Enabling social learning to stimulate value creation towards a circular economy: The case of the Food for Us food redistribution mobile application development process

by

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Abstract

This M.Ed. study investigates the social learning enabled by a food redistribution mobile application (app) project, Food for Us, in the Raymond Mhlaba municipality in the Eastern Cape, South Africa. Over an 18 month period, the Food for Us mobile app innovation project was piloted in two case study sites, Worcester, Western Cape, and the Raymond Mhlaba municipality, Eastern Cape, in South Africa, the latter being the focus of this study. In South Africa, one-third of the food produced for consumption is wasted; paradoxically, 26% of all households' experience hunger. Food surplus occurs in many contexts, including communities of emerging small scale farmers, many of which are not able to find markets for their produce, resulting in wastage. In a time of mobile technology expansion, the wide infiltration of Internet-enabled smartphones into diverse communities has increased dramatically with the uptake of mobile apps being a key area of interest amongst environmental educators. The Food for Us app project aims to address the challenges of food insecurity and market access for smallscale farmers by creating an innovative technological solution in the form of a mobile app. This research project aimed to investigate the social learning that was enabled within the communities of practice that utilised and interacted with the Food for Us mobile app and Food for Us project support systems. Data was collected through a series of surveys, interviews and workshops and was analysed using Wenger, Trayner and de Laat's (2011) Value Creation Framework. The Food for Us app pilot was not successful in the way that was originally anticipated by the Food for Us team; however, there were important social learning findings that emerged from the project which opened up a new way of looking at technological innovation in the supply chains with the small scale farming contexts. The key findings that emerged from this study indicated that technological innovation on its own is not effective in enabling deep social learning. When facilitated and supported by other networked social learning systems (such as WhatsApp group, workshops and course meetings), however, boundary crossing, intergenerational learning and network building emerged as important forms of value creation that can be enabled. Through the analysis it was noted that inhibiting factors such as app trial design, lack of critical mass participation and continued application software challenges, affected the development of value. These inhibiting factors informed recommendations around the need to develop strong social networked systems around technologically innovative solutions to promote the realisation of transformative value.

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Table of Contents

List of Appendices

List of Figures

List of Tables

List of Abbreviations and Acronyms

App	Application
Co-op	Co-operative
ELRC	Environmental Learning Research Centre
FAO	Food and Agriculture Organisation
FFU	Food for Us
ICT	Information and Communication Technologies
IBLN	Imvotho Bubomi Learning Network
m-learning	mobile learning
RMDA	Raymond Mhlaba Development Agency
TOT	Training of Trainers

CHAPTER ONE: Introduction and Background to the Study

1.1. Introduction

This chapter provides the background and context to this study, introducing the reader to the important challenges that the project aimed to address. This study forms part of a food redistribution and market transformation mobile application (app) project (Food for Us) that has been piloted in the Eastern Cape (Raymond Mhlaba municipality) and in the Western Cape (Worcester) provinces in South Africa. The Food for Us project responds to the growing global and national concerns of good food being lost (wasted) in areas of the world that suffer from malnutrition and food insecurity. This M.Ed study aims to investigate and understand social learning that is enabled by the Food for Us pilot mobile app project introduced into a small scale farming[1] community in the Raymond Mhlaba municipality. In this chapter, I firstly explain the background of the project and secondly, describe the context of the chosen site for this study, Raymond Mhlaba Municipality. This study investigates the types of social learning, or lack thereof, that emerged from the use of the Food for Us food redistribution app and the activities that surrounded the app project. In this chapter, I also present the overarching question and accompanying sub-questions that steered this research.

1.2. Broader Context of the Study

The project in which this study is situated was developed in response to the current global issue of excessive food wastage coupled with malnutrition and hunger. According to the Food and Agriculture Organisation (FAO) statistics yearbook, 24,8% of people in Africa are undernourished (FAO, 2014), while it is believed that up to 37% or 120-170kg/year per capita of food is paradoxically being wasted or lost in sub-Saharan Africa (Sheahan & Barrett, 2017). The Food for Us app was developed as a technologically innovative solution to be introduced in an increasingly technologically enabled society to address the issues of wasted resources and wasted value and to strengthen the development of a circular economy.

