section 1.4.2), then it is estimated that in the 12 dining halls in RU, 1800 litres of food waste is produced in one day. In 30 days (one month), 54,000 litres of food waste is produced. In one academic year containing about nine months of in-house food services, about 486,000 litres of food would have been wasted at RU.

Paradoxically, world hunger is on the increase and Patel (2007, p. 1) referred to the global correlating increase in hunger, obesity, poverty, diet related diseases and wealth as “our big fat contradiction.” Unfortunately this great discrepancy of the food consumption rate between the wealthy and the poor is not likely to change (DFID, 2004). FAO (2008) estimated the number of hungry people (people deprived of the food needed for an active healthy life) at 923 million, an increase of more than 60 million since 1992. Similarly, Holt-Gimenez and

Patel (2009), drawing on United Nations Development Fund for Women (UNIFEM), cited De Schutter who stated that there are about 852 million hungry people in the world,⁵ of which nearly 600 million were women and girls. These extrapolations imperil the attainment of the FAO's mandate in 1945 to reduce food losses, and that of the 1974 first World Food Conference, which identified reduction of post-harvest losses as part of the solution to address world hunger (Grolleaud, 2002; Parfitt, et al., 2010).

The above extrapolations further negate the United Nations Millennium Development Goals (Nwonsu, 2008; United Nations, 2011), which only 46 countries in Sub-Saharan African are successfully striving toward when it comes to the proposed eradication of extreme poverty and hunger by 2015 (IRIN, 2011). The attainment of the goals of the United Nations Decade of Education for Sustainable Development (UNDESD, 2005-2014) which is a global movement with the aim of positively transforming education policy, investment and practice (UNESCO, 2011) is also implicated. In the light of the above, it is environmentally, socially and economically unsustainable to mismanage and waste the precious food that the planet is still able to provide in an era of climate change risks and challenges. Orr (2004) defined the "abuse of natural resources" ... "waste" and taking "more than one's fair share" as "unpatriotic and wrong" (p. 32).

2.2.1.2 World food insecurity

World food security is a global objective and not a sector (Bread for the World Institute, 2011). Food insecurity is one of the major threats to sustainable development in Africa, and particularly Southern Africa and climate change is progressively having negative impacts on food production, thus increasing the vulnerability of poorly resourced communities (Pesanayi, 2009). In November 1996, the first Food Summit was held with representatives from 185 nations with the aim of cutting the number of hungry people by half by 2015 (Aljazeera, 2008). By the end of the summit, awareness was raised among participants and the plan of action to eradicate food insecurity and malnutrition was set as a blueprint to guide ongoing efforts (ibid).

The second Food Summit was held in 2002 with 180 nations with the aim of appraising the eradication or persistence of hunger despite the 1996 plan of action but unfortunately

⁵ This was the figure before the media picked up the 2008 food crisis and even in the United States (the richest country in the world), 35 million people were 'food insecure' in 2006: unsure of their next meal or unable to procure sufficient daily calories (Holt-Gimenez & Patel, 2009, p. 8).

progress lagged at least 60% behind their goal (ibid). They therefore concluded that hunger was on the rise instead of decreasing as proposed. The 2008 third Food Summit was greatly doubted, owing to the failure of the first two summits (ibid). In 2011, what is called the ‘worst’ and ‘extremely serious’ drought in the whole of Africa for 60 years, was experienced in Ethiopia, where about 1.3 million malnourished children and adults needed to be fed (BBC, 2011). In a more recent report, 12 million people were affected by the drought and famine that scourged the ‘Horn of Africa’⁶ (Plaut, 2011).

The UN Covenant on Social, Economic and Cultural Rights stated that access to food is supposed to be a right that anyone born into the world must not be denied (Wekerle, 2004). The implication is that all other Human Rights are inconsequential if the right to food and nourishment is violated (Thurow & Kilman, 2009). According to the World Bank (as cited in Emmette, 1999), a society, community, or country can only be considered food secure if all the citizens have access to enough food at all times for their active healthy lives.

It is, however, worthy of note that even in the process of ensuring food security, food is also wasted. A US based institute known as ‘Bread for the World’, published a recent hunger report. The report highlighted that “the politics of food aid lead to considerable waste and inefficiency” (Bread for the World Institute, 2011, p. 52). The study conducted by the U.S. Government Accountability Office discovered that food procured in Asia could get to the food aid recipients at costs of 34 percent less than U.S. commodities; while those from Sub-Saharan Africa could reach food aid recipients at costs of 29 percent less (ibid). This discrepancy and direct cause of food waste is due to the fact that the U.S. food aid “must be delivered on U.S.-flagged vessels” (ibid).

There are links between the environment, food security and social justice. This reality is upheld by environment and sustainability education practitioners in Africa and in the 2011 International Training Programme held at RU, the Vice Chancellor of the host institution, Dr Saleem Badat, reminded participants that environmental issues are indivisible from social justice issues (ELRC, 2011b). Wekerle (2004) argued that not much attention has been paid to food security in social movements; and that the links between planning and food systems have only recently begun. Starr (as cited in Wekerle, 2004) articulated the link between re-localizing strategies of community food security movements and the development of alternative political economies. Wekerle (2004) further sheds light on the food security

⁶ These are countries including Eritrea, Djibouti, Ethiopia and Somalia.

movement initiatives and agencies in Toronto. He provided 'FoodShare' as one example of a Toronto-based non profit agency coordinating emergency food services including food justice, local hunger and poverty alleviation, and urban sustainability (FoodShare, as cited in Wekerle, 2004).

There is yet another link between food security and food sovereignty. According to Pimbert (2009), the concept of food sovereignty was shaped and developed by *La Via Campesina*, a group created in 1993. This group has participated in various international forums and meetings including the 1996 and 2002 World Food Summits in Rome, Italy. Their recommendations were centred on the right to food, agricultural trade and production methods and other aspects. In the 1996 World Food Summit, *La Via Campesina* briefly defined food sovereignty as "a future without hunger," adding that it is a "precondition to genuine food security" (Pimbert, 2009, p. 7). In other words there cannot be effective and efficient food security in the world without world food sovereignty and it is the only way to practically confirm the presence or absence of food security.

Food sovereignty is "the right of peoples to define their own food and agriculture; to protect and regulate domestic agricultural production and trade in order to achieve sustainable development objectives; to determine the extent to which they want to be self reliant; to restrict the dumping of products in their markets" (Pimbert, 2006, p. ix; Pimbert, 2009, p. 5). Pimbert presented further that food sovereignty promotes the "formulation of trade policies and practices that serve the rights of people to food and to safe, healthy and ecologically sustainable production" (2009, p. 5).

2.2.1.3 The state of food waste, poverty and food insecurity in South Africa

Is South Africa implicated in the unsustainable practice of food wastage? If the latter is affirmative, then what is the quantity of food waste generated in South Africa? Unfortunately, statistics on food waste generated in South Africa (like every other country in Africa) are scanty. According to Kahn (2010) a substantive amount of food is wasted yearly and deposited in the landfill but what is lost in the Food Supply Chain is unknown. Kahn stated that "South Africans waste a mountain of food each year ... but exactly what gets chucked out between farm and fork is still unknown" (Kahn, 2010). However, it is estimated that 14% of food purchased by households is being thrown away annually (Callaghan, 2010).

Apart from households, food waste is also prominent within catering sectors, shopping malls and factories. A study conducted by the South African Department of Environmental Affairs and Development Planning, revealed that a significant volume of edible food waste is generated in the Western Cape, owing to its flourishing catering and restaurant trades (DEADP, 2006). Unilever factories in South Africa which produce food waste, use theirs to make compost in a bid to assist communities improve their vegetable gardens and reduce quantity of food sent to the landfill (Unilever, 2012).

Although there is no concrete quantification of food waste in South Africa, there are various studies underway, attempting to address this gap, in order to assist policy makers in planning and implementing measures to curb food wastage (Kahn, 2010). This is evident at Stellenbosch University, where a team of researchers led by Prof Linus Opara is working on a study focused on post-harvest food losses in Africa (Kahn, 2010; Opara, 2010). The lack of adequate quantification of food waste is a reality that should not be much of a surprise as Hall, et al. (2009) noted that it is difficult to quantify food waste, both at national and international level.

It is estimated however, that 14% of food purchased (for human consumption) by households in South Africa is being thrown, which is significant if when as many as 47.1% of South Africans are living below the poverty line (Callaghan, 2010). This latter estimation was a finding of a 2006 study conducted by the University of Stellenbosch (Callaghan, 2010). People living below the poverty line generally do not have enough money for essential items such as food (ibid). For instance, rural households in the Eastern Cape live in extreme poverty; spending most of their low-level income on food (see Section 1.2.1). In South Africa, child malnutrition and food insecurity pose a serious threat to families living in the Eastern Cape Province, as well as Limpopo and KwaZulu Natal (Nelson Mandela Foundation, 2005; Pesanayi, 2009). The result of a recent study conducted by another US based institution known as International Food Policy Research Institute, shows that the negative impact of climate change on food production is likely to increase malnutrition of children to as high as 20 percent in the next two decades (IRIN, 2011).

The practice of food wastage is a reality and this is evident in Grahamstown, where RU is situated. This is apparent because hungry street children and adults often scavenge in public refuse bins for food and other material to find leftovers. Some beg for money and food on the streets. As discussed earlier in Sections 1.2.1-1.2.3, this practice is related to the fact that the

Eastern Cape (by implication Grahamstown and Makana Municipality, although not in all localities) is among one of the poorest Provinces in South Africa with an unemployment rate of 45% and about two thirds of people living in poverty (SAIRR, as cited in Møller & Seti, 2004).

In the study conducted by Møller and Seti (2004) on 861 households in Grahamstown, they found that 51% of them grew their own vegetables and these statistics composed majorly larger households and pensioners. While a large majority of households were keen to start their own food gardens, households with an income from earning wages were less interested (ibid). Reasons why people had an interest in their food gardens included: ability to feed themselves and their families, preventing starvation, saving money, enhancement of well-being and health, and avoiding the reproach of begging for food from neighbours (ibid).

It is obvious that the attainment of food security by an average citizen is closely dependent on the presence or absence of poverty. The definition of poverty is quite contested and there has been scholarly distinction between the related notion of ‘poverty as capability inadequacy’ and ‘poverty as lowness of income’ (Sen, as cited in Lister, 2004, pp. 18-19). In 1997 and 2003, the United Nations Development Programme (UNDP) in the same way distinguished ‘capability-based human poverty’ from ‘income poverty’ (as cited in Lister, 2004, p. 19). Sen pointed out that income is a means and not an end (Lister, 2004; Walker, 2005).

The above standpoints then leave a challenge for high income earners who have the capabilities for food access but lack the capabilities to reduce food waste and low income earners who yearn for such capabilities but do not have them. Sen (as cited in Walker, 2005) further put forward that quality of life is related to capability and capability is what people are actually able to be and do, rather than the type of or what resources they have access to. Dowler and Leather (as cited in Lister, 2004, p. 25) talked about “food poverty” and the significance of mere food consumption instead of nutrients consumption. They asserted that “food is an expression of who a person is, what they are worth, and of their ability to provide for basic needs” (ibid).

2.2.2 Policy responses to global food loss and food waste

According to an FAO corporate document repository compiled by Grolleaud (2002), writers and agri-food specialists throughout the world have been addressing the problem of food losses at the different stages of the Food Supply Chain since the 1960s. This event marked

the beginning of the Green Revolution. The gravity of this issue was in the limelight during the first World Food Conference held in Rome in November 1974. This conference was held at a time when African countries started experiencing the repercussion of famine and drought. Then, the quantity of post-harvest losses was estimated at 15%. Such percentage was considered an issue of high priority and as a result 50% reduction by 1985 was proposed to address world hunger (Grolleaud, 2002; Parfitt, et al., 2010).

Much responsibility was laid on FAO, which had just hosted the World Conference, and had a mandate since its inception in 1947, to set up the Special Action Program called 'Prevention of Food Losses' (ibid). This programme was enacted in 1978 with the objective of conducting studies and surveys in order to gain better and reliable understanding of post-harvest losses as well as recommending feasible solutions (Grolleaud, 2002). The objectives of the programme also included the reduction of losses of durable grain but this scope was progressively extended to roots, tubers and fresh fruits and vegetables (Parfitt, et al., 2010). However, poor intervention rates gave rise to the conclusion that a more holistic approach must be adopted to find a lasting solution to the complex problem of food losses within the Food Supply Chain (Grolleaud, 2002; Parfitt, et al., 2010).

According to Parfitt, et al. (2010) no progress was recorded towards the 1985 FAO post-harvest food loss reduction plan until 2008, when Lundqvist, et al. (2008) advocated for action to reduce post-harvest food losses and waste to 50% by the year 2025. At the first Global Conference on Agriculture, Food Security and Climate Change, numerous tools were proposed by policy makers in order to attain triple wins and practical solutions to global challenges. Some of these tools include efficient harvesting and early transformation of agricultural products to reduce post-harvest losses, as well as waste minimization throughout the production and consumption chain (Bleker, 2010; ID2E, as cited in UNEP, 2011).

From an education perspective, efforts are also being made to educate producers and consumers. There are initiatives to support Sustainable Production and Consumption Education, for example, the Partnership for Education and Research for Responsible Lifestyles (PERL) and YouthXchange on Education for Sustainable Consumption and Production. United Nations Educational, Scientific and Cultural Organization (UNESCO) has been identified as lead agent for a UN Decade on Education for Sustainable Development (DESD), which aims to integrate all education and UN efforts to strengthen Education for Sustainable Development (ESD). The overarching goal of the UNDESD is to engage people

and communities in meaningful lifelong learning processes, which analyse how societies can live in more sustainable ways (UNESCO, 2011). The sustainability implied in the DESD's goal connotes that all human activity should include renewable energy sources, conservation, recycling, environmentally friendly kinds of development, water management and waste disposal (Emanuel & Adams, 2011).

In a Stockholm International Water Institute Policy Brief, Lundqvist, et al. (2008) proposed that international organisations, governments, and NGOs have a major role to play in developing and implementing policy agendas that can curb food wastage. The United Nations' green agricultural revolution aims at ensuring efficient use of natural resources, significant improvement in sustainable practices of waste reduction (United Nations, 2011). This same Green Revolution has, however, been critiqued by developing country activists including Vandana Shiva, Claudio Martini, Bernard Geier and Edward Goldsmith (ICFFA, 2006). In the context of this Green Revolution discourse, the UN has also proposed that "publicity, advocacy, education and even legislation should also be used to bring about ideological, cultural and behavioural changes so as to reduce high levels of retail and domestic food waste in the developed world" (United Nations, 2011, p. 99).

2.2.3 Implications for education

There is indeed "no freedom and no responsibility without education [and] as citizens, it is through education that we [will] learn to make choices for our daily life" (UNEP, 2010b, p. 4). FAO (2011) stated that further research in the area of global food losses and waste is urgently needed. This statement was made because there was evidence of major loopholes in the availability of empirical data in this niche, as a result of little ongoing research. This gap makes it impossible to actually and precisely confirm how much food is lost and wasted in the world today and how to prevent such practices; hence, assumptions are presently being made because of the lack of empirical information (ibid). Of interest to this study is the implication of this for education, and what kind of educational research could potentially address this problem.

Education is seen as potentially potent in the sustainable preservation of food resources, in sustainable production and consumption processes, and in shaping of society and the world at large (UNESCO, 2005; UNEP, 2010b). The overall goal of the United Nations Decade of Education for Sustainable Development (UNDESD 2005-2014) is:

To integrate the principles, values and practices of sustainable development into all aspects of education and learning. This education effort will encourage change in behaviour that will create a more sustainable future in terms of environmental integrity, economic viability, and a just society for present and future generations (UNESCO, 2005; UNEP 2006; UNESCO, 2009; UNESCO, 2011).

One of the major thrusts of Education for Sustainable Development (ESD) stated in the United Nations Implementation Scheme for the UNDESD is to re-orient education at all levels—including all institutions of higher education (UNEP, 2006). The kind of education referred to here is that which cuts across formal, informal and non-formal segments as long as it “brings about change in values, attitudes and lifestyles to ensure a sustainable future and the evolution of just societies” (UNESCO, 2007). The implementation of this broader objective of the Decade of Education for Sustainable Development (2005-2014) is being addressed by some bodies including the Mainstreaming of Environment and Sustainability into Africa (MESA) Universities Partnership. The effort of MESA has permeated several Higher Education Institutions in many African countries⁷ but the challenge of effectively spreading to all African countries lies ahead (MESA, n.d).

FAO (2011) proposed education in schools and education institutions (including Higher Education Institutions) as a possible starting point to help change consumers’ attitude towards the current massive food waste. However, such Environmental Education practices are said to require a more reflexive and critical approach (Wals, 2007; ELRC, 2011b). Eisner (1985) argued that what is taught and learnt is equally as important as how it has been taught and learnt, as well as what is not taught at all. Eisner emphasised the need for schools and education institutions to look critically at what is excluded from their explicit curriculum and pedagogy. This then means that there will be a need for change in the curriculum of Higher Education Institutions in order to ascertain their appropriateness towards the achievement of Education for Sustainable Development (ESD).

To facilitate curriculum change, de la Harpe and Thomas (2009) drawing on Eckel, et al. postulated some conditions that can facilitate successful curriculum change in universities, including understanding the change process, why change is needed and the eventual implementation of change. de la Harpe and Thomas (2009, p. 77) drawing on de la Harpe and Radloff further put forward some steps to curriculum change which resonate quite well with

⁷ MESA’s partnering countries include Cameroon, Cote D’Ivoire, DRC, Egypt, Ethiopia, Ghana, Kenya, Lesotho, Liberia, Malawi, Nigeria, Rwanda, South Africa, Sudan, Swaziland, Uganda and Zimbabwe.

the Expansive Learning Process (see Section 3.2.2.4 where it is discussed in more detail). These include engaging in an intellectual effort to develop an agreed vision and shared understanding; gaining active involvement of ownership by senior leadership, providing opportunities to debate, discuss, recognize and resolve issues; ensuring that tasks are completed by those assigned responsibility; ensuring that systems and processes are developed or/and modified to support and monitor the change agenda.

Concerning change-oriented learning and sustainability practices, Lotz-Sisitka (2008) noted that substantial Education for Sustainable Development (ESD) research on learning and sustainability practices is lacking in Southern Africa. She was referring to workplace learning, more broadly, but I am of the opinion that such research is also needed in Higher Education Institution workplaces. My research takes place among working subjects (men and women research participants) who work for about 39/59 hours per week, rotationally in their work places, producing food for students, where students are consumers in the university food economy.

In addition, one of the steps proposed by Lundqvist, et al. (2008) to tackle the food waste issue is international and national research that will reveal the real magnitude of food losses and wastage in the Food Supply Chain as well as research and practical steps oriented towards minimising it. These effective steps needed to minimise food waste lie in what Parson and Clark (1995, p. 329) and Glasser (2007, p. 48) referred to as “learning by individuals that take place in social settings and/or is socially conditioned ... learning by social aggregate.”

This kind of individual and collective learning towards solving an environmental, social, and economic issue (food wastage) must incorporate an analysis of the nature-culture relations embedded in the issue (Norgaard, 1994; Head, 2000). Hence, an in-depth analysis of what people are doing in a particular context and environment is necessary. What is it about their culture that makes them behave the way they do? Who/What is responsible? What can be done to change the situation for the better? When/How did it start? How can education and Environmental Education research mediate such inadequacies? Researching the cultural and historical ‘how’, ‘when’, ‘why’ of the origin of the environmental problems, issues and risks, in relation to the human influence, and impact is important. UNEP (2010b) postulated in a similar vein that:

Comprehensive research can strengthen the foundation for what is taught ... by providing insight into consumption's varied impacts on different environments and about how cultures accept or reject particular changes. Thus research needs to examine a diversity of approaches to sustainable consumption based on different social, economic, geographical and cultural conditions.

This means that not one single approach may be suitable to address food inefficiency; hence, a multi dimensional education strategy is necessary. The role of Education for Sustainable Development is to enable citizens to develop a sense of reflexivity and responsibility that will guarantee the maintenance and sustenance of the environment we live in, through interdisciplinary and comprehensive learning processes (Wals, 2007). Wals argued that the world is changing rapidly and unpredictably and for humans (irrespective of their status) to change this changing world, they themselves need to commence and continue changing (ibid). How can people learn and change, if they are not effectively taught? Hart, Jickling and Kool (1999) said that this is the role of Environmental Education. Further discussions regarding learning, change and learning theories towards sustainability and its application in this research are included in Sections 2.3.5, 2.3.6 and 2.4 below.

2.3 Specific responses to food waste

2.3.1 Education for Sustainable Consumption and Production and Sustainable Lifestyles

Education and specifically Environmental Education for sustainable consumption is a major challenge lately in the field of Education (González-Guadiano, 1999). Education for Sustainable Consumption (ESC) is an important part of the UN Decade for Sustainable Development (UNEP, 2010b). Education for Sustainable Consumption was launched during the 14th Session of the United Nations Commission of Sustainable Development—CSD14, New York in May 2006 (ibid). During the session, education was considered as an essential tool to actualise the smooth shift towards more sustainable consumption and production by introducing these issues into curricula (ibid).

In the bid to promote global effort on Sustainable Consumption and Production (SCP), the Marrakech Process⁸ started the Taskforce on Sustainable Lifestyle. The Taskforce on Sustainable Lifestyle attempts to provide opportunities that will enhance practices and

⁸ The Marrakech Process led by the United Nations Environment Programme (UNEP) and the United Nations Department of Economic and Social Affairs (UNDESA) was established as a response to the 2002 World Summit on Sustainable Development. The implementation plan that noted the need for initiatives focussed on Sustainable Consumption and Production, and included a focus on Education for Sustainable Consumption and Production.

choices that help individuals to meet their needs and aspirations but create a sense of responsibility towards present and future generations (UNEP, 2010a). Education is a major part of the Task Force on Sustainable Lifestyle as well.

The assumption is that having an understanding of the way we impact the world around us will help people make better personal and professional decisions (Hart, et al., 1999). Education for Sustainable Consumption (ESC) was therefore constituted as a sub-task group of the Marrakech Process. ESC aimed to provide the knowledge and skills that can enable individuals and groups to become actors of change (UNEP, 2010a). This movement mandates that all humans strive towards more sustainable consumption, as well as offering workable solutions and better alternatives to more sustainable living (ibid).

Sustainable consumption is therefore related to the process of purchasing, consuming and disposing products (Ministry of the Environment, Ministry of Integration and Gender Equality, 2007) and food resource management is no exception. Sustainability is referred to as meeting the needs of the present generation without compromising the ability of the future generations to meet their own needs (Brundtland Commission, as cited in Emanuel & Adams, 2011; Mitchell, 2011). Making the attainment of sustainability part of lifestyles can minimize the use of the earth's natural resources; it can reduce waste and yet provide basic needs and a better quality of life for current and future generations (UNEP, 2010a). Therefore, more sustainable consumption of food, effective food resource management, and food waste reduction are seen to be essential for a secured present and next generation (ibid).

According to Agenda 21 “education is critical for achieving environmental and ethical awareness, values and attitude, skills and behaviour consistent with sustainable development and for effective public participation in decision making (UNEP, 2006). The lifestyle of every individual, young or old, matters in the move towards sustainable consumption and production, because the displayed lifestyles of people are characterised by the kind of decisions they make. If the knowledge of and decision to make sustainable consumption choices cannot be separated from peoples’ behaviour, attitude, ethical awareness and what they place value on, how then can Environmental Education function effectively?

The link between what people have reasons to value and the role and aim of education has been expatiated upon by Sen (as cited in Walker, 2005), implying that bridging this gap can produce learners that have the capability to choose a life they have reasons to value. This

means that people may not naturally or automatically value sustainable food consumption and production. It also means that people can change and begin to respond positively to this quest if and only if there is quality education. Good quality education is that which is relevant and has the ability to empower people (UNESCO, cited in Shumba, Kasembe & Makudu, 2008) and the accomplishment of good education must be the goal of all educators (Hart, et al., 1999) and specifically environmental educators.

Quality education also needs to be planned in conjunction with the history and context of the learners; only with this mission can quality of life be possibly enhanced by the quality and relevance of education (Nelson Mandela Foundation, 2005). In other words effective education for sustainable consumption and production needs to be undertaken in relation to the learning/learners context, history and the environmental issue and risk. Hattingh (1999) recommends environmental pragmatism as an effective Environmental Education approach to environmental problems. He explained that this approach entails placing concrete environmental problems (including unsustainable food waste, consumption and production) within a particular context (such as the Higher Education Institutions, food services and dining halls), and that context is then linked with wider contexts (such as national and global food sovereignty, food insecurity, social justice and environmental degradation), within which it is embedded.

Further to this notion is the position of Hart, et al. (1999) who presented the educational value and role of Environmental Education. They stipulated that these values lie in the ability to teach citizens who urgently need sustainability teaching and learning as a pedagogical requirement for development. According to Hart, et al. (1999) the pedagogical requirement encapsulates the following: (a) what is happening in the environment?; (b) how do we know it is happening?; (c) who is benefitting from such activities that cause environmental unsustainability?; (d) what is being done to them to make them pay for such damages?; (e) what can be done to prevent further damages?; (f) how to find mode of human activities that align with nature's ability to produce resources?; (g) what can we do to remove already produced waste and subsequently reduce waste production? And (h) how to make people learn how to live well in their environment? Such strategic and purpose driven education should be interdisciplinary, contextualized, participatory, critical, value-based, inquiry-based, community-based, learner-centred and problem-centred (ibid).

2.3.2 Sustainable food consumption

Food is a basic physiological need of human beings as social and physical beings (Townsend, as cited in Lister, 2004; Dowler, et al., as cited in Lister, 2004). Townsend argued that food and nutrition are interrelated and dependent on social, historical and cultural contexts (as cited in Lister, 2004). This means that the “amount and cost of the food which is eaten [or wasted] depends on the social roles people play ... and the kind of foods made available socially through production and availability in markets” (ibid, p. 25). The above statement makes the attainment of sustainable consumption daunting and sometimes vague to figure out but it entails the ability to provide for the next generation of fellow consumers in a sustainable manner and this presents enormous opportunities and challenges (González-Guadiano, 1999; Krantz, 2010). The main challenges lie in ensuring the practicality of such a target. Krantz (2010) argued further that consumers have a great influence on the rate of demand and consumption hence a productive starting point is the focus on consumer behaviour.

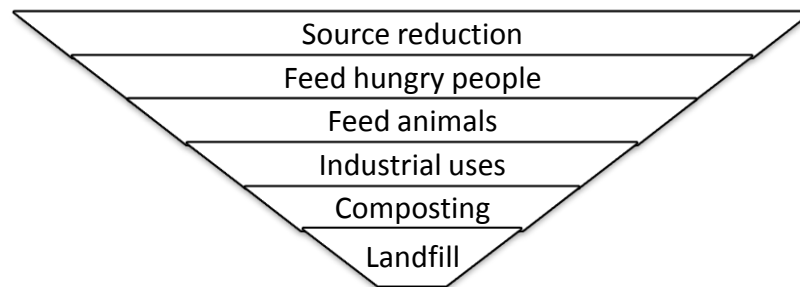
There is huge potential in individual and collective moves towards sustainable food consumption. Living and non-living entities have everything to gain if humans can learn to consume wisely. For example, a study conducted by the University of Arizona revealed that half of the food produced in America was never eaten and the United States Department of Agriculture (USDA) postulated that if just 5% of Americans' food scraps can be recovered, this stands at a value of one day's worth of food for four million people (Callaghan, 2010). The challenge below is the ability of every human:

To adopt patterns of consumption and production that safeguard human rights and community well-being as well as the regenerative capacities of the earth and to ensure that economic activities at all levels promote human development in an equitable and sustainable manner (UNEP, 2010b, p. 8).

Fostering sustainable consumption has been neglected, while sustainable production has been more emphasized (ibid). There is therefore need for the necessary transition that can foster sustainable consumption through “comprehensive investigation” (UNEP, 2010b, p. 16). The urgent need for more sustainable food consumption is gaining momentum. For instance, in the U.S., the Environmental Protection Agency commenced what they call ‘Food Recovery Challenge,’ which is an initiative towards sustainable materials management (EPA, 2011a). Its aim is to challenge people to reduce their food waste as much as possible by

recommending implementation of the food recovery hierarchy (See Figure 2 below) as a sustainable option for food resource management.

Figure 2: U.S. Environmental Protection Agency's (EPA) recommended food recovery hierarchy.



Apart from the above proposition, the U.S. sustainable food management webinar series is also currently in motion with the aim of helping universities and households' food consumers to increase their knowledge of food waste related issues (EPA, 2011b).

2.3.3 The nexus between sustainable food economy and food waste

Understanding the interconnection between food waste and food economy is significant in addressing food waste issues. The efficient or inefficient management of food economy of any nation, society, or organisation has an impact on food waste production. I deem it essential to examine the concept of food economy in order to establish the link between the two concepts (since I have dealt extensively with food waste thus far), and establish why it is essential to incorporate it in this review and in to my research questions. Food economy is defined by Kinsey (2001) as “the entire food chain, from the laboratories that slice, dice and splice genes to everything from our crop seeds, pharmaceuticals, and animals, to the cream cheese we spread on our bagels ... it is flow of product from farm to fork” (p. 1113-1114). This definition highlights the fact that the concept of food economy covers all processes and stages involved in producing food for human consumption.

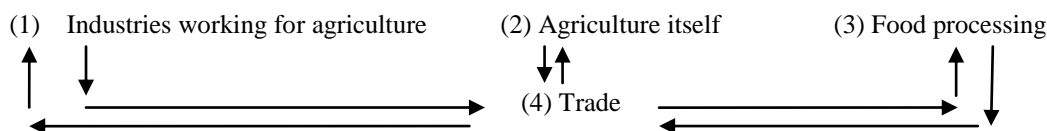
Kinsey further explained that food economy includes “the two main streams of activities in manufacturing plants, namely food for retail stores and food for food service establishments” (p. 1114). Following Kinsey's further explanation, if the food services, establishments and food retailers are embedded within the concept of food economy, then it clearly means that in the context of my research if I look at how and where the RU Food Services procure food and their general operations, then I am studying their food economy. Kinsey (2001) also stated that in the food economy “consumers are the end game of this [food] supply chain” (p. 1114). Adopting these propositions also implies that if this research focuses on how food is

consumed by consumers, then the study can still be said to be enclosed within the food economy of the food services. In a similar vein, Hunek (1973) stated that the food economy consists of four major elements including:

1. Industries working for the needs of agriculture [that is farm implement industries, fertilizer, and insecticides production].
2. Agricultural production itself [all production processes taking place in the field or on the farm].
3. The food processing industry [processing raw agricultural materials into finished food products].
4. Agricultural trade, together with service industries, which ensures circulation of goods between the three elements of the aggregate food economy (p. 27).

He represented the elements schematically as follows:

Figure 3: An illustration of the four streams of food economy



(Adapted from Hunek, 1973, p. 27)

In the context of this research and for the purpose of this review, only the third element which is the food processing industry responsible for processing raw agricultural materials into finished food products is applicable. This proposition, in line with Kinsey's (2001) viewpoint, also shows that food economy encapsulates the food services sector, owing to the fact that they process raw agricultural materials to edible products.

Dyka and Sackiewicz (as cited in Hunek, 1973) further elaborated the definition of food economy, stating that it is the sum of the four major elements identified by Hunek (1973), 'but including' a fifth element which is food consumption. Although Hunek did not agree with this, I am adopting Dyka and Sackiewicz's argument because the consumption of the food that is processed by the food processing industry in the context of my research is fundamental and cannot be separated. Łoś in sharp contrast to Dyka and Sackiewicz's notion regarded food economy as a "component of agriculture and food consumption" (as cited in Hunek, 1973, p. 28), rather than the other way round as proposed by Hunek, Dyka and Sackiewicz and Kinsey. I therefore base this study on the viewpoints of Kinsey (2001), Hunek (1973), and Dyka and Sackiewicz.

Food economy is a vast and complex concept that is often related to national or global economy at a macro level (Hunek, 1973; Garnett, 2000; Kinsey, 2001; de Haen, Stamoulis, Shetty & Pingali, 2003). However, food economy in the context of a Higher Education Institution such as Rhodes University for instance, represents food economy on a micro level. Food economy within the food services incorporates everything that goes into the procurement of the raw agricultural materials (element 2 in Figure 3 above) from food retailers, to food preservation, food preparation, food serving, food consumption, and eventually, food waste disposal.

Kinsey (2001) sheds more light on other inevitable micro components of the food economy including the food system that composes the supply and the demand chain, where consumers are the end and beginning of these chains respectively. Kinsey also stipulated that the food system that is enclosed in the food economy operates “within the culture of its community, the economy of its nation, and a market that extends around” (Kinsey, 2001, p. 1114). It includes natural resource and environmental issues, labour and marketing practices, waste disposal, recycling practices, public policies that are important to participating firms, human resources, transportation, consumers, and citizens (ibid). It includes the industries that service the food chain such as the financial sectors, labour unions, government agencies, and educational institutions, a complex transportation and distribution system that operates between food manufacturers, and retail outlets.

The food services and food retail operations which are components of food economy as stated by Kinsey (2001) generate two main categories of solid waste; namely, food waste and packaging materials, both of which constitute significant amounts of the overall solid waste stream (Davies & Konisky, 2000). In summary, adequate significant improvement or transformation of food waste related issues cannot be achieved if the entire food economy of an organization [national or international] is not incorporated. To buttress this argument, FAO (2011) made the following statement, “actions should not only be directed towards isolated parts of the [food supply] chain, since what is done (or not done) in one part has effects in others” (p. 15).

2.3.4 Universities as food consumers: An emphasis on food services sectors and the efficacy of food waste management practices

In the African continent, public and private Higher Education Institutions are supposed to be busy with the endeavour of teaching students to be better individuals and more responsible citizens in the future (UNEP, 2006). Many of these institutions are universities who provide in-house food services for their students. Are the food services sectors in Higher Education Institutions mandated to provide only quality, healthy food to consumers? Are they expected and obliged to perform other roles that can ensure 'more' sustainable food economy? I draw on Strohbehn and Gregoire (2004) who argued that the environmental and social responsibility of the food services in Higher Education Institutions is to provide healthy food and to teach and inculcate in students, appropriate eating habits. They argued further that the food services industry also has the mandate to educate students on the correlation between the food chain and the environment; including how students can be good keepers of the environment (ibid). This is very enlightening to know but the concern now is, how many Food Services have these mandates as goals? Are they even aware of these 'extra and mandatory' responsibilities?

Food services operations generate pre-consumer and post-consumer food waste (Leanpath Incorporation, 2008). Pre-consumer food waste [also known as 'waste in the back of the house'] is described as food waste discarded by kitchen staff members within the control of the food service operator, such as waste as a result of overproduction, trim waste, expiration, over procurement, spoilage, overcooked items, contaminated items and dropped food items (ibid). Post-consumer food waste, [also known as 'waste in the front of the house'] is food discarded from items at the consumers' disposal or placed at self-serve meal stations such as salad bars, tea, coffee, milk, margarine, peanut butter [and general condiments] and menus mistakenly ordered by consumers (ibid). Post-consumer waste also includes food waste discarded by consumers/students after the food has been sold or served, that is 'plate waste' or 'table scraps' and the decision to discard such food is made by the consumer rather than the food service operator (ibid).

Why is food waste management at university necessary? Kahn (2010) argued that "there is a moral imperative to cut down on consumer waste." The unsustainable but common act of food wastage disregards several declarations, protocol and policies; knowingly or unknowingly, intentionally or unintentionally, intended or unintended (Agbedahin, 2010a).

The risks involved in food wastage are numerous depending on the context, in time and in space. A few of these risks include loss of natural resources, air pollution (production of hazardous methane CH₄, which is 20 times more dangerous than carbon dioxide CO₂), pollution of ground water through leachate, littering, health hazards, attraction of vermin and flies, general nuisance and a host of other risks (Agbedahin, 2010a). Furthermore, food waste has substantial social, biophysical, cultural, economic and political consequences that have hitherto been taken for granted but should not be (ibid).

The fight against food waste is not restricted and should not be delegated to certain groups of people or professionals alone. It requires the individual and collective effort by all humans who have access to edible materials across races, religions, and cultures. I included the latter because the war against food waste runs contrary to some cultural traditions, where good hospitality is equated with providing more than enough food for guests (Vale & Vale, 2009). In the past, polite society in the West solved this problem by having servants ‘below their stairs’ who would consume the leftovers from the dining above stairs but thankfully this is no longer an option in most households (ibid). Vale and Vale therefore opined that “the least environmental impact is to eat everything put in front of you and to ensure that people are served only the amount they can eat each time they sit down at the table” (ibid, p. 62).

More so, it is recommended that all humans do not waste food and not overeat as well (Patel, 2007; Lundqvist, 2008a; Vale & Vale, 2009). As presented in Section 2.3.2 and Figure 2 above, the most recommended option for efficient food waste management is to reduce it from the source. The next best option is to feed hungry humans with food waste before it becomes waste and before it is used for animal fodder, which is the next best option. Composting of food is the second to last option and much less sustainable than the above. In order to meet the challenge of food waste management, conventional unsustainable food purchasing, storage, preparation, services and practices must change. This change can assure improved bottom line, socially supported and developed community and reduced green house gas emission, if deposited in landfills (EPA, 2011a; EPA, 2011b). In conclusion, Lundqvist (2008a, p. 13) argued that this involvement of all individuals and not just decision makers are “pre-conditions for a stable and sound development.”

2.3.5 Sustainability in Higher Education Institutions

Higher Education Institutions are considered as possible agents of change that can propel sustainable development, therefore if this role is managed and played securely, societal

change can possibly be attained since those institutions normally educate the elite and many of the decision makers in a society (Gough & William, 2007). Institutions of higher education as part of corporate organizations (Baldwin & Chung, as cited in Chen, Gregoire, Arendt & Shelley, 2011; McKinne & Halfacre, as cited in Chen, et al., 2011; Rauch & Newman, as cited in Chen, et al., 2011) are also required to operate in such a way that they balance their legal and economic demands with their social and environmental impact without compromising the execution of their role (Carroll, as cited in Chen, et al., 2011; Palazzi & Starcher, as cited in Chen, et al., 2011). I am of the opinion that the execution of the various roles played in organizations should rather not compromise environmental and social sustainability.

There is a call for sustainability in Higher Education Institutions because they too have an impact on the environment and capability to strengthen sustainable development through Education for Sustainable Development (UNEP, 2006). Such sustainability measures should cut across all disciplines in universities, involving the creative effort of all students, lecturers, managers, researchers and non academic staff members (ibid). Their level of impact as institutions can be traced back to the amount of resources such as food, water, electricity they consume as well as the amount of waste they generate (Earl, et al., as cited in Chen, et al., 2011). Since food services are active units concerned with production and consumption within Higher Education Institutions it is obvious that they contribute to the overall ecological footprint of these institutions (Chen, et al., 2011).

Some food services sectors in Higher Education Institutions have adopted certain sustainable practices such as reducing food miles by purchasing items from nearby farms, recycling, avoiding disposable utensils, and dining without trays (ibid). It has been found that the intention of such food services administrators to adopt these sustainable practices is due to several factors such as social pressure, personal views, attitudes and a personal feeling of obligation (ibid). The advantages of reducing the ecological footprint and waste in addition to those discussed in Section 2.3.2 are enormous and worth indulging in.

Fonseca, Macdonald, Dandy and Valenti (2011) pointed out that colleges and universities can play critical roles in contributing towards sustainability. Orr (1993) highlighted that the earth is in continuous jeopardy as a result of the decisions made by highly educated people. He added that the educational models that are used to form and produce these educated people must be questioned. Cortese (as cited in Fonseca, et al., 2011) also argued that the

aforementioned models tend not to ask students to challenge the common unsustainable assumptions they have. Orr (1993, p. 753) clearly asked "what are schools, colleges, and universities doing to re-educate the citizenry or their own faculty, administrations, and trustees for that matter?" He lamented that educational institutions are in the business of yearly graduating students who do not have a clue about the relationship between their lifestyles and the changes obviously observed on earth (ibid). Orr asked "how can this be?" (ibid).

However, since the early 1990s, the sustainability movement has permeated into all dimensions of academia and higher institutions, and has therefore made significant progress in research as well as institutional procedures (de la Harpe & Thomas, 2009; Savelyeva & Mckenna, 2011). The evidence of the mainstreaming of sustainability in colleges and universities in the U.S. is seen in the inclusion of sustainability in their mission, curricula, research, student life, planning and purchasing (Rowe, 2007). The evidence of the long term positive influence of universities in Africa was presented in an historical sketch that highlighted their numerous innovations (UNEP, 2006). An example of such is a research tailored towards ensuring food resource efficiency and that which is related to this study is evident at Stellenbosch University, where a team of postgraduate students (four PhD and four MSc) led by Prof Linus Opara, is presently conducting a series of studies (Opara, 2010). The primary aim of these studies is to quantify post-harvest food losses and how technology can reduce food losses, majorly in fruits and vegetables (ibid).

The international impact of the Mainstreaming Environment and Sustainability into African Universities (MESA) is another example of sustainability movements in Africa. MESA partners implement Education for Sustainable Development (ESD) in universities. They conduct seminars for university leaders and biennial conferences which provide opportunities to report their various ESD innovations and they also pilot programmes that link universities, communities, industries and businesses that enhance sustainable development (UNEP, 2006). The MESA University Partnership has been a major contribution to the United Nations Decade of Education for Sustainable Development (UNDESD) and it also enhances the mission of the United Nations Environment Programme (UNEP) for Africa (UNEP, 2006).

It is worth noting here that RU is currently included in the MESA University Partnership although previous research findings showed that "sustainable development has not been and is not being consistently mainstreamed among departments" (Togo, 2009, p. 275). Should

there be a tenable excuse for the non achievement of sustainability in every facet of a university despite the various sustainability declarations that focus on Higher Education Institutions and in particular, the African continent? Some of the declarations include the World Declaration on higher education for the 21st Century, which states that the role of Higher Education Institutions should incorporate “consolidation of human rights, sustainable development, democracy and peace, in a context of justice” (MESA, n.d). Another is the AAU Declaration on African Universities in the Third Millennium which calls for “the revitalization of the African University, and for a renewed sense of urgency in acknowledging the crucial role it should play in the many problems facing the continent” (Nepad Council Commission of Education, as cited in MESA, n.d).

2.3.6 Implications for education: Some types and approaches to learning

Learning encompasses formal, informal and non-formal types of learning (UNESCO, 2007). There are numerous theoretical perspectives explaining learning and they differ in respect to their interest, epistemology and ontology (Lundholm & Plummer, 2010). Within the field of education, and specifically Environmental Education, it is not any different. However, Lundholm and Plummer (2010) drawing on Greeno, Collins, and Resnick described three mainstream perspectives as follows: firstly, the behaviourists’ perception of learning, for example Watson and Baum; secondly, the cognitive for instance Piaget and Vosniadou and; thirdly the situative or sociocultural learning, building on the work of Vygotsky and Wertsch and Kanner.

Similarly, drawing on Reid and Nikel in an international ‘Knowledge, Learning, and Societal Change Science Plan’, Blackmore, Chabay, Collins, Gutscher, Lotz-Sisitka, McCauley, et al. (2011, p. 31) also clearly illustrated and explained this inexhaustible classification of learning theories in a tabular form as shown below:

Figure 4: Classification of learning theories (source, Blackmore, et al., 2011).

Perspective	Behaviourist	Cognitive	Situative / Social / Cybernetic
Epistemology	Empiricism	Rationalism	Socio-historicism / Pragmatism Relational
Traditions and sources of concepts contributing to learning theories	Associationism Behaviourism Connectionism	Gestalt psychology Constructivism	Social-cultural psychology and sociology Activity Systems Communities of

			Practice Networks / Cybernetics
Knowing as ...	Having associations affecting behaviour	Conceptual and cognitive development Personally meaningful	Distributed, relational and embodied cognition
Learning as ...	An organized accumulation of associations and components of skills	Understanding of concepts and theories in different subject matter / disciplinary domains, and general cognitive abilities	Becoming more adept at participating in distributed cognitive systems; engagement in interpersonal relations and identity in communities of practice; engagement with dissonances that exist in and between people and activity systems; networked relations
Learning and Transfer ...	Acquiring and applying associations Behavioural and attitudinal change	Acquiring and applying conceptual and cognitive structures	Initiation and induction; development of shared repertoires; collective and relational forms of knowledge and agency; uncertainty
Motivation and Engagement ... Focus on accountability and assessment ...	Extrinsic motivation External	Intrinsic motivation Individual	Engaged participation Connectedness Community; Networked relations
Underpinning links to theories of societal change ...	Societal change is attendant on responses to conditions or stimulus inputs	Societal change is attendant on the 'knowledgeable actor'	Societal change occurs through learning interactions amongst members of communities of practice and/or through within different human or cybernetic activity systems and networks.

Behaviourist learning theorists opined that learning takes place when a stimulus prompts a response (ELRC, 2011b). Social behaviourist theorists are of the opinion that learning comes as a result of modelling, observing or copying others (ibid). Lundholm and Plummer (2010, p. 476) noted that learning according to the behaviourist point of view is based on the proposition that “actions, feelings and thinking can and should be regarded as behaviour.”

The cognitive perspective is centred on an individual's conception and knowledge structure (ibid). Lastly, the socio-cultural perspective is based on how an individual's cultural, social and institutional experience influences learning (ibid). On the one hand, there are traditional assumptions that learning is individually constituted and detached from context and realities around the world. On the other hand social learning takes cognizance of the context, relations, and connections with others as well as the material realities in particular settings.

The position of social learning theorists is also radically different from the popular assumption that awareness leads to change in attitude and automatically propels action. They stipulate that circumstances, experiences and participation can facilitate 'learning by doing' in and through participation in communities of practice and such participation can enhance learners' values, hence competence is socially, culturally and historically constituted (Lave, 1991; Wenger, 2000). In a similar vein, socio-cultural learning theorists argue that the extent of learning is determined by various social and cultural factors in a particular learning situation (Capper & Williams, 2004). In addition they are of the opinion that preconceived ideas are influenced by how learners identify with role models, and what learners place value on.