1.2.1. Food Waste and Food Insecurity in the Global and Local Context

Food waste is a global issue that has recently come under the spotlight as the complex and paradoxical dynamics of this issue are being conducted and reported upon (Bagherzadeh, Inamura, & Jeong, 2014). According to the FAO's 2014 and 2017 reports, one third of the food produced each year for

[1] The term small scale farmers was used to describe many of the farmers in this study. The farmers who participated in the study all planted less than 2 ha and were planting and harvesting produce for both home consumption and sale to the local community. The term small-scale farmer is a commonly used term in South Africa referring to farmers operating on a smaller scale, often for their own consumption, without major commercial infrastructure (Aliber & Cousins, 2012).

human consumption is being wasted (FAO, 2014, 2017). This issue of food surplus is even more paradoxically striking in a time when food insecurity and global hunger is a major global concern (FAO, 2017). With major pressures from climate change, natural resource exploitation, environmental degradation and lack of resources, the occurrence of food waste in a food insecure community is not sustainable (WWF South Africa, 2017).

Food waste can be defined as food that is still of good quality and suitable for human consumption but does not get consumed and is discarded at the distribution, sale and consumption level of the supply chain (Lipinski, Hanson, Lomax, Kitinoja, Waite, & Searchinger, 2013). 'Food loss' refers to food that is lost within the early stages of the supply chain, where food spoils, bruises or wilts and therefore experiences a reduction in perceived quality and is lost most often while still on the farm (Lipinski et al., 2013). According to Vieri and Calabro (2016), food waste and food loss are a main concern of food systems research and praxis, and can be expressed as "inefficiencies and distortions of processes of production and distributions" (Vieri & Grazia, 2016, p. 1). 'Food wastage' (including both food waste and food loss) is a major challenge in both developed and developing countries[2] (Battersby, 2011). In more developed countries the larger issue lies with food waste that occurs at the end of the supply chain. In developed countries, between 95-101 kg of food per annum per person is wasted by consumers, while only 6-11 kg is wasted in developing countries (Vieri & Grazia, 2016). Food wastage in developing countries exists mainly in the form of food loss in the early stages of the supply chain, predominantly during on-farm production and post-harvest processing (Gustavsson, Cederberg, Sonesson, Otterdijk, & Meybeck, 2011). The mobile Food for Us app project in focus in this study aimed to reduce both food waste and food loss in the Raymond Mhlaba case study area. For this research I use the phrase 'food wastage' to combine food waste and food loss.

The Council for Scientific and Industrial Research (CSIR) reported that in South Africa the amount of food wastage that comes from local food production chains is estimated to be 9,04 million tonnes a year or 31.4% of the average annual production (Oelofse, 2015). In South Africa the greatest food wastage comes from fruits, vegetables and cereals, which together amount for 70% of all food wasted or lost (WWF South Africa, 2017). This food wastage can be recognised as food loss that occurs predominantly in the first three sectors of the supply chain, which include the agricultural production stage (2.7 million tonnes produced per year), processing and packaging stage (2.6 million tonnes per

[2] The terms 'developed' and 'developing' are somewhat politicised terms and can be quite ambiguous as a standardised, internationally recognised definition has not been negotiated (Rohland, 2018). In this study I have chosen to use the terms, 'developed' and 'developing' to differentiate between countries that are at different stages of economic and industrial development. Developed countries are countries that characteristically have a higher income, are commonly more industrialised with fewer infrastructural challenges (Rohland, 2018). Developing countries refers to low-income countries (where the citizens earn a lower income) where unemployment and poverty levels are high, and much of the population is inhibited by lack of infrastructure and low levels of industrialisation (Rohland, 2018).

year) and handling and storage stage (2.4 million tonnes) (Oelofse, 2015). According to the 2017 World Wildlife Fund's (WWF) Food Loss and Food Waste Report, up to 96% of food loss and food waste in South Africa occurs at pre-consumer level. Food waste at the consumption stage of the supply chain is only responsible for 0.5 million tonnes, significantly less than in developed countries (Gustavsson et al., 2011). Often food is not sold and becomes food waste due to farmers lacking buyers for their produce. The second most common form of wastage is through food being damaged through transportation to markets where the produce is not bought due bruising, resulting in food loss (Pereira, 2014; FAO, 2017; WWF South Africa, 2017).

With the occurrence of food waste and food loss increasing over time, Oelofse and Nahman (2013) believed that increased urbanisation, contraction of agricultural markets, change in dietary requirements and globalised trade are interrelated drivers of increased *food loss* and *food waste*. The increase of urbanisation and the contraction of agricultural markets leads to food travelling long distances, requiring improved infrastructure for transportation, improved marketing and ultimately results in a breakdown of rural small-scale markets (Oelofse & Nahman, 2013). By reducing the distance that food travels, one can reduce food wastage and its negative impacts. In response, the Food for Us (FFU) food redistribution app project sought to address the need to produce and consume food locally, therefore encouraging the purchase and consumption of local produce over imported products.