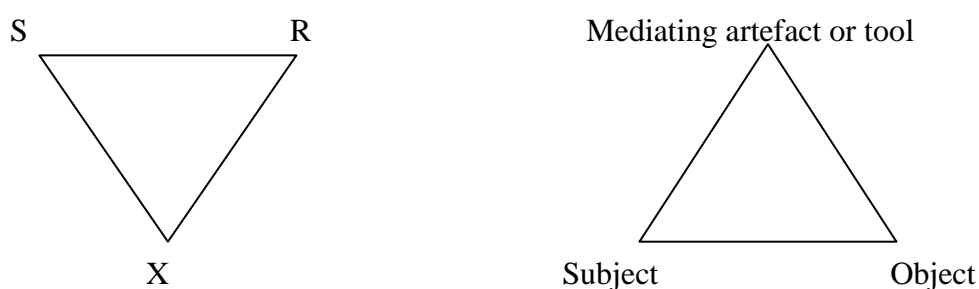
Learning theories developed most recently assert that learning processes involve not only the cognitive 'knowledge transfer' dimension but also essentially the cultural and social dimensions (Handley, Sturdy, Fincham & Clark, 2006; ELRC, 2011b). These three dimensions function effectively when learners derive meaning from the social context by making use of their prior knowledge-concepts and language (ELRC, 2011b). Learning therefore lies within the interplay of a learner's culture, language 'already known' and taught with, including how such learning is being mediated (ibid). Lundholm and Plummer (2010, p. 477) stated that when looking at learning it is essential to see it as a "multi-faceted process including cognitive, social and emotions aspects." Therefore, it is most effective to base learning "across the spectrum of available learning theory traditions" (Blackmore, et al., 2011, p. 32). Similarly, Sfard (1998) classified the main theories of learning into two groups; namely, acquisition and participatory approaches. He referred to them as "metaphors" and warned of the danger of focusing on one and neglecting the other (p. 4). Acquisition of knowledge is related to participation in knowledge making and development. To acquire certain practical and experiential knowledge, there is need for participation in a process of

learning. I will buttress my point with Vygotsky's illustration of learning and knowledge acquisition by 'doing' and 'action' (as cited in Daniels, 2004, p. 35):

Just as you cannot learn how to swim by standing at the seashore ... to learn how to swim you have to, out of necessity, plunge right into the water even though you still don't know how to swim, so the only way to learn something say, how to acquire knowledge, is by doing so, in other words by acquiring knowledge.

At this juncture, I will further dwell on Vygotsky's (1978) socio-cultural learning and activity theory that are centred on the concept of mediation because of its historical relevance to the theoretical framework of this study. As shown in Figure 5a below, Vygotsky developed a triangle, which connected the stimulus S to the response R and had a link to actions that are mediated by cultural factors X.

Figure 5: (a) Vygotsky's model of mediated act and (b) its common reformulation.



(Adapted from Engeström, 2001, p. 134)

This first generation of Cultural Historical Activity Theory (CHAT) is represented in a triangle with subject, object and mediating artefacts as shown in Figure 5b above (Engeström, 2001; Daniels, 2004). Vygotsky suggested the essence of a holistic analysis of human behaviour and awareness which is able to explain the social cultural and historical foundation of development (Daniels, 2004). He also argued that social, historical and cultural factors have substantial influence on individual development (ibid). The circumstances that these factors bring go beyond the individual experiences and transcend to determining collective human development (ibid). The limitation as a result of the individual focus of the first generation CHAT during analysis gave rise to the second generation by Leont'ev who formulated the essential difference between an individual action in relation to a collective activity (as cited in Engeström, 2001; Daniels, 2004). Leont'ev laid emphasis on the centrality of the object of an activity as the goal that motivates an activity system (Daniels, 2004).

However, Leont'ev did not graphically represent the expanded version of Vygotsky's triad model and this was Engeström's innovation which he also elaborated on to develop the third generation CHAT (ibid). Engeström postulated learning activity to be that which is not just individually oriented but rather collectively and systematically formulated into a complex structure that is mediated (ibid). This research is structured within Engeström's learning approach which is more fully discussed in Sections 2.4.2 and 2.4.3 below, and in Chapter Three, where the methodological aspects of CHAT research are highlighted and practically illustrated.

2.4 Learning and change in student community and within the food services sector

2.4.1 Learning and potential sustainability practices for improved food waste management

Learning and change within the food services sector of Higher Education Institutions is challenging and cannot be easily accomplished. This is because such obvious transformation is dependent on a number of factors including the institution within which it operates, its multifaceted structural power relations, traditional practices and contractual remunerations attached to specific job descriptions. Learning processes are essential to the attainment of change. UNESCO (2007) recommends a learning process that is locally relevant and which tackles real-life issues. It also recommends that appropriate implementation of learning processes can encourage "learners to view the world through a lens of concern for sustainability" (ibid, p. 5). Research is both a process of learning and medium of expansive learning, extended to research participants.

Through effective sustainability education, students can participate in, learn about, and help contribute to solving real-world sustainability problems (Brundiers & Wiek, 2010). Debra Rowe, the President of the U.S. Partnership for Education for Sustainable Development described sustainability education taking place among students as the following scenario:

Imagine what might happen if students were regularly assigned actual sustainability problems that were brought to higher education by cities, businesses, non-profit organizations, and other institutions. If classroom exercises produced workable contributions to solutions, students would understand they can have a positive impact on the world through their academic learning (Rowe, 2007, p. 324).

Assuming that the act and consequence of behaving in an unsustainable manner is unconscious to adults and particularly students in Higher Education Institutions may be

erroneous. Students are mostly adults who are exposed to the media and other sources of information as regards the negative impact of humans' numerous unsustainable practices contribute to climate change. There is therefore potentially a high level of awareness on the need to change that is not always socially mobilised for various reasons (Glasser, 2007).

Despite the fact that the change is not always socially mobilised, there are cases where individuals personally develop capabilities and agency for change. Sen (as cited in Walker 2005) highlights the nexus between agency, capabilities, functioning, freedom, social justice, human development and change. The presence or absence of one of these key components of development has consequences. Togo (2009) arguing for mainstreaming sustainability in all aspects of RU (Food Services inclusive), stated that agency and structure are two issues that influence this pursuit. Through her research, she discovered that the agency employed by some students and staff members has given birth to significant initiatives fostering sustainable development. She also added that at RU, agency is, however, limited by structural factors that occur in the form of rules and resources.

Unsustainable practices such as excessive consumption and wasteful habits compromise sustainability (Glasser, 2007), and are obvious in all spheres of life including Higher Education Institutions. Glasser (2007) drawing on Bandura's suggestion, stated that this level of unsustainability practices is a major hindrance to sustainable development, but should not be seen as a shocking reality because such behaviour is likely to persist despite the fact that the issues and risks are far-flung. In his paper, he referred to the need for social learning research that engages the 'gap' that exists between knowledge and action.

In the context of this research, Opara (as cited in Kahn, 2010) noted that an amazing amount of food is thrown away in South Africa but unfortunately it is not seen as a problem. If a supposedly critical issue is not considered as a problem, how can it be addressed? How then can learning and change be ensured in a community of future leaders? This is one of the reasons why this research was undertaken. Wals (2007) noted that 'safe spaces' are needed, where stakeholders can meet to deliberate such issues in order to provide solutions. He recommends engagement with dissonances in social learning processes.

Effective learning needs not to be focused only on cognitive processes but should be situated, reflexive, culturally and socially mediated with interactions between the context and personalities (Wals, 2007). Processes that enable deliberative co-configuration of ideas and

development of feasible solutions to sustainability issues that engage and propose economic, social, cultural, political, and technical solutions to these issues in a particular context (ELRC, 2011a) can support such learning. Learning cannot be considered effective if it does not bring about change in social structures, behaviour and imagination.

Barnett (2004) pointed out that learning means a change in our understanding and that which leads to a change in our relationship with the world. This world referred to here is that which is unpredictable, unknown and therefore poses enormous challenges on how to best understand and live peaceably in it. Barnett therefore suggests a twofold educational task of learning, one of which entails the task of preparing students for an unknown world through learning approaches that focus on deliberate open-ended decisions and judgment. Many argue that sustainable development is not a fixed concept but “a process of ongoing problem-solving and learning” (UNEP, 2006, p. 12). This kind of learning will require “conceptualizing an open and reflexive agenda for researching and learning about sustainable development” (ibid).

2.4.2 Why CHAT and Expansive Learning process? An appropriate theory of learning and change

Cultural Historical Activity Theory (CHAT) is a theoretical framework that has developed and gained ground through three generations of post-Vygotskian research (Engeström, 2001; Engeström, 2007a). This versatile theory explains how people learn to execute activities in activity systems and how their activities affect each other. It has been noted to have the potential to bridge the gap that exists between real life experiences at a micro level and structural realities at a macro level (Engeström, 2000). Engeström and Middleton explained that CHAT breaks the boundaries between concrete and abstract, qualitative and quantitative, observation and intervention, which are not easy to come by in many theoretical frameworks (ibid). Roth and Lee (2007, p. 191) drawing on Scribner recommended that CHAT is “an accommodating framework—a metatheory rather than a set of neat propositions.” Therefore, CHAT is an adaptable, flexible, open-ended framework that can be worked with in diverse contexts and yet be, relevant, effective and productive.

Unlike many other theoretical frameworks where researchers explore a particular case or institution, or programme for data collection and subsequent analysis without necessarily returning to the research participants for progressive dialogue as regards the findings, CHAT is peculiarly different. CHAT and expansive learning demand that a researcher fully engages

with the daily work, activities and practices of the ‘subjects’ under examination for a longer and consistent period of time. Data produced in the study is central to mobilising learning processes being studied, and involves feedback and monitoring of the changes in the expansive learning process that is occurring, before, during and after the mediation work. This kind of consistent commitment is considered as a “crucial resource” of activity theory (Sannino, Daniels & Gutiérrez, 2009, p. 3).

The second and third generations of CHAT provides analytical tools, lenses, and various possibilities. It also provides a descriptive and explanatory language (see Chapter Three where this is presented in more detail). The surfacing of ‘tensions’ and ‘contradictions’ within and between related activity systems and presentation of such back to research participants and stakeholders, which is a key component of the CHAT framework, is change oriented. CHAT also contributes to different ways of understanding phenomena.

Vare and Scott (2007) proposed that sustainable development doesn’t only depend on learning but is inherent in learning processes. This implies that ‘ordinary’ learning cannot foster sustainability, and there is a need to incorporate a learning theory that takes cognizance of this fact and provides a more effective alternative; hence the choice of the third generation CHAT with expansive learning processes in this study. CHAT methodology provides an expansive learning process in Developmental Work Research (see Section 3.2.1 below). It also offers the structure to gather data and use data maximally and effectively as well as the language to explain what is being done (see Section 3.3 below). With expansive learning, change and transformation of any phenomenon is achievable, observable and recordable with the study of agentic learning processes (cycle of change) (Mukute, 2010).

Engeström (2001) pointed out four central questions that any theory of learning must be able to answer. These questions include, who the subjects of the learning are? (Their definition and location), why the subjects learn? (What propels them), what are the subjects learning? (The contents and outcome of their learning); and how the subjects learn (indicators and processes of their learning). With the theory of expansive learning embedded in CHAT, Engeström (2001) was able to answer the above four questions when employed in an intervention study context. Applying this theoretical framework to the context of this research that is not in the classroom but in the space where the practice of food wastage is happening, provides optimism that learning will also be accomplished if the CHAT methodology is

carefully applied (see Section 3.2). In the next paragraph, I discuss the potentials and caution needed in the process of surfacing tensions and contradictions within the CHAT framework.

2.4.2.1 Contradictions: Potentials and caution

Drawing on Il'enkov, Engeström emphasised the existence and importance of contradictions between and within activity systems (as cited in Daniels, 2004). He maintained that such inherent contradictions are potential driving forces of change and development (Engeström, 2001, Daniels, 2004). Engeström (1987) further stipulated that there are four kinds of contradictions; namely, primary, secondary, tertiary and quaternary. Primary contradiction exists within an element of an activity system, for instance, within the community or the object. Secondary contradiction occurs between one element of an activity and another; for instance, between the rule and the tool. Tertiary contradiction arises when there is tension between the object of the central activity system and a more advanced activity system. This occurs usually when the more advanced activity system introduces another object. Quaternary contradiction happens when there is tension between the central activity system and other relating activity systems.

These contradictions exist between and within activity systems and surfacing them is a central component of CHAT research (Roth, et al., 2004). They are caused by structural tensions among or within the elements of the system (Engeström, as cited in Yamagata-Lynch, 2003). Yamagata-Lynch explained that tensions arise when the conditions of the other elements of an activity system force the subject to face contradictory situations that hamper the attainment of the 'object', which is the focus of the activity system. Therefore, contradictions and tensions inhibit development, sustainability and progress in any context and the researchers' role is to surface and present them as source for further learning and change. According to Sewell (1992) the social and material resources or structure (elements) that can constrain as well as enable human agency in an activity system are the tools, community, rules and division of labour.

However, Capper and Williams (2004) illuminate the potentials and cautions that exist when an organization encounters contradictions or surfaced underlying tensions. They argued that there is a tendency for such an organisation to fail utterly unless the stakeholders are able to learn how to deal with contradictory issues. This means that the surfacing and presenting of contradictions to research participants do not determine the change and developments that

have been postulated by Engeström and other authors, but rather the attitudes and dispositions of the stakeholders and research participants. If therefore they accept such contradictions and are willing and ready to learn from them for a better activity system, they will be able to learn about the ‘real’ world and by this condition alone can contradictions be “potential springboards for learning, innovation and development” (Capper & Williams, 2004, p. 12).

Some contradictions are easier to address than others and the degree of easiness or difficulty does not lie in the type of contradiction they are. Capper and Williams (2004) opined that the most difficult tensions and contradictions to deal with are the invisible or those that ‘cannot’ be discussed. By this they meant contradictions that have become part and parcel of the daily activity of the system to the extent that subject and stakeholders no longer see it as a problem. These are those sources of tensions that have been taken for granted, never openly talked about, although they are uncomfortable and embarrassing. Wals (2007) sees the contradictions and the diversity of opinions and perspectives as providing a good opportunity for social learning towards sustainability in the context of ESD.

2.4.3 Other examples of CHAT research

Russel (2009) attested through his use of Cultural Historical Activity Theory (CHAT) in written communication research that the use and application of CHAT in research work integrates both context and activities because these two are inseparable tools needed for effective mediation work. In investigating the potential in expansive agency, Yamazumi (2009) found expansive learning to be a suitable kind of learning that is able to make learners reach a level of transformation of their newly generated creative agency that is not only necessary and useful for now but also applicable to their future lives.

With learning by expansion, there is a “collective creative activity” that emerges when stakeholders from different managerial levels and status meet to discuss and debate on an issue (Engeström, as cited in Yamazumi 2009, p. 21). This implies that the creative agency that the participants in an activity theory-based research develop cuts across their role, significance, and personal norms in the focus activity. For instance, in the case of the dining hall, the view and participation of kitchen attendants as well as students cannot be despised and that of the Food Services manager cannot necessarily be accepted because of their status. Hence, an opportunity for collective collaboration and co-configuration of new ideas, concepts, and new forms of practice that will pave the way for a sustainable transformation of the central activity system, is available through expansive learning (Engeström, 2007b).

Mukute (2010) in his sustainable agricultural research work affirmed that expansive learning theory enables a researcher to intervene in ways that allow research participants to address some of the contradictions they are encountering in the activity system. His research portrayed that where the intention of a research is to stimulate social actions, then expansive learning processes can be an effective tool for researching change-oriented learning, sustainability practice as well as catalyzing change processes (Ibid).

Masara (2010) used CHAT in the context of commercial beekeeping in Zimbabwe as a historical and cultural analytical tool to identify and surface contradictions between and within activity systems. He explained that expansive learning is also a social learning process that generates new knowledge and practices in community contexts. Olvitt (2010) used CHAT to explore contradictions in the activity systems of two young Environmental Education learner-practitioners who were struggling to understand the ethical dimensions of their professional development work and that of the course. Her research points to the diversity of perspectives and discourses that need to be reconciled in and through expansive learning processes.

As noted above, this point about reconciling diversity and dissonance in and through expansive social learning processes has also been made by Wals (2007) who suggests this approach to learning in Environmental Education/Education for Sustainable Development. Mukute's (2010) research shows that such learning also develops individual and collective forms of agency, which lies at the heart of establishing new and different practices.

2.5 Researching learning and sustainable practices in a Rhodes University (RU) context

2.5.1 RU Campus Food Services and dining halls

RU has been considered as “an emerging system in terms of sustainability” (Togo, 2009, p. 227). More so, the “commitment to sustainable development at Rhodes University is not that obvious” (Togo, 2009, p. 278). Togo argued that one of the reasons for this is because RU “does not have an explicit sustainability policy even though it has an Environmental Policy and other policies with sustainability dimensions embedded within them” (ibid).

RU is a Higher Education Institution with the slogan ‘Where Leaders Learn’. As mentioned in Chapter One, this research is investigating the kind of learning that is taking place within its Food Services, in the dining halls and particularly with respect to the students who use the

dining halls in the RU residences. Going back to Engeström's (2001) four central questions as mentioned earlier (see Section 2.4.2): Who is learning about food economy at RU? What are they learning? Why are they learning and how are they learning? I would want to pose other questions. Who is learning and who is not learning? What are they learning and what are they not learning? Why are they learning, and why are they not learning and how are they learning and how are they supposed to learn? These other sides of Engeström's questions seem to be very crucial to me in researching learning and change in any context and are directly related to goals 1b, 2b and 2c of this study (see Section 1.7).

The embracing of 'more' sustainable practices cannot be effective if there is no appraisal of the currently existing practices to determine their efficiency. The movement towards sustainability in any context cannot be accomplished without substantial evidence of unsustainable practices. This study is also being undertaken because the literature reviewed has clarified that in order to enrich sustainability; the major problems cannot be solved from the current way of living (Tilbury, 2007). It therefore requires a shift from traditional ways of thinking and acting upon environmental and socio-ecological problems like food wastage (ibid). Hence, in order to experience a more sustainable food economy in RU Campus Food Services, the study includes the auditing of the current situation of sustainable practices. The next sub-section gives an overview of the preliminary results of my contextual profile.

2.5.2 Contextual profile research

During research undertaken as an initial scoping activity to explore the research terrain and to establish viable research questions, I discovered that some measures are being taken at various stages of the Food Supply Chain to manage food resources in RU Campus Food Services (Agbedahin, 2011a); but surprisingly food wastage is still a persistent call for concern. I had the opportunity to take meals in, and visit some of the RU dining halls particularly Allan Webb, Drosdty, and Founders.

Despite existing measures, substantive amounts of food are still presently given to pig farmers on a two year contract with the Food Services, at a minimum administrative fee (Pillay, as cited in Agbedahin, 2011a). Some of the sustainable practices observed include free offering of leftovers (as long as they remain) to students who queue up as a way of expressing their need for it. This is done in a process referred to as 'seconds' and it occurs after lunch and supper on a daily basis in all dining halls, without restriction to quantity or

menu (Agbedahin, 2011a). This is a sustainable way of ensuring that quality food that had not been used by those who booked for the meals is not added to the ‘waste in the back of the house or kitchen’ (see Section 2.3.4 above).

Another notable sustainable practice is the availability of hall rules that focus on food waste. This is stated in the Nelson Mandela Hall rule 11(n) and Lilian Ngoyi Hall rule 11(j) “take only what you CAN and INTEND eating — do not waste food.” Further to these sustainable practices is the use of four posters (as discussed in Section 1.4.2 and presented in Appendix 24) that were pasted up about 3 years ago across the RU dining halls. Dining hall staff members are prohibited from eating food meant for students; hence there is a separate menu for kitchen staff members (Pillay, as cited in Agbedahin, 2011a). This was not initially the case but was enacted when circumstances warranted it (Ibid). It is worth stating that this research is the first of its kind at Rhodes University and particularly within the Food Services department.

2.6 Conclusion

This chapter provided the broader contextual and theoretical framework related to the research problem and purpose. It highlighted the global, national and local contexts, policies and practices of food waste. It presented the implication of these policies and practices for education. It presented and justified the essence of the incorporation of the concept, food economy. It further presented literature on universities as food consumers and sustainability in Higher Education Institutions. It discussed learning theories, and introduced the theoretical framework CHAT, and its interest in Expansive Learning Process. It finally presented information concerning RU dining halls and highlighted current sustainability initiatives, and the aim of this research; to create opportunities for learning and change to foster more sustainable food economy.

At this juncture, it is worth noting that no literature has been found addressing the issue of food waste in a Rhodes University context. No publication was also found to have used CHAT to mitigate food economy and food waste. Among the few (food and sustainability) related articles that were encountered and used in this review, none were conducted in Africa. In the next chapter, I discuss CHAT in more depth from a methodological vantage point, and I also discuss the study design and methods used.

CHAPTER 3: METHODOLOGICAL DISCUSSION AND DESCRIPTION

3.1 Introduction

In this chapter, I present an overview of the methodological process of the study. I describe the Developmental Work Research as the methodology congruent with the conceptual and theoretical framework which is Cultural Historical Activity Theory (CHAT). I present the three existing generations of CHAT and complementary Expansive Learning process in more detail. I also describe the research design and orientation, methods used including interviews, observations, focus group discussions, document analysis and Change Laboratory Workshops. The analytical processes and measures taken to ensure research ethics and quality are also discussed in this chapter.

3.2 Methodological framework

Methodology is the strategy that linked the methods I used in this research to the findings of the research. It equally informed my choice and use of appropriate methods (Creswell, 2008).

3.2.1 Developmental Work Research (DWR)

The methodological framework employed in this research within the theoretical framework CHAT, is Developmental Work Research (DWR) which has been used in recent works related to CHAT (Engeström, 1987; Mukute & Lotz-Sisitka, 2011). CHAT employs this associated methodology which is potent in translating interpretive, explorative research (explorative phase one) into agentive research (expansive phase two), where research participants and stakeholders play a key role (Mukute, 2009). This methodology provides a framework in which “learning is co-terminous with the creation of new forms of activities, in which activities are learned as they are created” (Warmington, Daniels, Edwards, Brown, Leadbetter, Martin, et al., 1998, p. 7). Such an approach can be used to guide research in workplaces, institutions, organisations or wherever it is deemed appropriate. This participatory research methodology is practically actualised through the instituted expansive learning process or cycle, discussed in more detail in Section 3.2.2.4.

3.2.2 Theoretical and conceptual framework

The overall aim of conducting this research was to identify and establish expansive learning opportunities that can contribute to fostering a more sustainable food economy through food

waste reduction within the Food Services sector of Rhodes University (see Section 1.7 for research questions and goals). The research aimed to unearth underlying causes of persistent food wastage in the dining halls. The root causes of this unsustainable practice cannot be effectively delved into without a thorough understanding of how the present situation has come to be and practiced either individually or collectively. Capper and Williams (2004) argued that the structure and functioning of an organization are a product of historical and cultural traditions and experiences that have been handed over [either formally or informally] to individuals and groups by those who went before. Hence methodological strategies are needed to probe these aspects in more depth as proposed for phase one of this research.

Cultural and historical experiences carry tensions and contradictions (Engeström, 2000; Daniels, 2008) which are not the same as conflicts or problems but rather disturbances that are viable sources or a “driving force of change and development” (Engeström, 2001, p. 137). According to Capper and William (2004, p. 12) these contradictions are potential “springboards for learning.” They also require careful probing, and a methodology that allows for the ‘springboards’ for learning to be mobilised (phase two of this research).

In order to undertake credible and rigorous research that dealt adequately with this kind of issue and context, I worked with the framework of CHAT and DWR. This theory specializes in investigating individual and collective human practices (Kuutti, as cited in Mwanza, 2002). Second and third generations of CHAT were specifically used to guide this study since the key goal of the research is to create opportunities for learning and change among research participants and stakeholders (see Section 1.7). CHAT provides methodological and analytical tools to explore and analyse the situation in order to unveil underlying assumptions, tensions and contradictions. CHAT, through its expansive phase, is also a participatory research approach, and allows for critical contextual engagement with issues in social contexts.

3.2.2.1 Cultural Historical Activity Theory (CHAT)

CHAT provides essential methods and theory for exploring and understanding how people in different contexts, with different cultures, practices, behaviour patterns, beliefs, lifestyles and expertise, interact together within and around key activities, such as those in the Food Services (Mukute, 2010). It helped me to surface inherent tensions and contradictions in phase one of the research. This theoretical perspective also allowed me to begin to facilitate learning and change in food waste practices in phase two of the research. It provided concrete

conceptual, methodological, descriptive and analytical tools to inform both phases of this research.

People learn to do things through their routine everyday activities and for a purpose. CHAT helped me to investigate and document the learning activities and sustainable practices existing between various subjects of the activity systems and the latter's agency. It was also helpful in determining how the objects, mediating artefacts, rules, community, and division of labour (elements of the activity system), shape current food economy and food wastage. The nexus between other activity systems such as tools, objects, subjects, rules, producing activity systems, and the culturally more advanced activity system, was identified, analysed and understood in order to surface inherent tensions and contradictions during phase one. In phase two, CHAT offered expansive, transformative and co-configurative opportunities from the emergence of historical and cultural contradictions discovered within and between these related activity systems existing as a result of old patterns of activity and leading to tensions (Engeström, 2000). There are three generations of CHAT. For the purpose of this study I used second and third generations. The following sections describe them.

3.2.2.2 First generation of CHAT

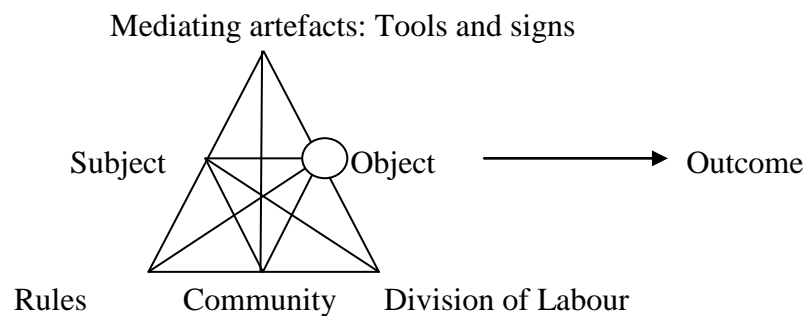
The first generation of CHAT is a framework initiated in the 1920s and early 1930s by the Russian psychologist Lev Vygotsky (1978), and was further developed by Alexei Leont'ev (1978, 1981) and Lucia (1979) (as cited in Engeström, 2000; Engeström, 2001; Engeström, 2007a). The method embedded within this generation is referred to as “instrumental method,” “historical-genetic method,” “method of double stimulation,” and “experimental-genetic method” (Engeström, 2007b, p. 364). It is the study of reactive responses based on the S-R (stimulus-response) formula (Engeström, 2007b; Daniels, 2005) as shown in Figure 5, Section 2.3.6 above.

Kaptelinin (2005) drawing on Leont'ev stated that the expression of an ‘objectless activity is meaningless, adding therefore that the object of activity (e.g. food waste reduction or food production) is undoubtedly a concept in activity that is considered as most important in human activity. First generation of CHAT research would focus on the subject-object-mediation tools inter-actions to understand mediations in the learning process. This was too narrow a focus for this study under engagement with inherent complex individual and structural contextual issues.

3.2.2.3 Second generation of CHAT

Yrjö Engeström built on the work of Vygotsky and his colleagues to develop the second and third generations of CHAT (Engeström, 2000; Yamagata-Lynch, 2003; Mukute, 2010). I chose Engeström's framework because it is an approach that is globally used across various disciplines to expand learning in workplaces and in situated social contexts (Engeström, Miettinen, & Punamäki, 1999; Chaiklin, et al., as cited in Engeström, 2000). This framework affords researchers, practitioners, administrators and a host of other professionals the possibility of working with people in organizations, institutions, and workplaces to investigate issues, share ideas, resolve problems and engage in Expansive Learning (Engeström, 2000; Lektorsky, 2009). The second generation activity theory helped me to identify and analyse the central activity system and its elements.

Figure 6: Second generation of CHAT heuristic

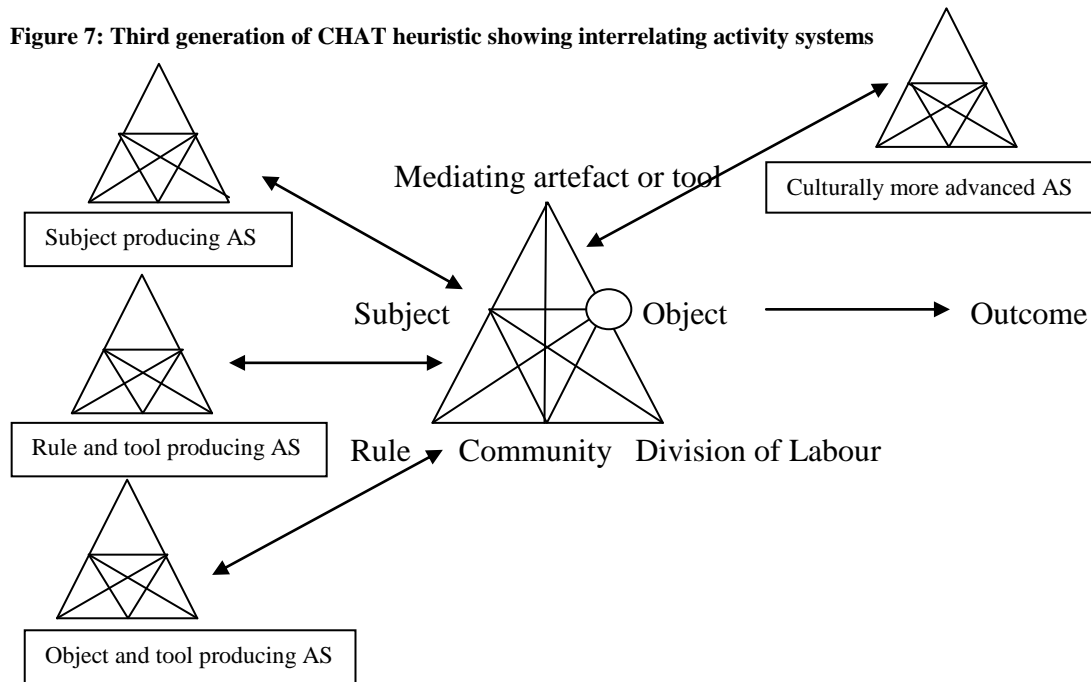


(Adapted from Daniels, 2004, p. 89)

Roth, et al., (2004) offered a simple explanation of the elements of an activity system as shown in Figure 6 above. The *subjects* of an activity system are the people who actually engage with the *object* that motivates the activity. Other elements are the *tools* they use, the *community* they are part of, the *rule* that patterns their actions and the *division of labour* that structures the roles they take in activity. Sewell (1992) put forward that the above elements are materials and social resources that have the capacity to [both] constrain or enable human agency in an activity system. Engeström (2007b, p. 363) argued that Vygotsky's "double stimulation" [in the first generation of CHAT] is "aimed at eliciting new, expansive forms of agency in subjects [in the second and third generations of CHAT]. This kind of stimulation is otherwise referred to as that which makes research participants "masters of their own lives" (Engeström, 2007b, p. 363; Mukute & Lotz-Sisitka, 2011, p. 6), hence my interest in the third generation.

3.2.2.4 Third generation of CHAT and the theory of expansive learning

The theory of expansive learning is developed within the framework of the third generation of CHAT. The third generation activity theory which supports expansive learning (Engeström & Toivainen, 2011) is used to expand the analysis of the central activity system upward and downward, outward and inward as it relates to the other interconnected activity systems which have partially shared and often split objects (Engeström, 1999), as shown in Figure 7 below.

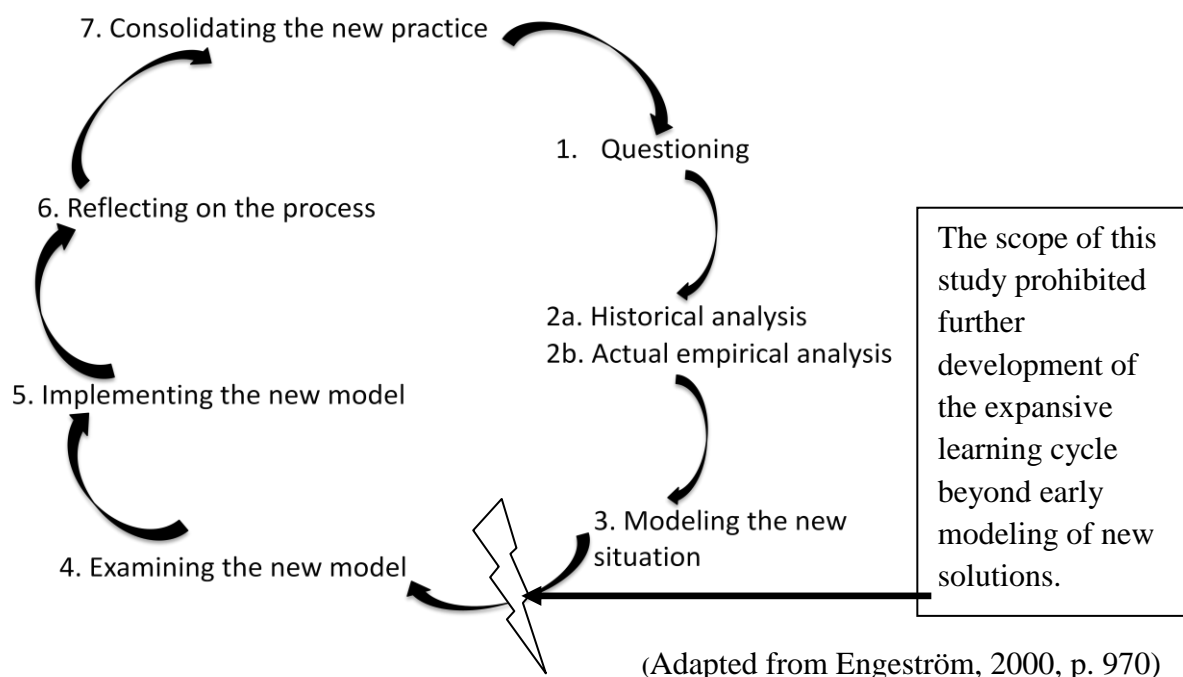


(Adapted from Engeström, 1999, p. 89)

Drawing on Figure 7 above, it is possible to show interaction between activity systems in the interconnected activity systems in this case study which includes Rhodes University—acting as the subject producing activity system; the Residential Operations Division—acting as the rule and tool producing activity system and the Food Services—acting as the rule, tools and object producing activity system. Culturally more advanced activity systems in the case of sustainability are activity systems such as the Food and Agriculture Organization of the United Nations (FAO), United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations Environmental Programmes (UNEP) which in conjunction with the Marrekech Task Force, Partnership for Education and Research for Responsible Lifestyles (PERL) and YouthXchange on Education for Sustainable Consumption and Production. See Section 2.2.2 where these are considered to some extent.

Transformative opportunities are established through the stepwise cycles or process of Expansive Learning which begins with the action of questioning the existing standard practices, and proceeds to the action of analyzing its contradictions and modelling a new situation. It follows with the action of examining and implementing the new models of practice, reflecting on the process and finally consolidating the new practices (Engeström, 1999; Engeström, 2000; Engeström, 2001; Mukute, 2010), as shown in Figure 8 below.

Figure 8: The expansive learning cycle or process



Expansive Learning Process enabled me as a researcher to intervene in ways that gave the subjects of the activity systems [research participants and stakeholders] a ‘safe space’ (Wals, 2007; Weston, as cited in Jickling, 2005) to address and begin to settle some of the sources of tension stemming from contradictions that were surfaced through the research between the activity systems. This was made possible when research participants and key stakeholders in the activity systems agreed to come together to construct and implement new, better, and doable changes in practice, so as to improve the collective system (Engeström, as cited in Engeström, 2007). Due to the scope of this study, I was only able to engage in the early stages of the Developmental Work Research cycle (to stage 3); the boundary of the study is therefore the early stages of expansive learning, rather than the full cycle.

Mukute (2010) explained that the role of the researcher in CHAT and Expansive Learning research is to obtain a systemic view of what is going on in the participating activity system

and in due course reflect the observation back to participants using mirror data, which occurs initially between stage 2a & 2b and 3 in Change Laboratory Workshops (see Figure 8 above). This process of learning and change is characterised by a facilitated dialogue and solution modelling through carefully and systematically structured Change Laboratory Workshops in stages 3, 4, and feedback workshop/meeting in stage 6 of the Developmental Work Process.

3.2.2.5 Shared object and boundaries

CHAT is able to mend many boundaries of work and research that are collapsing subtly (Engeström, 2000) as a result of contradictions associated with unaddressed and unresolved tensions. The identification and in-depth examination of interconnected activity systems in relation to the central activity system helped me to surface further contradictions and causes of tensions, but also to identify the shared object (see Figure 9 below) of the different activity systems in phase two of the research. This shared object existed between the two main categories of activity systems such as food consumers and food producers. The shared object which in this case is the ‘strategies for more sustainable food economy’ was developed jointly when the above stakeholders agreed on the urgency of the issue and decided to work collaboratively without prejudice. They crossed several boundaries in order to develop new knowledge, solutions, ideas, roles, and concepts that can enhance their shared object.

Figure 9: A diagram illustrating the shared object between the activity system of food producers and food consumers.



(Adapted from Daniels, 2004, p. 92)

3.2.3 Case study approach

I adopted a case study approach to this research. Bassey (1999) referred to case study as the study of a singularity which is chosen because of its interest to the researcher. A case study has the potential of providing researchers with an intensive understanding description and analysis of a phenomenon or social unit such as an individual, group, institution or community (Merriam, 2002; Ary, Jacobs, Razavieh & Sorensen, et al., 2006). Therefore this

case study focused on one dining hall, Nelson Mandela Dining Hall, which provides in-house food services to about 650 students residing in Nelson Mandela and Lilian Ngoyi Halls (see Section 1.3.4).

This dining hall employs about 28 staff members who work in two shifts with four main designations (as discussed in Section 1.3.4.). This case is a typology of the bounded integrated system that Stake (1995) and Merriam (2002) illustrated in their works. The choice of this dining hall was mainly informed by its accessibility and proximity. A case study approach was used in order to afford me and all participants, the opportunity to explore the phenomenon under investigation, and engage in learning, which as argued by social learning researchers does not take place in a vacuum but rather in a rich social context (Wals & Heymann, 2004; Wals & Jickling, as cited in Wals, 2007).

This case study research was conducted in such a way that a sufficient amount of data was collected for an exploration of significant features of the activity systems, and to create a plausible interpretation of what is found (in phase one), and to test the trustworthiness of these interpretations through the mirror data and early stages of the expansive learning phase (in phase two). Furthermore, it was useful to construct a worthwhile argument, relate the argument to available relevant research reported in the literature, and to convey it convincingly to research participants and stakeholders during the Change Laboratory Workshops. More so, a case study provides an audit trail by which other incoming interventionist researchers may validate or challenge the findings, or construct alternative arguments for this study (Bassey, 1999).

3.3 Research process and methods used for data collection

In educational research, methods are considered as the range of approaches used to collect data which will form the basis for inference and interpretation, explanation and prediction (Cohen, Manion & Morrison, 2007) and should be decided by the purpose of the research (Patton, 1990).

For the purpose of this research, a multi-methods approach was utilised to gather rich and diverse data, providing opportunity for triangulation. Triangulation requires the use of two or more methods of data collection in a study in order to explain more fully, the richness and complexity of human behaviour by studying it from more than one standpoint (Cohen, et al., 2007). In the use of multiple methods, the more methods contrast with each other, the greater

the researcher's confidence (ibid). The methods used in this research include: document review, observation with photographs taken, focus group discussions and interviews.

3.3.1 Data generated from documents reviewed in phase one of research

I sourced and retrieved some documents from the RU website. I requested and gained access to some documents from the RU Food Services Department and I also requested some documents from the NMH and LNH administrators. The following table lists all documents analysed during the course of this research:

DOCUMENT	INDEX
Caterer's job profile	Doc1
Cook's job profile	Doc2
Kitchen attendant's job profile	Doc3
Hall warden's job profile	Doc4
Benefits and allowances of hall and house wardens	Doc5
Conditions of Service of sub-wardens	Doc6
Nelson Mandela Hall Constitution	Doc7
Lilian Ngoyi Hall Rules	Doc8
RU Student disciplinary code	Doc9
RU Environmental Policy	Doc10
Nelson Mandela and Lilian Ngoyi Hall food representative meeting minutes for 16 March 2011	Doc11
Nelson Mandela and Lilian Ngoyi Hall food representative meeting minutes for 17 May 2011	Doc12
Nelson Mandela Dining Hall catering forms/records	Doc13-39
Grocery requisition from catering stores	Doc40-41
Frozen food requisition from catering stores	Doc42
Food Services' food procurement forms – May 30-June 25 2011	Doc43-51
2011 Oppidan dining hall meal booking form	Doc52
Four food waste posters	Doc53-56
New dining hall etiquette poster	Doc57
Allan Webb dining hall notices	Doc58-65
Orientation week-house committee training booklet	Doc66
Bokashi system for catering booklet	Doc67
RU Constitution of the students	Doc68
Catering for diverse cultures in institutions report	Doc69
Transforming from good to great – knowledge in food services booklet	Doc70
Food Services Organogram	Doc71
Old dining hall poster titled Meal allowances in dining halls	Doc72
Two weeks cycle menu list 2010	Doc73
Terms and conditions of staff employment	Doc74
RU Campus Food Services' (RUCFS) departmental report (Catering for diverse culture 2002)	Doc75
RU Calendar 2011	Doc76

Some documents were used before, during and after the actual research process to gain insight into the history, culture, procedure and structure of the RU food economy, examples include Doc 66, 69, 70, 71, 73 and 75. In order to know more about the subjects of the central activity system, the job descriptions and condition for service, I reviewed Doc 1-6 and 74. Doc7-10, 68 and 76 are tools and rules that shape the operations of the activity systems; they were reviewed to detect how they shape the food economy. During the data collection period in the dining hall, documents such as Doc 13-52, 57 and 72 which are being used in the kitchen for the smooth running of the food producers' activity system were reviewed to gain better understanding of the micro food economy. All the above documents were triangulated with other sources of data (interview, observation and focus group discussion) to surface contradictions and causes of tension.

3.3.2 Data generated from observations and photographs taken in phase one of research

Observation is a basic method for data collection in qualitative research. Ary, et al. (2006, p. 474) stated that the role of the qualitative researcher is to provide a "complete description of behaviour in a specific natural setting." They postulated that observation should usually take place over an extended period of time in order to properly describe the behaviour and the interactions present in the setting. Observation of the dining hall practices during breakfast, lunch and supper in order to get samples of operations, capture concrete proof and get a body of data for analysis was repeatedly undertaken at least thrice a week over a period of a month.

This was the first method of data collection used. Other methods were intentionally planned to commence after much of the observation data had been collected (apart from documents reviewed) to avoid possible interference with the actual situation of the dining hall activities (which is change) after notifying students about my research. By so doing, only the kitchen staff members, hall wardens and administrators were aware of the research at the early stage. This was also strategically done in order to observe and record any change in behavioural patterns before and after the awareness and involvement of students as well as what happens in the beginning, during and at the end of a school term. Kitchen staff members were observed and interactions between students and kitchen staff members were also observed in the dining hall.

During the period of observation, photographs were taken and the sequence was documented according to date, time and number of photographs (see Appendix 3). The use of photographs

was intended to document evidence, as a mode of analysis, and for use as mirror data during presentations in Change Laboratory Workshops. The observation was done by using an observation protocol and a plan (see Appendix 4) where I recorded what I saw and heard as well as the date, time, meal period, and length of time. I performed the role of an ‘observer as participant’. During participant observation, a researcher may interact with subjects enough to establish rapport but does not really become involved in the behaviour and activities of the group though his/her observer/researcher status is known to those under study (Ary, et al., 2006, p. 475).

These series of observations provided me with a rich experience of the actual situation of the dining hall, and were useful for triangulating data from documents reviewed, focus group discussions and interview data. Deliberate attention was given to practices and changes in the kitchen and dining room before the commencement of examinations, during examinations and after examinations and after the third term resumption in order to detect possible changes in the food economy. These observations were structurally done as well whenever I had the opportunity to be in and around the site.

Moreover, I obtained permission from the Head of Food Services and the two hall wardens involved in order to book for meals in the case study dining hall for research purposes only. Permission was granted although normally Oppidans are not allowed to use the undergraduate dining halls. After permission was granted (see Appendix 5 for correspondence), I booked and paid for my meals and menus. It is worth mentioning that this meal booking was instrumental during the data collection stage of the research process. I started eating and interacting with students during meal times and outside the dining hall before, during and towards the end of examination. In the process, students interested in the research signed up for the focus group discussions, which were scheduled for the first week of the third term (see Appendix 6 for a sample of the sign up form).

3.3.3 Data generated from interviews in phase one of research

Observation alone is inadequate in qualitative research because much of what is gained in this method is observed and cannot be obtained from others (Stake, 1995). He also affirmed that case studies involve obtaining interpretive and descriptive data from others. This is done through interviews to gain access to “multiple realities” of issues (ibid, p. 64). Face to face, individual interviews were conducted. Semi-structured and open-ended questions were

adapted. Open-ended questions are characterised by the non-availability of choices from which respondents can select answers. They are rather phrased to allow for individual responses (McMillan & Schumacher, 2006, p. 206).

The interviews were conducted with eight Nelson Mandela Dining Hall staff members. As discussed in Section 1.3.4, the four main occupations in the dining hall were interviewed. They include caterers, cooks, server attendants and kitchen attendants who are typically represented in both work shifts that work in the dining-hall. This was done in order to gain understanding of historical and cultural practices. The choice of the use of interviews for kitchen staff members was firstly informed by the fact that interviews with fewer respondents and individuals were doable in the context of the scope of this study. Secondly, I needed the particular experiences and opinions of each interviewee regarding the research topic and questions.

Group interviews or focus group discussions were likely to have a negative impact on research participants because of differences in academic levels, especially spoken and written language fluency, as well as work experience and hierarchies that exist within the Food Services. The need for this choice was detected during contextual profile interviews with kitchen staff members of Allan Webb Dining Hall. Besides, individual interviews in the context of this study made respondents feel more relaxed and free to share their experiences better and ethical measures could be ensured. Before I commenced, informal and irregular visits were made to the kitchen⁹ in order to establish high level of rapport and familiarity with kitchen staff members.

Afterwards, purposeful sampling of specific existing job descriptions such as two caterers, two cooks, two server attendants and two kitchen attendants was undertaken. Respondents were identified according to their years of experience, willingness to participate in research, and ability to communicate in English language. The pair selection was also deliberately done to protect participants' identity during data presentation. The routine activities of the selected job designations are distinct in terms of roles and responsibilities in the dining hall activity system. For example, the caterers play the supervisory role and are responsible for the whole

⁹ These were done during meal preparation, during meal times and during off duty hours.

dining hall catering services. They directly report to the Food Services' managers and ensure the daily smooth running of the food production cycle¹⁰ within the dining hall.

The cooks are in charge of preparing and getting all meals and menus ready on time and handing them over to the server attendants. The server attendants have the responsibility of presenting all menus and dishing out standardised portions of booked meals to students and other food consumers during meal times. The kitchen attendants assist in various duties in the kitchen, such as assisting in food processing, cleaning, washing, mopping, setting the tables for each meal. Hence the decision to involve two (one from each shift) specific job designations was essential, though very demanding from a transcription and data processing perspective. I prepared an interview appointment plan with dates and meal times where I immediately filled in the names of participants willing to be interviewed (see Appendix 7 for interview schedule). Interview questions were fine-tuned and pilot tested to ascertain their relevance and appropriateness to the research aim and questions (see Appendix 8 for interview protocol).

Before each interview, I introduced myself afresh, appreciated the participants and duly informed them about the research purpose, and the aim of the interview. Ethical assurance (this is fully discussed in Section 3.4 below) and awareness of future verification, alteration or addition to the interview proceedings and transcripts (member checks) were made. On agreement, participants were requested to sign the consent forms and they all did (see Appendix 9). The recording of the all interviews was done with a digital audio recorder only and they were conducted at the interviewees' convenience, for example, days, times, off duty hours and venue.

The shortest interview lasted for 23 minutes 56 seconds and the longest lasted for 1 hour 1 minute 51 seconds with an average of 40 minutes 34 seconds, and seven hours 12 minutes 41 seconds in totality (see Appendices 28-30 for interview guide). All interviews were indexed for identity protection and anonymity purposes. All eight interviews, including the two conducted with the Food Services Manager during preliminary studies were transcribed and presented to interviewees for member checking. Participants' member checking, done through face to face and hard copies were confirmed by their signatures¹¹ on each interview

¹⁰ The cycle includes food procurement, preparation, preservation, consumption and waste in the dining hall, as well as ensuring hygiene, safety and quality.

¹¹ This could have been included in the appendix but because of the protection of participant's identity, I have refrained from doing this.

transcript; while the soft copies sent via email were confirmed by the participants replies (see Appendix 10 for evidence).

The rich, relevant and substantial interview data collected during preliminary studies for the MEd course work assignments provided me with much experience and insight into doing this research. Such included the first and second MEd assignment interviews with the head of the RU Campus Food Services, two caterers in Allan Webb dining hall, Allan Webb hall warden, the RU students' officer, and RU students that eat in other RU dining halls.

3.3.4 Data generated from focus group discussions in phase one of research

The use of focus group discussion in conducting research has existed for the past 60 years (Kamberelis & Dimitriadis, 2008) and has been widely used over the past three decades by social scientists (Krueger & Casey, 2000). This method is characterised by the interviewer's provision of the topic of discussion, and is dependent on the discussion and interaction within the groups for the emergence of data (Cohen, et al., 2007).

This method in qualitative research also affords the researcher the means of triangulating other forms of data collection, in this case, observations, documents reviewed and interviews. Effective focus group discussion needs to be conducted by making concrete decisions as regard the purpose, size, composition and procedure to take (Krueger & Casey, 2000). The focus group should not be too large or too small (Krueger & Casey, 2000; Morgan, as cited in Cohen, et al., 2007). It is therefore suggested that a group should comprise a minimum number of four people and a maximum of 12 people to avoid fragmentation (Krueger & Casey, 2000; Morgan, as cited in Cohen, et al., 2007; O'Leary, 2010). Krueger and Casey (2000) are of the opinion that an ideal focus group should comprise six to eight participants, even though it is typical for it to comprise 5-10 people. In the focus group discussion, I acted as an interviewer, moderator and facilitator (Krueger & Casey, 2000; Kamberelis & Dimitriadis, 2008).

I interacted with students in Nelson Mandela Hall, Lilian Ngoyi Hall and their house food representatives, whom I consider as respondents with a lot of information (Krueger & Casey, 2000). The communications were done via email¹² and during meals in the dining hall before the end of the second term and interested students filled in the sign up forms I provided.

¹² The email correspondence started from the food representatives whose addresses I acquired from their hall administrators on request

Follow up emails and calls were made just before and after resumption of the third term for planning purposes. I also visited the residences where I met some food representatives who did not reply to the emails. I over-recruited participants in order to prevent the possible turn up of insufficient group participants on the scheduled day and time as advised by Morgan, as cited in Cohen, et al. (2007).

Random sampling was initially proposed to incorporate students who were willing to participate in the focus group discussion, and only four focus group discussions (two per hall) were initially proposed for this research. I, however, found it necessary to conduct one focus group discussion per residence, as this was more convenient for students and in order to analyse patterns and themes, differences or similarities across gender and the eight existing residences (Krueger & Casey, 2000).

Eventually, purposeful sampling was adopted with each group comprising students from different academic levels (first to fourth year), departments, gender (male and female), nationalities, race (black, white and coloured). Therefore the focus groups were heterogeneous in this regard and thus provided rich and diverse opinions and experiences. A common factor shared by all the focus groups was that the participants were all RU students, who were eating in the same dining hall and were living in the same residences.

The smallest focus group discussion comprised five students while the largest comprised nine. The following are the details, Ruth First FG-nine, Joe Slovo FG-six, Adelaide Tambo FG-six, Centenary FG-eight, Guy Butler FG-nine, Stanley Kidd FG-five, Victoria Mxenge FG-seven, Helen Joseph FG-six, and Food Representative FG-six.¹³ With this sample size, I was able to manage and keep track of participants for follow-up sessions and everyone had the opportunity to talk sufficiently because individuals were highly visible.

A semi-structured questioning route with both open-ended and closed-ended questions was adopted. Closed-ended questions were introductory questions used to involve all participants early in the discussion, as they required no concrete reasoning and are not usually analysed (Krueger & Casey, 2000). A singular questioning route was developed and used throughout the discussion in order to ensure consistency in the way questions were asked across groups and also, to improve the ease of analysis (ibid). They were only used after I received

¹³ The food representatives are six because there are four from LNH and only two from NMH representing its male and female residences.

feedback from critical friends¹⁴ and pilot tested them with other students that eat in the RU dining halls but who were not part of the sample population.

Before each discussion I sent emails and text messages to remind participants. According to Krueger and Casey (2000), focus groups should be held in a place and area where all participants will be comfortable. Accordingly all group discussions were conducted within and around the Nelson Mandela and Lilian Ngoyi Halls, specifically in the common rooms of each residence at a pre-agreed convenient time (see Appendix 11 for hall and time schedule). During the actual focus group discussions all participants signed the consent/registration form¹⁵ before the discussion commenced (see Appendix 12).

I moderated all focus group discussions and I did not have any assistant researcher. Focus group discussion usually commenced by re-introducing myself, my research interest, ethical considerations, the presentation of ground rules and then the questioning using the interview guide. As a researcher, acting as a moderator, I was careful not to communicate gestures or body language that might portray approval or disapproval as well as to avoid making judgements (Krueger & Casey, 2000). My role therefore was to ask questions and listen to discussion among the participants and to keep the conversation in focus (ibid).

A digital audio recorder and note taking were used to record the proceedings. The note taking was done by both the researcher and a student (also a participant) who was willing to write down the summaries of the group discussion and conclusion as requested. Member checking was strategically done after each focus group discussion by the reading out of the written summaries by the student. The confirmation was done as other students listening agreed, disagreed and sometimes added to the written discussions (see Appendix 13 for sample question and notes written by students). The shortest focus group discussion lasted for 46 minutes 17 seconds¹⁶ while the longest lasted for 1 hour 23 minutes 13 seconds¹⁷ (see Appendices 26-27 for questioning route). After the focus group discussion, all participants were sent an email thanking them for their participation (see Appendix 14).

¹⁴ These are intellectual, academic research colleagues.

¹⁵ Except one student who newly joined the focus group discussion and was not ready to sign the form and write his contact detail, even though he wrote down his name, year and nationality.

¹⁶ This was because the common room had to be used for their house meeting shortly after the focus group discussion.

¹⁷ This length was dependent on willingness of participants to continue with the discussion and my availability as well.

3.3.5 Data generated from the first Change Laboratory Workshop in phase two of the research

The Change Laboratory Workshop method was developed in the Centre for Activity Theory and Developmental Work Research in Finland and has been used for about ten years in formative interventions in workplaces (Engeström, 2007b; Daniels, 2008; Engeström & Toiviainen, 2011). Engeström (2007b) postulated that this method has been confirmed to develop work practices where participants such as food producers, food consumers, administrators and the interventionist researcher engage in dialogue and debate over a common issue of interest. He added that the Change Laboratory Workshop “facilitates both intensive, deep transformations and continuous incremental improvement” (ibid, p. 370). According to this proven potency, in phase two of this research, and according to the Developmental Work Research methodology, the first Change Laboratory Workshop took place after phase one data collection and analysis. It was organised and conducted with research participants and stakeholders, and I presented the findings in the form of tensions and contradictions technically referred to as ‘mirror data’ for further analysis and use.

In preparation for the first Change Laboratory Workshop which took place on the 30th of August, 2011, I obtained verbal permission from the Food Services manager to use the case dining hall. She informed and requested the caterers to assist me. I sent an email and a reminder to all the students that earlier volunteered to take part in the focus group discussion (63 in number), the Food Services manager and assistant manager, caterers (who duly informed all other kitchen staff members), catering store staff members, the two hall wardens and two administrators who deemed it fit to invite their hall wardens (see Appendix 15b). I attached the programme of a Change Laboratory Workshop in the friendly reminder email (see Appendix 16 for programme).

In further preparation I got ready the following items for a smooth Change Laboratory Workshop: projector for the powerpoint presentation, laptop, extension cables, adaptor, camera for photographs, camcorder and tripod for video coverage, digital audio recorder, printed list of contradictions, consent forms, name tags, labels, writing pads, and pens, and batteries. Engeström (2007b, p. 370) recommended that a videotaped Change Laboratory Workshop is essential to facilitate an appraisal of the events in subsequent sessions and this was done by one of the three available “research interventionist[s].” These are fellow social sciences researchers who are familiar with the interventionist research process and were

employed to assist (see Appendix 17 for correspondence email with enclosed responsibilities).

Altogether 35 participants were present in the Change Laboratory Workshop including me, the “interventionist researcher” (Engeström, 2007b, p. 370) and three researcher interventionists to guide the process, the two hall wardens, Food Services manager, assistant manager, the two hall administrators, two house wardens, three caterers, three cooks, 11 kitchen attendants, four serverly attendants, one food representative and one other student. The Change Laboratory Workshop commenced as participants completed and signed the registration/consent form (see Appendix 20) and were given the Change Laboratory Workshop materials.

In the first Change Laboratory Workshop, I made a powerpoint presentation highlighting the research problem, the necessity of the issue, the research methods and process, an overview of the theoretical framework, and the potential in mirror data. After the above, researcher-interventionists and I handed out the mirror data to all participants which was the list of ‘contradictions and associated tensions’ grouped into nine related issues. I read out and clarified each point where there was a need for clarification or comprehension, especially for the sake of the few less literate participants in the group (see Appendix 19 for list of contradiction).

The participants acknowledged and articulated the contradictions, and even though this was an emotionally charged process there was neither denial nor resistance, as envisaged by Engeström (2007b). This stage of the Change Laboratory Workshop is known as the “first stimulus” (Engeström, 2007b, p. 373). Participants tried to prioritise the contradictions in order of importance and degree of easiness to resolve. They identified and further analysed the root causes and their effects. They also articulated their past experiences as regards issues raised. Interestingly they started modelling solutions across all the issues and contradictions and apportioning roles and responsibilities even though this was planned in the programme for the second Change Laboratory Workshop.

Owing to the complexity of the issues, it was a challenge for participants to unanimously agree on the most important contradictions and to propose feasible solutions. It was agreed that the Food Services department would fix the date for the second Change Laboratory Workshop based on their availability. This workshop lasted for 1 hour 25 minutes 19

seconds. It is worth mentioning that though this length seems very short and the possibility of expanded learning could be doubted, it provided me with rich data to articulate possibilities for opportunities for further learning and change.

3.3.6 Data generated from second Change Laboratory Workshop (Phase two)

The second Change Laboratory Workshop was planned for and conducted on the 28th of September 2011. Participants present included one hall warden, the Food Services manager and assistant manager, the two hall administrators, one house warden, four caterers, six cooks, eight kitchen attendants, four serverly attendants, one food representative (student), one student, four research-interventionists and the interventionist researcher. Altogether 35 people attended (coincidentally the same number as the first Change Laboratory Workshop). The workshop commenced as participants completed and signed the registration/consent form (see Appendix 18) and were given the Change Laboratory Workshop materials (pens, writing pads).

In the Change Laboratory Workshop, I also made a powerpoint presentation to recap the outcomes of the first Change Laboratory Workshop for participants. I then did member checking by presenting the transcribed proceedings of the first Change Laboratory Workshop for their perusal. Participants in the second Change Laboratory Workshop had no objection to the presentation of the proceedings, but participants tried to confirm the choices of the most important and critical contradictions for deliberation and discussion. However, this was difficult and eventually inconclusive.

Participants broke into four activity groups for a deeper analysis of selected issues and to envision future models of a 'new situation'. Detailed composition included group one: students/food representatives, group two-kitchen staff members, group three-hall staff members (wardens and administrators) and group four-Food Services management. Participants returned to the main group to share their analyses and proposed modelled solutions for change. These models were developed and presented across all nine issues, contradictions and associated tensions. Participants developed action plans to implement model solutions for change, designated roles, proposed consultations and negotiation with other relevant stakeholders. These are reported in Chapters Four and Five.

Appreciation and the way forward, such as feedback or follow up sessions to review progress and to make necessary adjustments in a couple of months after, was agreed upon. A

consensus was reached between the Food Services and interventionist researcher to meet and discuss on a regular basis. This second Change Laboratory Workshop lasted for 1 hour 26 minutes 45 seconds. A follow up session was proposed to take place in a few months from then.

3.4 Research ethics

The awareness of ethical issues and concerns has grown considerably in the last decades in qualitative research (Punch, 1994; Christian, as cited in Flick, 2007). Bassey (1999, pp. 73-74) postulated that “it is helpful to consider research ethics under three headings: respect for democracy, respect for truth and respect for persons ... though these ethical values do clash.” In this research process, I took the following measures to address these three ethical considerations and more:

3.4.1 Respect for democracy

Bassey (1999) explained that ethics takes cognisance of the freedom people have to investigate issues, ask questions, and to give and receive information. Freedom to express ideas and to criticize the ideas of others is inclusive. It also encapsulates the freedom to publish research findings. All the above freedoms can be exhibited as long as researchers can do these things without doing harm or endangering the participants’ lives and of course the participants do not endanger the researcher’s life as well. I tried to observe this ethical consideration and this is evidenced across other ethics highlighted below.

3.4.2 Respect for truth

In observing respect for truth, “researchers are expected to be truthful in data collection, analysis and reporting of findings” (Bassey, 1999, pp. 73-74). In accordance with this injunction, I made sure that I was sincere in my dealings with all research participants. I did not manipulate the raw data, hence I have presented and worked with the data just the way I collected it and I have kept a full record of the case study as evidence of original data content and quality. I have also analysed and presented the data without manipulating them to suit my biased desires.

3.4.3 Respect for persons

Bassey (1999, pp. 73-74) also postulated that during research processes, researchers must ensure that “fellow humans beings are respected and entitled to dignity and privacy.” I accomplished this by expressing physical respect and taking cognizance of research participants’ privacy. I did not pressurise them physically, mentally, intellectually or otherwise, thereby making sure that I respected people as stipulated by Bassey (ibid). I also showed respect to research participants and their privacy by not using any part of the data collected that does not relate to the study and is somewhat confidential. Furthermore, I showed respect of persons by acknowledging the sources and authors of all literature used in this research process. See Section 3.4.6 for related ethical consideration.

3.4.4 Access negotiation

Negotiating access to do the research with the RU Campus Food Services, Nelson Mandela Dining Hall, hall wardens and with students staying in Nelson Mandela Hall and Lilian Ngoyi Hall was critical and essential. I ensured this by getting written and formal permission from the Food Services manager (see Appendix 21 for details) and the two associated hall wardens, hall administrators, house wardens and kitchen supervisors and other staff members were duly informed (see Appendix 22 for details).

3.4.5 Informed consent

The implication of this according to Christian (as cited in Flick, 2007, p. 69) is that “no one should be involved in research as a participant without knowing about this and without having the chance of refusing to take part.” This was adhered to by ensuring that participants fully understood the essence and jurisdiction of this research as well as their requested involvement (O’Leary, 2010). Therefore the participation of students and staff members was based on their competence, willingness to participate, awareness of their right to discontinue (which some of them did), confidentiality and autonomy. Participants were not in any way induced, deceived, or coerced throughout this research as recommended by O’Leary (ibid).

3.4.6 Confidentiality and anonymity

I ensured all participants are guaranteed confidentiality and anonymity by assuring and ensuring that their identity is protected by keeping the identification data solely to myself (O’Leary, 2010). This I also ensured by masking identity, securing storage of raw data, deliberately restricting access to the data (ibid) and having to keep it for five years as

suggested by my supervisor. Only the interview with the manager (and a few RU staff members) who granted me permission to reveal their identity is disclosed. Photographs were taken with due permission before the commencement of the research and I assured participants that only utilities would be captured (except during Change Laboratory Workshop where participants were duly informed of photographs and video coverage. These were, however, not used visually in the research report to ensure continued anonymity).

3.4.7 Harm and personal caution

O'Leary (2010) warned researchers against emotional or psychological harm (which is hard to identify and predict), as well as physical harm (which is easy to recognize). These harms in the form of embarrassment, resentment and evoking unpleasant memories were consciously prevented for participants. More so, due to the nature of this research and especially with the involvement of RU students who are key participants, I was very careful not to use judgmental statements that can imply wrongness or badness. I spoke and interacted reflexively with this caution in mind. Accepting food and drinks offered in the kitchen or asking for same within the period of this research was also refused and avoided respectively.

3.5 Ensuring research quality (validity or trustworthiness of research)

Janse van Rensburg (2001, p. 4) argued that “an ‘anything goes’ approach to doing research is morally unacceptable.” She added that “because the research practices affect the world, it is vital that we take ethical responsibilities for and are able to trust the research we produce.” Data collected in case studies must of a necessity be validated by the researcher as well as the readers (Stake, 1995). I undertook a number of measures to ensure the validity and trustworthiness of this research, as discussed below.

3.5.1 Persistent observation

Persistent observation of the activities inside (mostly) and outside the Nelson Mandela Dining Hall in order to establish the relevance and existence of both unsustainable and sustainable practices, food economy and learning activities was done over a period of a month. Persistent observation is a “phrase from Lincoln and Guba (1985) which entails thorough searching for tentative salient features of the case and then focusing attention on them-either to discover that they are not relevant or to try to gain some clear understanding of them” (Bassey, 1999, p. 76). I observed activities during breakfast, lunch and supper, before, during and after meals, including weekdays and weekends.

3.5.2 Triangulation

Triangulation “promotes the quality of qualitative research” (Flick, 2007, p. 43). It entails the use of different data sources or methods on the same phenomenon being studied in human behaviour (Janse van Rensburg, 2001; Cohen, et al., 2007). This is an approach I employed in this study. The use of different methods on the same object of study ensured methodological triangulation according to Cohen, et al. (2007). Correct and accurate description, interpretation, reporting and presentation of raw data were used as mirror data in the two Change Laboratory Workshops and throughout the research process; this helped to ensure descriptive and interpretative validity (Maxwell, 1992).

3.5.3 Member checks (face validity)

This concept connotes the “respondent validation to assess intentionality, to correct factual error, to offer them the opportunity to add further information and to check adequacy of the analysis” (Cohen, et al., 2007, p. 136). This act was painstakingly performed on all data generated through interviews, focus group discussion and the first and second Change Laboratory Workshop during phase one and in phase two of the research. This is essential because Bassey (1999, p. 76) stated that “sometimes people realise that they have not said what they meant to say and this provides an opportunity to put the record straight.” By performing member checking, I ensured face validity (Bassey, 1999; Cohen, et al., 2007). It was also a process where I confirmed the spelling of some unfamiliar or incorrect words and concepts used by participants.

3.5.4 Potentials of critical friends in communities of practice

This research was strengthened by the invaluable support of critical friends, people who played ‘devil’s advocate’ in questioning the research processes and outcomes. The process is otherwise referred to as ‘peer debriefing’ by Lincoln and Guba (as cited in Bassey, 1999). An environment for such critical research exists in the Environmental Learning Research Centre (ELRC) where I conducted the research and I asked for peer feedback many times from a range of colleagues.

I also had the opportunity to present my research process at various academic, local, regional and international forums, and I received concrete comments, admonitions, and critiques. Such arenas included the 2011 September 12-17 RU Research Design Course; the 2011 Eastern Cape Interdisciplinary Postgraduate Conference (IPGC) held 14-16 September at RU; the

2011 Environmental Education Association of Southern Africa Conference (EEASA) held 03-06 October in Lesotho; the International Training Programme on ESD in Higher Education held at the ELRC, RU, South Africa, 03-13 October 2011 and finally the 2011 Postgraduate Certificate (PGCE) Conference held October 31-3 November at the RU Education Department. The impact of personal discussions and correspondence with key stakeholders at Rhodes University such as the Vice Chancellor and Deputy Vice Chancellor (research) as regards this research were also useful.

3.5.5 Self-reflexivity

Janse van Rensburg (2001, p. 11) explained that “in critical research there is much emphasis on making explicit one’s standpoint as a researcher, however, the aim is not to ‘confess’, but to explain that this ‘bias’ informs the research [and that]... the research was undertaken from this value-laden position.” Therefore, I was aware of this possibility and I consciously and constantly reflected on my own subjectivity by making conscious efforts to limit how my value-laden position is influencing and shaping these research processes and outcomes; as well as the subjectivity of others.

3.5.6 Theoretical validity

I also insured theoretical validity by efficiently making use of my proposed theoretical framework, thereby linking every aspect of my research process to the components or concepts of CHAT and Expansive Learning theory. This was also ensured by linking the relationship that exists among these concepts to maintain internal or structural coherence (Maxwell, 1992; Janse van Rensburg, 2001).

3.5.7 Sustained interaction with research participants and stakeholders

Informal interaction commenced even before the main research started. I communicated with many research participants before, during and even after the data collection phase of the study to build confidence between the researcher and researched. According to the theoretical framework, there is room for further interaction and the research process has not ended as the learning experiences and the model solutions are part of an ongoing process within the Food Services and the RU community. Mukute’s (2010) research showed that expansive learning research stimulates actions beyond the change laboratory workshops that, even if it is not monitored as part of the research process, still exist.

3.6 Data analysis

The central focus of my analysis was to continually keep in mind the purpose of the research which was necessary to keep the whole research on track (Krueger & Casey, 2000). Raw data generated from the observations with photographs taken, staff interviews, students' focus group discussions, and documents were triangulated and analysed. This was done manually by using the activity system lens to unearth tensions and contradictions between and within various elements and how they affect and influence the object of their activities. Analytical approaches included inductive analysis (which constitutes a process where data can 'speak for itself') and abductive analysis (to understand and recontextualise data in depth using theory, and to make logical conclusions regarding emerging data).

I identified and analysed six activity systems by identifying their objects, subjects, rules, outcomes, division of labour, mediating artefacts and community; according to second generation CHAT (see Chapter Four). I further analysed the interrelationship between the six activity systems using the third generation CHAT (see Chapter Four). With these analytical tools I was able to understand and identify the various contradictions and tensions that inhibited more sustainable food economy and therefore propelled food waste production (see Chapter Four). I also analysed the two Change Laboratories Workshops for evidence of the early stages of the Expansive Learning Process—opportunities for learning and change.

3.6.1 Data indexing system

The indexing system employed to trace and present all data obtained from the different methods of data collection is as follows:

- a. Indexing of each focus group discussion was done with the residence name and FG, standing for focus group. For instance 'GBFG' stands for 'Guy Butler focus group' and 'HJFG' stands for 'Helen Joseph focus group'.
- b. Staff interviews were indexed using 'S' to represent staff and I for interview, followed by numbers 1-8 to represent the 8 staff members interviewed (Apart from the preliminary studies' interviews, where permission was granted to reveal identity). For instance 'SI6' stands for 'staff interview 6' and SI3 stands for staff interview 3. Personal communication was used and shortened as 'pers comm'.
- c. Documents reviewed are indexed using Doc which represents document and numbers to trace them. For instance Doc8 stands for document 8 (see Section 3.3.1 for list).

- d. Photographs were indexed using p which stands for photograph and numbers 1-260 were allocated. For example p44 stands for photograph 44.
- e. Although indexes were also developed for the model solutions in the first Change Laboratory Workshop, these were not disclosed in the presentation made in the second change laboratory and in this thesis because it became unnecessary in the reporting.
- f. Data collected through personal communications with other RU staff members apart from the dining hall staff members have been indexed as RUSI, where this represents Rhodes University staff interview. Numbers are added to distinguish one interview from the other, for example RUSI2 or RUSI3.

3.6.2 Analytical steps

I took the following analytical steps to aid the development of analytical statements that directly respond to my research questions and goals according to Bassey (1999).

1. The indexed interviews and focus group discussions from the digital audio recorder were transferred to a laptop and all interviews were transcribed verbatim (excluding the non relevant recordings).
2. After all interviews were member checked (as discussed in Section 3.5.3), categories, sub-categories and subset-categories were formulated according to my research questions and other categories were created as the need arose according to the data. Various colours and letter/number codes were assigned to each category (see Appendix 23). I then read through the hardcopies and shaded relevant portions according to these categories to draw out excerpts from the data that are related to the categories. This process was also applied to all documents in a process called data reduction.
3. After ensuring that all formulated categories present in the raw data were painstakingly coloured, I located them in the soft copies of the data, cut and pasted them in the respective categories that were developed in a matrix. I included the index of each data source in order to trace and track the source of the data. Data from documents which are hard copies was typed into the respective categories.
4. I then made an analytical memo by collating responses from all available sources that were in each category. By undertaking this process, I was still reducing my data, triangulating, and synthesising it in order to present appropriate and adequate “thick description[s]” from the

data to support the findings of the research (Geertz, as cited in Stake, 1995, p. 42). This formed the basis of Chapter Four, where thick descriptions of the data are presented.

5. Furthermore I made a summary of main and minor information and ideas that were present in a thick description in each category, sub-category and sub-set category (see Appendix 23 for data indexing, coding, categorizing and analytical matrix) to develop analytical statements that should be generated to give concise answers to research questions (Bassey, 1999) (See Chapter Five for analytical statements).

3.7 Conclusion

The processes presented and discussed in this chapter were full of learning, reflections, and insights. Being an interventionist researcher, doing a study within the Expansive Learning framework, I must admit that it was demanding to undertake this research in just one year in a half thesis but I was determined to do it rigorously in order to have a mastery of CHAT and post-graduate research design. With the numerous experiences gained, I found out that CHAT and Developmental Work Research are appropriate methodologies for this kind research problem and context. Although the scope of the data generation in the entire research process is broad, only data associated with the research questions was processed and explored. In this chapter I highlighted what I did in the research process, why I used the methods cited, when I used them and how I generally went about doing the research. I also clarified steps I took to analyse the data, and to ensure that ethical considerations were met and how I validated this two phased research process.

CHAPTER 4: PRESENTATION OF THE RESEARCH FINDINGS

4.1 Introduction

In this chapter I present the data generated from interviews with staff members, focus group discussions with students, observations made with photographs taken, as well as data from documents reviewed and the Change Laboratory Workshops. I present two main activity systems including the food producers' activity system (consisting of one macro food producer and four micro food producers) and one food consumers' activity system, making a total of six activity systems. This is presented in the table below:

Activity Systems	Description	Composition	Figures below
Activity System 1	Macro food producers	Food Services	Figure 10
Activity System 2	Micro food producers	Caterers	Figure 11
Activity System 3	Micro food producers	Cooks	Figure 12
Activity System 4	Micro food producers	Servery attendants	Figure 13
Activity System 5	Micro food producers	Kitchen attendants	Figure 14
Activity System 6	Food consumers	Students (mainly) and wardens	Figure 15

I further present the contradictions and associated tensions identified that emerged from structural tensions within and between the above-mentioned activity systems. I also present the solutions to contradictions and tensions that were modelled in phase two of this research. I conclude this chapter by providing reflections on the data presentation and research process.

4.2 Description of activity systems in the case study site

In this section, I describe and present the activity systems existing within the confines of the case study. These activity systems are presented in relation to the current situation of food economy, food waste, sustainable practices and learning activities in Nelson Mandela Dining Hall, addressing my first research question (see Section 1.7). Although the activity systems are many for a half thesis, it was necessary to present them here because they play a role in influencing the central activity system (the dining hall activity), and of course the entire research process. These different activity systems were all involved in the main *object* of the activity, which is food production and food consumption. They were also involved in the

successful development of a new shared object, that is, ‘strategies for more sustainable food economy’, with specific emphasis on food waste reduction.¹⁸

The food consumers are mainly students living in the associated residences and who eat in the dining hall. I have categorised the food producers’ activity system into two, namely the macro and micro activity systems. The macro food producers’ activity system describes the Food Services department, which oversees all other micro food producers’ activity system on campus (see Section 4.2.1.1). The micro food producers’ activity system described is that which exists in the dining hall, and encapsulates the activity systems of the caterers, cooks, serverly attendants and the kitchen attendants. I differentiated these activity systems because they played specific roles (division of labour) in the dining hall (central activity); see Section 4.2.1.2 for more detail below.

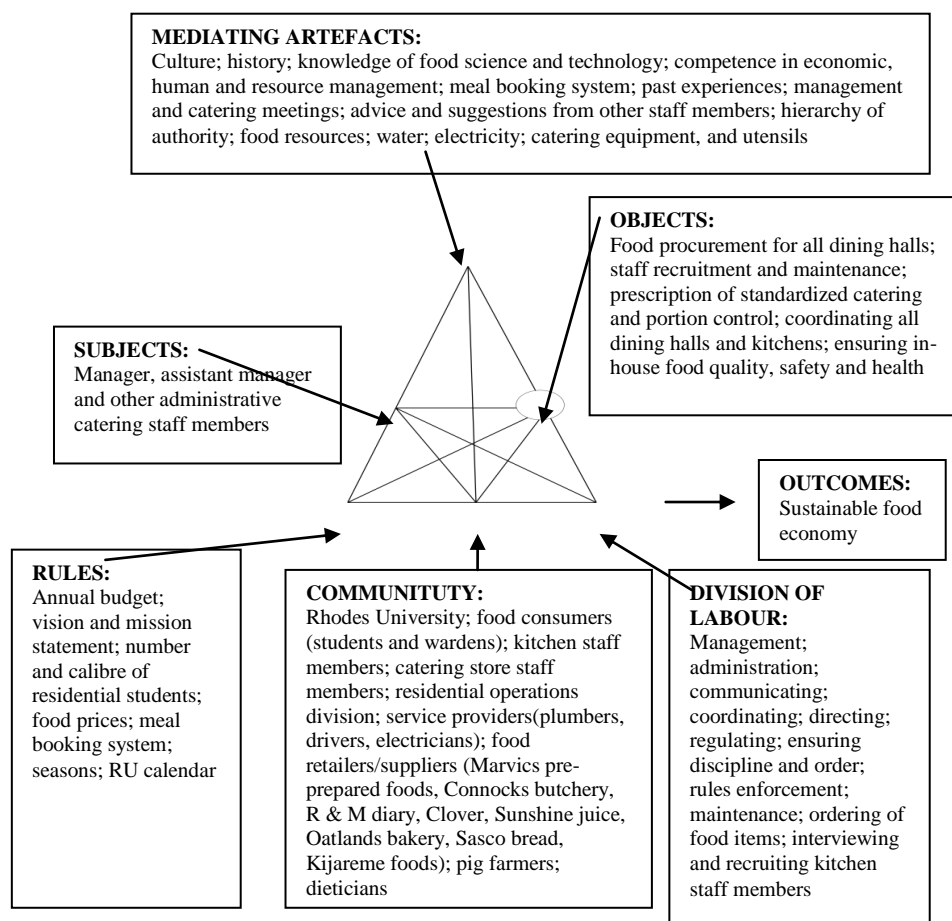
¹⁸ To manage the scope of this study, I confined phase two actions to food waste reduction, which became the key object.

4.2.1 Food producers' activity systems

4.2.1.1 Macro food producers' activity system

Figure 10 below is the presentation of the Food Services department as the macro food producers' activity system. This activity system oversees the operations of the 12 dining halls at Rhodes University as discussed in Section 1.3.3 above. The heuristic below shows the various subjects and objects of this activity system. It also shows the other elements of this activity system including their mediating tools, community, rules, division of labour and outcome of their activity.

Figure 10: RU Campus Food Services' activity system.



4.2.1.2 Micro food producers activity systems

Within the micro food producers' activity system, there are four main activity systems that are related and exist in the food production process. These include the activity systems of the caterers, cooks, serverly attendants and the kitchen attendants. I present these activity systems separately because it is cumbersome to lump their distinct activities together. I qualify the activity systems as 'routine' because they are characterised by repetitive activities that are carried out on a daily, weekly and fortnightly basis. I present the heuristic of the micro food producers' activity systems in Figures 11, 12, 13, and 14 below:

Figure 11: Caterers' routine activity system (a).

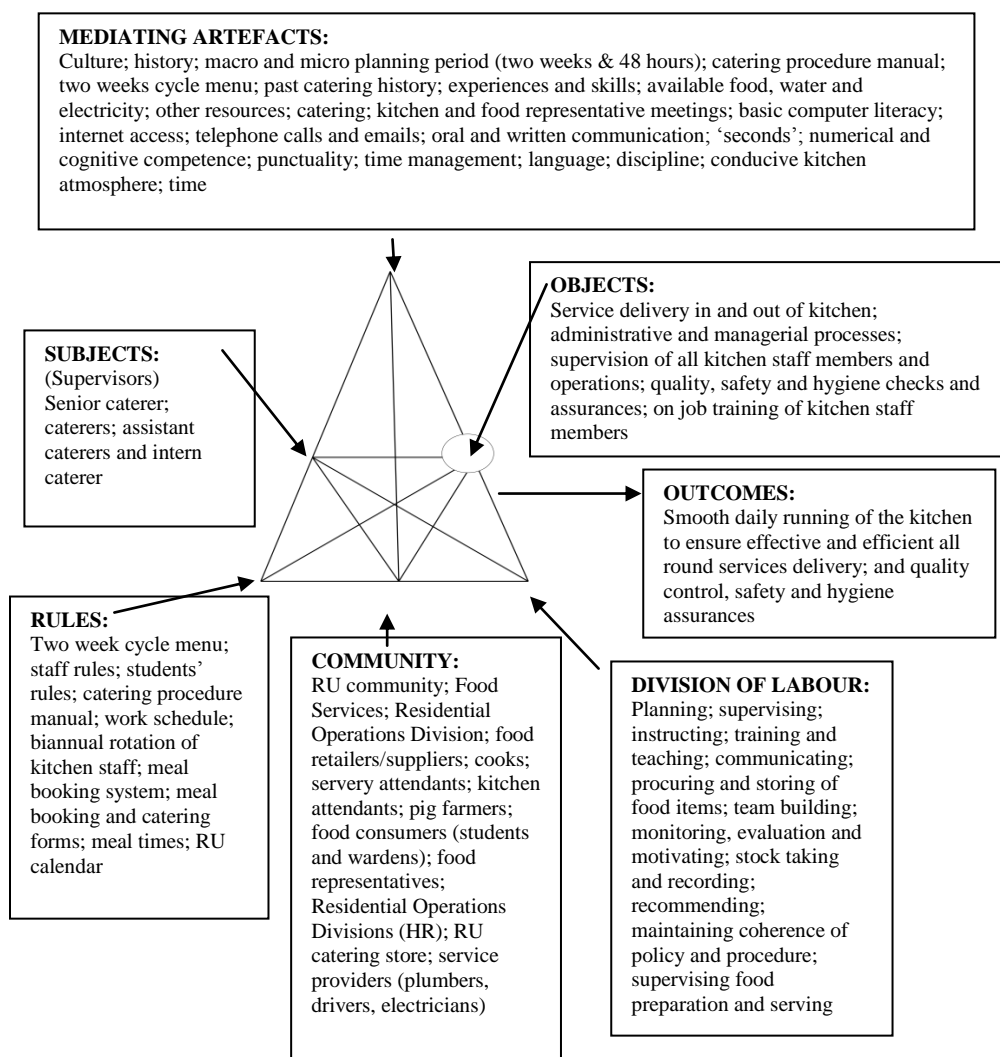


Figure 11 above represents the activity system of the caterers also acting as dining hall supervisors. At the point of doing this research,¹⁹ the subjects of this activity system (in

¹⁹ I said "at the point of doing this research" because after the Change Laboratory Workshops and at the time of writing up this thesis, some caterers have been transferred to other kitchens, while others caterers have been

hierarchical order) comprise one senior caterer, two caterers, two assistant caterers and one intern caterer in both work shifts (see Section 1.3.4). The object and outcome of their activity, including their division of labour, community, rules that govern their actions and mediating tools are listed in detail above.

Figure 12: Cooks' routine activity system (b).

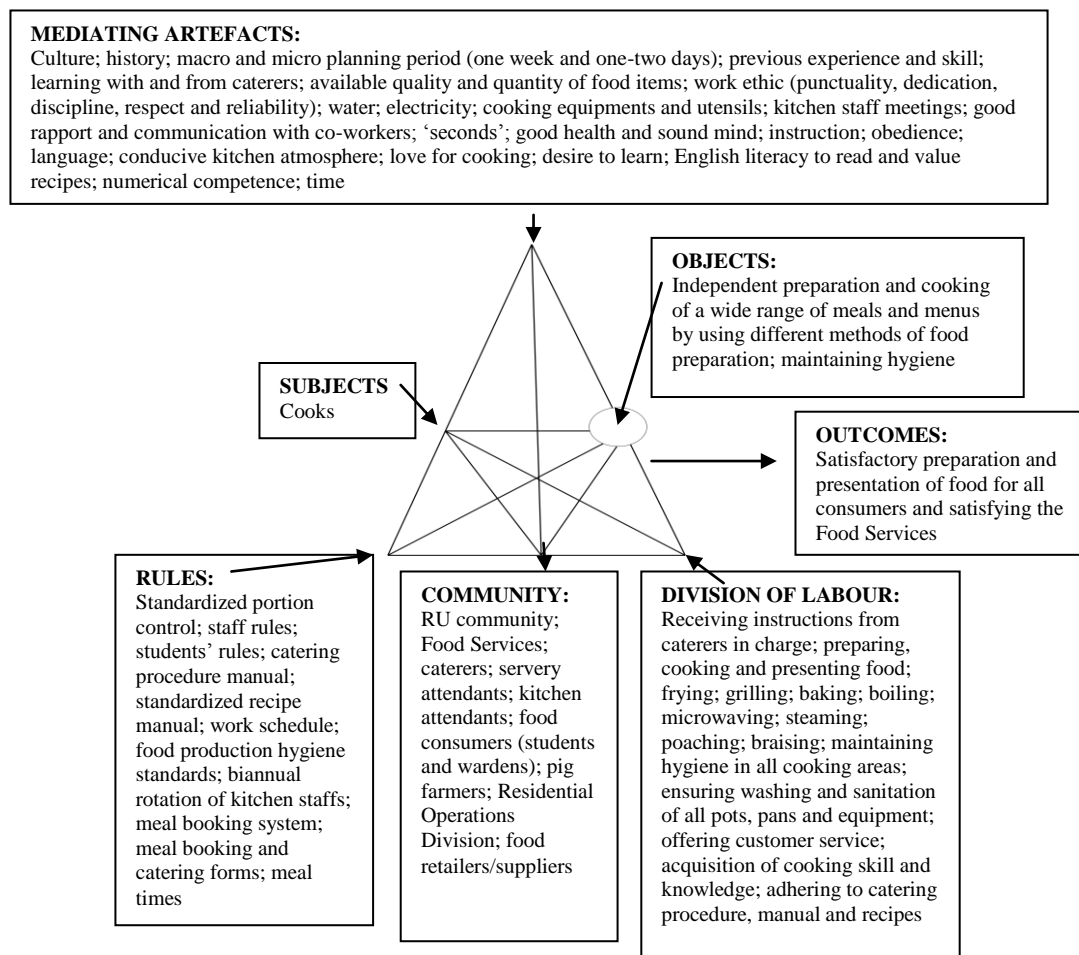


Figure 12 above is a presentation of the activity system of the cooks. They are six in number, three per work shift. The allocated meal preparation is the major object of their activity (see Section 4.3.1.4 below). The outcome, community, division of labour, rules and mediating tools are presented in detail in Figure 12.

transferred to Nelson Mandela Dining Hall from other kitchens. This reality can be linked to issue presented in Section 4.4.9 below.

Figure 13 below is the presentation of the activity system of the server attendants. There are about eight altogether in number, in the two work shifts. Their main object is to set the meals ready to be served and to dish them out to food consumers (see Section 4.3.1.5 below). The object of their activity, division of labour, rules, mediating tools and outcome of their activity is given in detail in Figure 13 below.

Figure 13: Server attendants' routine activity system (c).

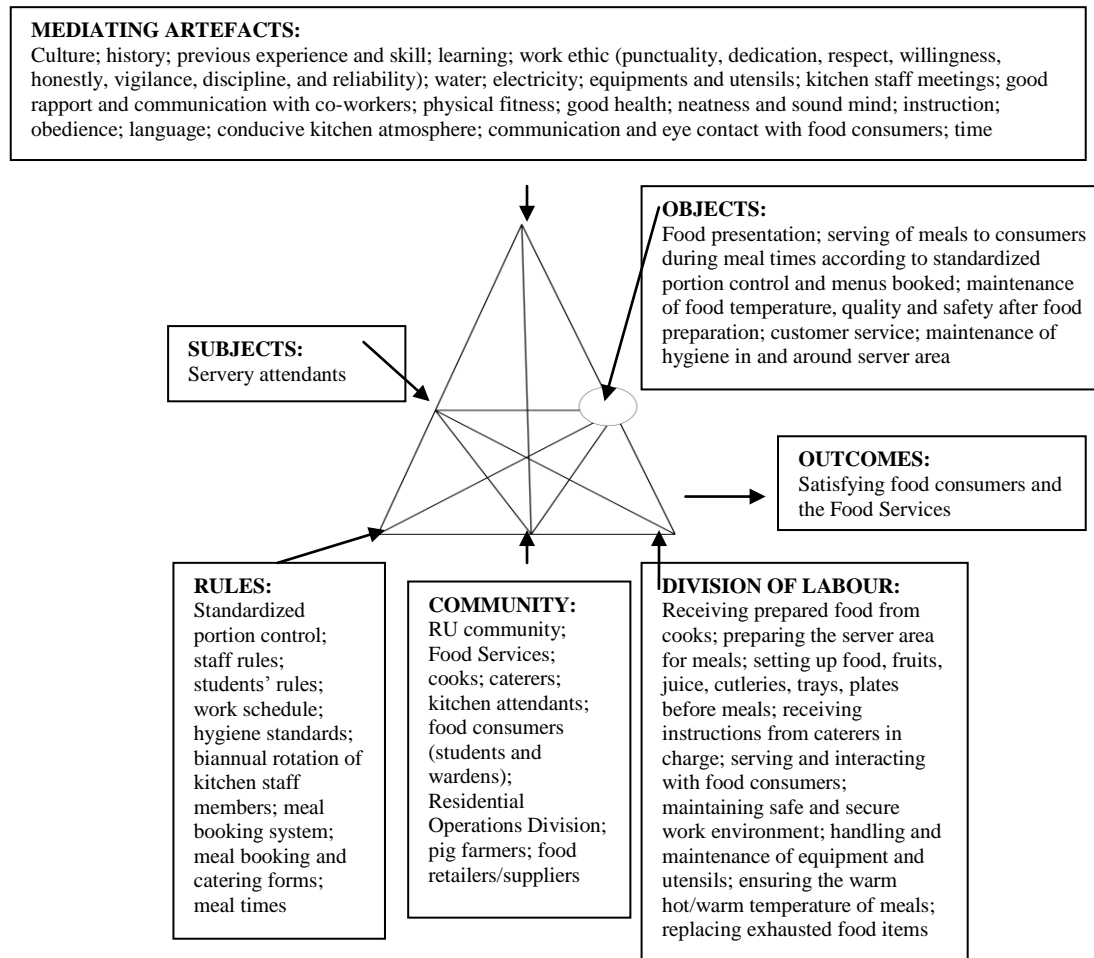
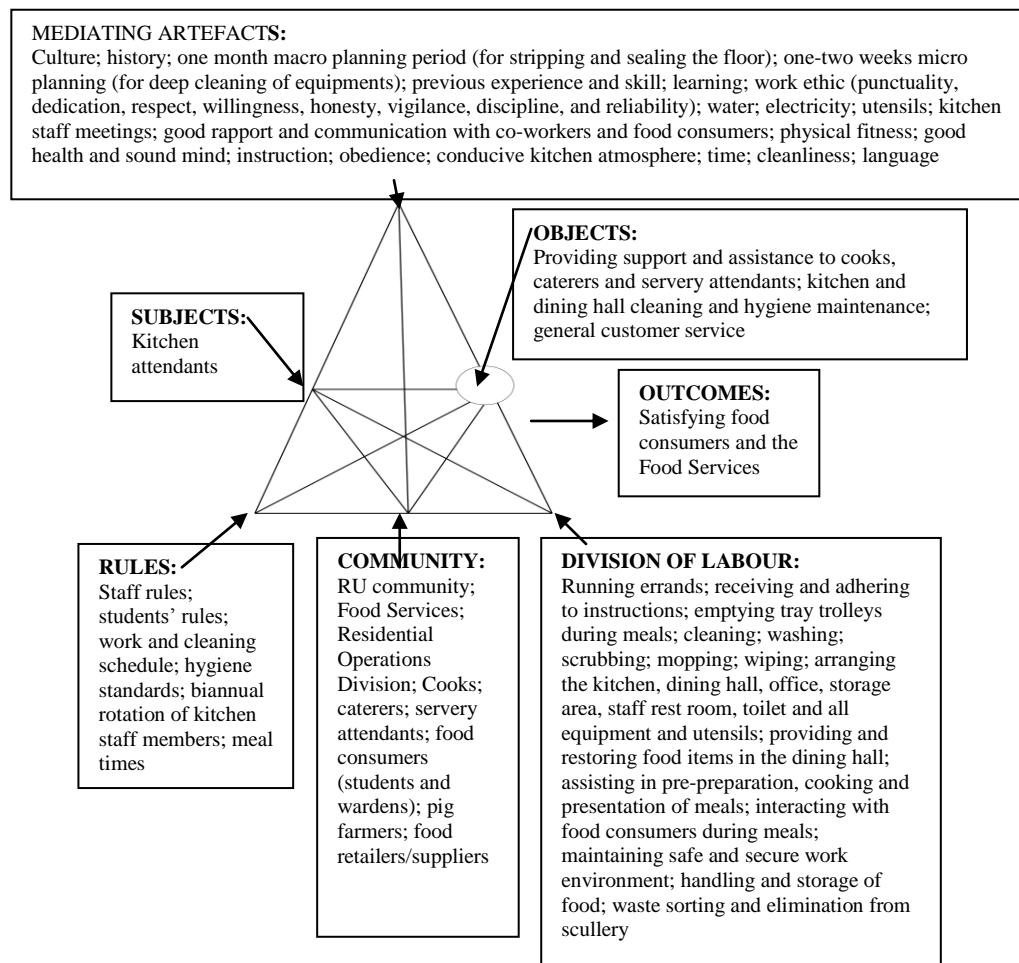


Figure 14 below presents the last micro food producers' activity system in the context of this research. The subjects of this activity system are the kitchen attendants. They are responsible

for providing general assistance and support for the smooth running of the kitchen as discussed in Section 3.3.3 above.