A recommendation by the Rockefeller Foundation to reduce post-harvest losses during transportation and handing in developing countries is to link alternative local buyers (including supermarkets, local processors, restaurants, hotels and grocers) to small scale farmers and aggregation centres. These buyers can promote the adoption of practices that reduce post-harvest losses by creating a local source of demand for surplus production and processed products (Rockefeller Foundation, 2015). The FFU app aimed to do this by linking small-scale farmers to potential buyers within the local area, therefore potentially reducing the occurrence of post-harvest waste as well as increasing demand for locally produced nutritious fresh produce.

As noted above, food wastage challenges exist paradoxically and simultaneously alongside the challenges of food security and malnutrition. Gustavsson et al. (2011) requested that the definition of 'food loss' be changed in the FAO reporting to not only include the quantity of food lost but also the nutritional value lost (Gustavsson, Cederberg, Sonesson, Otterdijk, & Meybeck, 2011). Godfray et al. (2010) explained that more than 14% of the global population does not have access to sufficient protein and energy from their daily diet and suffer from some kind of micronutrient malnourishment. In Southern Africa, up to 24,8% of the population is undernourished (FAO, 2014) and roughly 12 million people (24.5% of the population) have only one meal a day (Ramukhwatho, Du Plessis, & Oelofse, 2014; Farmers Weekly, 2016). The low dietary diversity of South African, particularly in the

Eastern Cape where household meals are characterised by energy dense, micronutrient poor meals, could lead to stunted growth and slow development in children (StatsSA, 2018).

While South Africa produces enough food for its 53 million citizens, roughly 26% of South African households are food insecure (Flick, von Kardorff, & Steinke, 2004; WWF South Africa, 2017). According to StatsSA, the most updated poverty headcount[3] (2009) in South Africa is 56.8% of South Africa's population (StatsSA, 2019). This percentage is even higher in the Eastern Cape Province of South Africa where 70,6 % of the population lives in poverty (StatsSA, 2019). This high level of poverty is heavily influenced by histories of exclusion and segregation, and more recently, by the high level of national unemployment which reached 25.1 % of the national workforce in the last quarter of 2017 (StatsSA, 2018). The lower income groups, who suffer from living below the poverty line, often due to unemployment, spend between 35%- 40% of their income on food (Pereira, 2014; StatsSA, 2015). With the level of poverty continuing to increase and therefore the accessibility of healthy food becoming more scarce, malnutrition has become an area of major concern in many South African communities (Battersby, 2012; WWF South Africa, 2017). Battersby (2012) believed that it is not food availability that is attributing to food insecurity, but more importantly inadequate access to good food. Community food security is defined by Battersby (2012) as, "accessibility, affordability, nutritional adequacy, cultural acceptability, and quality" (p. 147). With large amounts of nutritional food being lost, while there are major social challenges of poverty and malnutrition, there is a desperate need to avoid food loss and redirect potential food losses to those who need it (WWF South Africa, 2017).

Not only is there nutritional wastage but there are also high economic costs involved in food wastage. The total cost of food wastage in Sub-Saharan Africa has exceeded the value of total food aid that has been brought into the area over the last decade (Gustavsson, Cederberg, Sonesson, Otterdijk, & Meybeck, 2011). The World Bank and FAO agree that through reducing the economic loss that is incurred in the supply chain through food wastage, important pathways can be opened up to make more food available, to reduce poverty and improve nutrition (Gustavsson, Cederberg, Sonesson, Otterdijk, & Meybeck, 2011). In South Africa, food waste and food loss throughout the value chain amount to as much as R61.5 million per annum; this makes up 2.1% of South Africa's Gross Domestic Product (GDP) (Nahman & de Lange, 2013). Furthermore, through recent research, the Rockefeller Foundation has equated the percentage of small-scale farmer income lost due to food waste in developing countries to be at least 15% of their total income (Rockefeller Foundation, 2015).

[3] The poverty line defined by Stats SA is determined by the 2015 survey, which defined poverty according to three poverty lines, the national upper bound poverty, the national lower bound poverty line, or the national food poverty line. This definition of poverty is drawn from the national upper bound line of R992 per person per month (Stats SA, 2018).