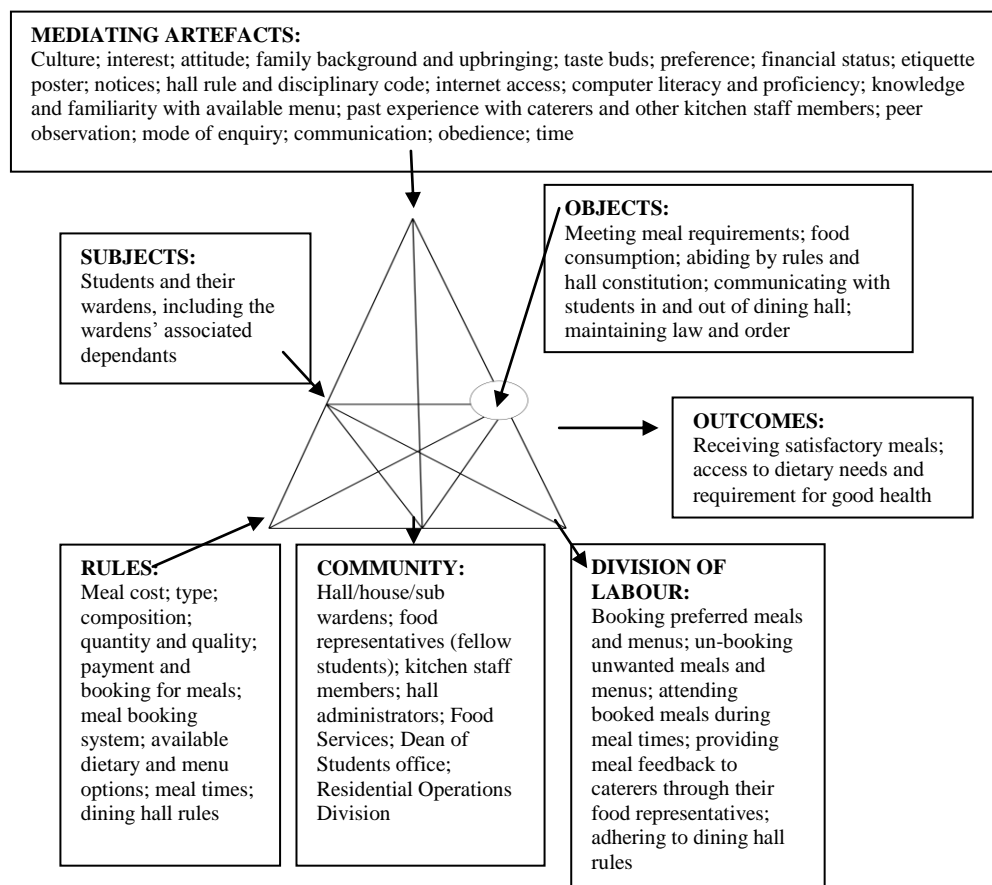
Figure 14: Kitchen attendants' routine activity system (d).



4.2.1.3 Food Consumers' Activity System

The activity system presented in Figure 15 below is the activity system of the food consumers. These subjects comprise mainly the students that reside in the eight residences in Nelson Mandela and Lilian Ngoyi Halls, who eat in the same dining hall (see Section 1.3.4). Subjects such as hall wardens, house wardens and their dependants are also included in this category since they also eat in the dining hall. The objects, outcomes, mediating tools, community, rules, and objects of their activity system are presented in detail in Figure 15.

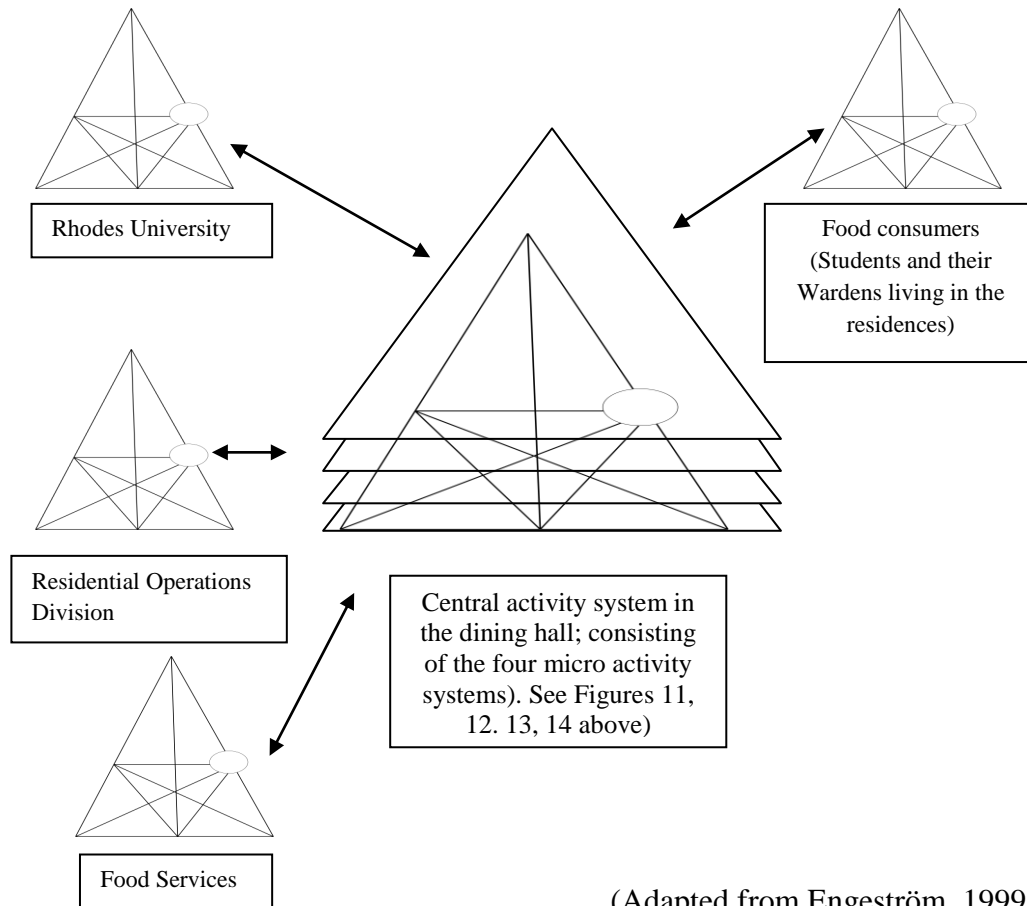
Figure 15: Food consumers' routine activity system.



The two main activity systems of the macro and micro food producers' and food consumers' activity systems presented above are interacting activity systems. Basically, none can operate without the others. Their routine activities are carried out in every academic session at Rhodes University. Figure 16 is a representation of all activity systems in this research context. It shows the central activity system (dining hall activity), where all other activity systems interact, including the students (food consumer), the Food Services (macro food

producers), the ‘community’ component of the above activity systems such as the Residential Operations Division, and the RU community.

Figure 16: Interrelating activity systems within the RU Food Services.



(Adapted from Engeström, 1999, p. 89)

The unrestricted and successful interactions between the above activity systems are necessary for a sustainable food economy. There have, however, been some disturbances to their smooth interaction. These are inherent tensions experienced as a result of contradictions. Details about the chosen theoretical framework CHAT (see Section 2.4.2) and explanations on contradictions have been presented in Section 2.4.2.1. The process by which the abovementioned subjects of the various activity systems addressed the identified contradictions is also presented in Sections 3.3.5 and 3.3.6. The list of contradictions and associated tensions, including data presentation to buttress them are fully discussed in Section 4.4 below and presented in Appendix 19.

4.3 Responding to research questions and goals in phase one of the research

In this section, I present data to address the first research question. The section draws on data from 10 interviews with nine kitchen staff members (this includes the two preliminary interviews with the Food Services manager); nine focus group discussions with students, documents reviewed and observations. Pictorial representations of answers to the questions are provided from the 260 photographs taken in the Nelson Mandela Dining Hall during the course of observation and interaction with research participants.

4.3.1 Phase one research question one

What is the current situation of food economy, sustainable practices, and learning activities in the Nelson Mandela Dining Hall in relation to food wastage?

4.3.1.1 What is the current situation of food economy in relation to food wastage?

To answer the first part of the question, the data presentation is made according to the six main stages of the micro food economy that this case study focused on. These stages include (1) food procurement and supply; (2) food preservation; (3) food preparation; (4) food serving; (5) food consumption; and (6) food waste disposal. Photographs are presented to describe the various stages as well. All the photographs were taken by me.

4.3.1.2 Food procurement and supply

This is the beginning of the stages of food economy within this research context, which is a micro food economy (as discussed in Section 4.2.1.2). This stage is characterised by the procurement of food by the macro and micro food producers and the supply of food by the food retailers, who are part of their ‘community’ (as presented in Figure10 above). Figure 17 and 18 below show a sample of the van and truck which supply pre-prepared fresh vegetables and butchery products, parked behind the dining hall kitchen.



Figure 17: (Photo taken 06:06:2011) Food supply.



Figure 18: (Photo taken 06:06:2011) Food supply.

These 'ready to use' vegetables are placed on a platform trolley and rolled to the cool room (see Figure 19 below). The grocery and frozen food stuffs required in all dining halls are procured en masse by the RU Food Services and stored in the RU catering unit. These items are thereafter dispatched to each kitchen as required by RU drivers with the RU trucks, as shown in Figure 20 below.



Figure 19: (Photo taken 06:06:2011) Food supply.



Figure 20: (Photo taken 21:06:2011) Food supply.

The caterers are in charge of making up orders in accordance with the number and type of meals that have been booked by food consumers. The following data supports this point:

The caterers order food, like vegetables they order it from Marvick ... fruit and vegetables and some of the stuff, they take them from the catering store ... almost everyday, but the grocery comes here about Monday, Wednesday and Friday (SI5).

The food we order a week in advance (SI4).

The food production process, starting from ordering, our stores are fully equipped, so it's very convenient. You saw now, I could now order my burgers for

tomorrow to substitute the meat burgers, easy divert, it works like stop watch (SI8).

Figure 21 below shows a picture of a caterer taking stock of the groceries that have been supplied.

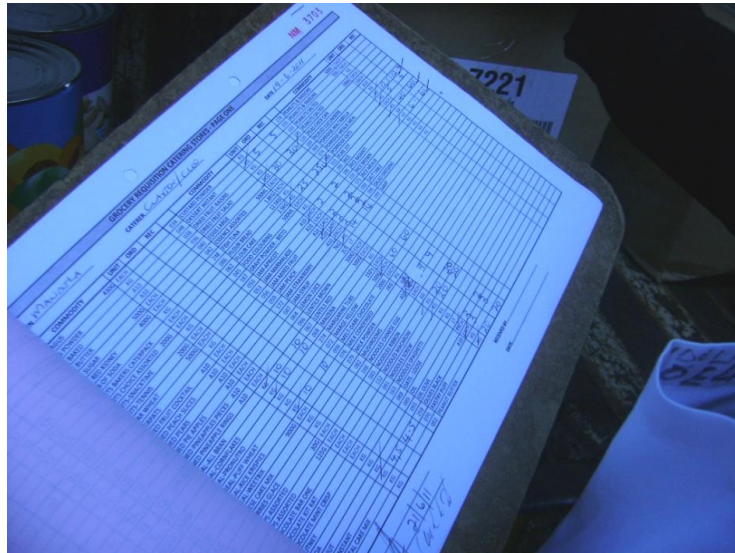


Figure 21: (Photo taken 21:06:2011) Caterer taking stock of supplied grocery order.

Items ordered in this way, including rice, margarine, and maize flour, are then transferred from inside the van, (Figure 22 below) to the kitchen stores, (Figure 23 below). Kitchen attendants are responsible for offloading and storing these food items, while the caterers supervise, take stock and keep records as shown in Figure 21 above.



Figure 22: (Photo taken 06:06:2011) Food supply.



Figure 23: (Photo taken 21:06:2011) Food supply.

The following interview data supports the above statements:

Most of our food comes in fresh, either a day before or on the day ... we try to bring in a fair amount of pre-prepared food ... I bring in sourced vegetable preparation ... they deliver peeled potatoes, chopped potatoes, grated carrot, chopped up cabbage ... it's voluminous, it's huge, it's 20, 40, up to 100 kilos at a time ... and all that is brought in is dry ... meat like mince which we now arrange to come on the day of preparation because it is highly perishable (Pillay, 2011).

[For] frozen goods and dry goods, we have a single catering store. You are aware that RU has ... 12 dining halls, 12 kitchens ... so there's a single store. We get all our frozen goods from them and all our grocery, fry goods from them. The bread is ordered fresh on a daily basis, it comes fresh, we order today for tomorrow and they supply. All meat, pork, fresh red meat delivered fresh on the day for cooking ... The juice comes from an outside supplier. The eggs, the cheese, same from where our dry goods come from ... RU single store. The only outside good is fresh meat from Port Alfred. Juice is from Port Alfred as well, and yoghurt from Clover (SI8).

Food procurement and supply at this stage of the food economy is efficient and prevents the production of food waste.

4.3.1.3 Food preservation

The following set of photographs represents the second stage of food economy in the dining hall. This is the preservation stage. It is characterised by the temporary storage of food stuffs in the freezer as shown in Figure 24 and in the cold room as shown in Figure 25 below.



Figure 24: (Photo taken 06:06:2011) Food preservation.



Figure 25: (Photo taken 06:06:2011) Food preservation.

Food is also temporarily stored, depending on the nature of the food item, in storerooms. Figure 26 below shows a platform trolley loaded with frozen packed foods about to be

transferred to the deep freezer. Figure 27 below shows what the interior of the freezer looks like. Caterers are responsible for ensuring that the temperatures of all foods are appropriate to avoid spoilage and contamination. The following interview supports the above explanations:

Fresh food is fresh, frozen food is frozen and maintained at that temperature ... fresh fruit and vegetables are stored in the cold room ... dairy, milk and cheese and butter are stored in the cold room at average temperature (Pillay, 2011).



Figure 26: (Photo taken 20:06:2011) Food preservation. Figure 27: (Photo taken 20:06:2011) Food preservation.

Food waste has been recorded to have occurred in this stage but at a very minimal rate. This is due to the fact that the Food Services ensure that waste is prevented by maintaining appropriate food storage temperatures from the stage of procurement to the food preparation stage. When asked if there have been cases of food being spoilt at this stage of food economy, the following opinions were given during interviews:

There have been cases of food being spoilt, primarily for various reasons. The one reason that comes to mind is that if it is not held at 65 degrees and above, then that is the risk. And there have been one or two occasions probably in the past 11 years where food was not fit for human consumption and we had to take out of the servery and discard it (Pillay, 2011).

No ... we have to keep it like that for hygiene ... [we] regulate the temperature, absolutely (SI8).

The above data presentation also shows that efficiency and good management prevents food wastage at this stage of the food economy.

4.3.1.4 Food preparation

This is the third stage of food economy. At this stage all fresh and frozen food stuffs preserved in the various mediums presented above are processed into edible materials. The

frozen items are defrosted at different rates and times, depending on the items and uses. During an interview, a staff member said:

Frozen food is defrosted in the cold room ... sometimes they might take it out a day or two day, depending on what it is; a day if it's fish and for chicken it might be two days and vegetables on the same day because they get defrosted at different rates (Pillay, 2011).

Three meals, including breakfast, lunch and supper and eight menus for lunch, five menus for dinner are prepared on a daily basis in the kitchen. These meals and menus are 'value-for-money, nutritious, tasty and well-balanced' as stated in the vision statement of the Food Services (see Section 1.3.3 above). The cooks are experts. They are primarily responsible for this stage, even though caterers cook as well and are assisted by the kitchen attendants in pre- and post-food preparations. This interview data sheds more light:

Food production process in the kitchen, as far as cooking is concerned; we do have great cooks ... we have three different cooks and each cook has his or her menu. If it's a 'normal' menu, then we have a 'normal' meat cook without the main course and then the HP [health platter] does the HP health menu, also desert and then the vegetarian cook would do the vegetarian menu and vegetables. So there are divisions [of labour] inside the kitchen (SI8).

All menus are supposed to be ready for consumption in the servery area 30 minutes before meal times. Various food preparation methods are employed in the kitchen including stir frying, baking, boiling, steaming, deep frying, braising. Food preparation is done according to meals and menus booked. Food is also prepared sometimes in batches depending on the meal, menu and for some other reasons including reduction of food waste. The following data shows this further:

For the cooking, you go into your protea [catering forms] and you check your numbers, how many [students] are booked and you cater according to that. But you can [cut down the numbers] being that you have been with students for a long time, you know exactly which meal is popular and which is not popular, especially the vegetables ... you know certain vegetables are not their favourite and you can cut down on some of the diets as far as 20% ... They don't waste the vegetables because we don't cook it all at once, we cook it in batches (SI4).

In the morning you can't cook all the eggs at one time because not all the children will come in and that extra is going to get wasted (SI1).

Figures 28-31 below presents a set of photographs showing some of the food preparation methods.



Figure 28: (Photo taken 20:06:2011) Food preparation.



Figure 29: (Photo taken 20:06:2011) Food preparation.



Figure 30: (Photo taken 06:06:2011) Food preparation.



Figure 31: (Photo taken 06:06:2011) Food preparation.

The following interview excerpt sheds more light on the food preparation stage.

We have to feed, three meals a day, our job is on demand ... all the food should be cooked and ready half an hour before the meal is served, so we are not cooking a day in advance or three hours in advance. The different methods of cooking that we use are, steaming of vegetable, we don't boil the vegetables, fish goes into our ovens, for stews and sauce we use braising, ... we also braise our steaks ... we braise the meat to keep it moist and we do deep frying, baking ... and boiling, boiling for rice and pastas ... (Pillay, 2011).

At this stage, food sometimes gets wasted for various reasons but this happens only once in a while. This data shows so:

Staff: *Yeah sometimes when they cook maybe she forget something in the oven and then it burns, so it's not going to be used, it is going to be thrown away. So that's waste.*

AV Agbedahin: *Does it happen all the time?*

Staff: *No it doesn't happen all the time, no no maybe once in a while.*

4.3.1.5 Food serving

The next stage of food economy after food preparation is the food serving stage. It is mainly the responsibility of the servery attendants to operate at this stage, but caterers and cooks also play this role occasionally. All meals and menus are placed and set in the appropriate food temperature 30 minutes before meal times, while the caterers in charge check and ensure that everything is in order afterwards. This interview excerpt supports this: “*supper is from 5-6:30 and the checking is by 4:30, am even happy if it gets to 4:45 but at least it is time for them to check*” (Pillay, 2011). Figure 32 below is a photograph that represents this stage.²⁰



Figure 32: (Photo taken 06:06:2011) Servery area (where food serving and food collection is done).

The serving of breakfast starts at 7am and ends by 8:30am, lunch is between 12noon and 2pm, while supper is served between 5pm and 6:30pm daily, except on weekends with a slight change in time and duration.²¹ A significant interaction between food producers' and food consumers' activity systems occurs at this stage. This takes less than four minutes but is characterised by affirming that the food consumer in the queue has a right to the meal and confirming what kind of meal/menu he/she has booked for. When confirmed, the servery

²⁰ More photographs could not be presented for ethical consideration noted in section 3.4.6 above.

²¹ On Saturdays and Sundays breakfast is between 8am and 9:45am, lunch is between 12noon to 1:30pm and supper is between 5pm and 6:30pm.

attendants then dish out the meal according to the menu booked, and sometimes according to students' request for vegetables. Exhausted meals are replaced immediately because food preparation sometimes goes on even during food serving. There is communication between these two activity systems. The following interview shows the communication:

AV Agbedahin: *Concerning food, when you are serving what do you talk about, don't you say anything related to the food...?*

Staff: *No*

AV Agbedahin: *So you don't ask them, "do you want this one or do you want that one"?*

Staff: *No I'm just given him or her what they have booked*

AV Agbedahin: *And students too, they don't indicate what they want and do not want? Like "I don't want vegetable", "I don't want carrot"?*

Staff: *They say so, that is why we are not dishing for them every single thing. You must ask them "you want vegetable"? So we are used to that, to ask, "you want vegetables"? Because some of them don't like vegetable, sometimes we tell him or her that "you must eat vegetable because it is healthy; but some don't like it.*

I observed that students pick their fruits and sometimes ask for more or less or none of some food items during meal serving. The server attendants mostly ask them if they want vegetables or not. There is usually consistency and strict adherence to the food portions given to students. The following focus group discussion excerpts present students' experiences at this stage:

Good relationship with most students, -Sometimes they ask if you want certain things e.g. veggies, -They always greet you in English, they are nice and lovely, -There is a breakdown in communication during serving of meals, -[When refusing some food items] they put it anyway, sometimes you shout and stick your hand to say no (HJFG).

They are generally friendly, -We understand them (VMFG); -They are friendly and approachable at times, -They ask if you want veggies – they only say "veggies" always, -They don't give more when you ask (SKFG); The staffs are very friendly and approachable (CFG); There's a generally good relationship with the kitchen staff, -They are caring, -Some staff are not friendly (GBFG).

Depends on if you are Xhosa speaking [or not], -Language is a major barrier, -[They] keep quiet and just dish, -[They] recently [started] asking if we want vegetable (ATFG); -Very nice people, -New staffs are not too nice but older ones are, -Language barrier plays a role so they react to people they know a little more, -Staff gave two pieces of chicken to a familiar student (JSFG).

[We] greet them, they are friendly, -If you greet in Xhosa she will give more, -More food are given to guys, -Don't always interact with them, -They get to know your preference if you greet them, -Portions increase towards end of meals, -Quality depends on the time food is brought out, -Some ask for smaller portions as the staff dish out (RFFG).

This stage of the food economy is crucial to either constrain or facilitate food wastage. The efficiency and management of food serving seem to propel some food wastage as well as reduce food wastage depending on factors including the type of the meal, menu served, type of communication between the server attendants, caterers and the food consumers.

4.3.1.6 Food consumption

This is the stage of food economy, after food has been served. Food consumption is done in the dining room. Figure 33 below shows a small portion of the dining room with the view of the servery area where food serving is done.



Figure 33: (Photo taken 30:08:2011) Dining room with a view of the servery area.

Some additional food items and condiments are placed in the dining room at the disposal of students. Items such as coffee, tea, sugar, margarine, tomato sauce, jam, peanut butter and others are provided. Other utensils including microwaves and toasters are also provided to be used by students. Figure 34 below shows a snapshot of a toaster placed in the dining room. The instruction for use is also pasted on the side of the toaster.



Figure 34: (Photo taken 23:06:2011) A toaster with instruction available in the dining room.

Food consumption rates and levels during meal times vary depending on the meal, menu available, the quality and quantity of food served, the period of the university calendar, gender issues, students' timetable, weather, and a host of other factors. Some menus are preferred to other menus. Preferred menus are highly booked by students when available. The following interview presents an insight into what happens between dining halls:

There are very different participation in the meals in different dining halls ... the guys do eat more bread, more starches ... when I compare a male and female residence like Founders, there is high consumption of bread, high consumption of starch, in fact what I tried to do was to reduce their vegetables by I think about 20 or 30 grams because they don't eat a lot of vegetables and they eat their chips in that proportion (Pillay, 2011).

The following pictures taken during meal times but focused on the plates and plate trolleys alone show the current situation of food consumption in Nelson Mandela Dining Hall. These pictures were taken when students had returned their trays with plates and cups after food consumption.



Figure 35: (Photo taken 03:06:2011) Food consumption. Figure 36: (Photo taken 03:06:2011) Food consumption.

Figures 35 and 36 above show leftover slices of bread and potato chips on students' plates: after they have left the dining hall during or after meal times. Data shows that it is not only students but staff members alike that are responsible for food wastage. Data below show this:

Yeah but even us the people who are working here, when they issue more food, like if they issue the total amount which have booked, so the others didn't come, so that is waste because it is leftover now (S15).

Figures 37 and 38 below show plates of leftover food during lunch and breakfast respectively.



Figure 37: (Photo taken 03:06:2011) Food consumption. Figure 38: (Photo taken 20:06:2011) Food consumption.



Figure 39: (Photo taken 06:06:2011) Food consumption. Figure 40: (Photo taken 03:06:2011) Food consumption.

Figure 39 above shows a picture of leftover burger and empty glasses of juice. Figure 41 below shows a picture of burnt leftover toasted bread. Figures 40 and 42 below show almost empty plates of food consumed by students.



Figure 41: (Photo taken 21:06:2011) Food consumption. Figure 42: (Photo taken 03:06:2011) Food consumption.

The above pictures and data give a broad range of ideas of what happens at this stage of the food economy. There is evidence of food wastage as well as complete consumption of allocated food portions. These little bits and pieces accumulate and add to the litres of food waste produced at the end of each meal and day (see Section 2.2.1.1). Various factors are responsible for these different practices and they are presented in subsequent sections below.

4.3.1.7 Food waste disposal

This is the final stage of food economy. It is characterised by the disposal, sorting and transference of the leftover food to pig farmers. Non-edible materials are separated from the food waste given to pigs, for instance serviettes and plastics bags. This stage is also characterised by the transference of the 'old' oil that has been used for frying and has become

unfit for further usage. This oil is stored and transferred to a factory to be processed and used to produce other forms of oil usable for machinery (e.g. lawnmowers on the RU campus). After food consumption, students place their trays on the available trolley and leave the dining hall. Figure 43 below shows a picture of a trolley with plates.



Figure 43: (Photo taken 20:06:2011) Food waste disposal. Figure 44: (Photo taken 21:06:2011) Food waste disposal.

At this point, it is the responsibility of the kitchen attendants to remove the plates, cups and cutlery from the trolley and wash them. They scrape all leftovers from plates into an oval entrance, which feeds into black 50 litre waste bins in the scullery area of the kitchen, as shown in Figure 44. Other leftovers that are not served after meal times and seconds are also poured into the waste bins, as kitchen staff members are not allowed to consume them or take them out of the dining hall and they have separate menus from students. The following interview data illustrates:

We are not allowed to eat it after seconds ... If it is meat we put it in the fridge for the 'seconds' tomorrow. If it is vegetable or starch like rice we throw it away ... mash, wraps, we throw it away ... even if it is plenty, even if it on the menu for tomorrow, it is supposed to be thrown away because nobody is going to use it (SI5).

Figures 45-48 below contain pictures that show this practice on three different days in the month of June, 2011.



Figure 45: (Photo taken 24:06:2011) Food waste disposal.



Figure 46: (Photo taken 23:06:2011) Food waste disposal.



Figure 47: (Photo taken 23:06:2011) Food waste disposal.



Figure 48: (Photo taken 18:06:2011) Food waste disposal.

These food waste loaded bins are rolled outside the dining hall, through the kitchen back door, as shown in Figures 49 and 50 below.



Figure 49: (Photo taken 23:06:2011) Food waste disposal.



Figure 50: (Photo taken 23:06:2011) Food waste disposal.

They are placed outside, but behind the dining hall as shown in Figures 51 and 52 below. At this point, pig farmers on contract with the RU Food Services (see Section 2.5.2) come to the Nelson Mandela Dining Hall (and other dining halls on campus) to collect the food waste to be fed to pigs. This following interview data illustrates:

People just buy it from the catering. There are people who buy that food for their pigs (SI5).



Figure 51: (Photo taken 07:06:2011) Food waste disposal. Figure 52: (Photo taken 30:05:2011) Food waste disposal.

This food waste is always available everyday (during school sessions), but the pig farmers only come to collect it at times convenient to them. This usually happens on a daily basis but occasionally only at two day intervals in a week.

4.3.2 Phase one research question two

What is the current situation of sustainability practices in Nelson Mandela Dining Hall in relation to food wastage?

It is written in the hall constitution across campus that students should endeavour not to waste food. For example:

Take only what you CAN and INTEND eating—do not waste food (Doc7 and Doc8) (Emphases from source).

Students are also enjoined not to pile up their plates with salad which is at their disposal in the dining hall. This admonition is useful in encouraging students to take only the quantity of food they are able to consume at a time. It is stated that:

When salads are available at a meal, you may serve yourself, BUT you must please be reasonable with your serving. The 'piling up' of salads on your plate is NOT permitted (Doc7 and Doc8) (Emphases from source).

Concerning the presentation of leftovers to students, which is a sustainable attempt to reduce food waste, students are invited to have what is known as 'seconds'. It is stated in the hall rules that:

Seconds will be served PROVIDED there is food left over and once everybody has been served (Doc7 and Doc8) (Emphases from source).

The commencement of this sustainable practice dates back to about 10 years ago. The following interview excerpt illustrates further the history and context:

Ever since the meal booking system started ... about 10 years ago, when the booking is not cancelled then it say 'seconds' available. The reason why they made it I think it is because if there are leftovers and there are some students who wants , so they can just come and chip ... each chip records every meal ... They book and some of them got lectures ... sport and they don't un-book their meals. So the guys that come for 'seconds' have got advantage (SI4).

However, after seconds there are sometimes still leftovers as shown in Figures 45-48 above. Some are preserved and re-presented to students as 'bonuses' at the next meal time. This is not done during supper because some menus are highly perishable and cannot be preserved for long.

The following interview excerpt reflects the sustainable practices made by micro food producers to reduce food waste:

If we have large portions over, if for example, club steaks or chicken leg quarters or stew that is a bulk left over at lunchtime, we will give it to them [students] at supper time and set it out in the dining hall for them to help themselves ... If it's leftover at supper time, I will then give it to them as extras for lunch the next day but we cannot give it as a meal, only extras. Pizzas, pies and everything that is left will be given to them [students] at their next meal as extra (SI8).

The following pictures in Figures 53-56 below show such possible attempts. Figure 52 shows plates of meals covered with plastic and laid on a table in the dining hall. Figure 54 shows a plate labelled as 'veg' strictly for vegetarians. Figure 55 shows a closer look at the composition of a meal plate consisting of: brown bread, vegetable, chopped sausage and feta cheese.



Figure 53: (Photo taken 24:06:2011) Presentation of leftovers to students.

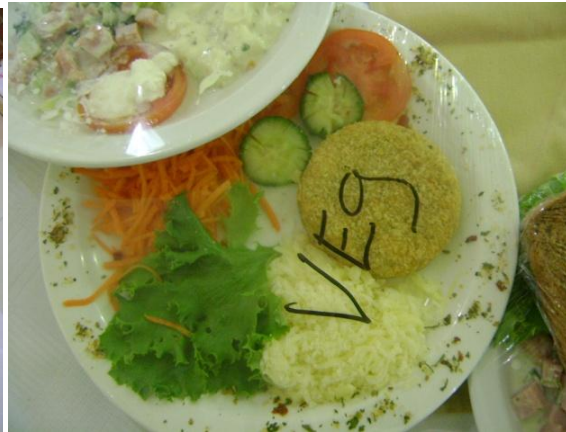


Figure 54: (Photo taken 24:06:2011) Presentation of leftovers to students.



Figure 55: (Photo taken 24:06:2011) Presentation of leftovers to students.



Figure 56: (Photo taken 24:06:2011) Reuse of leftover carrot.

Figure 56 above shows another sustainable practice by a caterer to reuse leftover carrot. This blended leftover carrot was used to make soup to be consumed by humans, instead of disposing of it immediately. Other sustainable attempts to reduce food waste are for kitchen supervisors to allow students who come late for their meals to have their meals. Another attempt to reduce the amount of food waste is to allow kitchen staff members to eat the leftovers instead of discarding consumable food on a daily basis. This practice depends on the discretion of the caterers in charge and various other circumstances as well. The following interview excerpts from interviews with staff members shed light on the above sustainable practice by food producers:

Today a student came in to ask for food, now that student is a regular latecomer, but I did give him food and it is our right to say no, but if there is food there for him to have, I will give him (SI8).

The only other effort that I personally can make is control effort like ... to ensure that no unnecessary food is taken. If you come to me hungry, and ask me for food I will give you. But don't waste—staff and students ... If you are hungry and you need it, then eat it ... just don't take a bite and you leave it just because it is there ... for staffs, that also teaches them not to take food unnecessarily (SI8).

There are sometimes we eat our food but there are sometimes we eat the leftovers when we see that it is too much (SI3).

No, we just have to eat when the 'seconds' have finished; yeah after second we can eat (SI6).

4.3.3 Phase one research question three

What is the current situation regarding learning activities in Nelson Mandela Dining Hall in relation to food wastage?

Before, during and after the actual data collection process, there was nothing in Nelson Mandela Dining Hall that presents a message related to food wastage. There was no notice or poster. Neither did I come across any poster, notice or resource material on the issue of food waste in the student residences. During the focus group discussions with students, I asked them to share any teaching or learning activity related to food waste or food resource management or sustainable living they have received at RU. Most participants said there was none while others said there had been posters in the dining hall sometime before but, they had not received any significant teaching on food wastage.

I showed students the food waste posters that were being used in some other dining halls but none of the first year students had seen them or were conversant with them. First year students saw the posters for the first time, however, others [second, third and fourth year students] unanimously recalled and agreed that these posters were formerly pasted in the Nelson Mandela Dining Hall but have not been pasted this year (2011). Some students said the posters fell down. Further discussions made some students show interest and speak of the positive impact the posters had and may have if put in place. Other students were of the opinion that it won't make much difference (see Appendix 24 for posters).

Another food related activity students mentioned was the availability of books where complaints about food can be written as well as discussions with the food representatives about their dissatisfaction and compliments regarding food services rendered in the dining hall. The following excerpts from focus group discussion notes illustrate this:

No, the only awareness of food wastage we have is only a few posters in the dining hall ... last year there were posters in the dining hall but they are not there this year (FRFG).

Books in each residence to complain about food ... seen posters last year, but they were taken out quickly ... posters fell down (ATFG).

Yes and no. Not everyone was familiar with them (VMFG).

Messages on posters makes people 'think', they 'worked' ... first years haven't seen posters on food wastage (RFFG).

No waste posters in hall—unfamiliar ... posters are good, it would have helped (SKFG).

I asked students in a focus group discussion if they would appreciate it if a lecture is organised on food waste, some didn't mind, if it will be effective in reducing food waste but some replied by stating "*No one will attend such a lecture unless it is compulsory*" (VMFG). These perspectives show the scope of interest and concern (or lack thereof) that students in a Higher Education Institution like RU have for the ethical and environmental issue of food waste.

Kitchen staff members have not had any training, teaching or learning regarding food wastage either. Although on-the-job training is conducted within the Food Services Sector, particularly within kitchens and across kitchens supervised by caterers, these no longer seem to take place; perhaps they were focused on catering skills and expertise. Currently, informal teaching and learning activities exist in Nelson Mandela Dining Hall centred on cooking skills but not directly on food wastage. The following data shows this:

Staff: *I did my training here at Rhodes ... I was taught how to do catering ... It is like an 'on-job' training.*

AV Agbedahin: *Is the on-job training still on now?*

Staff: *Not really, but there is, if some staff members are interested, if they want to learn or know something then we will teach them in all the kitchens.*

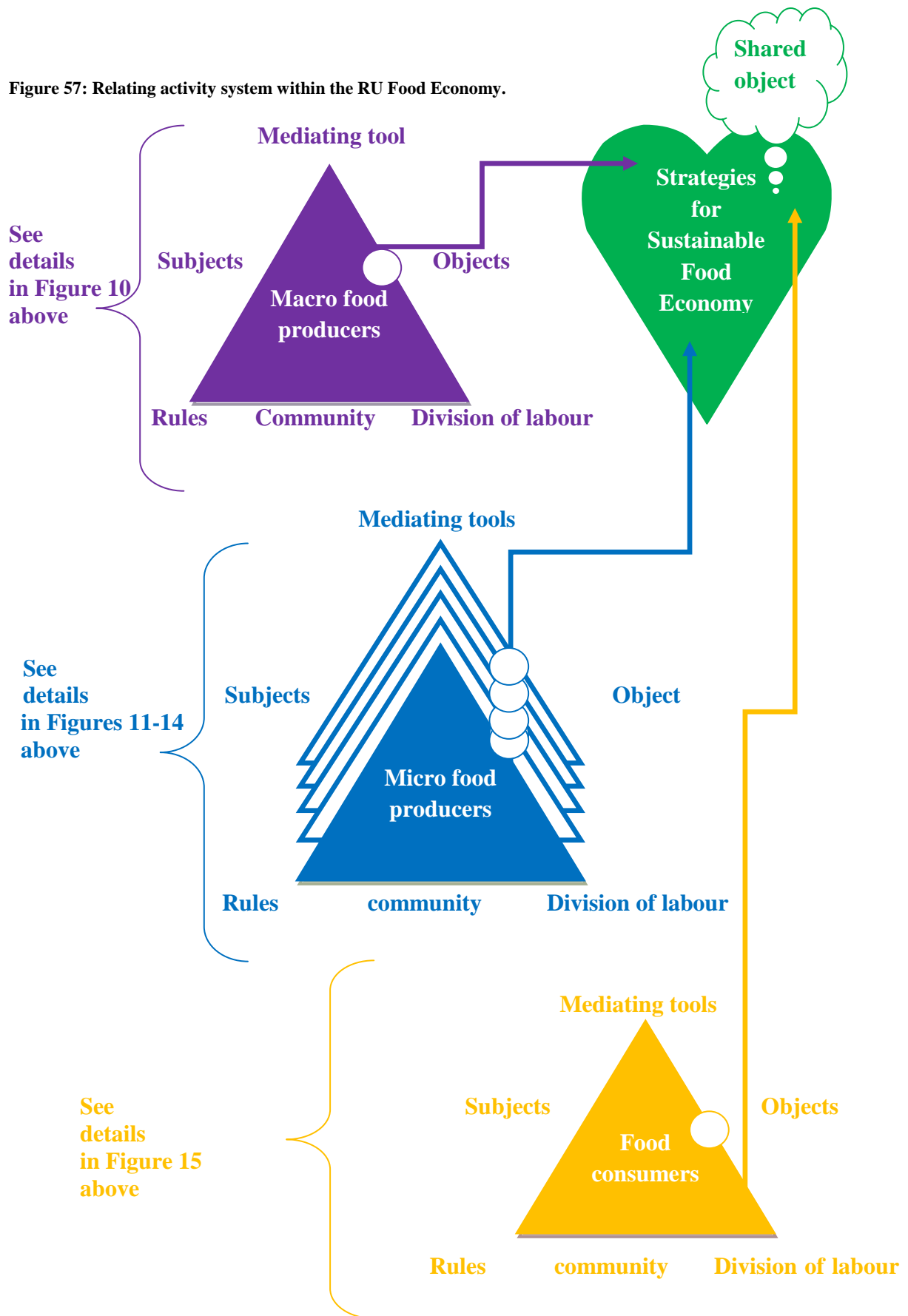
The majority of them [other staff members] are willing to learn because I [have] a lot of cooking experience and I like to teach them to bring out the best cooking ability that they can. And if they are willing to learn, then it saves us (SI8).

4.4 Contradictions identified with their associated implicit and explicit tensions

In this section, I present the contradictions and tensions that were identified in the food economy of the RU Food Services department. The contradictions and tensions are intentionally grouped into nine related categories because of their interrelated nature. These contradictions range from primary, secondary, tertiary and quaternary contradictions (see Section 2.4.2.1 for details about these types of contradictions).

Figure 57 below presents a diagram illustrating the six activity systems within the Food Services and within the context of this study. It also shows an illustration of their shared object. The purple coloured triangle represents the macro food producers' activity system (see details in Figure10 above). The blue coloured middle set of triangles represents the activity system of the micro food producers (see details in Figures 11-14 above). The third lower orange coloured triangle represents the food consumers' activity system (see Figure 15 above for details).

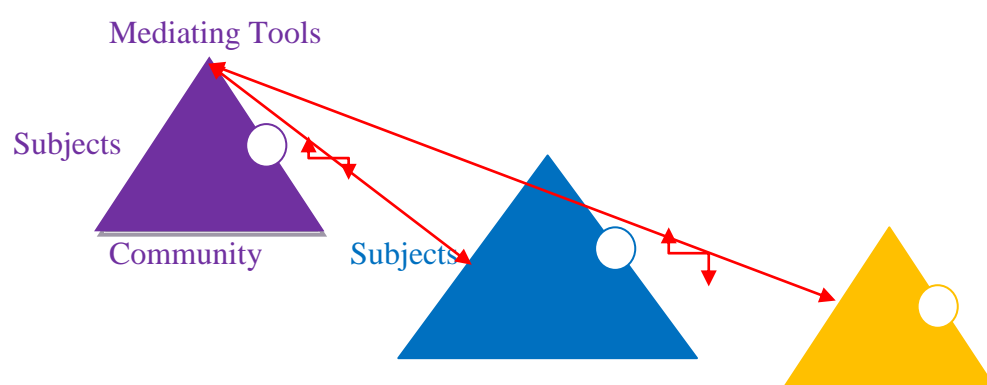
Figure 57: Relating activity system within the RU Food Economy.



4.4.1 Issue 1: Non availability of substantial learning activities

4.4.1.1 Quaternary contradiction between subjects and mediating tools (see heuristic below)

This quaternary contradiction was identified between the expectations of the RU community/Residential Operations Division/Food Services on the kitchen staff members and students to reduce food waste, and the non availability of substantial informal or formal learning activities, lectures, discussions, and learning materials to facilitate the learning.



This contradiction was identified from observation, interview, documents reviewed and focus group discussion data. The contradiction is between the macro food producers' activity system's mediating tools and subjects of the micro food producers' and food consumers' activity systems. It is expressed as a desire that the amount of food waste generated in the RU dining halls be reduced. The manager stated in an interview that "*there should be then a level of consciousness of wastage*" but as discussed in Section 4.3.3 above, the level of food wastage education, resource materials, or teaching and learning activities (mediating tools) amongst students (subjects) in Nelson Mandela Dining Hall is almost inconsequential.

For instance apart from the food waste posters (see Appendix 24), which were formally available but now removed, students only indicated that they were aware of the 'Meatless Monday'²² which is actually related to environmental conservation and stewardship and not food waste reduction per se. There has been an automatic expectation of students (adults) to actualize food waste reduction. What seems to have been focussed on is discussion around the cost, quality and quantity of food in the dining hall. Some focus group discussion data excerpts shed more light:

²² These are Mondays when people have decided not to eat meat, in order to reduce meat consumption and contribute to environmental sustainability.

There was no formal teaching on food waste reduction in the dining hall ... students felt they were adults and that the school had assumed this by not holding any formal teaching (CFG).

[We] haven't had any formal talk (ATFG).

... None, doubtful ... not in a public forum (JSFG).

Food representative may ask about quality or discussed in meetings ... Meatless Monday talks ... first years may have had talked earlier on, not sure (RFFG).

Only Meatless Monday on RU connected, even though not implemented well so there's no real awareness and people don't know it is going on (HJFG).

No teaching (SKFG).

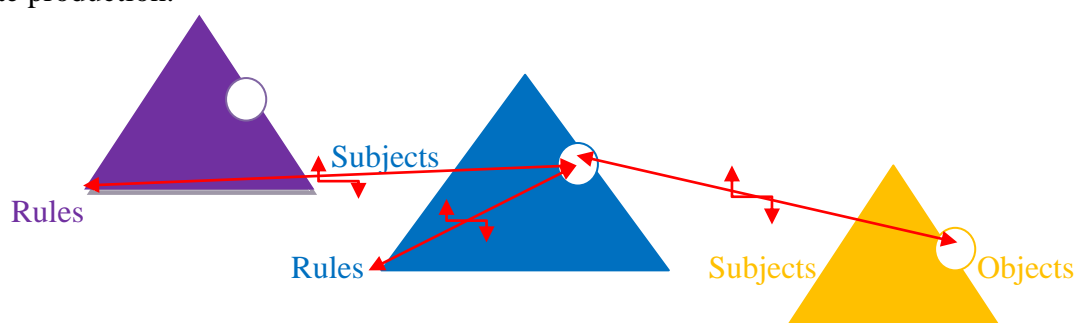
Moreover, the onus is placed on the kitchen staff members (subjects in micro food producers' activity system) to reduce food waste. A kitchen staff member said: "*from our side ... it is our duty to curb food waste*" (SI8). However, they also have not received any such training and education. They were only aware of posters which were meant for students. Such situation therefore is antithetical to the quest and desire to reduce the amount of food waste generated in the dining hall. The following interview excerpt represent staff members' responses when asked about the food waste related to the teaching or learning they have been exposed to within the RU Food Services:

In the beginning of the year, we have a meeting and we discuss everything about catering, how to go ahead in cooking and equipments and all those things ... No (SI4).

4.4.2 Issue 2: Menus, meals, meal booking and responsibility

4.4.2.1 Secondary and quaternary contradiction between rules and subjects (see heuristic below)

The contradiction between the prerequisite for meal access, number of meals booked and the number of students attending prepared meals (especially during breakfast, beginning of the year and after examinations), creates tension among kitchen staff members and causes food waste production.



This contradiction and source of tension was identified from observation, interviews and documents reviewed. To be an undergraduate student (subject) residing at RU means that such a student has been admitted (rule), registered (rule), and has also paid for the respective accommodation and feeding (rule in the dining hall). In other words students eating in the dining hall have paid and booked for the meals; without doing this they cannot have access to meals (under normal circumstances). This point is supported by the excerpt from the new etiquette poster (see Figure 58 in Section 4.4.3.2): “*valid meal booking is essential in order to enter the dining hall at meal times.*”

The caterers (subject) therefore are supposed to cater for those students (object) according to the number of meals (rule) and menus they have paid and booked for (rule). This therefore means that if for instance 300 students book for particular meals and menus, these meals should of a necessity be prepared; and such students should attend their respectively booked meals, diets and menus. Unfortunately this is not always the case. The number of students that attended booked meals often varies drastically from the number of students that eventually attend meals. These discrepancies are evident in the dining hall and in the one month catering order forms (Doc13-39) I reviewed (see Appendix 25 for sample catering form). For instance on the 22nd of June 2011, 222 students booked for breakfast and only 73 attended the meal and on the 30th of May, 294 students booked for breakfast and 116 attended. This imbalance is more during breakfasts and at the beginning of academic years when new students are admitted. The following interview and focus group discussion excerpts illustrate this issue:

You have a total number booked but not many arrive for breakfast ... they book and some of them got lectures ... sport and they don't un-book their meals ... in the beginning of the year, they used to go out, they don't un-book their meals (S14).

Yes obviously breakfast is easier, you have a total number booked but not many arrive for breakfast ... On the computer we have certain booked figures booked for certain meals and then for example 10% of a certain meal won't pitch up (S18).

In the first Change Laboratory Workshop, a caterer provided more explanation for this tension by saying:

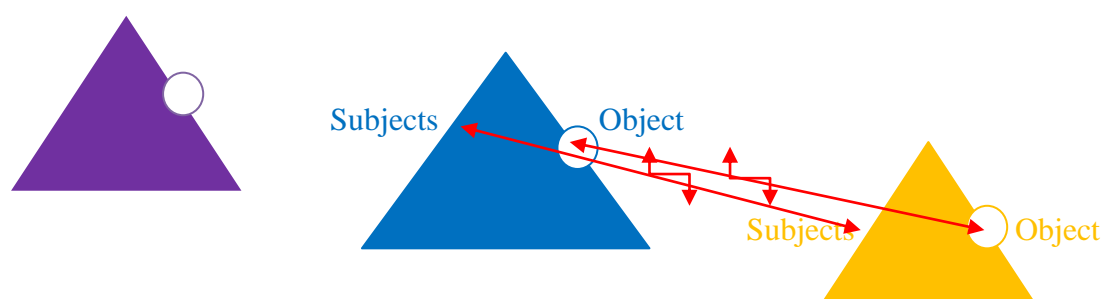
For example this weekend, I was on this weekend, and I had up to 580 students booked for the weekend, generally for Saturday lunch and supper, Sunday lunch and supper. Of all the 580, only 2/3 of the students came in this weekend, 2/3, that's

very low and it was very difficult for me to decide that only 2/3 of that total is coming in (Caterer).

During observations and interactions, staff members in the dining hall, often expressed their concern at this regularly experienced tension.

4.4.2.2 Explicit tension between objects/objects and subjects/subjects associated with contradiction 4.4.2.1 above (see heuristic below)

There is tension between the practice of the cooking of menus/meals in batches, cutting down on the number of meals booked (because of the uncertainty of the actual number of students that will be present for meals) and the exhaustion and quality of meals experienced sometimes by students.



This contradiction and source of tension was identified from food representatives' minutes of meetings (Doc11 and Doc12), interviews, observation and focus group discussions. During observation and interviews, I discovered that caterers and cooks have developed tacit knowledge and a strategy to cut down on the number of meals prepared (object), despite higher numbers of bookings. They also intentionally cooked in batches (object) to prevent food waste. This cooking in batches is also done on certain menus such as pizzas and burgers to ensure freshness. I asked if there are times when the kitchen runs out of meals. A staff member responded:

In the beginning, because you're never sure if they are coming but from the 2nd month you know exactly; if today is a favourite meal, you have to do all (SI4).

Coincidentally this is the same period that first year students told me that they weren't yet familiar with the RU menu and thus engaged in what they referred to 'trial and error'. Students said:

[They were] unfamiliar with the menus but got used to it after many months ... trial and error (SKFG).

Kitchen staff members indicated that they were attempting to reduce the preparation of the exact number of menus and meals booked, because they ‘know’ that not all students would attend those meals and menus. But unfortunately sometimes the prepared meals get exhausted. The following interview excerpts expatiate on this:

We cut down on 10% -15% but still they don’t come [because] they’ve still got money to spend in town ... As a caterer you have to monitor it all the time to see that the cooks don’t do [cook or fry] too many eggs all at once (SI4).

They try, like to cut the issues, when they issue food, maybe rice, they know the portion control for ... let’s say 150 people who booked for ‘normal’ [name given to a particular diet], then maybe there will be only 120 coming in, so they try to cut it, not to prepare for that 150. Sometimes it gets finished before the time (SI5).

When we issue the cooks with their ingredients or food that they are supposed to cook ... my vegetable cook for example would cook the vegetables as it is going along, not make everything that I put in front of her, she will cook as she goes along (SI8).

The effect of these practices experienced within the micro food producing (subjects) and food consuming (subjects) activity systems cause a lot of tension and pressure. The following interview presents such a tension:

Maybe if 350 booked, sometimes all 350 doesn’t come, so what they normally do is that they cut like 200 but when eventually there is a long queue and the other 50 I haven’t made already and there are 50 people still in the row, caterer X [name withheld] will be like [interviewee’s name withheld] “times 50” and I have to rush to make 50 fast. So those are some of the difficulties I find in the dining hall (SI2).

This pressure in the kitchen is most likely what is responsible for the difference in the quality and quantity of meals that are served during early meal times and late meal times and toughness of steak, uncooked pizza ... that were expressed in some focus group discussions. Students expressed their opinions and the following excerpts reveal their experiences:

Meals run out, maybe they are miscalculated (HJFG).

Problem when you book online but when you arrive at the dining hall, it’s unavailable ... names are not representing meals (VMFG).

In the 2011 food representative meeting’s minutes (Doc11 and Doc12) that I had access to, there is evidence that students complain of unavailability of their menus or diets when they arrive for meals. The following excerpts illustrate this:

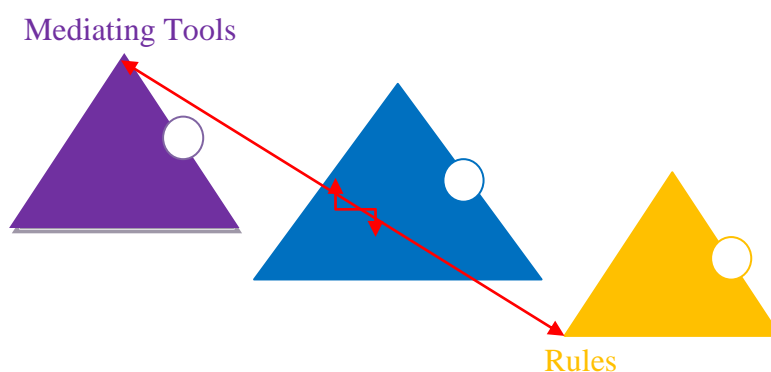
Saturday before the kitchen ran out of burgers ... Diets running out ... running out of meals ... bean salad gets finished before 13h00 (Doc11).

Running out of meal preferences, several people had arrived at the dining hall and had to have a different meal to the one they ordered, especially with the African dishes and the vetkoek and mince (Doc12).

A kitchen staff member further said: “even if we cut it, it will still remain, it can be short sometimes and it can remain sometimes” (SI2).

4.4.2.3 Quaternary contradiction between mediating tools and rules (see heuristic below)

There is a contradiction between the restrictions on the number/amount of meals that can be un-booked and the number/amount of meals some students would like to un-book; and food wastage.



This contradiction and source of tension was identified through my personal experience, observation, interview, focus group discussions and rules. In the course of the research, I paid and booked for some meals in the case dining hall (as discussed in Section 3.3.2). I discovered that there is a restriction on the number of meals (rules) students (subjects) could un-book and refunds they are entitled to, to this effect. Excerpt from Doc76 stated below illustrates further:

Students will be refunded twice yearly (at the end of each semester) with the credit owing to them as a result of un-booking meals ... Meal refunds are limited to a maximum amount per semester ... Un-booking meals will be refunded to students' fee accounts at the end of each semester. Refunds will be limited to a maximum of R1 360.00 per semester [for undergraduates residences]. Refunds paid to residents of Celeste and Oakdene House [which are post graduate residences] will be limited to a maximum of R1 871.00 per semester."

From the data generated from observation and Doc13-39 as discussed above (daily catering forms), it was obvious that there is a difference in the number of meals booked and number of meals attended. During focus group discussions, I asked questions related to how often students normally eat in the dining hall and I was informed that they mostly attend lunch and

breakfast. Not all of them go for breakfast for several reasons beyond the scope of this study.

The following excerpts present their responses:

Breakfast are usually missed, two meals are taken (GBFG).

All meals excluding breakfast on some/most days are uneaten (JSFG).

Everyday but majority don't take breakfast except during exams ... breakfasts are un-booked (RFFG).

Some eat twice a day, while others don't really (HJFG).

Twice a day, mostly lunch ... two people take breakfast (VMFG).

Two times a day, lunch and dinner ... almost all breakfasts un-booked (SKFG).

Students further expressed their dissatisfaction regarding the restriction on the relative amount of meals they are allowed to un-book in a term. They were not quite sure about the correct amount; a group said R1 300, while another group said R1 360. The following excerpts illustrate this and present the students' plea:

R1300 is not enough (HJFG).

Increase the un-booking allowance and give us the ability to un-book more meals than R1360 (RFFG).

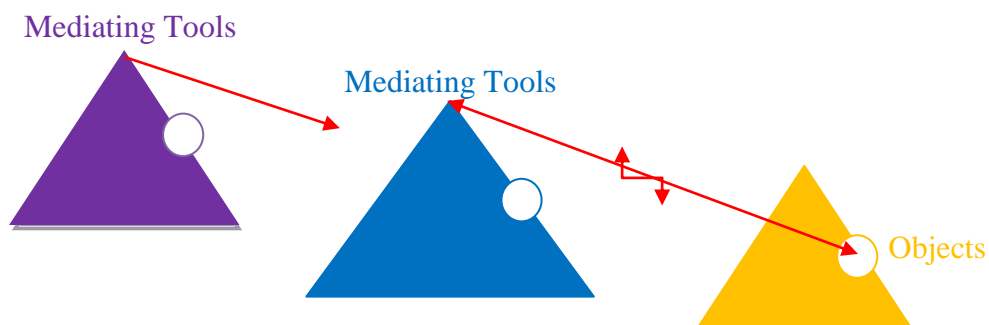
In the activity system of the food producers, they expressed dissatisfaction by stating the following:

Yes, they book for it but they didn't come. It is the students that should have un-booked their meals (SI5).

The students can like order, 250 booked and only 200 came in (SI2).

4.4.2.4 Quaternary contradiction between mediating tools and objects (see heuristic below)

There is a contradiction between online meal booking, menu names, their descriptions, and actual menu experienced by students (in their first few months in the dining hall before they get familiar with the menus).



This contradiction and source of tension was identified from observation, interviews, focus group discussion, and my personal experience in the process of eating in the dining hall for research purposes. Meals and menus are booked online on the RU website (mediating tool), through the computerised meal booking system. Through this system students are meant to choose their preferred diet from the eight available diets (as discussed in Section 1.3.3). They are also supposed to choose the kind of menus they want from the many available menus provided fortnightly (as discussed in Section 1.3.3). The following focus group discussion excerpts describe the experiences in the food producers' activity system (subjects) during online meal booking and meal consumption (objects) in the dining hall. Even though students are grateful they have options to choose from, tensions exist:

The names of the meals are very deceiving (FRFG); Systems used to book are confusing at times where meal names are unknown (GBFG); Food is sometimes exaggerated (ATFG); Display and names are misleading ... [It is like] false advertising though having the option to choose is great (JSFG); The names of menus do not correspond with the actual meal (RFFG); Lack of description (SKFG).

In the micro food producers' activity system, whatever meal and menu that is booked is relayed to the caterers in the kitchen for them to order the necessary food stuffs (see Section 4.3.1.2 above). The cooks then prepare the meal according to this specification and their designated diet specialization. Serverly attendants dish out food to students with the supervision of the caterers. The following interview excerpt supports the fact that students 'know' the menus they book:

They do. We are going according to the menu, they've got the menu. They know what they booked. If it is the HP [health platter—a diet] dish they love, you see them booking it because they saw the menu ... They walk into the dining hall knowing what [they are] going to get (SI2).

The following interview excerpts present the tension that occurs in the kitchen as regard this contradiction:

Some of them don't even read the menu, they just book (SI5).

Yeah I dish what they booked for ... [but] if somebody didn't touch the food, and then I wonder, what's wrong? What was it? Is it my cooking or what? But now I realise that maybe they didn't feel like eating it because they order sometimes the things that they don't want (SI3).

Even if the food is nice today and nice tomorrow and nice the other day, your stomach is getting used to that ... so that is where the food wastage comes from. Like one person books one thing and you're getting bored of eating it, at the end of the day, it will go to waste (SI2).

In line with the focus group discussion excerpts above, in the beginning of the year, students were not yet familiar with the menu names, looks and taste. It was a period of experimenting but after a couple of months, they become conversant with the menu and they could book their favourite meals. An interview excerpt supports this point:

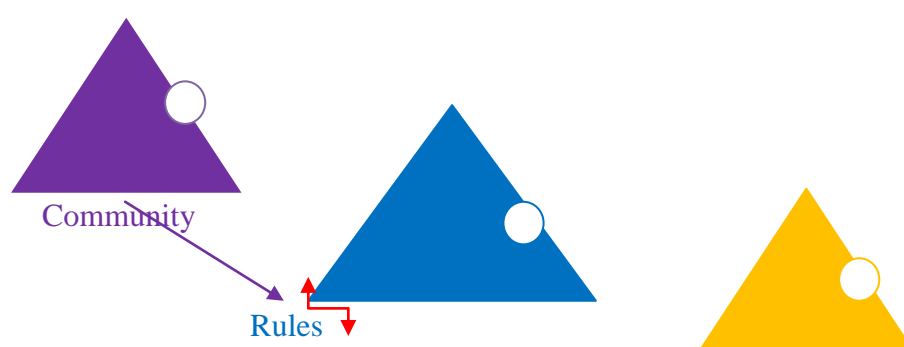
In the beginning [of the year] they used to waste a lot of food but now they've started studying ... exam ... there is not too much food wastage ...It is only at exam times that it decreases because they eat more, and they study during the night ... But in the beginning of the year, they used to go out, they don't un-book their meals (SI4).

Towards the end of exams and after exams (before the dining hall formally closed), I observed that there was an increase in food waste and the caterers attested to this during personal communications. This was because students did not un-book their meals and they left campus after their examination. The focus group discussions revealed that the university does an automatic un-booking of meals for 'some students' but some said "no" because they have to do it themselves manually. Some focus group discussions also revealed that in the first two days of resumption, all meals are default and students said they mostly eat outside or collect the meals and leave it uneaten because it was not their choice. The vegetarians are mostly affected by the beginning of term default meals because their diet is not catered for.

4.4.3 Issue 3: Dining hall rules and etiquettes

4.4.3.1 Primary contradiction between rules and rules (see heuristic below)

There is a contradiction between Nelson Mandela hall rule 11(ii) and Lilian Ngoyi hall rule 11B (ii) which state "*pass through the servery area, collecting your full meal from the Caterer on duty. Once you have passed through, you may NOT re-enter to fetch any other food,*" and Nelson Mandela hall rules 11(n) and Lilian Ngoyi hall rule 11(j) "*take only what you CAN and INTEND eating – do not waste food.*"



This contradiction was identified from Doc7, Doc8, observation, interview and focus group discussions. The effect of this contradiction is being experienced by students and kitchen staff members. Students expressed their tension by asking questions like *‘how can we pass through the servery area, collecting our full meals and yet we are asked to take only what we can and intend to finish’?* They further asked me *‘in the first instance do we intend to eat what we are offered as food?’*

This explicit contradiction (and the one presented below), were said to be some of the reasons why student are left with no other option but to waste food. The following focus group discussion excerpt supports this:

*Some issues with rules, some seem ridiculous, some contradictions (JSFG).
Rules are broken because loopholes are found—we just generally break them (SKFG).*

During my observation I saw and heard kitchen staff members cautioning students entering the servery area to pick ‘extra’ fruits, bread or to serve themselves juice. Sometimes students would say they hadn’t picked such an item before. Interview data revealed that students usually enter in and out of the servery more than once. Kitchen staff members said that students would come in to pick more slices of bread, fruit and cups of juice. When asked why students are not controlled or prevented from doing so according to the rules guiding the dining hall, kitchen staff members gave the following reason: *“some students are not truthful”* (SI1). Students are many and difficult to control. It is difficult for them to leave their essential duty and be controlling or monitoring students’ behaviour. The following excerpt illustrates further:

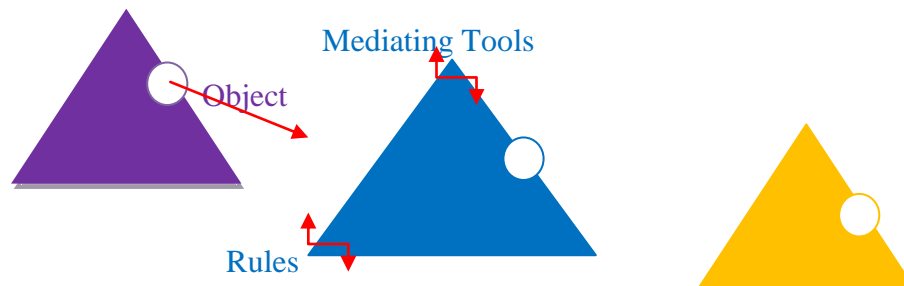
Yhooooo! Some take four, and he is coming again for another four [we both laughed deeply] yes. [the student will say] “Mum I didn’t take bread”, [I will say] “you supposed to take four slice” [the student will respond] “yes mama I know but I didn’t take bread” ... “I didn’t take fruit mama”, [I will say] “you take fruit already”, [the student will say] “no mama I didn’t take” but he knows he is lying (SI1).

This next viewpoint was also expressed by a kitchen staff member during the first Change Laboratory Workshop when this issue was being analysed further:

I speak to a lot of students, however, I cannot stop what am doing at lunch time or supper time to run after students who took three glasses of juice, run after a student who I think came the second time to take more slices of bread, I can’t, that’s not possible. I’ve got my duties to work on.

4.4.3.2 Primary contradiction between rules and rules and mediating tool and mediating tool (see heuristic below)

There is a contradiction between the rule—removal of only two slices of bread from the dining hall during supper and the removal of four slices of bread stated in the new dining hall etiquette poster.



This contradiction and source of tension was identified on the new etiquette and between the new and old etiquette posters (mediating tools). The photographs below are copies of the etiquette posters that are pasted in the case dining hall and some other dining halls on campus (as at the time of this research). In it lies the contradiction in instructions (rules) to students (food consumers).

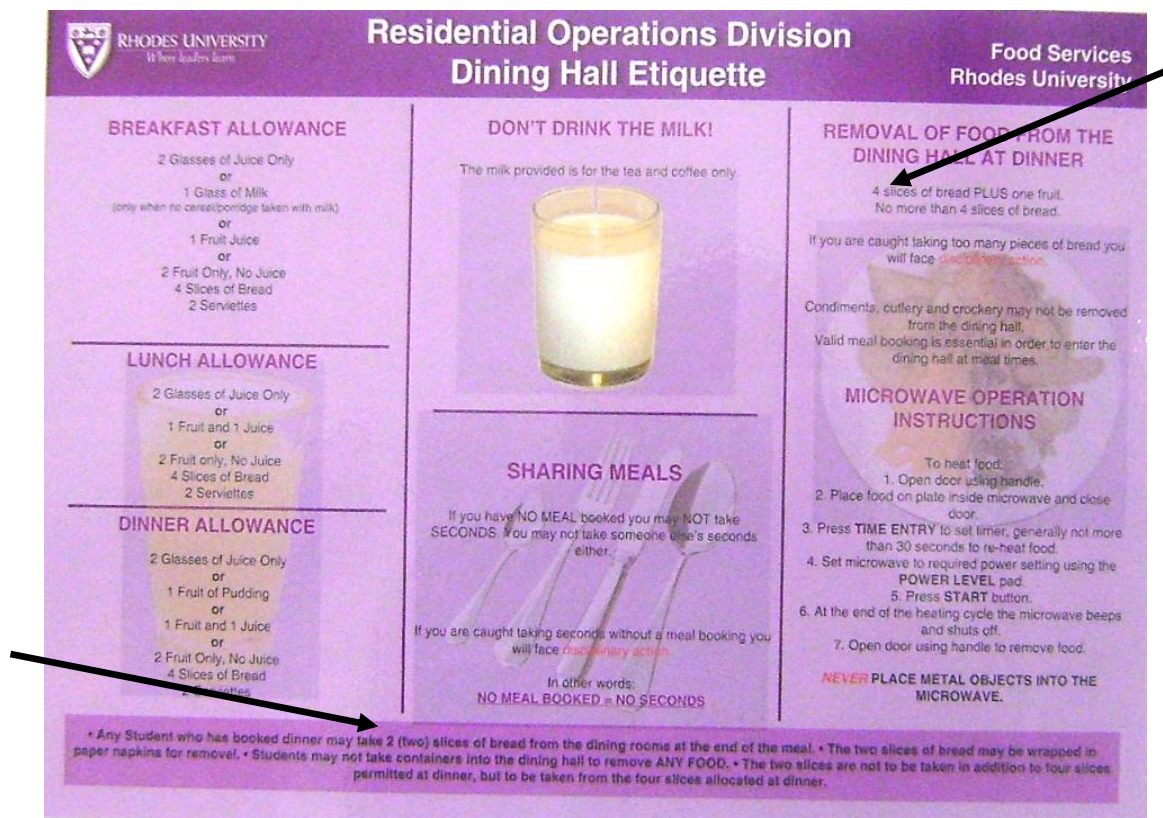


Figure 58: (Photo taken 05:06:2011) New etiquette poster.

BREAKFAST ALLOWANCE	LUNCH ALLOWANCE	SUPPER ALLOWANCE
2 GLASSES OF JUICE ONLY OR 1 GLASS OF JUICE AND 1 GLASS OF MILK (only when no cereal/porridge taken with milk) OR 1 FRUIT AND 1 JUICE OR	2 GLASSES OF JUICE ONLY OR 1 FRUIT AND 1 JUICE OR	2 GLASSES OF JUICE ONLY OR 1 FRUIT OR PUDDING OR 1 FRUIT AND 1 JUICE OR
2 FRUIT ONLY, NO JUICE	2 FRUIT ONLY, NO JUICE	2 FRUIT ONLY, NO JUICE
4 SLICES OF BREAD	4 SLICES OF BREAD	4 SLICES OF BREAD
2 SERVIETTES	2 SERVIETTES	2 SERVIETTES
➤ Any student who has asked supper may take 2 (two) slices of bread from the dining rooms at the end of the meal. ➤ The two slices of bread may be wrapped in paper napkins for removal. ➤ Students may not take containers into the dining hall to remove ANY FOOD ➤ The two slices are not to be taken in addition to the four slices permitted at supper, but to be taken from the four slices allocated at supper.		

Figure 59: (Photo taken 05:06:2011) Old etiquette poster.

The following focus group discussion excerpts illustrate further:

Rules are at times confusing [there are] contradictory posters on the number of bread (VMFG).

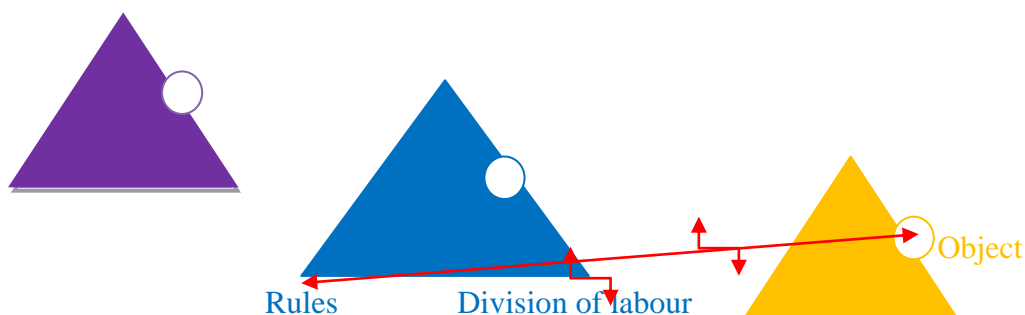
Some issues with rules, some seem ridiculous, some contradictions (JSFG).

Rules are broken because loopholes are found - we just generally break them (SKFG).

We take more napkins to wrap bread because if we take two and use the two, you can't wrap bread [as stated in poster] (RFFG).

4.4.3.3 Quaternary contradiction between rules, objects and division of labour (see heuristic below)

There is a contradiction between the existence of dining hall rules, partial compliance to rules by many students and ineffective enforcement of rules.



This contradiction was detected from observation, interviews, focus group discussion, and the above-mentioned etiquette notices Doc57, Doc7 and Doc8. In the Nelson Mandela Hall, and

Lilian Ngoyi Hall constitution and dining hall etiquettes, guidelines and rules regarding conduct within the dining hall and residences are stated. Doc7 and Doc8 state “*Ignorance of the rules is NO excuse*”. Such rules include those prohibiting removal of food from the dining hall, except students’ portion of fruits or two slices of bread. Doc7 and Doc8 state:

NO FOOD may be taken out of the dining hall except a students’ portion of fruit. No bread may be removed from the dining hall except after dinner when two of the four slices of bread that a student is entitled to may be taken out.

Don’t drink the milk! The milk provided is for the tea and coffee only (Doc57).

If you have NO MEAL booked you may NOT take seconds. You may not take some one else’s seconds either. If you are caught taking seconds without a meal booking you will face disciplinary action (ibid).

Students may not take containers into the dining hall to remove ANY FOOD (ibid).

Other rules require students to only pass through the servery area once and for all to collect their full meals during meal times. Doc7 and Doc8 states: “*Pass through the servery area, collecting your full meal from the Caterer on duty. Once you have passed through, you may NOT re-enter to fetch any other food.*”

The above presented etiquette posters are placed in the servery area of the case dining hall. During focus group discussions it was also clear that most of the students were aware of the existing posters and the hall rule documents online. But despite students’ awareness about the dining hall rules, I observed that these rules are often intentionally violated. Students also confirmed that they break most of the rules without remorse because they are not strictly enforced.

This discrepancy between the existence of stern and clear rules without major compliance is as a result of ineffective enforcement of the rules and other reasons. The following focus group discussion excerpts expressed by students support this:

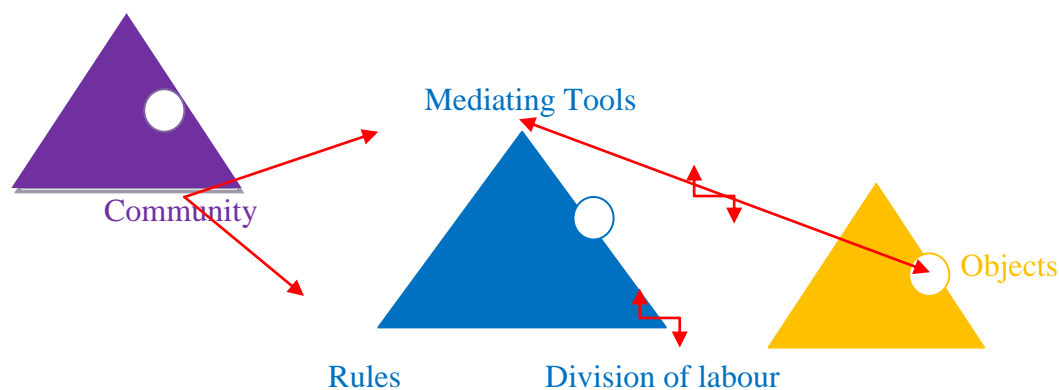
The rules are there, but leniency is given (FRFG); It was agreed that rules were not strictly enforced (CFG); [Rules are] Not pressed (SKFG); Nobody stressed the rules ... a lot of rules and regulations are breached every day (ATFG); Rules are not enforced (VMFG); We need to be told and messages need to be enforced (ATFG); Aware of rules but they are not practical at times (SKFG).

The following interview excerpts provide evidence of students breaching the above stated rules:

*Some of them [students] take out food and bread (SI4).
 Sometimes they don't even start eating, they take the plate the way it is and then put it back in the trolley (SI7).
 Yes they're burning, they burn the bread and they go take other slices (SI3).
 Some take four, and he is coming again for another four, yes (SI1).*

4.4.3.4 Quaternary contradiction between rules/mediating tools and objects (see heuristic below)

There is a contradiction between the rate of violation of dining hall rules, and students' disciplinary code and the intensity/actualization of disciplinary action stated in the etiquette poster and hall rules.



This contradiction was identified during observation, focus group discussion, and Doc7, Doc8. It is stated in the dining hall etiquette poster and hall constitution that any student caught breaching the enclosed rules will face disciplinary action. Doc7 and Doc8 state: “a breach of any of these rules will be regarded as a disciplinary offence which may result in a disciplinary penalty being imposed.”

As stated above, the etiquette poster also states:

If you are caught taking too many pieces of bread you will face disciplinary action ... students may not take containers into the dining hall to remove ANY FOOD (Doc57) (Emphasis from source).

The enforcement of these rules is part of the responsibilities of kitchen staff members, hall wardens, house wardens and sub-wardens. However these rules are breached to a great extent. During interviews I asked kitchen staff members if wardens had been ensuring

disciplinary action on students caught breaching the dining hall rules, one responded that: *“They do, students get assigned to the kitchen for discipline, punishment, they clean the kitchen; they work in the scullery cleaning trays”* (SI8).

I asked how often this happens and I was told that: *“It’s been happening very often in the last 2 months”* (SI8). However, during all my observation period, I never came across any students working in the kitchen. During the focus group discussions, when I asked students if they have ever faced disciplinary action, they all echoed *“No”* (ATFG, JSFG, RFFG, HJFG, VMFG, SKFG, CFG, GBFG).

In the course of the discussion the following excerpt indicates that the gravity of the stated penalty cannot be compared to the actual experience in the dining hall: *“There was an incident of disciplinary action but the actual punishment was unknown ... none of the students in the group had faced disciplinary action”* (CFG). Another group stated that: *“Mostly not, there has been no case heard of that a student has faced disciplinary action”* (GBFG). Yet another group attested that rules are: *“Not really followed ... always broken”* (HJFG). When asked to give instances of when rules were breached, they stated that *“...some [students] take more fruits”* (RFFG); *“some bring guests ... [some] majority ‘steal’ to feed guests who have un-booked their meals”* (RFFG).

I further asked why students are prone to breaching the rules and some group put forward that *“[the] rules and regulations are too strict”* (GBFG). Another FG was of the opinion that *“some rules are found to be tedious and not feasible so people will tend not to follow them”* (FRFG). Another group said that the *“stated consequences are too severe for a petty action”* (RFFG). However, when asked if they know of other students who have faced disciplinary action, most of them were not aware of any one but in one group, a house committee member said that *“a few [students] have been caught and given hours to work in the dining hall”* (ATFG). One student in another group said he had *“witnessed a student receiving hours for sharing food”* (ATFG). In another group *“none of the participants have been punished even though rules have been broken”* (HJFG).

During observation of practices inside and outside the dining hall, I noticed that some students take more than the required four slices of bread and two fruits or two cups of juice. I

also observed that some students bring in containers to take away their meals or wrap them in napkins or plastic that is used to cover the butter saucers. More interviews reveal that:

*They just take the food ... just put it in a plastic and just go with it (SI6).
Ah the food waste is happening here, for instance one day there was a child here who was writing [with] tomatoes sauce on the bread, even I take the photo; can I show you the photo? (SI7).*

The following photograph shows a slice of bread with an inscription “I love u 2 death”, written with tomatoes sauce. It was taken by a kitchen staff member and brought to my attention.

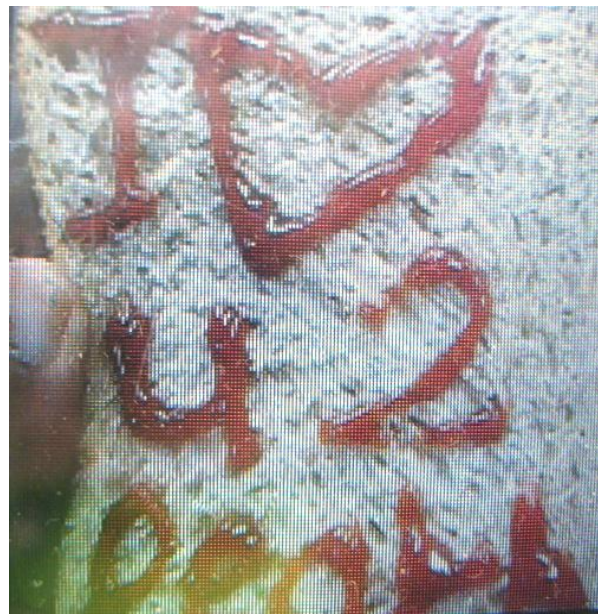
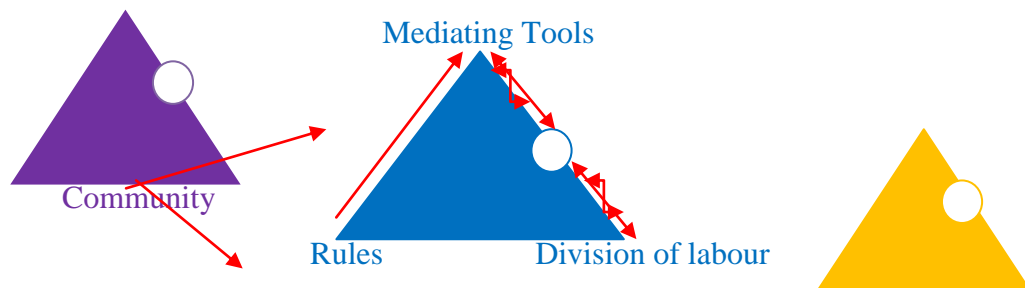


Figure 60: (Photo taken 24:06:2011) A slice of bread with an inscription made with tomato sauce.

4.4.3.5 Secondary contradiction between rules, mediating tools and division of labour (see heuristic below)

There is a contradiction between the repercussions of violating the rules stated in the etiquette poster, hall rules and students’ disciplinary code and the verbal cautions/warnings that often occur in the dining hall by kitchen staff members and wardens.



This contradiction was identified during observation, interviews and focus group discussion. It is stated in Doc4 that hall wardens are:

Required to ensure that the Students Disciplinary Code and other Hall regulations are adhered to and the appropriate disciplinary action taken where necessary.

During my observation, the caterer on duty cautioned students when they breached rules and they were caught. For example an excerpt of the observation data written on 6 July during lunch states:

Caterer approached a male student who has put and placed 5 slices of bread on the table in bread plastic to take away. The caterer asked for the bread plastic, collected and trashed it. The student denied knowing such rule.

During focus group discussions I asked students how these rules were being enforced and some explained that: “dining hall staffs tell you not to and that is enough ... informal rebuke” (FSFG). Another group highlighted that rules are enforced only through “verbal caution,” stating that their “hall warden caution students” (VMFG). Others expressed their opinion by stating: “the level of leniency was appreciated” (CFG); “...Quite Lenient” (ATFG); “...Verbal warnings,” “[they were] shouted at,” “[they were] told to return food” (SKFG). I also asked students why they think that rules are handled leniently, they said:

Staffs understand - no hiding (SKFG).

Some rules aren't too strict i.e. bread ... they used to be strict but lenient now ... only one person has been shouted at (RFFG).

It is a waste of time to be giving disciplinary action (FSFG).

We would prefer to take meals out (RFFG).

Because people feel that sometimes they should be allowed to take food out (HJFG).

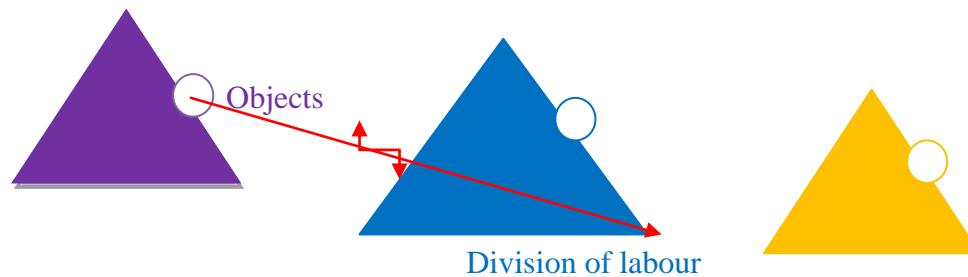
[Two students in the group said] we don't eat supper in the dining hall, we always take it to the room, we are not aware that there is a rule like that, why? (HJFG).

From observation data, I present the following practices in the dining hall:

The caterer supervised verbally, cautioned a male student who came into the servery to pick a fruit. The student apologized when caterer [name withheld] reminded him of the rules (May 30 – During supper).

4.4.3.6 Quaternary contradiction between objects and division of labour (see heuristic below)

There is a contradiction between the Residential Operations Division and Food Services' expectation from the wardens, sub-wardens (rule enforcers that are students), and kitchen staff members to enforce rules, and the feasibility thereof.



This contradiction was identified from interviews, observation, Doc4 and Change Laboratory Workshop. The enforcement of rules is left to wardens and some kitchen staff members, particularly the supervisors (caterers). However, about 650 students living in eight residences, eat in Nelson Mandela Dining Hall (see Section 1.3.4). An interview excerpt illustrates:

That has really been pushed to the hall warden within the dining hall sector where the sub-wardens are paid a fee for their job, so they need to be visible in the dining hall and to monitor that there isn't abuse of the facilities and so that students don't take the food out and eat them within the dining hall (Pillay, 2011).

Another staff member explained: “walk around in the dining hall ... speak to them [students]. We've got to make a way ... it is our duty to walk around and check” (SI4). Another staff member confirms by stating that:

We ... are there to ensure that they follow the rules ... we have the greatest responsibility in the smooth running operation of the kitchen ... and general well-being of the students of the University (SI8).

Staff interviews, focus group discussions and Change Laboratory data revealed that the number of students to be monitored (about 650) is one major limiting factor to the feasibility of dining hall rule enforcement. Staff members that are mandated to carry out many other duties are unable to efficiently enforce rules, they do so only when they are able to, especially those around their jurisdiction. The following interview excerpt illustrates this point:

They obey to our rules on this side [servery] but the thing is that when you're on this side you can't always see what is going on at the other side [dining room]. But if I do see something, I go to them straight away; I don't wait (SI4).

When asked if they, as kitchen staff members, are able to ensure all students' effective adherence to the rules despite the huge number of students, a staff member responded:

Not every student but we control as far as we possibly can and it's up to them to abide to as many rules as possible. Remember they [students] have senior hall students, they have wardens, and they have sub-wardens and besides the caterers are in the kitchen, these wardens, hall warden, sub-wardens and senior

hall students are all in the dining hall. So if anybody is misbehaving they should pick it up (SI8).

Other kitchen staff members expressed their dissatisfaction by saying:

Ahhhh! They come back to take [food items] again because [there are] a lot of people here, you don't know which one has taken, they just come back to take another one, just like that (SI6).

You know a lot of people they come in and out, so they not gonna know if you take bread again. Students just go there, take bread and come out (SI6).

Yeah, it's difficult, there are a lot of students ... they continue to do that and they tell us that "they pay for this food", you understand, so you can't say "stop this waste." They paid for the food (SI7).

I walk around and monitor ... it's a very physical monitoring process that has to take place, we don't have the time for that ... for that we don't have. On that level we must all come together and work together. I alone can't do it (SI8).

Exactly, even the bread, you know they are supposed to take 4 slices, but they will take 6, they will take 7 slices, they will take 5 and then those slices are coming back from their plates, it's not right (SI3).

During Change Laboratory Workshop 1, a kitchen staff member expressed the pressure they experience within the kitchen:

If I may say this, the caterer's duty during lunch time and supper time especially, we are under an enormous amount of pressure at that time and we cannot be braving students during meal times.

This next contradiction exists within the contraction 4.4.3.6 discussed here. It was discovered during personal communication with students and staff members, focus group discussion, observation, Change Laboratory Workshops and Doc6 reviewed. Doc6 states the conditions of service of sub-wardens. Sub-wardens are meant to eat in the dining hall. They have the responsibility to monitor the activities of fellow students during meal hours in the dining hall. They are given specific duties in the dining hall at certain times by their hall-wardens, and as directed by the Dean of Students. Excerpt of Doc6 states:

Sub-wardens are required to take most of their meals in the dining hall ... [they] are required to undertake such duties in the dining hall as the Dean of Students and/or the relevant hall warden may require of them from time to time.

Such duties may include supervising and controlling the entry of students into the dining hall or into those sections in which meals are served. During my observation, some sub-wardens and senior students who are expected to also play a role in the actualisation of discipline and

adherence to the dining hall rules are themselves violators of the rules. This first Change Laboratory Workshop excerpt supports the above observation data:

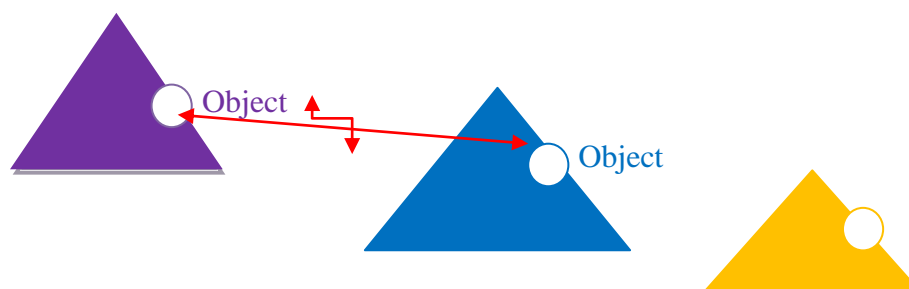
Okay in food representative meetings, we as caterers are severely reprimanded but I have examples here at Mandela-hall where senior students start lining up for seconds 10 minutes before the closing hour of that meal, senior students, very bad example ... they crowd the two servery sides that people coming 10 minutes before or 5 minutes before closing time have to push through them and I don't think that's fair to me.

...And you will expect the wardens to be setting examples. I had to speak to two wardens particularly about that, it is a great dissention because we need to set an example to the students but this has happened.

In some focus group discussions it was revealed that many sub-wardens themselves break some of the rules. A sub-warden present in one of the focus group discussions put forward that some of the rules are not realistic. This does not mean that they do not carry out their duties. They do because a sub-warden in a focus group discussion attested to the fact that they have caught and given a student 'hours' for theft. Such a student was indulging in what they called "top-away" sugar. In another focus group discussion, some students revealed that sub-wardens often caution them, when they take too many slices of bread. They stated: "sub warden telling guys to only take a few" (SKFG). From my observation, I have the following data to buttress this contradiction: "sub-warden finished his food but had a guest with him because the guys told me he was not in Mandela or Lilian Ngoyi hall, but I do not know if his meal was booked" (Saturday, 18 June 2011, during supper).

4.4.3.7 Explicit tension associated with contradictions 4.4.3.1-6 above (see heuristic below)

There is a tension emanating from the lack of awareness of the origin and efficacy of rules by most students and kitchen staff members and what seems reasonable and fair to them.



This tension was identified during interviews and focus group discussion. This data generated revealed that students and kitchen staff members are not quite informed about the essence and

history of the dining hall rules. When making enquiries about the history of the rules guiding the dining hall, I was informed that rules have always been a part of the operations of the Food Services, the Human Resources department and the entire RU. These rules are introduced to staff members at the point of taking up their appointments but I was unable to see any document stating such rules. Two staff members said that:

There has always been a rule, always, all the time. When they [staff] get appointed then they get a rule book ... [it is] the human resources, Residential Operations Division that does (SI8).

You are not allowed ... no ... it is the rules of the University (SI1).

Two of the food related kitchen staff members' rules are that they are not allowed to eat food meant and prepared for students; hence they have a separate menu. They are also not allowed to take any food out of the kitchen or dining hall to their homes. They are therefore supposed to pour every leftover after 'seconds' and that which cannot be preserved [to be offered back to students] into the waste bins. When asked about the origin of such rules, most of them (in the micro food producer activity system) did not quite understand why and felt unhappy.

Some linked this source of tension to the South African apartheid regime, while others guessed it is in place to cut down on the food consumed by staff members. Others thought that the separate food is geared towards providing their traditional meals, while some others said they think it is in place because some people were stealing food items. However, most of them expressed dissatisfaction as they considered it inhuman to throw edible food away to be fed to pigs, rather than humans.

From the macro food producers' activity system, one important aspect of this rule for example is to assist the management in evaluating the meal expenses of students and not necessarily to segregate kitchen staff members. More so, theft and dishonesty experienced in the past had warranted such restrictions. The Food Services Manager stated:

Our staff are not allowed to have students' meals at all, primarily because we need to monitor the food cost of students' meals ... the [separate] menu is geared towards their traditional meals ... they used to be given students' food, the leftover and I put a stop to it because what had happened was that at the end of the meal, there might be 12 staff on that shift and they will keep their 12 portions, you see and then 12 students would go without, so I couldn't risk that, so I said "ha ha, thank you very much, any staff caught eating students' food, either off their plates in the scullery or from the servery, possibly keeping the food would be disciplined for theft ... so we now allocated staff meals, it's costed and it's balanced and they get a fruit, they get a salad and vegetable and bread (Pillay, 2011).

Notwithstanding, the following interview excerpt provided evidence of the lack of knowledge and understanding concerning the history and essence of such rules:

They say their culture (SI4).

Well, maybe when I put it like this may, I gonna be wrong, I'll say apartheid. That's what I was talking about "why are they doing this, there's a nice food they leftover, why I cannot take that one and then you have to cook this one?" (SI6)

Maybe because of the cost of food ... I don't know but we are not eating like students, we have a different meal ... students meal is better than our food (SI7).

The following interview excerpts present more tensions experienced by kitchen staff members as a result of the lack of due knowledge and mutual understanding regarding the rules they are obliged to follow. These interviewees have worked within RU Food Services for a duration ranging from one year to 21 years. The following excerpts highlight this:

No, you are not allowed to take food ... I don't know, I didn't ask them why but you can only eat here ... I don't know, I cannot say [anything] about that (SI7).

Sometimes when I ask them, they like to say "you, you like to talk and ask everything." So I don't know why, I just keep my mouth shut. Because I was telling them another day ... I was just asking "why is it that our food, we cannot eat this [students'] food." They say "no the students are paying for this one", but I say "we are working here" (SI6).

Yes before I came, they [kitchen staff members] used to carry food to their location, the leftover, they used to do it but by the time I came here [over 10, 15, 18 years ago] 'that Christmas was over' (SI5).

I don't know, I was coming here, they told me long time ago people they were taking the food, they just give the food but people they just stealing more, you see, so they decided to not give anyone [the] food ... I don't know about that because I find it, it's unfair (SI6).

In the process of making enquiries about what happens in the students' activity system, I was made to understand that their rules are introduced to them by their hall wardens. An interviewee said that "...in the beginning of the year, the hall warden addresses all those things with the students" (SI8). However, during focus group discussions students expressed tensions regarding what the rules require of them and what they can realistically comprehend as reasonable. Students did not know when, how, and why certain rules are in place. They discussed and presented their doubts and rumours, without a reliable source of information. The following focus group discussion illuminates this point:

Rules should be better explained e.g. rules that 'you can't take food out'; we are longing to know why because we want to take food out (VMFG); Rules are

presented in an authoritarian manner ... [they said] reasons concerns health and hygiene (GBFG); They talk about everything in the hall but not rules (HJFG). Allow students to package their food out of the dining hall – it's gonna save our money (SKFG).

Furthermore, micro food producers expressed another dissatisfaction of students:

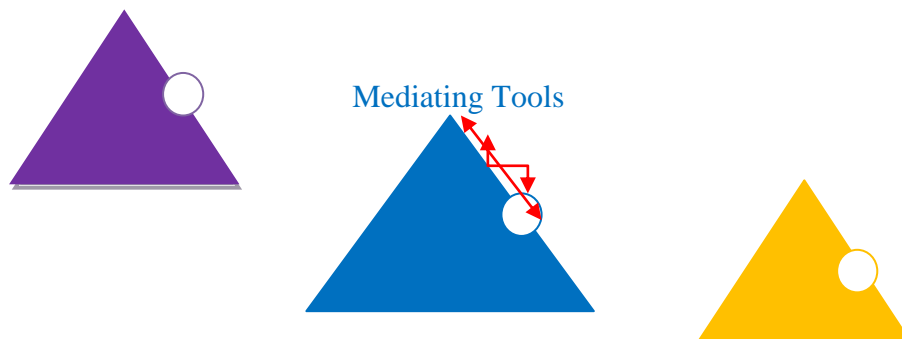
I don't know why they don't allow students to take away their food, they must just give it to them, you know? Anyway nobody must go out with anything food; you cannot take any food away from here (SI3).

I don't know why because anybody can bring their dishes to take their food but that I don't understand. I don't know why because they book for themselves meals, they can take it home. I don't know why it is not allowed (SI5).

4.4.4 Issue 4: 'Seconds'

4.4.4.1 Secondary contradiction between mediating tools and objects (see heuristic below)

There is a contradiction between the purpose of 'seconds' (reduction of food waste) and what occurs during and after 'seconds'.