The introduction of technological innovation (such as the app) has the potential to increase market access enabling small-scale farmers to find local buyers, thereby uplifting the community, opening up new employment opportunities as well as opening up access to fresh, healthy nutritious food (Jenkins, 2016).

Lastly, the ecological consequences of food waste are extensive. Increased food production requires increased land and therefore more pressure is put on converting areas of biodiversity into mono-crop farming (WWF South Africa, 2017). Similarly, food production requires a number of resources, the most important of these being water. Wasted food that is not consumed results in massive water wastage, which is of great concern in water scarce countries such as South Africa. According to Oelofse (2014), the availability of water is the greatest limiting factor of agricultural production in South Africa with 62% of the country's available water being used for agriculture (Oelofse, 2014). One of the limiting factors to successful small-scale farming in many of South Africa's rural communities is due to the lack of a consistent source of clean water for crops (Louw, Vermeulen, Kirsten, & Madevu, 2007; Pesanayi, 2018).

Not only is water a limiting factor for small-scale farmers, but so are costs of transport, fertilisers, herbicide and seed amongst other expenses. Monetary resources are spent on these costs while there is no guarantee that the farmers will be able to sell all their produce at the preferred price allowing them to earn an income (Mpandeli & Maponya, 2014; Khapayi & Celliers, 2016) .

The final ecological consequence is the large volume of greenhouse gases entering the atmosphere due to landfills being filled with biodegradable food waste which emits large quantities of methane amongst other gases when it degrades (Graham-Rowe, Jessop, & Sparks, 2014). According to Bagherzadeh, Inamura and Jeong (2014), all the food that is wasted globally is responsible for adding 3.3 billion tons of greenhouse gases to the planet's atmosphere each year. This makes food waste the third greatest emitter of greenhouse gases to the atmosphere (Bagherzadeh et al., 2014). Through the redistribution of food surplus, through innovative redistribution systems such as the one the Food for Us app is trying to develop, food can be consumed and utilised instead of ending up landfills where its decomposition results in the creation of methane.

Food waste and food loss is a multifaceted issue that includes many components as indicated above. Unfortunately the food waste and food loss field is under-researched in the South Africa, especially outside of the standard agriculture and economic analysis (Pereira, 2014). Pereira (2014) explained that "understanding food waste could provide insights into dynamics in the broader food system and in particular where in the chain the most effective interventions would be to make it more sustainable and equitable" (p. 37). Through this research, I hope to contribute to the understanding around food

waste and food loss in the small-scale farmer context. My research also explores how one can use technology as a leveraging tool to enable social learning around food waste and food loss.

1.2.2. Small-scale Farmers within the Raymond Mhlaba Municipality

For many families in rural communities in developing countries, farming makes up a large part of their household income, creates work for a large percentage of the rural population and provides a large percentage of the households with food (Aliber & Cousins, 2012; FAO, 2017). In South Africa close to half of the population is living in rural areas which are characterised by higher levels of poverty and unemployment (Department of Agriculture Forestry and Fisheries, 2013; Lotz-Sisitka et al., 2016). Three-quarters of all small-scale farmers in South Africa are still found within rural former homelands with the remaining quarter split between small-scale farms in urban areas and small-scale farmers dotted within commercial farming areas (Department of Agriculture Forestry and Fisheries, 2015). South Africa has a dualistic farming structure with a small number of large commercial farmers (60 000) producing 95% of the countries marketed output. This is juxtaposed against a much larger number (3 million) of small-scale farmers who produce much less output and occupy 13% of the country's arable land (Aliber & Cousins, 2012).

According to Vink and Van Rooyen (2009), small-scale agriculture enables very little economic remuneration for a household. This has led to many farmers seeking extra employment to earn additional income to support their households (Biénabe & Vermeulen, 2007; Ortmann & King, 2010). According to Ortman and King (2010), small scale farmers in South Africa generally have limited access to factors of production, credit and information, as well as face high transaction costs. These challenges are creating barriers to small scale farmers, inhibiting them from growing to a stage where they are able to compete with large commercial farms.

Khapayi and Celliers (2016) and Mpandeli and Maponya (2014) noted that one of the key challenges that hinder small-scale emerging farmers' development is their lack of participation in appropriate local markets. In a study conducted in King William's Town, Eastern Cape, it was found that 55% of the small-scale emerging farmers had no access to market information, therefore no exposure to new markets, prices, or information regarding produce supply and demand. Many farmers complained that their produce would be spoiled due to the lack of markets in close proximity (Khapayi & Celliers, 2016; Mpandeli & Maponya, 2014). The concept of 'market transformation' in this study is viewed as a process of linking small-scale farmers to alternative markets they were previously unable to infiltrate: this may include the infiltration of fresh markets, informal markets or supermarkets. The FFU mobile app provided a platform on which producers and consumers can trade, therefore creating a tool that has the potential to transform the market from one that is dominated by retailers and

commercial produce, to one that encourages consumers to support local farmers (Jenkins & Ward, 2016).