This contradiction was identified during observation, focus group discussion, interviews and personal experience during meal consumption. 'Seconds' is a sustainable practice of offering leftovers to students who want them in order to reduce food waste. The strategy was put in place about 10 years ago (year 2000). The following interview excerpt explains this practice:

Ever since the meal booking system started ... about 10 years, when the booking is not cancelled then it say 'seconds' available. The reason why they made it I think it is because if there are leftovers and there are some students who wants, so they can just come and chip ... each chip records every meal (SI4).

I have a system where am offering 'seconds' and my students eat and then they merry and whatever is leftover from that is very small (Pillay, 2011).

Indeed leftovers are greatly reduced if many students go for seconds but this is not always the case. Some staff members said:

Sometimes students don't come for 'seconds' (SI3).

Sometimes, because there's a 'seconds', they give them [students] the 'seconds' if the food is left and if there is something left in the servery we take it and put it in the pigs drum, to feed the pigs (SI7).

Sometimes it is extra for students. Sometimes we throw away (SI1).

During interviews and focus group discussions, it became obvious that the initial purpose of 'seconds' has been dented. Although students that go for 'seconds' are indeed glad and really taking advantage of it, the unnecessary demand for large quantities, 'top aways', abuse, misuse, disposal of originally booked meal in order to make free choices during 'seconds' time and eventual food wastage is what occurs in the dining hall.

The following interview excerpts support this:

The food waste is much even at the 'seconds' time when they will want that 'seconds', they just leave those food on the plate but they want you to dish up big big like this [she demonstrated with her hands] for the second meal but they just leave it like that on the plate and all that gets thrown away (SI3).

[Food] is wasted because if somebody doesn't want his or her food, he throws it away then he waits for the 'seconds' because in 'seconds' you choose what you want, you don't eat that first food (SI5).

During focus group discussion, some female students expressed their grievance by saying that the guys are greedy, they opt for more food at 'seconds' even after taking extra slices of bread already. Female students said they are conscious of their weight, shape and size. Most female students say they are satisfied with their main meal. However, one female student went for 'seconds' (despite the stigma) because she had discarded her main food, which was not what she booked for, in order to make a better choice during 'seconds' [but if what she booked for was not available, the caterer must have asked her to choose from the available options, which is the same thing she plans take during 'seconds'].

During my eating experience in the dining hall, I took 'seconds' once and in accordance with the opinion of the female students as stated above, I struggled to finish the extra chips and the chicken thigh I collected during 'seconds'. When I made enquires about the actual reasons why students go for 'seconds', I got the following responses:

My mother normally says 'your eyes are bigger than your stomach', so that is the only reason. Maybe he ate and then still saw the food he wants to eat more because the more is there (SI2).

[The] quantity of food is a major concern so students resort to eating seconds. Students get to choose any other meals other than their initially booked meals (GBFG).

Students go because they are dissatisfied with their first meal- If the main meal is bad, I would go for seconds (VMFG); For those who are hungry ... you can choose your diet at seconds, you don't stick to the meal you've booked (ATFG); Hungry ... keep their food for later (JSFG); They have a choice of meal (RFFG); Not satisfied with the amount of your food or the type of meal you get (HJFG); To make takeaways ... still hungry ... Unpleasant main meal (SKFG).

From my observation data on Monday 30th May, 2011 during lunch, this is an excerpt corroborating the above opinion:

One of the male students that had gone for seconds has already wrapped his two slices of bread and 1 fruit in a serviette as take away but got a pizza for 'seconds', placed it on a serviette and took it out of the dining hall.

On Thursday 2nd of June, 2011, I recorded the following:

14 male students and one female student queued for 'seconds'. Some of them had leftovers while some others completely finished their 'seconds.'

A male student came just before the end of lunch, took his meal, left it on the table and went for 'seconds'. He placed his four slices of bread in the toaster but before he returned they were slightly burnt. He dumped the four slices of bread on the butter saucer and went into the server to pick another four slices but no staff caught him. He took his time to eat the double meals but couldn't finish it so he left two slices of bread and some vegetable on his tray.

Figures 61 and 62 below are a snapshot of his plates and tray after he left the dining hall:



Figure 61: (Photo taken 03:06:2011) A food tray after seconds.

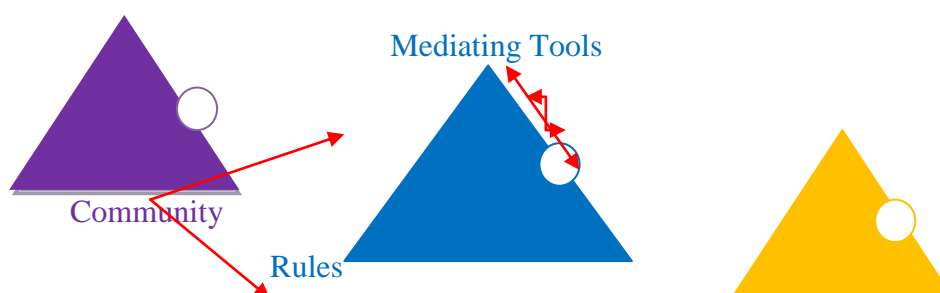


Figure 62: (Photo taken 03:06:2011) A food tray after seconds.

4.4.5 Issue 5: Daily food provision for wardens

4.4.5.1 Secondary contradiction between mediating tools and objects (see heuristic below)

There is a contradiction between the benefit of providing daily food for hall wardens, house wardens and their families and their unavoidable inconsistent attendance at meals, (especially breakfast and supper) which is counterproductive to food waste reduction.



This contradiction was discovered during observation, Doc5, and personal communications with kitchen staff members and the hall warden. In reviewing Doc5 which is titled “*Benefits and Allowances of Hall and House Wardens*,” there is evidence that people with this job description have access to free meals (Mediating Tools) in the dining hall. This provision of daily food is meant to facilitate a cordial communication between these staff members and students. Excerpts from the said Doc5 states:

To encourage interaction between wardens and students, free meals for Hall and House Wardens and their families (spouses, dependent children and any other dependents as determined by the Vice-Chancellor on application) are provided in the dining halls during terms as well as during the vacation when a Dining Hall is open. In the event of the closure of a kitchen due to industrial action, where students are reimbursed for meals missed, Wardens and their families, as described above, will receive the same reimbursement.

Hall and House Wardens and their families are entitled to free meals in one of the dining halls during the vacations for as long as one of the Dining Halls is open.

Wardens and their families cannot accrue credit for meals not eaten.

During focus group discussions, students said that Wardens are present in the dining hall mostly during lunch and just a few during breakfast and supper (object). They said: “*Lunch is under consideration of staff*” (SKFG).

During my observation period, I came across some wardens eating in the dining hall (object). I have the following observation data excerpts to support this:

The hall warden was in the servery taking his lunch. I met him and he asked how my research was going on. I responded and asked him if he takes meals everyday breakfast, lunch and supper in the dining hall. This I asked because of the benefit and allowance document I stumbled on a week before. He said he is supposed to but he is usually present for lunch alone because breakfast and supper is way too early for him. I then went to ask a caterer, even though I had earlier asked another caterer if all hall wardens and house wardens take their three meals every day. She said they are all booked for meals but only [name withheld] and [name withheld] usually comes for breakfast. She added that they all usually come for lunch except if they can't help it but that they seldom come for supper.

During further analysis of this contradiction and tension in the first Change Laboratory Workshop, it was disclosed that wardens are not able to attend all their meals and also be present at some hours and times for different reasons. Even though there have been attempts to un-book unwanted meals, the RU meal booking system automatically re-books their meals (regularly). It was also apparent that wardens have made some attempts in the past to express their tension but to no avail. The following excerpts illustrates further:

For me I don't eat breakfast in the dining hall.

Yes and yet every time I log in I have been rebooked for breakfast and rebooked for supper.

What am concerned about is Vanessa talking about people taking food out of the dining hall during seconds for 'top-aways'. I know that I am never around when 'seconds' happens, there is no way I'm in the dining hall at 2pm and there's no

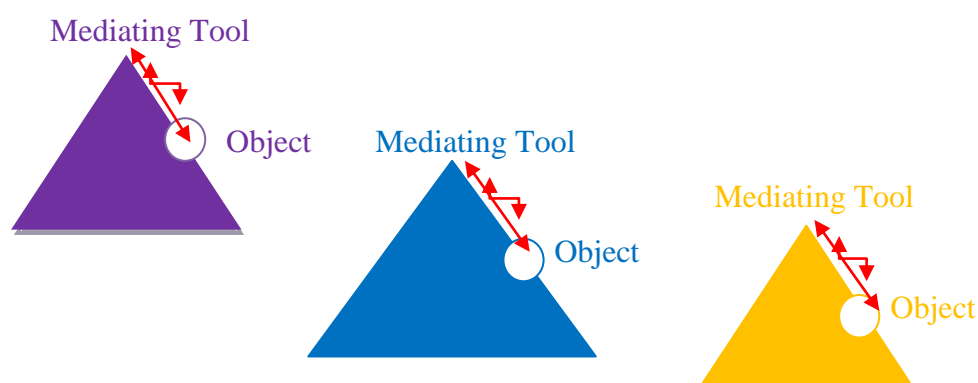
way I'm in the dining hall at 2:30pm, so maybe [name withheld] and I need to address this issue somehow.

We book but there's no incentive for us not to or un-book and it may not necessarily be a monetary refund but [that which] allows [us] to build up credit. So if you have a guest that you'll like to invite, you can use that credit and that I think wardens have been asking for that for a long time.

4.4.6 Issue 6: Priority placed on food wastage issue

4.4.6.1 Secondary contradiction between mediating tools and objects (see heuristic below)

There is a contradiction between issues prioritised in management and food representative meetings and issues related to food wastage.



This contradiction was identified from interview, food representatives' focus group discussions, and minutes of food representatives' meetings (Doc11 and Doc12). Senior Food Services officials and caterers have meetings. Caterers have weekly meetings with their other kitchen staff members. When I asked if the issue of food wastage is addressed in such meetings, kitchen staff members responded by stating:

In the beginning of the year, we have a meeting and we discuss everything about catering, how to go ahead in cooking and equipment and all those things ... no, we don't talk about waste ... never heard anyone talking about wastage ... we only talk about it now ever since you started [your research] (SI4).

That is a very small part of the meeting. Just like you said before, I mean wasting has been going for years but there has been no big deal about it, so in those meetings we would talk about organizational issues, about staff issues, about stock issues, about management issues ...very little (SI8).

Since food waste is not a crucial issue during the meetings, I wanted to know what usually happens during their meetings. A staff member said: *“I ask for advice, we compare notes ... recommendation we give to the wardens and foods reps to take back to their residences and house meetings”* (SI8).

In the two food representatives’ meeting held this year 2011, in March and May, the food wastage issue was not recorded to have been mentioned. Not even once. Only complaints, complements, decisions and promises to ensure better service delivery are prominent. Other issues discussed in such meetings are what food representatives should relay to their fellow students (Doc11 and Doc12).

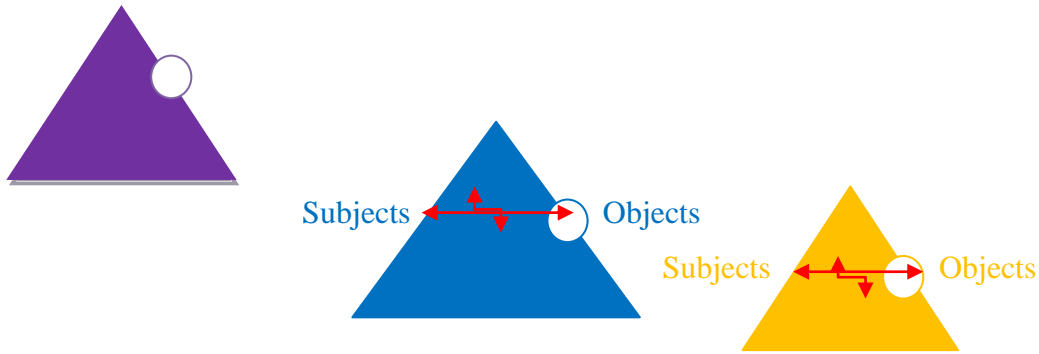
During the focus group discussions with food representatives, I made enquiries about their roles and this is what they said: *“we are responsible for communicating to the dining hall staff, expressed complaints, queries and compliments from students”* (FRFG). I asked specifically about their portfolio and what role they play regarding the enormous food waste they have told me is produced in the dining hall, they responded: *“No, we do not play any particular role in waste reduction”* (FRFG).

I further asked about the procedure through which they became food representatives and they said: *“it came together with the other portfolio e.g. entertainment representatives automatically become food representatives ... some are appointed by hall committee”* (FRFG). Therefore there is another contradiction between the ideal roles and essence of food representative and the circumstances in which they were made to take up the roles. A senior student was present in one of the focus group discussions and this is what he said concerning food waste in house meetings: *“we have about 3 hours of house committee meeting and nothing is said about food waste”* (JSFG).

4.4.7 Issue 7: Attitude towards food waste

4.4.7.1 Secondary contradiction between subjects and their objects (see heuristic below)

There is a contradiction between some kitchen staff members and students who do/do not recognize the essence and possibility of food waste reduction and do not avoid food wastage in the dining hall respectively.



This contradiction was identified from interviews, focus group discussions and observation data. The agency to reduce food waste is a possible attribute. Some staff members and students can exhibit such capabilities, but do not do so for several reasons. Such reasons can be related to their culture, attitude, mindset, designation, family background and resistance to or reception to change. The following excerpts support this notion:

You always feel pains, no mother will like food to go to waste, even at home, you will be like “if you don’t want it, put it back in the fridge and then later you’re going to be hungry, go and warm it up,” so food waste is not the right thing anywhere because the economy is high, so you can’t like afford to waste, not at all (SI2).

One man alone can’t change it. I will have to have the support of not only my assistant caterer and colleagues but the broader Food Services community because there is too much for one person to take that responsibility. And I have taken a lot of that responsibility to control unnecessary wastage (SI8).

You know they are supposed to take 4 slices, but they will take 6, they will take 7 slices, they will take 5 and then those slices are coming back from their plates, it’s not right (SI3).

You can’t use it again ... you got to put it in the waste bin and the pigswill people collect it... It is heartbreaking to see children wasting food like that (SI4).

When I asked students if they usually eat every meal they book, this was what they had to say: “sometimes, but mostly yes, depending on allowance received from parents (GBFG).

The other side of this issue has a contradiction that was identified from interviews, focus group discussions and observation. As discussed above, the reasons for not recognizing the essence and possibility of food waste reduction can also be traced to reasons itemized earlier.

The following excerpts support this notion:

It’s a day to day problem but I think what we’re dealing here with is the culture of entitlement that is “I have paid” ... going back to the culture of entitlement, “my parents have paid” “I’ve paid for the meal so I will take what my allowances are and because of that there’s a high wastage of food ... so I think that’s the culture I am dealing with, I am not saying all the students, some of the

students, because when I look at the students on financial aid, they are more conscious (Pillay, 2011).

You know, ah that's a difficult question because we're coming from different homes, it is just like us workers, you know? ... It is worse when they are writing exams, they are frustrated, they're cheeky, they are doing all sort of things but we as parents who have children at home must know how we must treat them (SI3).

Where people come from, backgrounds and amount of pocket money they have (FRFG).

They can take a pizza or two pizzas from 'seconds' while they are already full and then ruin the pizza, at the end of the day they have to then throw it away (SI2).

But in overall the students do waste food, they come in they won't say "I don't want this, I don't want that, they let you dish out their full meals, go into dining hall and you see the plate is covered; only a bit has been eaten. They take their four slices of bread; they leave it on the tray. I think students don't know 'what is the value of money yet'; they haven't worked for money yet (SI4).

We've got a mixture of them. For me being a mother, children are children. I've got a child who is eating in the dining hall, so every child has their attitude because I have my attitude as well. Knowing that the background of each child is not the same, they are not brought up by the same mother, so you just have to understand their different attitudes (SI2).

Although I was unable to detect and differentiate between students on financial aid and those that are not, during observation there seems to be less difference in practices between physical characteristics like sex, race, or stature. These observation data present food consumption activities in the dining hall:

May 30, 2011: During lunch

A male student covers his plate of uneaten food with a saucer.

A male student left a fruit uneaten.

A female left two slices of bread on her plate and placed her tray on the tray rack trolley.

A white male student takes five slices of bread, fills saucer with salad, and took two cups juice but no fruits.

Black and white male students go for seconds with their plates, without trays.

Black male student finished food.

May 31, 2011: During supper

Female black student wraps four slices of bread with serviette.

While the caterer was not watching, a black female student picked a piece of fruit and rushed out of the servery.

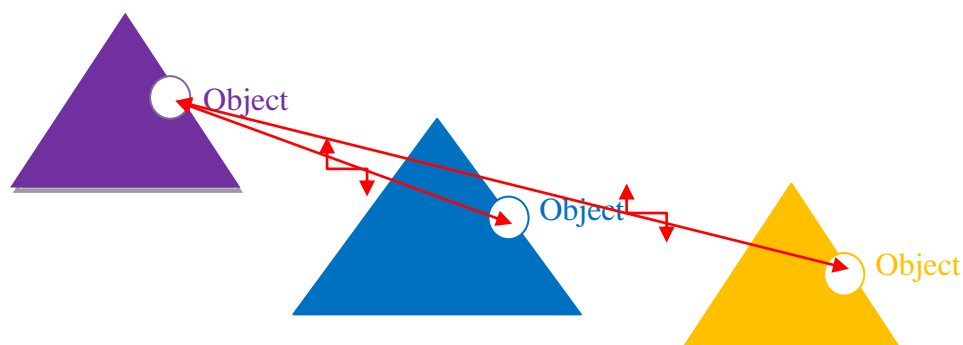
June 5, 2011: During supper

Two white male students were disappointed at their meal booked, they preferred another menu, they took it anyway, one took five slices of bread and smiled at the caterer for permission and the caterer smiled back.

4.4.8 Issue 8: Food waste disposal

4.4.8.1 Quaternary contradiction between objects (see heuristic below)

There is a contradiction between students/kitchen staff members' willingness to practice sustainable food waste reduction and their knowledge of the Food Services' practice of donating food waste to pig farmers at a minimal administrative fee.



This contradiction and source of tension was identified from interviews, observations, photographs taken, and focus group discussion. The fact that currently food waste is given to pig farmers on a two year contract and at a minimum handling fee is a major hindrance to sustainability practices by micro food producers and food consumers. By this I mean that if students ask just for what they can and intend to eat by refusing their full allowance but then at the end of the day that food is going to the pigs; of what use is the good practice? If students refuse to ask for too much during 'seconds' and take just what they can eat in the dining hall, while the remaining leftovers will be poured in the waste bin; why should they try to live more responsibly?

If the caterers and the cooks all make an effort to cook optimally and not all students attend meals and then they are mandated to dispose it even when they are burning with grievance; why should they be expected to make such efforts? If students are warned not to take their meals out of the dining hall, except for two slices of bread and their portion of fruits but the food will be eaten by pigs while they go hungry in a few hours [especially after their early supper between 17h00-18h30]; why should they abide by the rules? During an interview, a kitchen staff member provided an interesting observation that throws much light on this contradiction and dilemma. When I put forward that some students feel that after all, if they

don't take their food, you will give it to pigs, so they prefer to take it; the kitchen staff member responded by saying:

[If] they are taking it, [or] they are not going to take it out to the residence, at the end of the day it is going to the pigs. And if they don't take it, it is going to the pigs as well. Otherwise if you take it, if you don't take it, if it is not eaten, it is going to the pigs. Take it or not take it (SI2).

When I asked students what in their opinion happens to the food waste generated from the dining hall, there were varied opinions, ideas and assumptions. Such included the thoughts that the food waste is eaten by kitchen staff members in the dining hall or taken home. Some thought it was given to street children or charity homes. Others thought it was taken to the landfill. Some mentioned the obvious sustainable practice of refrigerating the possible food items and making it available during the next meal. The following focus group discussion excerpts illustrate this:

It is given to the homeless (RFFG), It is thrown away (ATFG); Thrown away (HJFG); Leftovers on plates are thrown away (SKFG); Refrigerated (VMFG); Staffs eat it (SKFG); Workers take them home (RFFG); Staff have some of the meals after 'second' are served, and when the server is closed (GBFG); Put out at next meal times (SKFG); It is 'recycled' in vegetarian meals (RFFG); Sometimes food is redistributed to students if it is a favourite meal (GBFG); Sometimes it gets given the next day (ATFG); or landfill (JSFG).

However, quite a large number of students knew for sure that the food waste generated in the dining hall was given, sold, taken or donated to pig farmers. The following excerpt from different focus group discussion data provides evidence:

Sold to pig farmers (SKFG); [It] goes to pig farmers (ATFG); Pig farmers (JSFG); Sold to pig farmers (VMFG); Fed to pigs (HJFG); Truck picked them up to redistribute (SKFG); Leftovers were said to go to a pig farm - this is good and a form of recycling (CFG).

The above shows that a great number of students know that food waste generated is used to feed pigs. It was a shock for those few students who did not know about this reality. They expressed their disappointment and made several suggestions. On the side of the kitchen staff members who already know and are conversant with the process, procedure and even the cost paid by the pig farmers, it was a different case. Some argued that the Food Services have not been able to curtail food waste over the years because they have nothing to lose, since the food has already been paid for upfront. This is how they expressed their long experienced tensions:

What I know is that they [pig farmers] are benefiting a lot from the food waste, they love it because they pay up once in a whole year and then they grab the whole year ... R500 for a year (SI2).

[It is] so terrible because there are guys in town that don't have food and we give food to the pigs (SI6).

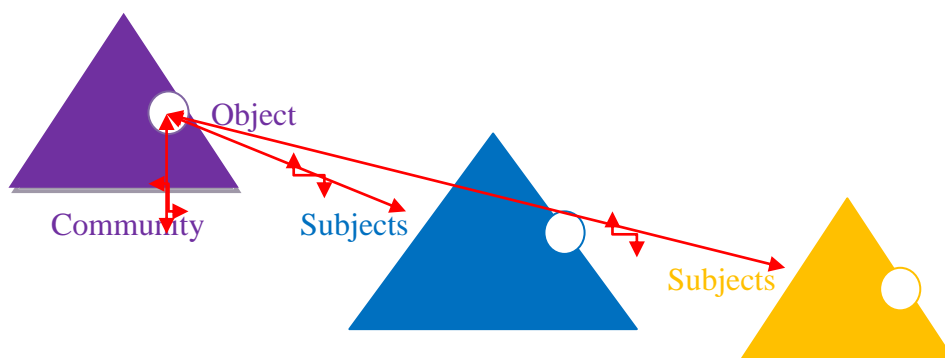
I feel bad because I wanted that food that is thrown away, the first days I came here, I really wanted that food but I can't do anything but just to eat and get fat ... we don't like it but we can't help it, what are we going to do? (SI5).

Sometimes you will say "there's nothing at home, oh my God, my children and this month I don't have money, you know"? You think about things like that but you mustn't let that happen to you because the job comes first (SI3).

At the end of the day they are not losing, you understand, because they know, they're counting each and every time, you see ... yes they are not losing, because those students that are wasting the food have already paid, you understand and they have the bookings. They have already paid for the food so the company is not loosing anything again (SI7).

4.4.8.2 Explicit associated tension from quaternary contradiction (Section 4.4.8.1 above) between objects and subjects (see heuristic below)

There is tension emanating from the current transference of leftovers to pig farmers [not humans] by the Food Services and the continuous concern about better ways of dealing with food waste to ensure 'more' sustainable food economy, among kitchen staffs, students and the RU community.



Finally, this contradiction and source of tension was surfaced from interview data, focus group discussion, personal communications, observations, and informal discussion with a senior manager at a function held at ELRC. On this occasion, the said RU senior manager, who openly expressed his concern and noted several previous attempts made to find a more

sustainable solution to food waste production at RU [not just the dining halls]. He added that other members of the senior management had also made some efforts to address this issue. He further pointed out that the possibility exists that food prepared at RU could be reduced to about 20%, in order to reduce leftovers.

Going down the horizontal hierarchy, there is tension at the generational transference of food waste to pigs and not humans, especially in light of the realities in Grahamstown, South Africa, Southern Africa and the world at large such as poverty, hunger, food insecurity and related concerns (discussed in Chapters One and Two). During the course of this research, I came across many staff members who uttered their grievances regarding this issue. The following provide a few instances where data was collected via personal communications:

Food wastage is a sin, it is a terrible sin and God is not pleased with it (RUS1, pers comm, June 11, 2011).

It is horrible. Something has to be done about it, how can pigs be feeding better than I am? I have suggested that the food be sold to the catering headquarter staffs, we will buy it to feed our families. It is criminal (RUS2, pers comm, June 2011).

Yhoooo! There is too much food that is being thrown away in the dining halls, chicken, fish, whole loafs of bread, good food. It is very bad (RUS3, pers comm, June 2011).

I have seen plenty of food, pizza, pie, pasta full on the tray. I feel like eating it. They should sell it to us we will buy it but they should not give it to pigs. Even a pig farmer who is a friend told me that they used to sort out the food waste, pick out the whole piece of meat and braai the chicken thigh to eat from the pigswill (RUS4, pers comm, June 2011).

I present the following tensions expressed during interviews:

They can solve this problem ... instead of giving the pig, the food students didn't use, put it aside, and they can give the food to the children outside on the street not the pigs. You give animals food and people no food; that is unfair (SI6).

No, not at all: I'm thinking of the babies at home, you as a mother, you can't waste food because you know you've got children who are starving who would have loved to have that plate, that nice plate given to pigs (SI2).

Nothing is allowed to be taken out of the dining hall ... they cannot ... it is a bit harsh (SI8).

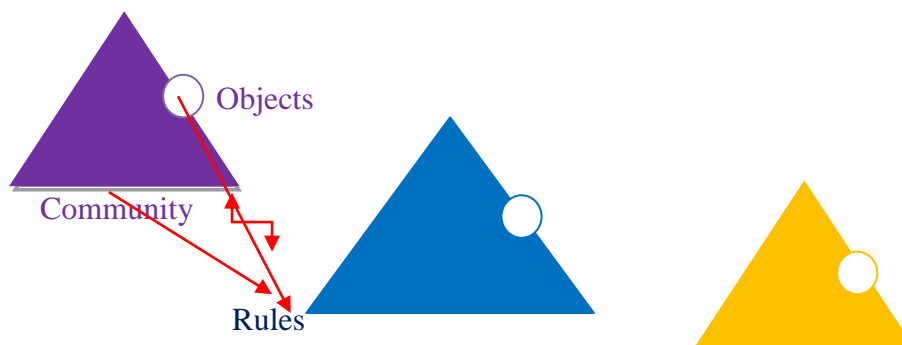
But I think it is senseless of me, if there's a small portion of something that is leftover and staff want to have it. I'll rather let the staff have it or let it go for pigswill, I mean that's me (SI8).

I was worried at first but now am used to it. I was worried at first but I can't help it, so am used to it ... Nothing can be done because you can't say you want this food for my children, it doesn't work like that (SI5).

4.4.9 Issue 9: Rotation of kitchen staff members

4.4.9.1 Explicit tension between objects and rules (see heuristic below)

There is a tension stemming from the regular practice of rotating kitchen staff members by the Residential Operations Division and the Food Services and the structural, mental, and physical adjustments made by kitchen staff members, as well as the effect on service delivery experienced by students in the dining hall.



This source of tension was identified from focus group discussions and interview data. Within the RU Food Services, kitchen staff members with different job descriptions are not posted permanently to work in any dining hall. They are rotated within the 12 kitchens in RU. It is usually done every two years and during the year as well. This rotation is done abruptly and prior knowledge of such movement is limited. The following interview excerpts attest to this:

One year because what they are doing is they are rotating staffs, they don't keep staffs anymore longer than 2 or 5 years at a stretch, in a kitchen, so they are swapping the staffs around ... After here they will transfer you to maybe Drostdy or yeah somewhere, wherever they wish. So what's not right is that you don't know where you are going, it's just like picky, picky, picky (SI2).

I started here in Mandela hall [year and month withheld].²³ I have worked in [kitchen name withheld] but they change us after 2 years so they changed me to this kitchen (SI7).

²³ The following information including dining hall names and the number of years spent in each are withheld to protect interviewees' identity.

Now, its [years withheld] I've been working here [at Rhodes] ... No, another month I was in [dining hall withheld] for [years withheld] ... Here am starting [year withheld] they send me to [dining hall withheld], then I came back here to Mandela [dining hall] (SI6).

Yeah, I worked in different halls (SI4).

I did not start here at Mandela. By the time I started here, Mandela was not here. It was [year withheld]. I started at [dining hall withheld]. Mandela started I think in [year withheld] or so but I only came here at [year withheld] (SI5).

I started in [year withheld] and [dining hall withheld] in [year withheld] and Mandela in [year withheld] again (SI1).

On the one hand, this practice of rotating micro food producers is done for effective management of the kitchens and dining hall operations; especially to curb theft, ensure efficiency and resolve conflicts. The following excerpt from Change Laboratory Workshop data illustrates further:

We don't change the whole team ... 100%, I mean 50% of the team changes and also it's a chance. You'll notice this year for example we've taken staff members that have not worked well in the last four years with another caterer, they've been problem staffs, they were in our offices regularly with regard to disciplinaries, and however this year they are meritable staff members, so there is a positive side to the whole thing.

On the other hand, the staff members involved have worked with various tensions. These tensions vary from the compulsory adjustment they have to make in order to create a good conducive workplace to understanding and abiding by different dictates of different supervisors. Other tensions are associated with ensuring a cordial division of labour in each activity system and from one activity system to the other. The aftermath of this tension is concomitantly felt in service delivery to food consumers. This cause and effect of this tension was further analysed and explicated during the Change Laboratory Workshop. The following excerpts from workshops illustrate better:

It is not just the senior caterer, it is the whole catering teams as a whole, I mean, we see it in residences in terms of house keeper etcetera. Whenever [name withheld] rotates team every two years, the caterer, the house keeper, whoever is in charge has to start rebuilding a team and as a result, the service always suffers and this a apparently done to stop theft ... this whole thing is being driven by what? Why do we have to keep changing? Other than making peoples lives difficult.

Dealing with staff issues and as a result food in this dining hall in the first term was really not fine at the scratch and it was because the staff members were changed. Now I see the benefit of moving a few people around but 50% of the staff? You are putting tremendous pressure on [caterers' name withheld] and you

made a huge impact on the service delivery to the students ... and I'm sure all the other caterers were under that sort of pressure. They were learning to walk with someone different, the menus were changed but it had a huge impact and I don't think these are necessary.

The kitchen staff members involved have the following experiences:

Different supervisors, some caterers are difficult ... the caterers who are here now are new almost all of them, it is only [name withheld] so we don't know each other, sometimes we fight, something like that. If you are used to doing things like this, then he or she wants you to change and do something in a different way, so it ends up as a fight ... that is some of my challenges (SI5).

Staff cultures, I personally once again have a problem with that because of work ethics. There's a totally different work ethics to what I am used to (SI8).

I get very angry but I used to be like that because they don't know me, I am coming from another kitchen but now they are trying to know me (SI3).

Although there are many obvious similarities between the activities of all dining halls at RU, differences with regard to personalities and group composition makes a lot of difference from one dining hall to the other. Such similarities include meal times, meals, menus, rules, portion control, remunerations, and job descriptions. This is revealed in the following excerpts:

I don't think there's too much they can do because we almost do the same thing (SI5).

In Nelson Mandela particularly, it is not for long but there's nothing different from the others (SI2).

These other peculiar differences have the capacity to either foster or mar efficient performance of staff members and service delivery to students in terms of food quality, food quantity, and communication. Implicit differences are also evident in the way different supervisors manage 'their' kitchens and these reflect in practices in the kitchen. The following interview excerpts exemplify this:

Some, like here in Mandela if they know that you've here for a long time, you are a threat to them, so they treat you differently (SI5).

SI8: *It's up to me, the caterer at a particular kitchen to say so, it is not a right, I can't deny it*

AV Agbedahin: *and at the same time, if the Food Services get to know about this, isn't there a problem with that?*

SI8: *Umm, they have already left it over into our hands, into our recognisances but it's a control process ... so it's up to my discretion.*

SI3: *They say they are still hungry, you can't say "no" that they can't have another two slices of bread, you know? Because they say we are rude when we are doing that*

AV Agbedahin: *So you just leave them to take?*

SI3: *It depends on the caterer because they are also staying at the servery, they can see.*

I just see that here [at Mandela dining hall], because in [dining hall withheld] we never wanted our pots on the side, we used to eat what is left from the children because sometimes it is too much food that has been left, so we're used to not doing that there but now in the kitchen here they are doing it (SI3).

Inherent and worthy of note in this contradiction is a 'double' tension. On the one hand, there are tensions experienced from kitchen to kitchen and on the other hand there are tensions that occur within the two work shifts that run the kitchen. The following interview excerpt provides more information and proof:

We've got breakfast at 7 o'clock so the staffs are there at about 6 o'clock in the morning, the first shift (Pillay, 2011).

SI5: *Yes, all the time all the dining halls have got shift and the shifts are right because like those who have gone home will come 10 o'clock tomorrow. We are going late and they are coming early ... the shift is good but I prefer ... two days in, we work from morning till late for two days then we go off two days while that shift is doing the same*

AV Agbedahin: *Don't you compare your shift with the other shifts...?*

SI5: *There is always a competition because some say "they do better than the others*

AV Agbedahin: *Do they say it to themselves?*

SI5: *They say it, we hear them say that "they work better than us, they are fast, they are neat, something like that [we both laughed]. They say so but we can't see that, we say "we are the ones that do better".*

These experiences do not seem convenient to kitchen staff members but they are left with no option but to practically devise mechanisms to live/work with such challenging tensions. Some staff members express this opinion in the following interview excerpts:

Job is scarce and we have to just say 'thank God that you've got a job' and you work for it ... we just do it, we know our job. No difficulty as long as you are used to it (SI2).

Behaviour and attitude of the students, I would say relatively good for end of teens, moving into adulthood and I know ... we have to handle that, that's just part of the job. Hmm staff! you get very respectful staff and you get very disrespectful staff, so that also easily occurs but generally ... the staffs are good, you obviously get those attitudes that you will get everywhere (SI8).

During focus group discussions, some of the reasons students thought were responsible for food waste production are as a result of staff rotation. The older students who have experienced the effect made it clear to the first years as they compared and contrasted their ideas and stances. The following data present a few such opinions:

Preference: the way in which the food is presented sometimes put students off ... change of staff, caterers (GBFG).

Caterers must be more diligent because control and management is slack, hence better management ... Stronger personality [name of staff mentioned withheld] (JSFG).

[When] [name withheld] [was] dining hall manager, the dining hall was well structured (ATFG).

New staffs are not too nice but older ones are (JSFG).

4.5 Responding to research questions and goals in phase two of the research

How can Change Laboratory Workshops help to identify possibilities for Expansive Learning processes that can create opportunities for learning and change in fostering more sustainable food economy and contribute to Education for Sustainable Development (ESD)?

4.5.1 Proposed solutions modelled by research participants and stakeholders during the first and second Change Laboratory Workshops

The data presented below represents the solutions modelled in relation to the nine issues, with their related contradictions and tensions discussed during the two Change Laboratory Workshops. They are presented according to the issues and participants were asked to try to prioritize them according to their order of importance and degree of easiness to resolve them (where possible). The detail of the order is important and is as follows: one-five: one = unimportant, two = little importance, three = moderately important, four = important, five = very important. The degree of easiness in addressing the issues is as follows: E = Easy, M = Medium, D = Difficult. It is worth reiterating that although they were meant and attempted to be prioritized by participants, it was very difficult to do so. It was eventually recorded that no issue or contradiction or tension was prioritized below three, which is 'moderately important'. The contradictions and tensions were discussed and analysed further according to the nine (eventually important) issues, hence the modelling was done in the same way.

4.5.1.1 Presentation of model solution to contradiction (Section 4.4.1.1 above) centred on the issue of non availability of substantial learning activities as regard food wastage (Section 4.4.1 above)

Regarding this one contradiction, it was generally agreed that food waste education was lacking but was very essential within the Food Services. A lot of the other solutions modelled to tackle all other contradictions and tensions had a link with the importance of quality food waste education. It was agreed that students as well as kitchen staff members need to be educated. A proposal to initiate a pilot program in the next academic year was presented. Food representatives were considered as a key medium and office to facilitate food waste awareness in their residences. The following data from the first and second Change Laboratory Workshops illustrate the proposed solutions for this contradiction:

I think it is important to educate everybody and perhaps the food representative meetings should be a little bit more formal to force down the education issue to the general students and I think some radical actions, let's put out some bins out here with the leftover because this is happening where students don't see so it is not affecting them directly, so your education I think it's important but it could go from being very easy to do and very difficult to do.

In terms of the learning we strongly believe that there should be better orientation ... we like the idea of training a few food representatives.

We can do that for a week. There's no education program tied to the food representatives ... I think that's something we can do. It is easy to set in place but it is difficult to get it right.

That goes back to quality education.

I know the orientation programme is quite intense but if we want to incorporate some of the research that Vanessa has been doing it will be very interesting ... let's talk about food waste for first years, this is actually an issue that will be effective.

[A hall warden asked the other hall warden if they could] *Pilot something next year?*

Educating students and giving the food representatives some kind of tips.

...Sharp therapy in terms of educating [students].

Take the bins after a meal, after lunch and we could put them in the foyer before people arrive for supper and people have to walk pass them and it's a big sign that says 'this is what you wasted at lunch'.

Again I think this goes back to education.

4.5.1.2 Presentation of model solution to contradictions and associated tensions (Sections 4.4.2.1-4) centred on menus, meals, meal booking and responsibility (Section 4.4.2 above)

Concerning this set of contradictions and tensions, the research participants and stakeholders have proposed to start a pilot programme on food waste during the new students' orientation week that is usually organised at the beginning of every academic year. They proposed that during the programme, students could have the opportunities to be exposed to the RU meals and menus and probably have a taste of them. They also intend to enhance the description of each menu online by providing pictorial representation of each menu. Concerning cooking in batches to ensure freshness, they propose to inform students earlier on the need to wait a few minutes in the dining hall for certain menus (if need be). An increase in the possibility of un-booking meals in less than 24 hours was also suggested. It was also made clear that the feasibility of certain decisions cannot be confirmed until they are presented to the senior management of the Food Services.

The following excerpts from the first and second Change Laboratory Workshops data illustrate the proposed solutions for these contradictions and associated tensions:

During orientation week should we be bringing those [menus] out and having some meals perhaps or some plates or having a time when students can come and taste the various meals, so they can make informed decisions.

This could be part of our orientation budget.

Or pictures on the web with detailed explanation?

Why can't they just wait for 5 to 10 minutes to get a fresh burger rather than waiting and eating a shoe.

Let the students know why they've got to wait eight minutes if they come, because the cooking is being done in batches to cut down the wastage, so it is not the case that caterers don't care.

If we highlighted it online and the descriptions were clear and picture to depict the meal that would meet the students' expectations.

It is something that we probably need to then take to the senior management board of residences where it can be deliberated and discussed further, which is again making people aware of the effect the un-booking is having.

Is there any benefit in having a facility where students can cancel their meals for whatever reason, because they know they can't make it?

They must also be told to un-book their meals a lot of them don't un-book their meals and they just decide to go over the weekend.

4.5.1.3 Presentation of model solution to contradictions and associated tensions (Sections 4.4.3.1-7 above) centred on dining hall rules and etiquettes (Section 4.4.3 above)

As regard these contradictions and tensions, it was suggested that rules should be in place in the dining halls but that all the current rules should be directed to the Residential Operations Division, where the rules are developed for amendment. Other suggestions were that there should be standardized rules and disciplinary procedure across all dining halls on campus, instead of each hall having its own (as it is presently the case). The contradictory posters were also proposed to be changed as soon as possible. It was suggested that caterers should endeavour to ensure the enforcement of dining hall rules but this suggestion was rejected because it was considered non-feasible because of the caterers' more pressing responsibilities during meal times. Wardens were enjoined to live by example by abiding by the dining hall rules. The following Change Laboratory Workshops' data excerpts illustrate the above points:

Should we ... look at that as one issue, the entire rules ... prioritising them as one thing?

...To ask your caterers to take on this role?

...The whole section be given back to [name withheld] to fix because I see no reason for each hall should have rules with regard entry and exit into the dining room, slices of bread and all of that. It must be removed from all of the specific hall rules.

The rules must be in place but we must make sure that we don't have posters with conflicting information out there and I hope that the students would do it accordingly.

The rules should be standardized across dining halls.

We expect the wardens ... to set an example to the students.

I think we can set a police man out there, customer service.

There are too many conflicting issues, contradictions and I think I agree with [name withheld] that there needs to be one set of rules and it's in a rule book and all the dining halls should comply to it because I think within Food Services we have to manage these different tensions and that's difficult.

It is something that could be very easy to sort out, across campus, it's very important that we have one content between all dining halls.

4.5.1.4 Presentation of model solution to contradiction and associated tension (Section 4.4.4.1 above) centred on the provision of leftovers to students as ‘seconds’ (Section 4.4.4 above)

In accordance with the contradiction, further tensions were presented by kitchen staff members and students during the first Change Laboratory Workshop. Although the use of ‘seconds’ was a sustainable practice of reducing food waste, the contradictions and tensions from other issues had a negative consequence on the effectiveness of this procedure. Proposed solutions to these were recommended as they were responsible for the tension. The following excerpts present proposed solutions:

There is a way caterers can alert students that seconds is now being served and possibly that could solve that tension and we can certainly buy a bell, put it close to Mandela [hall] and the caterers can just go and ring it then.

We must amend our rules to align with meal serving times.

[The rules] must be boldly stated.

Again we need to then make sure that all the dining hall rules are the same.

We really like further ideas to do that ... actually policing people in the dining hall ... at least one of us is going to be around.

We can teach each other ... during orientation express all these to the students.

They must be made to be aware that there are other people coming after them ... they’ve got to respect other people.

4.5.1.5 Presentation of model solution to contradiction and associated tension (Section 4.4.5.1 above) centred on the daily food provision for wardens (Section 4.4.5 above)

During further analysis of this contradiction, it was revealed that despite the fact that wardens make deliberate attempts to un-book their unwanted meals; the computer meal booking system automatically does a re-booking of all meals at the beginning of the term. The frustration of re-un-booking these meals on a regular basis was a tension further expressed. Proposed model solutions to this contradiction and source of tension included ensuring that un-booked meals are not automatically booked or the possibility of a non-monetary refund to wardens when they un-book their meals. Other suggestions were that wardens and their family members could be consulted instead of assuming that all their automatically booked meals will be attended. The following Change Laboratory Workshop data sheds more light on proposed solutions:

We book but there's no incentive for us to un-book and it may not necessarily be a monetary refund but [that which] allows [us] to build up credit. So if you have a guest that you'll like to invite, you can use that credit and that I think wardens have been asking for that for a long time.

That's easy; it's a change, the change we've been asking for, for years.

I know for a fact that I have regularly had to go and un-book [dependant's identity withheld] meals because [dependant's sex withheld] does not eat in the dining hall and yet every time I log in before or after a vacation, [dependant's sex withheld] suddenly been rebooked for everything. Now, I firmly believe in not wasting food but how many times do I have to login and check to see if Rhodes hasn't rebooked for me the meals that I have un-booked at least twice in the year? ... Stop messing with our bookings please!

It is a batch booking and at the end of every term they just automatically [do it] ... may be we need to just in an upfront was say to the wardens ... "how many meals do you need for the year? ... And I think that's saving, by not preparing that meal which will then benefit the university.

[Could there be] facilities to un-book all breakfast for staffs beforehand? ... Especially block bookings like breakfast should be un-booked.

4.5.1.6 Presentation of model solution to contradiction and associated tension (Section 4.4.6.1 above) centred on the priority placed on food wastage issues (Section 4.4.6 above)

This contradiction was discussed with the intent of analysing the role of food representatives in relation to food wastage. This was done because their current main responsibility had nothing to do with food wastage but rather to act as liaison between students and the kitchen staff members and hall wardens. Stakeholders decided to re-define their office portfolio to critically include the reduction of food waste. The procedures to go about this proposed plan were suggested. The following Change Laboratory data excerpts highlight these points further:

I'm wondering if we shouldn't really look at the whole food representative situation ... that portfolio ... shouldn't their role be bigger than what it is and different?

Give them some guidelines in terms of how it should be done and formalise it.

Food wastage becomes part of the portfolio and [we can] possibly have meetings where they meet with other food reps.

Simply start by getting the food reps to meet with caterers here doing Orientation-week, go and meet them, go and say hello, get to know them, have a cup of coffee.

Maybe together with Food Services we can draw guidelines ... to assist you.

The new food representatives at the beginning of the year can spend an entire day in the kitchen with the caterers.

Yeah ... I think it can also be reinforced during their meetings.

4.5.1.7 Presentation of model solution to contradiction and associated tension (Section 4.4.7.1 above) centred on the attitude of kitchen staff members and students towards or against food wastage in the dining hall (Section 4.4.7 above)

This contradiction was considered to be difficult to resolve knowing full well that RU is composed of several classes of people with different personalities, cultures, beliefs and a host of other characteristics. It was suggested that tackling food wastage education effectively could address this contradiction in the long run. The following Change Laboratory excerpts illustrates further:

The role of food representatives needs some expansion and discussion ... playing a role in developing an attitude to food wastage.

A clear outline of the rules from the beginning ... put up notices about food waste ... maybe an email system about food waste ... to have some sort of communication.

It could be residence office through the registrar's department ... where they plan orientation ... so it could be via my office, residence office and registrar getting students as well involved.

4.5.1.8 Presentation of model solution to contradiction and associated tensions (Sections 4.4.8.1-4.4.8.2 above) centred on the issue of food waste that is transferred to pig farmers to feed pigs instead of human beings (Section 4.4.8 above)

This contradiction and source of tension among many members of the RU community has been an ongoing debate due to the tension it brings about. The current transference to pig farmers seems to conveniently be the best solution. Although this was not pleasing to most research participants and stakeholders present at the Change Laboratory Workshops, they were helpless to establish alternative solutions. It was therefore concluded that if the above proposed solutions are attended to appropriately and promptly, then food waste production at RU should drastically reduce. The following excerpts highlight this issue:

The reason why we supported Vanessa is that we realize there's a gap in how we do things and we need to seriously consider how we manage food waste and how we get into the mind of all the stakeholders to be effective in that.

If we can drive or change the attitude in a system, if you can fiddle with the rules and we make optimum use of the food that is available to us, our waste should decrease, possibly bringing this to light. I don't think this is as important as the other ideas we've discussed also I'll rather the food go to the charity, and I understand why that can't happen, so this system will need to remain in place, we can't simply go and throw the food on the floor. Yeah, I propose that this be given a little less attention than the other key areas where we can have a far more positive impact and I think this will be reduced if the other areas were addressed.

All these things can be discussed in one particular meeting, during students' orientation.

4.5.1.9 Presentation of model solution to explicit tensions (Section 4.4.9.1 above) centred on the issue of rotating kitchen staff members from one dining hall to the other by the Food Services management (Section 4.4.9 above)

This tension was further expressed and analysed during the Change Laboratory Workshops. The positive and negative implication of the rotation of kitchen staff members was highlighted by different stakeholders in different activity systems. The essence of this rotation was, however, highlighted. It was suggested that this rotation should be done minimally to reduce the negative impact. It was also suggested that the number of kitchen staff members transferred from/to a dining hall should be reduced. The following data excerpts support these points:

This is a 5 [priority placed on issue] and it is a trivial thing to fix because this rotation [of kitchen staff members] is having a huge impact on the service delivered by the caterers, and we understand their difficulties, we really do.

In terms of students, this would be a 5 [priority placed on issue] because they notice this directly.

I do have some personal comment which but then I'll take up with [name withheld] because we as Food Services management have to manage these teams and to rebuild the teams and just to manage our own operation, it was very difficult.

[If it is about] theft issues ... find another way of managing it ... to catch thieves, put some cameras in, they work wonderfully.

You can move one or two or three or four [kitchen staff members].

4.6 Conclusion

In this chapter, I presented the six activity systems existing in the context of this research. I presented data that addresses the research questions and meets the goals of this research. I

also presented the contradictions and associated tensions identified within the RU Food Services inhibiting more sustainable food economy and causing food waste production. I used data to shed more light on the contradictions and tensions. I finally presented some key solutions to the contradictions that were modelled during the first and second Change Laboratory Workshops.

CHAPTER 5: DISCUSSION OF THE RESEARCH FINDINGS AND RECOMMENDATIONS

Possibilities for Opportunities for Learning and Change within the Food Services Sector

5.1 Introduction

In this chapter I discuss the findings of the research in the form of analytical statements (Bassey, 1999). I present these analytical statements herewith and discuss them using the literature reviewed in Chapter Two (contextual and theoretical framework) and thick descriptive data (Geertz, as cited in Stake, 1995) provided in Chapter Four (research findings). I also link this discussion chapter to Chapters One and Three; Chapter One because of the context and result of preliminary studies, and Chapter Three because of the methodological process. I also discuss the analytical statements in relation to the composition of the contradictions, associated tensions and their respectively proposed modelled solutions presented in Chapter Four. In the process of delving concurrently into the above sections, I address the two-phased research questions and goals presented in Chapter One, (Section 1.7), where the broader question this research aims to answer is ‘How can expansive learning opportunities that can foster a more sustainable food economy be identified in a dining hall and by implication the Food Services Sector of Rhodes University and by further implication ESC and ESD?’ I conclude each discussion of the findings (analytical statements) with recommendations. The following goals guided the entire study:

- To generate data that will be used to explore and analyse the elements of the central food economy activity system in the dining hall, and related activity systems, in order to understand how they shape the current food economy and food wastage.
- To identify and analyse the existing educational and sustainable measures and processes used to reduce food waste in the dining hall.
- To investigate and identify tensions and contradictions inhibiting a more sustainable food economy and food waste reduction in the dining hall.
- To present the outcomes of the analysis of phase one data collection, as tensions and contradictions that will act as ‘mirror data’ for key stakeholders and research participants to engage with during Change Laboratory Workshops.

- To collaborate with research participants and key stakeholders to choose and deliberate on the most important tensions and contradictions in depth, as much as possible; and
- To examine and develop possible strategies that can create opportunities for learning and change in practices towards a more sustainable food economy and reduction of food waste in the dining halls.

These stepwise goals were attempted in the order in which they had been pre-planned. They are considered again in order to establish the insights that have been gained throughout the research process and in response to the two research questions (Section 1.7) the above goals led to answer. The analytical statements presented below is adopted to help keep this discussion chapter in focus and to distinguish content of each statement from the other.

5.2 Analytical statement 1: Causes of food waste

5.2.1 The causes of food waste go beyond the food entity; every other related factor in food economy matters and needs to be included in the context of learning

Reflecting on the contradictions and associated tensions presented in detail from Sections 4.4.1-4.4.9, emanating from nine issues itemized, it is apparent that the unsustainable practice of food wastage cannot be curtailed without significant analysis of the whole food economy. To curtail food waste, it is necessary to focus more critically on issues including the availability or unavailability of food waste related education, rules, learning support materials used to mediate learning, policies and modes of food waste disposal, recruitment of kitchen staff members and the organizational structure of the Food Services.

According to the data in Chapter Four, it is obvious that these issues could act as both enabling and limiting factors, and constitute the source of contradictions and tensions inhibiting sustainable food economy. Other factors contributing to food wastage include the continuous unaddressed discrepancy between the number of paid/booked meals and the meals attended, which is a cause of food waste, as well as the discrepancy between menu names and the actual meals experienced by students.

Food waste cannot be successfully reduced if the above-mentioned factors are taken for granted or if some are given more attention than others. This is confirmed by the inability of stakeholders and research participants to successfully prioritize the identified contradictions and associated tensions. None of the issues was considered ‘unimportant’ or of ‘little

importance' (see Section 4.5.1 for details). I admit that this occurrence is somewhat 'unusual' with the CHAT methodology but it is a reality in this case. Every issue is important if there is going to be a remarkable change in food economy. If one aspect of food economy is given no attention, then there will still be a considerable amount of food waste from that unattended aspect. It also means that if all issues are addressed, employing the assistance of all stakeholders in their various capacities, then there will be a clear attainment of food waste reduction in a shorter period of time.

As discussed in Section 2.2.1, food is lost and wasted throughout the Food Supply Chain, which in this research context begins with food procurement and ends with food consumption, although it was also clear that food waste was more pronounced at the consumption and disposal stages. Factors responsible for food waste at each stage of the six stages of food economy presented in Chapter Four, Sections 4.3.1.2-4.3.1.7 are not the same. Although most food waste occur at the consumption stage as stated by FAO (2011) and as explained in Section 2.2.1.1; food waste also occurs at the other stages of food economy, but at a lesser magnitude depending on the context. Data presented in Section 4.3.1.3 reveals that food waste occurs at the preservation stage but indeed at a minimal rate, because of the efficient food preservation methods. Data also reveals the occurrence of food waste at other stages including food preparation, serving and consumption (Sections 4.3.1.4-4.3.1.6).

The import of this is that, to tackle food waste in its entirety, there is need to include all stages, thus the whole food economy as argued in Section 2.3.3. In a similar vein, FAO (2011) enjoins us to focus on areas in the food economy "which have negative impacts, and which need attention" as well, as presented in Section 2.2.1.1, therefore all areas must be incorporated if food waste must be addressed effectively. Data presented also shows that even the smallest and hitherto negligible factor can have a subtle negative impact within the Food Service and can breed tensions among stakeholders. For instance, menu names, provision of food daily to wardens, and conflicting mediating tools.

Hence, I postulate that there is no feasibility in tagging and tackling one issue, contradiction or tension as very important and relegating another as non important, if truly a more sustainable food economy must be attained. As a stakeholder rightly pointed out during the first Change Laboratory Workshop in Section 4.5.1.8:

If we can drive or change the attitude in a system, if you can fiddle with the rules and we make optimum use of the food that is available to us our waste should

decrease ... I think this [food waste] will be reduced if the other areas were addressed.

5.2.1.1 Recommendations

There is great potential in addressing the issues presented in Chapter Four that are causing food waste. The above data excerpt also clearly admits that issues causing food waste should be tackled rather than concentrating on what to do with the enormous amount of food waste produced such as using it for composting, worm farms and the likes. The careful investigation, consideration, and analysis of the root causes of food waste as done in this research can be considered as just a stepping stone. I consider this a stepping stone because Lundqvist, et al. (2008) said that to tackle the food waste issue, international and national research will have to reveal the real magnitude of food wastage in the Food Supply Chain, which this research has tried to showcase, but only to a limited extent (see Section 2.2.1.1). They also proffered that such research must provide practical steps oriented towards minimising food waste (see Section 2.3.2). This research process can therefore be terminated at this point if nothing is done about the practical steps provided herewith.

I recommend the actualization of the entire expansive learning process which requires that a reflexive and critical review of the issues raised and traditional practices within the Food Services be made by those in managerial positions. Traditional practices may not necessarily have been orchestrated by current decision makers but have been handed over from those that have gone ahead (see Section 3.2.2). Furthermore, before implementation of new strategies, a concrete deliberative process should be followed in order to ascertain the effectiveness, feasibility and sustainability of such novel practices. This process should involve all related activity systems in order to resolve current tensions and prevent future ones. Every tension should be resolved amicably across groups of individuals involved in the food economy including students, kitchen staff members, wardens, the Food Services management, Residential Operations Division, and the Dean of Students' Office. The concern and unacceptability of food waste should also be made explicit during weekly, fortnightly, monthly and quarterly meetings, training and workshops at all levels within the Food Services, residences and beyond.

The necessity of the inclusion of this approach in the context of learning is not far from the fact that this case is within a context of a Higher Education Institution of learning. This issue should be openly talked about and addressed, without which inherent tensions may not be

sustainably resolved. There is great potential in bringing people together to deliberate on issues of common interest, in order to mutually develop favourable model solutions that are fairly suitable for all stakeholders as shown by the data from the two Change Laboratories held. Kinsey (2001) urged us to direct our attention to ‘other inevitable micro components of the food economy’ that make up the supply and the demand chain (see Section 2.3.3). This is equally important in order to ensure a smooth flow in the food economy, stakeholders in the upstream food supply and downstream food demand should be painstakingly considered in future.

5.3 Analytical statement 2: Limited food waste antagonists

5.3.1 Concern, sustainable practices and learning about food waste related issues and risks are limited among micro food producers and even more limited among food consumers

The ‘expected’ level of concern for food as an essential resource that humans cannot live without is limited among kitchen staff members but even more limited among students. The reasons for this obviously vary but those within the scope of this study are discussed here. Research findings presented in Sections 4.3.3 and 4.4.1, reveal that the level of learning and sustainable practices as regard food waste is not substantial. The major reason being that the facilitated learning activity provided within the Food Services, dining halls, and students’ residences is poor. The findings corroborate Glasser’s (2007) position as discussed in Section 2.4.1, which points to the fact that education on unsustainable practices is not prominent among learners in Higher Education Institutions. The reason for this unfortunate situation is context driven. It may be different among learners in kindergarten or schooling contexts for example.

Although Bandura (as cited in Glasser, 2007) propounded that the level of unsustainability among students should not be surprising as discussed in Section 2.4.1, nevertheless it is not a hopeless situation. It is far better to make it known than to be observed and yet left unattended to; which is a finding in the case of RU. What should have been done to avert it and what can be done to ameliorate the situation? Whose responsibility is it to ensure that students in a learning context are taught to know, learn and act more appropriately, regardless of the other reasons that may have caused the knowledge gap?

Orr (2004) is of the opinion that wastage, which is ‘unpatriotic and wrong’, is the fault of the current education system (see Section 2.2.1.1). He also lamented at the numerous number of

students that supposedly pass through the schooling system but graduate with little or no inclination to obvious environmental issues. Hart, et al. (1999) believed that it is education and particularly Environmental Education that should direct the attention of people to such unsustainable practices (see Section 2.2.3). Weston (as cited in Hart, et al., 1999) also argued for the filling of the epistemological loophole that is observed in schools and, as in the case of this study, Higher Education Institutions.

As discussed in Section 2.3.4, Strohbehn and Gregoire (2004) argued that the responsibility of the Food Services department is not just limited to the confines of quality food production. They stipulated that their responsibility also includes ensuring that students, as recipients of their food service, are taught how to be responsible food consumers and environmental stewards. There is therefore a need for a deliberate ‘fight’ against food waste. Food waste may seem a subtle problem but it is connected to various other issues including poverty, social justice, inequality and rising global climatic issues and risks. Such a ‘fight’ which cuts across all related activity systems of both food producers and consumers, is necessary to effectively manage precious food resources and to attain sustainable developmental goals as proffered by Lundqvist (2008b). Engeström (2001) would not describe this as fight, but rather sees the potential for learning emerging from tensions and contradictions in systems such as the food economy system in a university.

Data presented in Section 4.3.3 shows that the only learning intervention so far done at RU concerning the reduction of food waste was the production of the food waste posters in 2009 (see Appendix 24). At the time this research was being conducted these posters were not in use in the case study site—Nelson Mandela Dining Hall. Such lack of teaching and learning activities related to food waste, except the posters (among old students), can be said to be partly responsible for the limited knowledge and action against food waste among students. There are indeed food waste posters in use in many of the RU dining halls and the Nelson Mandela Dining Hall is one of those that had them pasted up previously but they have not been put up this year (2011). The absence of these posters invariably meant that all first year students admitted, resident and eating in the dining hall, had no encounter with them (see Section 4.3.3).

5.3.1.1 Recommendations

The use of a food waste poster is appreciated by many students I interviewed across campus and during some focus group discussions. Food waste posters should be placed in the dining hall where food is being consumed and where students spend considerably more time than in the servery areas where students spend just a few minutes. They could also be placed in common rooms of students' residences. These posters may be re-developed showcasing and using pictures of the practices and statistics within the dining hall. There is evidence that the posters played vital roles according to the experiences of [older] students eating in the dining hall (see Section 4.3.3) and across campus (Agbedahin, 2011a). Designing strategies to facilitate learning about food waste becomes necessary.

Furthermore, an integration of teaching and learning strategies across dining halls, departments, students' residences and the RU campus is urgently needed. In as much as the Food Services are expected to play this role, it is important that the Dean of Students Office and wardens in charge of each residence liaise with the Food Services to implement a concrete educational approach. The unacceptability of food wastage has to be expressed clearly. The proposed 'Where leaders learn programme' proposed to be run for students or the 'Allan Gray centre for leadership ethics' may be strategic avenues for such educational activities. Including food waste reduction in the ethos or culture of RU, and that of the dining halls and students' residences could be part of the teaching and learning practices.

The above suggestions towards more efficient food resource management should be initiated by top university officials and co-defined by other staff members and the students. UNEP (2006) in this regard stipulated that universities in the African continent also have a responsibility to teach students to be better individuals and more responsible citizens in the future (see Section 2.3.4). The RU annual student orientation week is a possible starting point as modelled by stakeholders in Section 4.5.1.1 and 4.5.1.2. Food waste issues could be included in the plan, programme, booklet and activities in collaboration with the kitchen staff members, wardens, food representatives and senior students.

5.4 Analytical statement 3: Assumptions and action without follow through

5.4.1 Assumptions are inadvertently made about students' indulgence in food wastage without follow through

There is evidence in the data provided in Chapter Four that many students indulge in a lot of food wastage in the dining hall and this is on a daily basis (see Sections 4.4.2.1, 4.4.2.2, 4.4.2.4, 4.4.3.4, 4.4.3.6 for some instances). The factors responsible for the above are numerous and need to be investigated rather than making inadvertent assumptions. The evidence of the amount of food waste bins that are produced in the dining hall on a daily basis has also been presented (see Sections 1.4.2 and 4.3.1.7). Pictorial samples of food wastage are also available (see Figures 35-39, 41, 45, 46, 51 and 52 in Section 4.3.1.6 for examples). Data also shows evidence that in many cases students are blamed (see Sections 4.4.7.1 and 4.4.1.1).

A kitchen staff member categorically stated that *“most of the time, it is the students because all the food that is in that bin comes from the dining hall”* (SI4). Does it mean that because all the food waste produced is from the dining hall is it therefore the students that are solely responsible for it? This general assumption that students are responsible for food waste in the dining halls is not limited to kitchen staff members; the Food Services and a number of RU community members I communicated with; even fellow students themselves expressed it.

Is it really the fault of students? Data presented in Chapter Four shows the yearnings of students as well. Some students expect a little more recognition and consideration. Some expressed their displeasure over several issues. Many complain, while others bear the tension. Many express sympathy at the complexity of the actualisation of their desires. Paradoxically, year in year out different calibres of students are admitted at RU from over 40 different countries and data presented in Chapter Four reveals that food wastage is not a recent phenomenon at RU. It has been occurring for at least the past 21 years.

Data presented also shows that because students have paid for this food that is being wasted and fed to pigs, may be a reason why nothing substantial has been done over the years. There is a need to investigate this widely spread notion further. Orr (2004) opined that unpatriotic behaviours such as wastage should someday be addressed as such. Wals (2007) argued that in the changing world, humans (individually and collectively) need to engage in and continue engaging in a change themselves first before any change can be made (see Section 2.2.3).

The food waste posters as discussed in Section 5.3.1 and presented in Appendix 24 were produced in 2009. The fact that these posters were produced to create awareness and conscientize students towards wastage meant that their practice is not admired (Agbedahin, 2011b). The fact that there has not been a clear follow through to ascertain the efficiency and impact of these pilot attempts towards food waste reduction also made it unsustainable. The fact that despite the posters, there has not been a clear cut difference in the food waste production means that something is wrong elsewhere that cannot simply be attributed to the students' disposition. It may not just be about the students then. It may not just be about their culture. It may not just be about the fact that they have money and they can afford the in-house campus food supply or out-door food purchase. There is much more beyond students' contribution to food waste production at RU.

5.4.1.1 Recommendations

As discussed in Section 2.3.1, sustainable consumption is about the process of purchasing, consuming and disposing products. It is not a one sided adventure. Students can't only be responsible for food waste in the context of Higher Education Institutions. Learning to ensure learning and change in the processes involved in the food economy takes cognisance of both food service providers and food consumers. Therefore distinct change may not just happen, especially if nothing significant has been attempted. This long lasting assumption and expectation that has not yielded any fruit must be abandoned and other strategies and new approaches adopted. There should be a deliberate active learning engagement with students. A thorough survey, forum, and/or consortium conceptualised as an extended expansive learning process, may be planned to provide students and other roles players some opportunity to express their concerns and commitment to a sustainable food economy.

Learning and change processes need to be facilitated, because this may not necessarily happen among students in the context of the food services, as in the case of the dining hall. As shown in Mukute's (2010) study, interventionist researchers engaging with expansive learning processes may play such a facilitated role, but other bodies (e.g. Dean of Students or hall wardens) may too. As argued by Parson and Clark (1995) and Glasser (2007) and as discussed in Section 2.2.3, effective steps needed to minimise food waste lie in the successful collaboration and learning by individuals and by social aggregates in social settings like the dining hall.

5.5 Analytical statement 4: Knowledge and disapproval of rules

5.5.1 The performative effects of the lack of knowledge and approval of the origin and essence of food consumption and production related students and kitchen staff member's rules deserve attention and action

As indicated in Chapter Four, it is obvious that there are many rules governing the conduct of students and kitchen staff members within and outside the RU dining halls. Such rules are supposedly engrained and tailored towards ensuring law and order as well as maintaining the smooth running of the activity systems during academic sessions (see Section 4.4.3.7). In the context of this research these rules shape the food economy in a way that will be fully unravelled in the course of this discussion. Rules and regulations are in themselves not 'bad', but when rules in any given context constitute a major source of tension and induce an unwholesome environment then they become questionable. As stated in Section 2.4.1, Togo's (2009) research revealed that at RU, agency is limited by structural factors that occur in the form of rules and resources. As seen in Chapter Four, the scope of tensions associated with the rules, implies that such rules are either not feasible or realistic or not understood, or just not meaningful and hence difficult to comply with or be enforced.

Rules are considered and categorized as normative frameworks that presume certain goals and pre-conceived achievements. Sayer (as cited in Lotz-Sisitka & Schudel, 2007) put forward that there is need to question whether normative goals are feasible or not. This admonition may be applicable to different contexts, including the RU context. I am of the opinion that if it is discovered that certain rules are not feasible or even if they are so tension laden, then something needs to be done about the sources of tension or the way the rules are administered or enforced. Sayer (2000) argued further that if normative frameworks are not feasible, then the outcome of their usage will result in a 'two-fold danger'²⁴.

The two-fold danger described by Sayer includes "the tendency to engage in empty moralizing; [and] the danger of assuming that whatever is agreed to be good will therefore come into being" (as cited in Lotz-Sisitka & Schudel, 2007, p. 250). Discussing them in turn, empty moralising can be likened to pouring and storing treasured grains in a knitted basket with holes—knowingly or unknowingly. That is making effort to ensure good morals in

²⁴ The terminology 'danger', does not imply a presence of a pleasant omen but a negative connotation.

people but indirectly doing nothing positively significant in a short and long term. The second danger fails to consider the possibility of reflecting, assessing and evaluating the effectiveness of normative frameworks, and assumes that once they have been decided upon by certain ‘influential persons’, the rules will work to the desired end.

In an attempt to contextualise the above discussion, I refer to data provided in Chapter Four, Sections 4.4.3.1-7 which centres on the ‘performative effect’ of the normative frameworks being employed in the dining halls and how it shapes the food economy. The course of surfacing contradictions and tensions in the Expansive Learning Process gave rise to these effects which are intended to be positive but turn out to be negative to a sustainable food economy. Some examples of a positive performative effect of these rules include provision of food to wardens or the remarkable avenue for giving leftovers to students as ‘seconds’ but these in themselves constitute performative contradictions and tensions. Other rules have intended positive performative effects but currently compose negative performative effects.

It is worth reiterating at this point that the issue of rules and etiquette had the highest number of contradictions and tensions in this case. This contextual evidence resonates well with what Lotz-Sisitka and Schudel (2007) discovered in their attempt to analyse the practical adequacy of the normative framework in the context of the South African national curriculum. They concluded that normative frameworks can enable and yet constrain the possibilities for participation and action in different ways. Data shows that rules being used in the dining halls across campus are currently both enabling and constraining sustainable participation of micro food producers and food consumers in food waste management.

Although some rules are effective in avoiding the abuse and misuse of food, as well as stipulating what each student is entitled to, which is good; others are problematic. The tensions it produces can be traced to their origin, mode of transmission, usage, mediating tools, presentation, introduction, enforcement, non enforcement, as well as stipulated consequence of violating them. Section 4.4.3.7 presents the explicit tensions associated with the contradictions uncovered in the dining hall which result from the lack of knowledge and disapproval of the origin and essence of food consumption related to students and kitchen staff members’ rules.

5.5.1.1 Recommendations

I key my recommendation to the advice of Jickling, Lotz-Sisitka, O'Donoghue and Ogbuigwe (2006), and Jickling (2005) regarding the handling of an ethical issue or problem like food waste. Rules made around ethical issues should not resonate to the users as a form 'preaching', 'indoctrinating' or a 'code of conduct and behaviour'. They advised that the use of rules and stipulated etiquettes should be 'open' and should be done in a 'process' as well as involving critical thinking, flexibility and inquiry. Inquiry here depicts finding out and exploring the feasibility and suitability of such process. It should not be conclusively upheld at the initial implementation stage.

They further propounded that it requires a critical review which is also open to discussion, re-examination, and revision. This approach concurs with the Expansive Learning Process (Engeström, 1999; Engeström, 2000) which involves the implementation of solutions through deliberative avenues for examining before implementation and reflecting after implementation, and even before the final consolidation (see Figure 8 and Section 3.2.2.4). As shown in the modelled solutions in the Change Laboratory Workshops in Section 4.5.1, such an approach shows some promise for enhancing a sustainable food economy but requires a careful process of implementation, review and revision. UNEP (2006) proffered that the concept sustainable development is not fixed but is a dynamic process involving an ongoing approach to learning and problem solving (see Section 2.4.1).

To affirm a need to revisit the currently consolidated rules, I further recommend the provision of opportunities for dialogue, deliberation regarding all rules and disciplinary codes guiding dining halls. I recommend a co-creating expansive learning process between all activity systems and RU authorities involved including the Food Services, Residential Operations Division, Human Resource Division, kitchen staff members, hall wardens, house wardens, sub-wardens, and food representatives and students who are the primary 'users' of the rules. I also recommend that the opinion of micro food producers and food consumers should be considered for the reduction of tensions, for better service delivery and a more hospitable environment. Besides, the new guidelines should be better mediated, and standardized across all dining halls and residences on RU campus. The practicability of enforcing and obeying them should be critically considered as well.

5.6 Analytical statement 5: Advantages of Change Laboratory Workshops

5.6.1 The potentials in Change Laboratory Workshops conducted to foster ‘more’ sustainable food economy facilitated the process of learning interaction between different groups and calibre of people—providing a ‘safe space’ for learning and change

The possibility and opportunity for a more sustainable food economy through learning and change within the Food Services (as aimed at in this research) are dependent on the successful collaboration between the food producers, food consumers and other related stakeholders. Hitherto, the lack of learning, collaboration and mutual understanding between the macro/micro food producers and food consumers in their different activity systems has been a non-discussed source of tension; let alone resolution. Engeström (2000, 2007b) put forward that the intervention undertaken by an interventionist researcher has the potential of assisting the ‘researched’ to solve their own culturally and historically constituted problems (see Section 3.2.2.3). Capper and Williams (2004) explained also that organisations have underlying tensional issues that are never openly dwelt on from generation to generation for several reasons (see Section 3.2.2).

It could be said that ‘what goes around comes around’ within Food Services Sectors. If an aspect is painstakingly planned and another aspect is given less attention, the spin-off will be so obvious that it will give less worth to the positive effect on the latter. This argument appears to resonate with Eisner’s (1985) notion discussed in Section 2.2.3, pointing to the reality that what is explicitly taught (therefore considered openly as a necessity in the context of learning), is equally as important as what is not taught (null issues un-considered as essential). For instance and as reflected in Chapter Four the sustainable practices that micro food producers are actively engaged in during food production to reduce food waste but are unknown to food consumers, are a source of tension between both activity systems.

Another example is the availability of several menus and diets, which students acknowledged was a privilege because of their non-availability in many other South African universities; but yet constituted a source of tension. Even the sustainable practice of giving leftovers to students also constituted a source of tension in the central activity systems and in the activity systems of the food consumers, between the male and female students (see Section 4.4.4.1). Different subjects within and between different activity systems in the Food Services grappled with these tensions because of the lack of what Vygotsky invented and

conceptualized as the zone of proximal development between subjects which in this case was not activated. This is also closely linked to boundary crossing by different activity systems. These zones or boundaries were never openly crossed because there has never been an avenue where such intentions were disclosed and heard by one another. In other words it is because of the lack of learning across these activity systems. Until this 'safe space' as stipulated by Wals (2007) and Weston (as cited in Hart, et al., 1999) is created; people cannot become confidently part of and proud of their involvement in a system.

According to the findings in Chapter Four, it can be further said that the tacit knowledge used by food producers, which works perfectly many times in the fight against food waste production unfortunately incurs a boomerang effect as experienced by students when sometimes they come for their meals which have not been 'catered' for. It may sound strange because if students have booked for a certain kind and number of menu, of a necessity (at least all things being equal), such a menu must be presented on demand as explained by Pillay (2011) in Section 4.3.1.4. But from the food producers' experience and recommendation from the management, meals may be cut down to about 20% by caterers; that they must not 'over cater' is a sustainable practice with a caveat. This is because the breach of such injunction leads to an all round waste of time, effort, resource, energy and expertise that may have been employed to produce the food that is afterwards deliberately fed to pigs.

The disclosure of this 'behind the scene' practice which was found very illuminating during focus group discussions, interviews, Change Laboratory Workshops and during this research presentation in different forums, could as well present further opportunities for learning and change within the food producers and food consumers as a whole. More avenues and opportunities need to be created for further awareness, sharing of information and knowledge, deliberation, learning, training, teaching, and action which would precede an institutional change process. Hart, et al. (1999), put forward that only if citizens are made to 'know' about what is happening in the environment (behind the dining hall scene), they cannot 'know', let alone change their lifestyle.

5.6.1.1 Recommendations

I commend the Food Services for permitting the creation of this 'safe space' and I recommend a continual expression of interest and support for this kind of research within the

Food Services, the RU and Higher Education Institution as a whole. Continuous dialogue and boundary crossing between different activity systems is recommended. The re-defining of the food representatives' portfolio as proposed by stakeholders to include roles and responsibilities related to food resource management, appreciation and reduction of food waste may be implemented. Wardens and food representatives may act as liaison persons between the food producers and food consumers, attending other related responsibilities. Curriculum initiatives such as the 'where leaders learn programme' or 'Allan Gray centre for leadership ethics' can also facilitate such boundary crossing.

5.7 Analytical statement 6: Contradictions and associated tensions

5.7.1 Implicit and explicit contradictions and tensions that are embedded in the food economy, but not identified, voiced, accepted and corporately addressed by stakeholders can further inhibit sustainability, learning and change

The surfacing of contradiction in a sector should not be seen and handled with contempt, as a source of embarrassment or humiliation by the officials or institutions involved. Rather their discovery by an internal or external interventionist researcher in any context should be seen as an advantage and enormous benefit to the organization in the long run (see Section 2.4.2.1). Findings in Chapter Four show certain issues that constitute contradictions and tensions within the RU Food Services. Some of these contradictions are noticeable, while others are concealed. Irrespective of their explicitness or implicitness, they are by and large inhibiting factors to a more sustainable food economy.

An example of explicit contradiction will be that which is inherent in the etiquette poster being used in the dining hall. Examples of implicit contradictions and tensions are those related to food production in the kitchen or menu name versus meal experienced in the dining hall. As facilitated by the use of the Expansive Learning Process, most of these contradictions and tensions do not have a short history. Some have existed within a time frame that is not less than one year while some have existed for over 21 years. The characteristics of these contradictions and tensions are engraved in the structure, history, ethos and institutionalism of RU, including the history and context of South Africa.

As mentioned in Chapters One and Two, this kind of research has not been recorded in the history of Rhodes University. This automatically means that despite the existence of these surfaced tensions and contradictions, a remarkable voice has not been raised to bring these issues to the limelight. Although attempts have been made by top RU personnel and some

concerned individuals to find a more sustainable solution to issues revolving around food waste at RU, all interventions are limited to the 6 stages identified in the current state of food economy (see Sections 4.3.1.2-4.3.1.7). This interventionist research has succeeded in surfacing issues that have been responsible for the suppressed betterment of the RU food economy.

The methodology and findings in Chapters Three and Four respectively, reflect that research stakeholders and research participants have succeeded in accepting the ‘mirror data’; these inhibiting issues, contradictions and associated tensions. This step is very crucial in the Expansive Learning Process, where participants either engage or disengage with problematic issues. Wals (2007) referred to these as dissonances in a social learning process (see Section 2.4.1). It makes or mars the process depending on the attitude and dispositions of stakeholders (see Section 2.4.2.1). These chapters also reveal that there have been discussions and analyses of the issues for a deeper understanding of the root causes and consequences. It is also evident that there has been a high level of cooperation among participants and the interventionist researcher but there is yet a reservation. This high level of exhibited cooperation will not necessarily suffice for the sustenance and achievement of expansive learning, implementation and consolidated change.

Much more effort, cooperation, passion and sincere action needs to be deployed for an affirmation of the transformed future food economy of the Food Services; there is need to extend the expansive learning process beyond stage 3 of the Developmental Work Research (see Figure 8, Section 3.2.2.4). The process leading to the expected consolidated change will definitely take some time but the speed, timeframe and burden of responsibility remains that of RU decision makers (see Section 2.4.2.1). Togo’s (2009) research revealed that RU is only systematically and gradually approaching sustainability (see Section 2.3.5). Hence if the process is a little slower than expected, it could be understood because of her findings. Her research proved further that hitherto RU’s commitment to sustainable development is happening but in a gradual manner. One of the reasons she cited as responsible for this is that RU “does not have an explicit sustainability policy” even though there is an Environmental Policy and some other policies available with ramifications of sustainability embedded in them (Togo, 2009, p. 278).

5.7.1.1 Recommendations

The Expansive Learning Process needs to engage both the implicit and explicit contradictions and tensions, even though these sources of tensions seem to have been unnoticed because they have been normalized; findings in Chapter Four show that they are there but were not hitherto explicated. I recommend that the expansive learning process be extended beyond stage 3 of the Developmental Work Research cycle as much as possible and as soon as possible so as not to lose the positive momentum established in the two phases of this research.

If this remarkable move can be made, it will expand learning further, improve the quality of life of students and kitchen staff members, promote human development and ameliorate food wastage at RU. It is also recommended that the proposed solutions modelled and highlighted in Section 4.6.1 are re-examined, piloted and eventually implemented if workable through such a process. Above all, I recommend that the issues of sustainability be practically upheld and affirmed in RU, starting from a clear and concrete sustainability policy.

5.8 Analytical statement 7: Agency and capabilities to reduce food waste

5.8.1 The full agency and capabilities needed for food consumers and micro food producers to reduce food waste production have been and can be further incapacitated

The economist Amartya Sen developed the human capability approach which is being proven to be relevant and useful to Education, Environmental Education and on a broader scale Education for Sustainable Consumption and Education for Sustainable Development. The capability humans possess is not judged, evaluated or considered by the resources they have but rather their actions in time and space or what they are willing and able to do (Sen, as cited in Walker, 2005). In the context of this research the resources referred to here will stand for money, access to food, studentship, workmanship, position, internet access, computer literacy etcetera. In this regard Sen's capability theory disproves that the above-named classes of resources ascertain an individual's capability but rather what they are able to do with their access to these resources.

The concept agency is also central to Sen's capability approach (Walker, 2005). Agency connotes a persons' ability to set and achieve goals that he/she values and has reason to be proud of (ibid). Activities in the dining hall include decision making, doing and acting in a certain acceptable manner. According to Sen's capability approach, the freedom individuals

have in making personally suitable, convenient and rational choices (e.g. to not waste food) within the context of their activity (e.g. food consumption) cannot be dissociated from their capability (e.g. to live a healthy life) (ibid). This therefore means, for example, that if an individual deems it fit to do something in a particular way or manner and is not able to do it as a result of any of the contradictions and tensions or structural constraints highlighted in Chapter Four, then the person does not have capability, even though the resources are there. An individuals' capability therefore lies in the freedom he/she has to act in ways that seem worthwhile to them within the social systems that they are part of.

The adjective 'full' used in quantifying the nouns 'agency' and 'capability' stated in the analytical statement above is as a result of the insight gained from the research process. Some data presented in Chapter Four reveals the fact that there is evidence that some individuals and the Food Services institution have cultivated the agency to avoid food waste despite the inhibiting contradictions and tensions. This capability they display has been developed as a result of their family backgrounds, institutional norms, upbringing, culture, beliefs, life experiences and personal principles (see interview data in Section 4.3.2 and workshop data in Section 4.6.1.5 for instances of these). Data presented also shows that some of the identified explicit and implicit contradictions are a limiting factor to continuous expression of their agency for food waste reduction (see Section 4.4.8.1 for details). The improvement or deterioration of the agency and capability students and kitchen staff members have in reducing food waste is linked to opportunities created by the Food Services, hall wardens and the RU authorities at large; as shown by the interacting nature of the activity systems.

5.8.1.1 Recommendations

The availability of resources that are not used to enable or further enable peoples' capabilities is futile. A lot of resources abound within the Food Services Sector, students' residences and the entire Rhodes University as a whole. There is a need for the university authority and Food Services to make substantial deliberate efforts to address inhibiting factors to peoples' capabilities, and to facilitate flexible structures (e.g. forums) to do so. Addressing these issues will encourage students and kitchen staff members to further exercise their agency to act positively. Chapter Four data shows that much can be done to facilitate a process of learning. Such process should focus on food resource management activities amongst students and kitchen staff members. Significant, re-learning activities can be implemented in halls and in dining halls. The facilitation and creation of opportunities for individual agency and freedom

has the capacity to strengthen their social lives. This corporately has potential to foster human development, the quality of life of students and staff members and sustainable development.

5.9 Analytical statement 8: Food waste disposal

5.9.1 The daily massive production of food waste and its transference to pig farmers to feed pigs (and not humans) at a minimum administrative fee is an unsustainable approach and an avoidable source of tension

Findings in Chapter Four reveal that this approach is generally displeasing and disappointing to the majority of the food producers, food consumers and the RU community. This tension experienced and expressed by all micro food producers, most food consumers and some RU community members I communicated with is not minimal. An urgent change of this approach will surely reduce institutional tension, social injustice, unforeseen future risks, and contribute to human, social and community development. I argue that this approach is unsustainable because of the following reasons.

According to the definition proffered by FAO, food waste is any edible material meant and fit for human consumption but is instead discarded (as cited in Parfitt, et al., 2010) (see Section 2.2.1). According to Stuart (2009) food waste is also wholesome food, meant for human beings but that which is intentionally fed to animals (see Section 2.2.1). This action can occur at any point of the micro food economy. In the context of this research, the above definitions encapsulate all the leftovers generated in the dining halls, both the plate scraps, the un-served food in the serverly, the consumable kitchen waste during food preservation and preparation, irrespective of the circumstances that warrant its disposal. It does not seem to take cognisance of the circumstances in which such food is given to animals including health risks as a result of the risk of food contamination and institutional liability. It also does not consider other ways of ‘recycling’ human food including composting and bio-chemical food processes as acceptable.

Stuart (2009) further defined food waste as the by-product of food processing diverted away from human food by whatever means, essence and purpose to non-human usage (see Section 2.2.1). This third definition describes the seemingly sustainable re-use of frying oil, the ‘old’ oil that has been used for frying several times and has become ‘unusable’ but is not literally poured away to waste but is instead stored and transferred to a factory to be processed and used to produce other forms of oil usable for machinery. If the above, ‘seemingly’ sustainable approaches of handling food resources are considered as food wastage, then what is/are the

more sustainable options of managing food resources that do not divert good food into the waste stream? Such approach should be upheld in RU, all other institutions and households.

5.9.1.1 Recommendations

I hinge my final recommendation herewith on the food recovery hierarchy propounded by the U.S. Environmental Protection Agency (see Section 2.3.2, and Figure 2). They recommend that the most sustainable way of ensuring food resource efficiency is to reduce it at the source. The second next best option, if it cannot be reduced, is to feed hungry people with it. If it cannot be fed to hungry human beings then it can then be used to feed animals. The three remaining options if the above options are not viable, in hierarchical order are that food be used for industrial uses; composting and taken to landfill—these latter three options are most unsustainable (also see Section 2.3.4.1).

I therefore recommend the review of traditional practices and I enjoin the Food Services Sector to re-imagine possibilities for implementing new approaches that would foster food resource efficiency, reduction of food waste ‘from the source’ for the betterment of RU, human condition and the society at large. I suggest that only after exploring the inherent tensions and contradictions in Chapter Four ‘conclusively’, and with the above-mentioned proposed solution hierarchy, should the food waste be given to farmers to feed pigs. I am optimistic that a lot of food could be preserved if these contradictions and tensions are addressed.

New strategies may include the revision of rules that promote food wastage and embracing and re-defining those that will maximize food resources. I take a few examples from the findings presented in Chapter Four. The rule prohibiting kitchen staff members from taking non-contaminated, un-served leftovers even after ‘seconds’ out of the dining hall and requiring them to discard them instead (as shown in Figure 45-48), if they cannot be preserved to be given to students in the next meal. This is very tensional and may be revised. This rule applies to students as well, where they are not permitted to take their food out of the dining halls except for two slices of bread and fruits. This is violated and may as well be eradicated and food waste will reduce, after all students are provided with refrigerators in their residences and they are free to eat their personally purchased food in their rooms, with adequate health and cleanliness standards adhered to. It should be noted that many student

residences in other countries have allowed these practices, by providing student residences with small kitchen units.

From the tensions evident in the findings in Chapter Four, I am also confident that this new approach will create a more productive workplace environment and enhance a more humane Food Services and RU as a Higher Education Institution striving towards sustainability. Critically addressing the issues presented in Chapter Four will drastically reduce food waste from the source. Implementing the RU Environmental policy (1998), stipulating that solid waste will be reduced as much as possible from the discharge point on campus (see Section 1.4.2) is appropriate. This approach will help RU to be truly built on social justice, with the intention of ensuring social transformation, human development and sustainable food economy; hence the use and goal of CHAT being employed in this research.

Other strategies such as dialogue and deliberation with kitchen staff members to develop mutually understood and agreed guidelines, are important. Since kitchen supervisors (caterers) are marked with the responsibility of directing the affairs of the kitchen and reporting to the Food Services management, they are in the position to ensure sincerity, integrity and honesty in the kitchens as well. Indoor and outdoor monitoring gadgets and cameras could be put in place for surveillance if theft problems exist or emerge.

Further strategies may be to create opportunities for students to express their opinions directly and constructively to the Food Services. If they do not appreciate certain menus, those menus may be changed. They may be asked to suggest what they would prefer as menus, since they complain they are being ‘forced’ to eat what they do not desire. This kind of active engagement with students will reduce food waste and also foster learning and behavioural change in the dining halls.

I finally recommend the re-imagining of the possibilities of implementing strategies to safely transfer wholesome un-served food to humans after appropriate legal agreements and systems are set up between RU and such department, organization, charity or stakeholder in the township in Grahamstown who could safely provide food for those in need (e.g. charity homes or church soup kitchens). Systems could be investigated for the immediate transfer of edible foods without incurring any expenses to RU. This research has also shown that within the RU community, some people are willing and ready to buy the un-served leftovers.

The above numerous more sustainable options can be investigated and implemented through further Change Laboratory Workshop deliberations, and boundary crossing deliberations with other activity systems on the RU campus (e.g. senior management, student representative council or community engagement division). Solutions could be found to address the current inhibiting factor (health risk incurred through food contamination) using modern technologies such as freezing some of the unused leftovers etc.

5.10 Conclusion

The study set out to understand ways of establishing a more sustainable food economy through Expansive Learning Processes. Using Cultural Historical Activity Theory, in-depth insights into the existing food economy were gained and tensions and contradictions were surfaced. These were shared back to the multiple interacting activity systems concerned with the food economy in the dining hall context where model solutions were generated as the first stages in an expansive learning process. The study succeeded in identifying a number of opportunities for expansive learning and change in the Nelson Mandela Dining Hall's food economy, which are not unrelated to wider systems of food production and consumption at RU. A key recommendation from this study is the need to further explore and expand learning and change emerging from these identified learning opportunities.

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APPENDICES

Appendix 1: 'Change project' correspondence with the RU Food Services 1

Date: Fri, 28 Jan 2011
From: Jay Pillay
To: vanessa agbedahin
Cc: [Names withheld for ethical reasons]
Reply-To: Jay.Pillay
Subject: Re: Implementation of Change Project

Priority: Urgent

Hi Vanessa

Many thanks for your email and sms. Sorry I took so long to contact you. I have been away on a leadership w/shop with my supervisors.

As explained to you, I am happy to support your project and initiative. I have copied the relevant people that will assist you with this. Will it be possible to meet with them to discuss the way forward?

Regards
Jay
Head: Food Services
Residential Operations Division
Rhodes University
Grahamstown

On 24 Jan 2011 at 20:41, vanessa agbedahin wrote:

Dear Madam,

I hope this finds you well. My name is Vanessa A. Agbedahin, an M.Ed (EE) student from the Environmental Learning Research Centre, Education Department, and Rhodes University.

In 2010, I attended the International Certificate Course in Environmental Education, organized by RU/SADC REEP. As part of the course requirements, all participants are to implement a 'change project' with the aim of bringing about change in various niche contexts (environmental-educational, moral, economic, physical, psycho-social etc.) in the lives of a target population for a sustainable future.

Please find attached the details of my change project which I decided to carry out in the Nelson Mandela Dining Hall, since I reside at Rhodes University.

I anticipate your support as you use your good office to ensure the success of this informal activist research project.

Kind regards,

Adesuwa Vanessa Agbedahin

Appendix 2: ‘Change project’ correspondence with the RU Food Services 2

Date: Fri, 28 Jan 2011
From: Jay Pillay
To: [Names withheld for ethical reasons]
Cc: s.Gangiah, g.Mardon, vanessa agbedahin
Reply-To: Jay.Pillay
Subject: Food Wastage- research proposal
Priority: Urgent

Dear All

Attached is the details of Vanessa's proposal. She will be contacting you soon to start implementing her plan of action. It may require her chatting you all and spending time in the kitchen and dining halls to chat to staff and students. She will also suggest other strategies to assist with reducing food waste. We are using this as a pilot research initiative and if it all goes well, we may want to roll out with the other d/halls.

Your support will be greatly appreciated.

Regards
Jay

Mrs Jay Pillay
Head: Food Services
Residential Operations Division
Rhodes University
Grahamstown.

Appendix 3: Dining hall photographing plan

MEALS	WEEK 1, DATES & TIME	WEEK 2, DATES & TIME	WEEK 3, DATES & TIME	WEEK 4, DATES & TIME	WEEK 5, DATES & TIME
BF/DR/AF²⁵ BREAKFAST LUNCH SUPPER		Mon 30 May	Mon 6 June	Mon 13 June	Mon 20 June
BF/DR/AF BREAKFAST LUNCH SUPPER		Tue 31 May	Tue 7 June	Tue 14 June	Tue 21 June
BF/DR/AF BREAKFAST LUNCH SUPPER		Wed 1 June	Wed 8 June	Wed 15 June	Wed 22 June
BF/DR/AF BREAKFAST LUNCH SUPPER		Thus 2 June	Thus 9 June	Thus 16 June	Thus 23 June
BF/DR/AF BREAKFAST LUNCH SUPPER	Fri 27 May	Fri 3 June	Fri 10 June	Fri 17 June	Fri 24 June
BF/DR/AF BREAKFAST LUNCH SUPPER	Sat 28 May	Sat 4 June	Sat 11 June	Sat 18 June	Sat 25 June
BF/DR/AF BREAKFAST LUNCH SUPPER	Sun 29 May	Sun 5 June	Sun 12 June	Sun 19 June	Sun 26 June

²⁵ BF stands for before, DR stands for during and AF stands for after.

Appendix 4: Dining hall observation protocol

DATE	MEAL TIME	FOCUS UNIT OF ANALYSIS	WHAT TO OBSERVE/QUESTIONS TO ANSWER	NOTES OF EVIDENCE INDICATOR	
			What evidence is there? Who is in the dining hall? (subject + community) What are they doing? (division of labour) Is food waste minimal? (outcome) Is food being wasted, how much? (object) In a scale of none- few-much-very much? (object)		Photos
			What kind of food is being wasted? (object) Trends in particular food items that are being wasted (Bread, meat, fish, fruits, juice, tea, salad...)? (object)		Photos
			What set of students indulge more in the practice of food wastage? (male/female or individuals or groups) (subject)		
			How do students and staff members react to food waste? What do they say? (subject)		

			<p>Are students abiding to the dh etiquettes or not?</p> <p>-Do they bring guests to the dh?</p> <p>-Do they share their meals with them?</p> <p>-Do they take more than 4 slices of bread?</p> <p>-How many slices of bread do they take?</p> <p>-If they take less or more than 4 slices, do they go back for more?</p> <p>-Do they drink milk?</p> <p>-Do they remove more than 4 slices of bread, 1 fruit or condiments from the dh?</p> <p>- Do they bring in containers to remove food or use paper napkins? (all subject + rules)</p>		
			What is enabling or constraining the practice of food wastage? (rules + tools)		
			<p>Is the dining hall etiquette, food waste poster, notices in the dining hall? (rules + tools)</p> <p>How many, where are they it placed? (tools)</p>		Photos
			What attempts are made by students and staffs to reduce food waste (In terms of advise, jokes, insults, encouragement, plea, request, announcement) (subject + outcome)		
			<p>What happens to the food waste? (object)</p> <p>How is it disposed in the hall, kitchen and dining hall premises? (tools + division of labour + community)</p>		Photos
			Any other emerging observation?		Photos?