1.2.3. South African Food Systems

There are three common market destinations for small-scale farmers' produce. These include fresh produce markets (intermediary market between farmers and retailers and procurement organisations) informal markets and supermarket chains (Baiphethi & Jacobs, 2009). South Africa has a highly diverse and layered food retail system which includes large formalised supermarket chains, spaza shops[4], informal traders and localised selling hubs (WWF South Africa, 2017).

South Africa's formal sector is characterised by large retail outlets who sell high quality produce where there are strict safety standards, food production regulations and where marketing agents can be easily monitored (Marumo & Mabuza, 2018). In the 2017 Food Waste Report, WWF described the formal market as being a concentrated sector dominated by four large supermarket chains including Pick 'n Pay, Shoprite, SPAR and Woolworths. These four supermarkets are spread throughout South Africa's provinces, with these four retail chains accounting for up to 70% of the entire retail market (D'Haese & Van Huylenbroeck, 2005; WWF South Africa, 2017). Retail chains are often less flexible in their local produce procurement due to legislation and other bureaucratic barriers (WWF South Africa, 2017). Louw, Vermulen, Kirsten and Madevu (2007) have categorised supermarkets into two types, the first being large supermarket chains that cater for mainly high-income groups and source their produce from large commercial farmers; the second being decentralised supermarket chains that source their fresh produce from smaller local farmers. There have been some success stories in larger supermarkets where local farmers are used to procure fresh produce, but this is not always the case (Louw et al., 2007).

According to Marumo and Mabuza (2018), the South African informal sector is often unregulated, established in temporary settings and is not protected by the law. According to the WWF report, the South African informal markets are generally the main suppliers of food to food-insecure households where smaller amounts of produce are purchased on a regular basis. Informal markets include food vendors, hawkers, and bakkie[5] traders amongst others. On average 70% of all South African

[4] 'Spaza shops'(*spaza* is the Zulu word for hidden) is a colloquial expression that means a small convenience store that is found in most small neighbourhoods in cities and towns. Spaza shops generally sell dry ingredients, cosmetics and other convenience items. Spaza shops generally have a fairly limited selection of fruit and vegetables (D'Haese & Van Huylenbroeck, 2005).

[5] 'Bakkie' is a colloquial word used to describe the local single cab trucks that, in this rural farming context, are used to transport produce to towns from the farmers. 'Bakkie trader' mean informal produce traders who sell produce collected from the farmer on the back of their single or double cab tuck vehicles on the side of the road in busy urban spaces.

households source their food from informal sellers with the market size estimated to be as great as R176 billion (WWF South Africa, 2017). The informal market currently absorbs the majority of the produce that the formal market rejects such as: spent layer hens, chicken heads and legs, and damaged, misshapen or discounted fresh produce (WWF South Africa, 2017). This multi-layered characteristic of the South African market structure enables the development of a more circular economy where alternative buyers find value in produce that is deemed waste or loss by other entities.

According to a study done in the Vhembe district in South Africa, two thirds of informal sellers are women, of which 56% indicated that this was their only source of income (Baiphethi & Jacobs, 2009). WWF (2017) estimated the number of informal food sellers in South Africa to be more than 350 000 vendors. WWF (2017) and Baiphethi and Jacobs (2009) agreed that informal traders buy most of their produce for resale from bulk packing houses or from large fresh produce markets so as to sell the produce at a cheaper price thereby leveraging economies of scale. The large number of 'middle men' traders increases the handling of produce and the distance that food travels to its final point of consumption therefore reducing the economic return of the crop to the small-scale farmer (WWF South Africa, 2017).

There has been a recent shift of rural households (including many small-scale farmers) becoming net consumers rather than net producers of food (Baiphethi & Jacobs, 2009; Louw et al., 2007). This has been coupled with the growth and movement of supermarkets into smaller rural towns, which is attracting a mass consumer market (Louw et al., 2007). According to Baiphethi and Jacobs (2009) the percentage of rural households who buy their meat, dairy and vegetables from supermarkets and chain stores are as high as 94%, 94% and 72% respectively. Many of these supermarkets do not buy the produce from the local small-scale farmers due to the regulations and standards that need to be met, therefore with the increase in consumers purchasing from the supermarkets and supermarkets transporting in produce from commercial farms, the demand for local farmers produce has decreased significantly (Weatherspoon & Reardon, 2003; D'Haese & Van Huylenbroeck, 2005; Louw et al., 2007).