Appendix 5: Permission letter to eat in the dining hall

Date: Mon, 06 Jun 2011
From: Jay Pillay
To: vanessa agbedahin
Cc: sharmila Gangiah, r.Kleinhans
Reply-To: Jay.Pillay
Subject: (Fwd) RE: (Fwd) Meal booking for research purpose

Priority: urgent

Hi Vanessa

Desiree and Jeremy have agreed that you can have your meals in the Nelson Mandela Hall. Please arrange to pay and book your meals with Renette Kleinhans. Renette's office is on the first floor of the Oppidan / Steve Biko Building.

Warm regards
Jay

----- Forwarded message follows -----
From: "Desiree Wicks"
To: <Jay.Pillay>,<j.baxter
Subject: RE: (Fwd) Meal booking for research purpose
Date sent: Mon, 6 Jun 2011

No problem from my side.

Regards

DESIREE WICKS
MANAGER : STUDENT BUREAU
RHODES UNIVERSITY
GRAHAMSTOWN
6139

-----Original Message-----
From: Jay Pillay [mailto:Jay.Pillay]
Sent: 03 June 2011 02:09 PM
To: j.baxter; d.wicks
Subject: (Fwd) Meal booking for research purpose

Dear Desiree and Jeremy

Vanessa is the masters student doing the wastage research in your dining hall. I need your permission to book her to take some meals in the Nelson Mandela hall. Details are listed in Vanessa's email.

Regards
Jay

----- Forwarded message follows -----
Date sent: Thu, 02 Jun 2011
From: vanessa agbedahin
To: Jay Pillay
Subject: Meal booking for research purpose

Dear Jay,

Sequel to our telephone conversation, though I am presently doing observation of the Nelson Mandela Dining Hall activities and interviewing kitchen staff members this month, there is however need for me to experience the eating and dining as well.

I am aware that Mandela Dining hall is not available to Oppidan students but I really hope this special arrangement could be made for the purpose of my research.

I want to initially book for 6 meals (Breakfast 2, lunch 2 and supper 2)

Breakfast: Mon 6 June & Mon 20 June

Lunch: Fri 10 June & Sunday 19 June and

Supper: Sat 18 June & Fri 24 June.

Anticipating a positive response.

--

Kind regards,

Adesuwa Vanessa Agbedahin

M.Ed (EE) Student,

Environmental Learning Research Centre,

Appendix 6: Sample of focus group discussion sign up form

CENTENARY HOUSE (Male-Lilian Ngoyi Hall)

S/N	Name of student	Department	Year	Nationality	Email address	Cell phone No.	Signature
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Appendix 7: Staff interview schedule

MEAL	TIME	WEEK 1, DATES & TIME	WEEK 2, DATES & TIME	WEEK 3, DATES & TIME	WEEK 4, DATES & TIME	WEEK 5, DATES & TIME
TEA BREAK LUNCH BREAK			Mon 30 May	Mon 6 June	Mon 13 June	Mon 20 June
	10H00 – 10H30					
	14H30 – 15H30					
TEA BREAK LUNCH BREAK			Tue 31 May	Tue 7 June	Tue 14 June	Tue 21 June
	10H00 – 10H30					
	14H30 – 15H30					
TEA BREAK LUNCH BREAK			Wed 1 June	Wed 8 June	Wed 15 June	Wed 22 June
	10H00 – 10H30					
	14H30 – 15H30					
TEA BREAK LUNCH BREAK			Thus 2 June	Thus 9 June	Thus 16 June	Thus 23 June
	10H00 – 10H30					
	14H30 – 15H30					
TEA BREAK LUNCH BREAK		Fri 27 May	Fri 3 June	Fri 10 June	Fri 17 June	Fri 24 June
	10H00 – 10H30					
	14H30 – 15H30					
TEA BREAK LUNCH BREAK		Sat 28 May	Sat 4 June	Sat 11 June	Sat 18 June	Sat 25 June
	10H00- 10H30					
	14H00 – 16H00					
TEA BREAK LUNCH BREAK		Sun 29 May	Sun 5 June	Sun 12 June	Sun 19 June	Sun 26 June
	10H00- 10H30					
	14H00 – 16H00					

Appendix 8: Interview guide for caterers

Food economy

- a. Please can you tell me about your history in NMDH and with RU Food Services? (history)
- b. How did you acquire your catering skill and knowledge? When, where, how long? (tools)
- c. What challenges do you face in this dining hall as a caterer? (T&C)
- d. How is food procured and purchased in this kitchen? (tools + rules + community)
- e. How are you able to ensure that 3 meals and 8 diets are accurately prepared everyday? (manual/recipe) (tools)
- f. What can you say about the culture, attitude and behaviour of students and staff members that you are working with? (subject + T&C)
- g. Please what is your opinion of food wastage in this dining hall? (inception, gravity/quantity/quality, composition (meal, diet), cause/responsible for, how is it disposed?) (history + object + subject + T&C + community)
- h. How come Food Services have not been able to address food waste over the years? (outcome + T&C)

Sustainable practices and learning activities

- a. How did 'seconds' come about? After it do you sometimes still have leftover food, juice, fruits, and condiments in the kitchen? If yes, what happens to it? (history + object + T&C)
- b. Apart from students' leftovers on the tray and the remaining food after 'seconds', have there been instances whereby foodstuffs get spoilt in the cold room, freezer or store? What was responsible for that? (history + object + tool)
- c. Why do kitchen staff members have separate menus from students?
- d. In your opinion, do the rules governing the dining hall contribute to food waste in any way? E.g. guests, removal of food, staff members' separate meals, mealtimes etc. How? (rules + T&C).
- e. Do you discuss issues pertaining the causes and solutions to food wastage in your meetings? (tools + div of lab)
- f. As staff members, have you been given any teaching or training on food resource management? (tools+ outcome + object)
- g. What efforts are you and other staff members making to reduce food waste? (outcome + T&C)
- h. How else can the dining hall be run in order to support better food resource efficiency? (solution)
- i. Do you have any other information you want to provide me with? (miscellaneous)

Appendix 9: Sample of staff interview consent form



RHODES UNIVERSITY
Where leaders learn

RESEARCH CONSENT FORM

Thank you for agreeing to be part of this study. This document serves to obtain your written consent for being involved in this study and to use data provided for research purposes.

Researcher: Agbedahin Adesuwa Vanessa-g11a4055@campus.ru.ac.za

Department: Environmental Learning Research Centre, Faculty of Education

Provisional title of Research: Using expansive learning processes to foster better food economy and food waste management practices: A case study of Nelson Mandela dining-hall, Rhodes University Campus Food Services, South Africa.

For participant:

- I have received information about this study.
- I understand the purpose of the research and my involvement in it.
- I understand that participation in this study is done on a voluntary basis.
- I understand anonymity will be granted (except otherwise indicated)

Name Mrs Gay Pellay Designation Head Food Services
Signature [Signature] Date 30 May 2011

For researcher:

- I have provided information about my research to the above participant.
- He/she is willing to participate and has granted me permission to use data for research purposes.
- I will maintain confidentiality, respect for persons, truth and democracy

Signed [Signature] Date 30 May 2011

environmental
LEARNING RESEARCH CENTRE

Appendix 10: Sample of letter of correspondence for member checking

Date: Thu, 04 Aug 2011 06:41:53 +0200 [08/04/2011 06:41:53 SAST]

From: Jay Pillay

To: vanessa agbedahin

Reply-To: Jay.Pillay

Subject: Re: Request for interview transcript approval

Dear Vanessa

I have read your transcript and it is a true reflection of our conversations on both occasions. I have not made any adjustments. There are some verbal grammars and spelling that needs adjustment. It is quite strange to read one's conversation. I kept saying, "did I say that". Anyway, I am satisfied that you may use the content of this interview in your research, barring some of the grammar and Yeahs.....

Good Luck

Jay

On 1 Aug 2011 at 22:02, vanessa agbedahin wrote:

Dear Jay,

I sincerely apologize for sending this transcript later than I promised, I underestimated the final editing and proof reading I needed to do.

Please find attached 2 interview transcripts. The first was the one conducted 3 March, 2011 in your residence, page 1-11 and the second was conducted 4 May, 2011 in your office, page 12-18. I employ you to please find time to read through and let me know if it accurately reflects our conversation. As you know, this is essential for the fulfilment of the ethical considerations I made. Respect for truth, thereby I would ensure that I truthful collect data, analyze and report the findings correctly.

Please kindly note that the words or phrases in square brackets [] were added to explain what took place during the interview, for instance, permission not to quote you at a point, laughing, attending to someone, checking your laptop. It buttresses words and pronouns and also gives explanations for any un-transcribed information, so that you can keep track of the conversation easily.

Ellipsis ... connotes omitted repeated and unwanted words/phrases.
Long dots.....denote words/phrases I couldn't figure out during transcription and bracket () to indicate unspoken actions.

Very many thanks for this tedious task I am giving you.

I am sincerely grateful.

--

Kind regards,

Adesuwa Vanessa Agbedahin

Appendix 11: Hall and time schedule for focus group discussions							
TIME/DATE	MON 25/Venue	TUES 26/Venue	WED 27/Venue	THUS 28/Venue	FRI 29/Venue	SAT 30/Venue	SUN 31/Venue
07:00-07:30							
07:30-08:00							
08:00-08:30							
08:30-09:00							
09:00-09:30							
09:30-10:00							
10:00-10:30							
10:30-11:00							
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15:00-15:30							
15:30-16:00							
16:00-16:30							
16:30-17:00							
17:00-17:30							
17:30-18:00							
18:00-18:30							
18:30-19:00							
19:00-19:30							
19:30-20:00							
20:00-20:30							
20:30-21:00							
21:00-21:30							
21:30-22:00							

Appendix 12: Sample of registration and consent form for focus group discussions

HOUSE ()

S/N	Name of student	Department	Year	Nationality	Email address	Cell phone No.	Signature
1*		Science	1	RSA	@campus.ru.ac.za		
2		Science	1	Ugandan	@campus.ru.ac.za		
3		Humanities	2	RSA	@campus.ru.ac.za		
4		Humanities	1	Zimbabwean	@campus.ru.ac.za		
5		Humanities	1	Kenyan	@campus.ru.ac.za		
6*		Law	4	Zimbabwean	@campus.ru.ac.za		
7		Humanities	3	Zimbabwean	@campus.ru.ac.za		
8							
9							
10							

NEW PARTICIPANTS AFTER 3RD TERM RESUMPTION

S/N	Name of student	Department	Year	Nationality	Email address	Cell phone No.	Signature
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Appendix 13: Sample of focus group discussion guide and notes written by students

FOCUS GROUP DISCUSSION DATA

House: [redacted]
 Index: [redacted]
 Venue: [redacted] common room
 Date: 26 July, 2014
 Time: 6:50 pm - 7:45
 Number of students: 9
 Composition: 1st, 2nd 3rd year, national + international students, various d
 Length: 55 minutes

QUESTIONING ROUTES	SUMMARY OF GROUP
1. How often do you eat in Nelson Mandela dining hall? (subject + CenAS)	<ul style="list-style-type: none"> 2-3 times a day Breakfast usually missed where 2 meals are taken First time period in dining hall was immediate
2. Think back at when you first entered the NMDH. What was your first impression-briefly? (history + subject)	→
3. Could you please share your experiences in terms of... (subject + object + T&C) <ul style="list-style-type: none"> The way you have to book and unbook of your meals? (tool + rules) 	<ul style="list-style-type: none"> Vast options are available Systems used to book are confusing at times, where meal names are unknown Generally, there's a balance between the
<ul style="list-style-type: none"> Cost of meals? (tool + rules) vs. Quality & Quantity of the food? (object) 	<ul style="list-style-type: none"> Breakfast: R427 Lunch: R15 <p>Quantity: Minimum satisfaction; pricing of food unfair</p> <p>Quality: Sometimes food not well done... health hazard??</p>
<ul style="list-style-type: none"> Types of diets? (object) 	<p>Vast diet... about 8.</p> <p>Favourite: African dish... Default meal opted secondary.</p>

Vanessa's research instruments. Page 9

<ul style="list-style-type: none"> Meal times? (tool + rules) 	<p>Breakfast: 07h00 - 08h30 If breakfast times would be extended, it would be</p> <p>Lunch:</p> <p>Supper: 17h00 - 18h30</p>
<ul style="list-style-type: none"> How is eating in the dining-hall different from eating at home? (culture) 	<p>Breakfast: some cultural diversity ... cereal vs traditional porridge</p> <p>Lunch: Chicken Kiev is much different from chicken that would be prepared at home.</p> <p>Supper:</p> <p>Expectancy of ^{prepared} meals do not ^{is not} coherent with what students identically expected ^{identically expected} meal</p>
<p>4. What's your opinion about food wastage in the dining-hall? (quantity, composition, (history + object + rules + T&C))</p>	<p>Quantity: a large amount of food is wasted.</p> <p>Composition: ^{Vegetables,} Chicken Kiev, bread, baked fish are among the most wasted foods</p>
<ul style="list-style-type: none"> What do you think is responsible for food waste in the dining-hall? <p>Do you eat every meal you book?</p>	<ul style="list-style-type: none"> Preference: the way in which the food is presented sometimes puts students off. Change of staff-caterers. Ignorance of computer systems. <p>Sometimes, but mostly yes ... dependent on allowance received from parents.</p>
<ul style="list-style-type: none"> Why do some students always go for 'seconds' and some don't? (SusP) 	<p>Supper time is the peak time seconds are taken</p> <p>Why? Quantity of food is a major concern (money) \therefore students resort to eating seconds.</p> <p>Why? Students get to choose any other meal other than their initially booked meal.</p> <p>Why not? There's a rush of students \therefore greed is present...</p>

<ul style="list-style-type: none"> What do you think happens to leftovers? (object) 	<ul style="list-style-type: none"> Sometimes food is redistributed to students if it is a favourite meal Staff have some sense of the meals after 'see' are served, and when the canteen is closed.
<p>5. What do you feel about the rules and regulations stated in the dining-hall session of your 'hall rule book' and the etiquettes poster in the dining-hall? .</p>	<p>R & R are too strict... Students are discouraged to have meals at times... Contribution to food waste... Students usually ignore these rules as they get hungry...</p> <p>Sometimes rules and regulation constrain students from their own diet...</p>
<ul style="list-style-type: none"> How were these rules introduced to you? 	<p>In an authoritarian manner...</p> <p>Reasons concern health and hygiene</p>
<ul style="list-style-type: none"> Do you think the R&R have any possible influence on food waste in the dining-hall? How? (subject + rules) 	<p>Yes...</p>
<ul style="list-style-type: none"> Have you ever undergone disciplinary action as a result of violating a dining-hall rule? Can you share your experience? (subject + rules) 	<p>Mostly not... there has been no case heard of that a student has faced disciplinary action</p>

<ul style="list-style-type: none"> • How do you think the dining-hall would be without these rules? (rules) 	
6. Please can you share any teaching, lecture or learning activities that you've been given in your house/dining-hall concerning food waste reduction? (what of the posters?) (subject + tools)	<i>Not usually... not at all.</i>
7. How is your relationship with the kitchen staff members? (T&C + subject)	<i>There's a generally good relationship with the kitchen staff... they are caring... some staff are not friendly... particular ones mentioned.</i>
8. As students, what have you been doing to avoid food waste in the dining-hall? (subject + object)	<i>Nothing.</i>
9. What do you suggest the Food Services, kitchen staff members or hall warden can do in order to reduce food waste in the dining-hall? (solution)	<ul style="list-style-type: none"> • Conduct surveys • Listen to critiques from students • Attentiveness to what is backed most... • Regarding bread, students burn it... majorly credited to relentless of students...

Appendix 14: Sample of focus group discussion appreciation letter to students

Date: Sat, 30 Jul 2011

From: [Name and student number withheld for ethical reasons]

To: vanessa agbedahin

Subject: Re: Appreciation

Hi!

It was a pleasure being part of it.

Warm wishes,

[Name withheld]!

Quoting vanessa agbedahin:

Dear [Students' names withheld]

This is just to express my gratitude to you all for joining my focus group discussion today. I must confess that I had a fantastic time that was full of understanding, insight and great information to boost my research.

Thanks a lot.

I hope if I invite a few of you for a follow-up research workshop by the end of August or early September, you will not mind attending.

Thank you once again. I am sincerely grateful.

Vanessa.

Appendix 15a: Sample (1) of Change Laboratory Workshop introductory letter and reply

Date: Wed, 24 Aug 2011
From: Jay Pillay
To: vanessa agbedahin
Reply-To: Jay.Pillay
Subject: Re: Food Economy Research Workshop

Thanks Vanessa

I am looking forward to the feedback session.

Regards

Jay

On 24 Aug 2011 at 15:26, vanessa agbedahin wrote:

Dear All,

I hope this finds you well. This is a follow-up of the research focusing on how a 'more' Sustainable food economy and reduction of food waste can be attained; with particular focus on Rhodes University dining halls [Using Cultural Historical Activity Theory (CHAT) and Expansive Learning processes]. This is also sequel to the email I sent to the Food Services? Manager on 10 May 2011 which she forwarded to some of you on 11 May 2011 before I commenced the study.

I have completed the first phase of the research which involved observations, interviews, focus group discussions, personal communications and data analysis, focussing on the current situation of the phenomenon. I am now in the second phase which entails the presentation of the findings of phase 1 preliminary analysis and the detail of the first is as follows:

Date: Tuesday 30 August 2011
Time: 10am-11:15am prompt
Venue: Nelson Mandela Dining Hall.

Expected stakeholders include the Food Services Manager & Assistant Manager, some Nelson Mandela Kitchen Caterers, Cooks, Servery Ladies & Kitchen Attendants, Nelson Mandela and Lilian Ngoyi Hall Wardens, Hall Administrators and Food Representatives, Senior Catering Store men and a few students.

I will be facilitating the workshop with a power-point presentation and the programme of the activities will be sent beforehand. Besides I would like to inform you that during the workshop I will video and audio record the even for proper documentation and presentation on the one hand, and to meet related ethical and validity requirements on the other hand. I will therefore be employing one or two RU students as research assistants.

I greatly appreciate your presence in advance to make this workshop a great success. Please feel free to contact me for further details.

Thanks a million as we meet together to discuss, deliberate, co-create for a 'more' Sustainable future.

--

Kind regards,
Adesuwa Vanessa Agbedahin

Appendix 15b: Sample (2) of Change Laboratory Workshop introductory letter and reply

Date: Mon, 29 Aug 2011
From: Sharmila Gangiah
To: 'vanessa agbedahin'
Subject: RE: Programme for tomorrow's food economy workshop

Hi Vanessa

Yes, Desiree and I will be there. We have also extended this invite to our house wardens

-----Original Message-----

From: vanessa agbedahin
Sent: 29 August 2011 09:59
To: vanessa agbedahin
Cc: Jay.Pillay; s.wright; [some names withheld for ethical reasons], Jeremy Baxter; Desiree Wicks; genean Mardon; sharmila Gangiah; a.winter; [student numbers of food representatives withheld]
Subject: Re: Programme for tomorrow's food economy workshop

Dear all,

Please find attached the programme for our 'Change Laboratory' workshop tomorrow. Please and please, your presence is highly essential and you may invite other relevant stakeholders as well, if you so wish.

Thank you and see you there.

Vanessa.

Quoting vanessa agbedahin

Appendix 16: First and second Change Laboratory Workshop programme

Change Laboratory Workshop (1) programme

Date: Tuesday 30th August 2011; Time: 10am; Venue: Nelson Mandela Dining Hall.

SN	Agenda	Facilitator	Time
1	Registration	Researcher and assistants	10h00-
2	Welcome address and handover to researcher	Jay Pillay	10h05-10h10
3	Introduction to food activity systems research with emphasis on the positive and educational dimensions of the contradictions found in phase 1 data collection and analysis	Vanessa Agbedahin	10h10-10h25
4	Presentation of 'mirror data' based on phase 1 research and contradictions	Vanessa Agbedahin	10h25-10h45
5	Participants agree on contradictions and prioritize key common issues that can be addressed	Jay Pillay	10h45-11h00
6	Schedule date and time for workshop (2)	Jay Pillay	11h00-11h10
7	Appreciation and departure	Vanessa Agbedahin	11h10-11h15 ²⁶

Change Laboratory Workshop (2) programme

Date: Wednesday 28th September, 2011; Time: 10am; Venue: Nelson Mandela Dining Hall

S N	Agenda	Facilitators	Time
1	Arrival of participants and registration	Researcher and research assistants	10h00-10h05
2	A recapitulation of workshop 1: Where we were, where we are, and where we are hopefully going	Vanessa Agbedahin	10h05-10h15
3	Participants confirm choices of the most important and critical contradictions for deliberation and discussion	Jay Pillay	10h15-10h20
4	Participants break into 4 activity groups for a deeper analysis of selected issues and model solutions [1-Students/food reps, 2-kitchen staff members, 3-hall staff members and 4-Food Services]	Vanessa Agbedahin	10h20-10h40
5	Participants return to main group to share their analyses and proposed model solutions for change	Vanessa Agbedahin and Jay Pillay	10h40-10h55
6	Participants develop action plan to implement modelled solutions for change, designate role, propose consultation and negotiation with other relevant stakeholders	Jay Pillay	10h55-11h10
7	Appreciation, way forward (Feedback workshop to review progress and to make necessary adjustments) and departure	Vanessa Agbedahin	11h10-11h15

²⁶ Please note that these times were the pre-planned times and they were extended during the actual workshops.

Appendix 17: 'Researcher interventionist' email correspondence

From: Vanessa Agbedahin
To: Clayton Zazu, Sikka Tshinigayamwe, Nina Rivers, Komlan Agbedahin
Date: Tue, Sep 27, 2011 at 2:59 PM
Subject: Change Laboratory Workshop plans tomorrow-Thank you

I hope this finds you well. Thank you very much for offering to assist me in this workshop, indeed you are 'critical research friends'.

This is to give you a brief run down of tomorrow's Change Laboratory workshop and what I would humbly expect of you.

It is starting by 10am prompt but I will need you to be there at least 30mins before then pleaseeeeeeeeeeeeeee, so we can put everything in order. Please before and during the workshop can you help me ensure that ALL participants have filled and signed the consent/registration forms? Dear Nina and Sirkka, please you may have to count the signed forms and the participants to confirm this). Komlan will be the video man, while Clayton will be the photographer please.

After my PowerPoint presentation and Jay's (Food Services manager) confirmation of most important issues, participants will break into activity groups to deliberate and model solutions to the prioritised contradictions. At this point please we have to quickly arrange the chairs in 4 circles per group (1. students, 2. kitchen staff members, 3. Food Services management, and 4 Hall administrators, hall wardens and house wardens).

They will then converge again to present their modelled solutions, and on and on and on.

Thank you so much guys, I really appreciate it.

Vanessa.

.....

From: Vanessa Agbedahin
To: Clayton Zazu, Sirkka Tshinigayamwe, Nina Rivers, Komlan Agbedahin
Date: Wed, Sep 28, 2011 at 12:24 PM
Subject: You are highly appreciated

Dear critical research friends,

I must confess that I am overwhelmed at your concern and support. You are such a blessing and your contributions, help, advice, and much more have invariably contributed to the huge success of my Change Laboratory Workshops. I sure do cannot thank you enough but please accept the limited words I have to express my gratitude.

Much appreciation comes from my husband to you guys as well, he is really impressed.

Thanks a million and GOD BLESS YOU all ABUNDANTLY.

See you in the ELRC shortly.

--

Kind regards,

.....

Reply from Clayton Zazu

Hie,

Thanks and all the best in the other processes. You will make it lady!!!

Regards

Clayton


.....

Reply from Nina Rivers


Dear Vanessa! You are so great and it was such a pleasure to help you out. Sorry I had to leave early. Be blessed today. You will be rewarded for all your hard work.

Love Nina

Appendix 18: Sample of second Change Laboratory Workshop consent form



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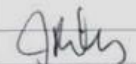
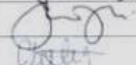

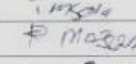
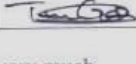
environmental
LEARNING RESEARCH CENTRE

FOOD ECONOMY 'CHANGE LABORATORY' WORKSHOP 2

Date: Wednesday 28 September 2011, **Time:** 10-11:15am, **Venue:** Nelson Mandela Dining-Hall

ATTENDANCE REGISTER AND RESEARCH CONSENT FORM

Thank you for attending this workshop. This document serves to obtain your written consent for being involved in this study and to use data provided for research purposes. [Please indicate if you would like to view my interpretations of the data].

SN	NAME	DESIGNATION	CELL NUMBER	AVAILABLE FOR DATA INTERPRETATION	SIGNATURE
1		Food Service Manager		yes	
2		Ass F/S MGR		yes	
3		Student		yes	
4		Kitchen Attendant			
5		kitchen attendant			
6		food server			
7		Food serv/ Kitchen attendant			
8		food server			
9		COOK		yes	
10		Cook		yes	

Thank you very much
Adesuwa Vanessa Agbedahin.

Appendix 19: List of contradictions and associated tensions grouped into nine issues

Issue 1: Non availability of substantial learning activities

1. Quaternary contradiction between subjects and mediating tools

This quaternary contradiction was identified between the expectations of the RU community/Residential Operations Division/Food Services of the kitchen staff members and students to reduce food waste, and the non availability of substantial informal or formal learning activities, lectures, discussions, and learning materials to facilitate the learning.

Issue 2: Menus, meals, meal booking and responsibility

2. Secondary and quaternary contradiction between rules and subjects

The contradiction between the prerequisite for meal access, number of meals booked and the number of students attending prepared meals (especially during breakfast, beginning of the year and after examinations), creates tension among kitchen staff members and causes food waste production.

3. Explicit tension between objects/objects and subjects/subjects associated with contradiction 2 above

There is tension between the practice of the cooking of menus/meals in batches, cutting down on the number of meals booked [because of the uncertainty of the actual number of students that will be present for meals] and the exhaustion and quality of meals experienced sometimes by students.

4. Quaternary contradiction between mediating tools and rules

There is a contradiction between the restrictions on the number/amount of meals that can be un-booked and the number/amount of meals some students would like to un-book; and food wastage.

5. Quaternary contradiction between mediating tools and objects

There is a contradiction between online meal booking, menu names, their descriptions, and actual menu experienced by students [in their first few months in the dining hall before they get familiar with the menus].

Issue 3: Dining hall rules and etiquettes

6. Primary contradiction between rules and rules

There is a contradiction between Nelson Mandela hall rule 11(ii) and Lilian Ngoyi hall rule 11B (ii) which state “*pass through the servery area, collecting your full meal from the Caterer on duty. Once you have passed through, you may NOT re-enter to fetch any other food,*” and Nelson Mandela hall rules 11(n) and Lilian Ngoyi hall rule 11(j) “*take only what you CAN and INTEND eating – do not waste food.*”

7. Primary contradiction between rules and rules and mediating tool and mediating tool

There is a contradiction between the rule—removal of only two slices of bread from the dining hall during supper and the removal of four slices of bread stated in the new dining hall etiquette poster.

8. Quaternary contradiction between rules, objects and division of labour

There is a contradiction between the existence of dining hall rules, partial compliance to rules by many students and ineffective enforcement of rules.

9. Quaternary contradiction between rules/mediating tools and objects

There is a contradiction between the rate of violation of dining hall rules, and students' disciplinary code and the intensity/actualization of disciplinary action stated in the etiquette poster and hall rules.

10. Secondary contradiction between rules, mediating tools and division of labour

There is a contradiction between the repercussions of violating the rules stated in the etiquette poster, hall rules and students' disciplinary code and the verbal cautions/warnings that often occur in the dining hall by kitchen staff members and wardens.

11. Quaternary contradiction between objects and division of labour

There is a contradiction between the Residential Operations Division and Food Services' expectation from the wardens, sub-wardens [rule enforcers that are students], and kitchen staff members to enforce rules, and the feasibility thereof.

12. Explicit tension associated with contradictions 6-11 above

There is a tension emanating from the lack of awareness of the origin and efficacy of rules by most students and kitchen staff members and what seems reasonable and fair to them.

Issue 4: 'Seconds'

13. Secondary contradiction between mediating tools and objects

There is a contradiction between the purpose of 'seconds' [reduction of food waste] and what occurs during and after 'seconds.'

Issue 5: Daily food provision for wardens

14. Secondary contradiction between mediating tools and objects

There is a contradiction between the benefit of providing daily food for hall wardens, house wardens and their families and their unavoidable inconsistent attendance at meals, [especially breakfast and supper] which is counter productive to food waste reduction.

Issue 6: Priority placed on food wastage issue

15. Secondary contradiction between mediating tools and objects

There is a contradiction between issues prioritised in management and food representative meetings and issues related to food wastage.

Issue 7: Attitude towards food waste

16. Secondary contradiction between subjects and their objects

There is a contradiction between some kitchen staff members and students who do/do not recognize the essence and possibility of food waste reduction and do not avoid food wastage in the dining hall respectively.

Issue 8: Food waste disposal

17. Quaternary contradiction between objects

There is a contradiction between students/kitchen staff members' willingness to practice sustainable food waste reduction and their knowledge of the Food Services' practice of donating food waste to pig farmers at a minimal administrative fee.

18. Explicit associated tension from quaternary contradiction (17 above) between objects and subjects

There is tension emanating from the current transference of leftovers to pig farmers [not humans] by the Food Services and the continuous concern about better ways of dealing with food waste to ensure 'more' sustainable food economy, among kitchen staffs, students and the RU community.

Issue 9: Rotation of kitchen staff members

19. Explicit tension between objects and rules

There is a tension stemming from the regular practice of rotating kitchen staff members by the Residential Operations Division and the Food Services and the structural, mental, and physical adjustments made by kitchen staff members, as well as the effect on service delivery experienced by students in the dining hall.

Appendix 20: Sample of first Change Laboratory Workshop



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LEARNING RESEARCH CENTRE

FOOD ECONOMY 'CHANGE LABORATORY' WORKSHOP 1

Date: Tuesday 30 August 2011, **Time:** 10-11:15am, **Venue:** Nelson Mandela Dining-Hall

ATTENDANCE REGISTER AND RESEARCH CONSENT FORM

Thank you for attending this workshop. This document serves to obtain your written consent for being involved in this study and to use data provided for research purposes. [Please indicate if you would like to view my interpretations of the data].

SN	NAME	DESIGNATION	CELL NUMBER	AVAILABLE FOR DATA INTERPRETATION	SIGNATURE
1		ASS. F/SERVICES MGR		✓	
2		Food rep for Nuth First		✓	
3		House Warden - G. Butler		✓	
4		Servicing Lady		✓	
5		S. W. M.		✓	
6		KITCHEN ATTENDANT		✓	
7		KITCHEN ATTENDANT		✓	
8		SERVING LADY		✓	
9		Assistant researcher		✓	
10		CATERER		✓	

Thank you very much
Adesuwa Vanessa Agbedahin.

Appendix 21: Letter to negotiate research access with the RU Food Services

Date: Tue, 10 May 2011

From: Jay Pillay

To: vanessa agbedahin

Cc: s.wright, Desiree Wicks, Jeremy Baxter, i.l'ange sharmila Gangiah, genean Mardon

Reply-To: Jay.Pillay

Subject: RE: REQUEST TO PARTNER IN RESEARCH AND TO NEGOTIATE ACCESS

Dear Vanessa

Many thanks for your email and for the information regarding your research. The outcomes of such a research may benefit food services in respect of identifying better waste management practices.

I have taken the liberty of copying Mrs Desiree Wicks and Mr Jeremy Baxter for their input and approval to conduct the research in their respective halls. Mrs Wicks is the Hall warden for the Nelson Mandela Dining Hall and Mr Baxter is the Hall warden for Lilian Ngoyi hall.

I have also copied Dr Iain L'Ange who is the director of Residential Operations Division for his input and approval as well.

Warm Regards,
Jay

On 10 May 2011 at 11:23, vanessa agbedahin wrote:

Dear Jay,

I deem it fit to commence this letter by expressing my great appreciation to you for your obvious interest and support in my academic pursuit so far. This letter is to therefore seek formal approval to commence my research.

I am a master's student from Environmental Learning Research Centre, Faculty of Education, Rhodes University. The provisional title of my research is using expansive learning processes to foster better food waste management practice? and I intend to do a pilot case study in Nelson Mandela Dining Hall. In line with this, I will be collecting data from the Rhodes University Campus Food Services, the Nelson Mandela Dining Hall staff members, Nelson Mandela hall and Lilian Ngoyi hall staff members, including their respective students.

The proposed research is planned to be in two phases. Phase 1 entails the exploration of the current situation of Nelson Mandela Dining Hall as regards food wastage by facilitating dialogues with participants during interviews, focus group discussions and observation with photographing, in order to identify opportunities for learning and change. While phase 2 of the study will involve sharing the findings of phase 1 and will require the collective deliberation and development of possible and viable measures to foster the overall reduction in food waste. This will be done through planned workshops involving all participants and the most convenient times for the 3-4 workshops would be negotiated during the second

phase of the research.

This study will spread over 4 months, precisely from May-August 2011. Respect for persons, truth and democracy will be honoured, therefore participation will be on a voluntary basis, and besides all given or observed information will be handled confidentially and used for research purposes only.

I anticipate your positive response and support as I look forward to having a productive time with you all.

Kind regards,

Vanessa A. Agbedahin
M.Ed (EE) Student,
Environmental Learning Research Centre,

Appendix 22: Letter to negotiate research access with Nelson Mandela and Lilian Ngoyi hall wardens

Date: Wed, 11 May 2011 11:57:23 +0200 [05/11/2011 11:57:23 SAST]
From: Desiree Wicks
To: 'Jeremy Baxter', 'vanessa agbedahin'
Cc: Jay.Pillay, i.l'ange, 'sharmila Gangiah', 'genean Mardon'
Subject: RE: REQUEST TO PARTNER IN RESEARCH AND TO NEGOTIATE ACCESS

No problem from my side.

Good luck

Regards

DESIREE WICKS
MANAGER: STUDENT BUREAU
RHODES UNIVERSITY
GRAHAMSTOWN
6139

-----Original Message-----

From: Jeremy Baxter
Sent: 11 May 2011 11:56 AM
To: vanessa agbedahin; Desiree wicks
Cc: Jay.Pillay; i.l'ange; sharmila Gangiah; genean Mardon
Subject: Re: REQUEST TO PARTNER IN RESEARCH AND TO NEGOTIATE ACCESS

Dear Vanessa

I have no problem with you conducting your research in the Nelson Mandela Dining Hall. Please note that confirmation should also be obtained from Mrs D Wicks, the Nelson Mandela Hall warden.

Jeremy Baxter
Lilian Ngoyi Hall warden.

Appendix 23: Data indexing, coding, categorizing and analytical matrix

SN	Main Category	Thick description	Sub categories	Thick description	Subset categories	Thick description
1	Food Economy (FE-Blue)		Food procurement (FE1)		Fresh Fruits and Vegetables (FE1a)	
					Grocery (FE1b)	
					Bread (FE1c)	
					Milk & Dairy (FE1d)	
					Juice (FE1e)	
					Challenges (FE1f)	
					Learning (FE1g)	
					Unsustainable practices (FE1h)	
					Tension (FE1i)	
			Food preservation (FE2)		Freezer (FE2a)	
					Cold Room (FE2b)	
					Challenges (FE2c)	
					Learning (FE2d)	
					Knowledge/Experience (FE2e)	
					Unsustainable practices (FE2f)	
					Tension (FE2g)	
			Food preparation (FE3)		Diets (FE3a)	
					Time (FE3b)	
					Knowledge/Experience (FE3c)	
					Challenges (FE3d)	

					Learning (FE3e)	
					Unsustainable practices (FE3f)	
					Tension (FE3g)	
			Food serving (FE4)		Communication (FE4a)	
					Menu Allocation (FE4b)	
					Time (FE4c)	
					Food Quantity Indication (FE4d)	
					Menu Preference Indication (FE4e)	
					Unsustainable practices (FE4f)	
					Tensions (FE4g)	
			Food consumption (FE5)		Meal time (FE5a)	
					Food quality (FE5b)	
					Food quantity (FE5c)	
					Unsustainable practices (FE5d)	
					Tension (FE5e)	
			Food waste (FE6)		Quantity (FE6a)	
					Quality (FE6b)	
					Composition (FE6c)	
					Mostly wasted (FE6d)	
					Less wasted (FE6e)	
					Causes of waste (FE6f)	
					History (FE6g)	
					Unsustainable practices (FE6h)	
					Tension (FE6i)	
2	Sustainable		By food producers (SP1)		1. Caterer 1 (S...)	

	Practices (SP- Green)				2. Caterer 2 (S...)	
					3. Cook 1 (S...)	
					4. Cook 2 (S...)	
					5. Servery attendant 1 (S...)	
					6. Servery attendant 2 (S...)	
					7. Kitchen attendant 1 (S...)	
					8. Kitchen attendant 2 (S...)	
			By food consumers (SP2)		1. Guy Butler House (GBFG)	
					2. Adelaide Tambo House (ATFG)	
					3. Ruth First House (RFFG)	
					4. Centenary House (CFG)	
					5. Helen Joseph House (HJFG)	
					6. Victoria Mzenge House (VMFG)	
					7. Joe Slovo House (JSFG)	
					8. Stanley Kidd House (SKFG)	
					9. Food Representatives (FRFG)	
			By Food Services (SP3)			
			By RU (SP4)			
3.	Learning		Resource Materials (LA1)		For Staff Members (LA1a)	

	Activities (LA-Pink)				For Students (LA1b)	
					For Food Reps (LA1c)	
			Teaching or Lecture (LA2)		For Staff Members (LA2a)	
					For Students (LA2b)	
					For Food Representatives (LA1c)	
4.	Agentive talk (AT- Orange)		By Food Producers (AT1)			
			By Food Consumers (AT2)			
5.	Reflexive talk (RT- Purple)		By Food Producers (RT1)			
			By Food Consumers (RT2)			
			By Food Services (RT3)			
6.	Solution (S-Lemon Green)		By Food Producers (S1)			
			By Food Consumers (S2)			
			By Food Services (S3)			

Appendix 24: Food waste posters



Appendix 25: Sample of daily dining hall catering form

PLEASE COMPLETE IN DUPLICATE

KITCHEN.....

CATERER.....

DATE.....

DAY.....

MEAL	BOOKED			CATERED			TAKEN			SECONDS
	STU	CONF	OTH	STU	CONF	OTH	STU	CONF	OTH	
BREAKFAST				15			13			
							3			
LUNCH HALAAL							5			
LUNCH NORMAL										
LUNCH VEGETARIAN										
LUNCH AFRICAN							11			
LUNCH HEALTH										
LUNCH FAST FOOD							8			
LUNCH FF HALAAL							10			
LUNCH FF VEGETARIAN							1			
PACKED LUNCHES				1			1			
DINNER HALAAL				25			20			
DINNER NORMAL				1			16			
DINNER VEGETARIAN				10			5			
DINNER HEALTH				2			6			
DINNER AFRICAN				1			46			
PACKED DINNERS					3					

NB :

STU = STUDENTS, WARDENS, WARDENS FAMILIES

CONF = CONFERENCE GUESTS

OTH = VISITORS, VAC STUDENTS

Appendix 26: Questioning route for focus group discussion with food representatives

1. How did you become food representatives? (history + subject)
2. What are your responsibilities as food representatives? (subject + tools)
3. What challenges or difficulties do you face as food representatives? (role +subject+ T&C)
4. What roles have you played as food representatives that are related to the reduction of food waste? (subject + tools)
5. What is your relationship with the kitchen staff members and the Food Services? When, how, what do you communicate? (T&C + subject).
6. What in your opinion are the factors responsible for food waste in this ? (T&C + object)
7. Please can you share any teaching, lecture or learning activities that you've been given in your house/dining hall concerning food waste reduction? (posters?) (subject + tools)
8. What can you say about the dining hall etiquettes and the dining hall rules stated in your hall rules. (rules + T&C)
9. To what extent are students obeying them? Why? and Why not? (rule + subject)
10. Under what circumstances do students face disciplinary actions for violating a dining hall rule? How often & procedure (subject +rule)
11. What do you suggest the Food Services, kitchen staff members or hall wardens can do in order to reduce food waste in the dining hall? (solution)

Appendix 27: Questioning route for focus group discussion with students

1. How often do you eat in Nelson Mandela Dining Hall? (subject + CenAS)
2. Think back at when you first entered the NMDH. What was your first impression-briefly? (history + subject)
3. Could you please share your experiences in terms of:
 - a. The way you book and un-book of your meals online?
 - b. Your selection of preferred menu? (tool + rules)
 - c. Cost of meals? (tool + rules) vs. Quality & Quantity of the food? (object)
 - d. Types of diets? (object)
 - e. Meal times? (tool + rules)
4. How is eating in the dining hall the same or different from eating at home? (culture as regards the above points)
5. What is your opinion about food waste in the dining hall? Quantity? Composition? Progression? (history + object + rules + T&C)
6. What do you think is responsible for food waste in the dining hall? (object + subject)
7. Do you go for 'seconds'? Why do some students always go for 'seconds' and some don't? (SusP + object + subject)
8. What do you think happens to leftovers? (object) How do you feel about it? (T&C)
9. What can you say about the dining hall rules stated in the dining hall session of your 'hall rules' and the etiquettes poster in the dining hall?
 - a. How were these rules introduced to you?
 - b. Do you think the rules have any possible influence on food wastage in the dining hall? How? (subject + rules)
 - c. Have you ever undergone disciplinary action as a result of violating a dining hall rule?
 - d. Can you share your experience? (subject + rules)
 - e. How do you think the dining hall would be without these rules? (rules)
10. Please can you share any learning activity, teaching or lecture that you've been given in your house or dining hall concerning food waste reduction? Are you familiar with these posters? (subject + tools)
11. How is your relationship with the kitchen staff members? (T&C + subject). How do you communicate with them and vice versa?
12. As students, what have you been doing to avoid food waste in the dining hall? (subject + object).
13. What are the possible things students can do to reduce food waste?
14. What do you suggest the Food Services can do in order to reduce food waste in the dining hall?
 - a. Kitchen staff members?
 - b. Hall warden? (solution)

Appendix 28: Interview guide for cooks

Food economy

- a. Please tell me about your history in NMDH and with RU Food Services? (history)
- b. How did you acquire your cooking skill and knowledge? (tools)
- c. What meals and diets do you cook? (rules)
- d. What challenges do you face in this dining hall as a cook? (T&C)
- e. How are you able to ensure that 3 meals and 8 diets are accurately prepared everyday? (manual/recipe) (tools)
- f. What can you say about the culture, attitude and behaviour of students and staff members that you are working with? (subject + T&C)
- g. Please what can you say about food waste in this dining hall? (inception, gravity/quantity/quality, composition (meal, diet), cause/responsible for-student or staff members too, how is it disposed) (history + object + subject + T&C + community)
- h. How do you feel when students and staff members waste food? Why? (subject + T&C)

Sustainable practices and learning activities

- a. How did 'seconds' come about? After it do you sometimes still have leftover food, juice, fruits, and condiments in the kitchen? If yes, what happens to it? (history + object + T&C)
- b. Apart from students' leftovers on the tray and the remaining food after 'seconds', have there been instances whereby food stuffs get spoilt in the cold room, freezer or store? If yes, what was responsible for that? (history + object + tool)
- c. Why do staff members have separate meals from students? (rules, T&C)
- d. In your opinion, do the rules governing the dining hall contribute to food wastage in any way? E.g. guests, removal of food, staff members' separate meals, meal times etc (rules + T&C).
- e. Do you discuss issues pertaining to the causes and solutions to food wastage in your meetings? (tools + div of lab)
- f. As staff members, have you been given any teaching or training on food wastage? (tools+ outcome + object)
- g. What efforts are you and staff members making to reduce food waste? (outcome + T&C)
- h. How come food waste has not been able to be addressed over the years? (outcome + T&C)
- i. What do you think can be done to reduce food waste in this dining hall? (solution)
- j. Do you have any other information you want to provide me with? (miscellaneous)

Appendix 29: Interview guide for server attendants

Food economy

- a. Please tell me about your history in NMDH and with RU Food Services? (history)
- b. How did you acquire your job skill and knowledge? (when/where did you receive training and for how long?) (tools)
- c. What is your responsibility in this kitchen (tool)
- d. What challenges do you face in this dining hall as a server lady? (T&C)
- e. How is food procured and purchased in this kitchen? (tools + rules + community)
- f. What do you think about the way food is prepared and accessed in this dining hall (object + T&C)
- g. What can you say about the culture, attitude and behaviour of students and staff members that you are working with? (subject + T&C)
- h. How do you communicate with students when serving? How do students communicate with you when they come for meals? (subject)
- i. Please what is your opinion of food waste in this dining hall? (inception, gravity/quantity/quality, composition (meal, diet), how is it disposed, how do you feel about it?) (history + object + subject + T&C + community)
- j. What are the things, issues or factor responsible for food waste in this dining hall? (T&C)

Sustainable practices and learning activities

- j. How did 'seconds' come about? After it do you sometimes still have leftover food, juice, fruits, and condiments in the kitchen? Why? If yes, what happens to it? How do you feel about it? (history + object + T&C)
- k. Apart from students' leftovers on the tray and the remaining food after 'seconds', have there been instances whereby foodstuffs get spoilt in the cold room, freezer or store? What was responsible for that? (history + object + tool)
- l. Why do kitchen staff members have separate menus from students? But they are allowed to eat student food sometimes, right?
- m. Why can't staff members take food home? History (rule + T&C)
- n. In your opinion, do the rules governing the dining hall contribute to food waste in any way? E.g. guests, removal of food, staff members' separate meals, meal times etc (rules + T&C).
- o. Do you discuss issues pertaining the causes and solutions to food wastage in your meetings? (tools + div of lab)
- p. As staff members, what teaching or training on food resource management have you been given? (tools+ outcome + object)
- q. What efforts are you and other staff members making to reduce food waste? (outcome + T&C)
- r. What do you suggest Food Services can do to reduce food waste? (solution)
- s. Do you have any other information you want to provide me with? (miscellaneous)

Appendix 30: Interview guide for kitchen attendants

1. Please tell me about your history with RU Food Services and in NMDH? (history)
2. Please what is your responsibility in this dining hall? (tools)
3. How do you ensure that your work is done? (tools)
4. Who are you working with and what are their responsibilities as well? (division of labour + community)
5. What rules and regulations govern the kitchen and the dining hall? (rules)
6. What can you say about food waste in this dining hall? (object)
7. With your experience, when did you start having food waste, is it recently or has it always been there? (object + history)
8. Can you say the quantity reducing or increasing? 2009-date? (object + culture)
9. About how much leftovers do you actually see per day? (object)
10. Which meal, diet or food has more leftovers? (object)
11. How do you feel when students waste food? Why? (T&C)
12. What categories of students would you say waste more food? (male/female, individuals or group of friends) (subject + T&C + culture)
13. What happens to the leftovers? (object + community)
14. What do you think are the things, issues or conditions that have been causing food wastage in the dining hall? (T&C + object)
15. Why is it that kitchen staff members are not allowed to eat the same food students' eat? (T&C)
16. As staff members, what are you doing to prevent food wastage? (tools+ outcome +object)
17. Do you discuss issues pertaining to food waste during kitchen staff, food services or food rep's meetings (daily, weekly, monthly or quarterly) (tools + object + division of labour)
18. What do you think can be done to reduce food waste in this dining hall? (solution)
19. What other comment do you have to make? (miscellaneous).