1.2.4. Working towards a Circular Economy in a One-use World

The necessity to move toward developing a more sustainable society has taken centre stage in many international development agreements such as the Sustainable Development Goals (SDG), a set of 17 interrelated, cross-cutting international goals that work towards achieving a more sustainable society (Sustainable Development Solutions Network, 2015). The issue of *food waste* coupled with food insecurity is addressed in these SDGs, most notably in Goal 2: 'eradicating hunger' and Goal 12: 'responsible consumption and production' (Battersby, 2011; Sustainable Development Solutions Network, 2015). There has been a growing realisation that we cannot continue with the current

trajectory of a resource intensive and wasteful society. This has given impetus to ideas such as the development of a circular economy (Raworth, 2017).

The 'Circular Economy' discussion was prompted by Braungart and Mc Donough's publication of *Cradle to Cradle: Remaking the way we make things* in 2002. The 'cradle to cradle' concept promotes a circular system where value is not lost through the supply chain, but is instead enhanced. The authors argued that it is not useful to only minimise negative issues in our current wasteful society as this is treating the symptom rather than the cause (Lacy & Rutqvist, 2015).

'Circular Economy' is a relatively recent concept that was successfully investigated and promoted by the Ellen MacArthur Foundation (Lacy & Rutqvist, 2015). The MacArthur Foundation views the Circular Economy as a new industrial model that aims to optimise the use of resources while reducing or eliminating waste (Ellen MacArthur Foundation, 2018). The 'Circular Economy' features very prominently in Kate Raworth's most recent book, '*Doughnut Economics: Seven ways to think like a 21st- Century Economist'* (Raworth, 2017). According to Raworth (2017) we need more than to achieve zero waste; we need to design a system that gives back to the environment, which she called a regenerative process. This 'do more good' theory addresses the challenges experienced by our complex society, by balancing development in the 'safe zone' of the 'doughnut' between the planetary boundaries' ecological ceiling and the social foundation as seen in Figure 1-1 below (Raworth, 2017). Economic growth is no longer the key focus; rather the prosperity of society that is achieved within planetary boundaries (or ecological ceiling) described in the figure below (Leach, Raworth, & Rockström, 2013; Raworth, 2017).

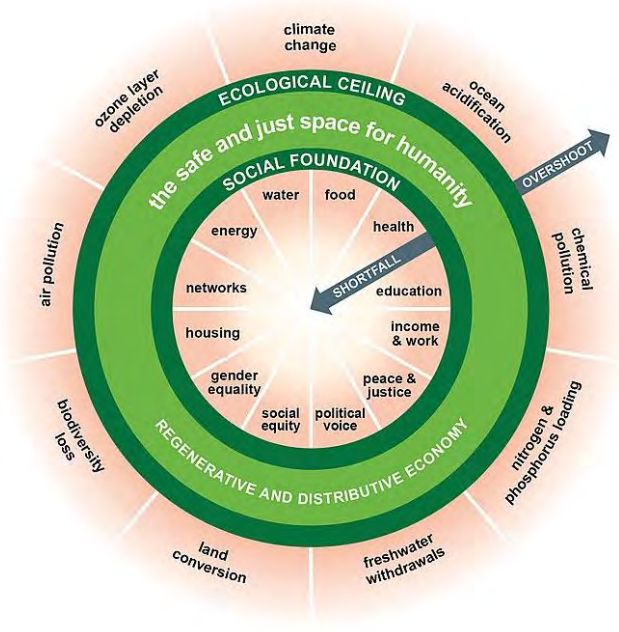


Figure 1-1: The 'doughnut' of the Doughnut Economics model designed by Kate Raworth to explain the safe space in which humanity should try to exist (Raworth,2017)

The current food supply chain is predominantly linear, with one third of the food produced being lost (WWF South Africa, 2017). Figure 1-2 describes a system where society "takes", "makes", "uses" and then "loses" therefore creating waste matter and waste heat (Raworth, 2017). Resources are taken from the environment and used to make food that is consumed by either people or animals. That which is not consumed is lost and creates waste matter, which then needs to be disposed of. The food, which is lost out of the linear system, is what the FFU project is trying to recuperate by creating innovative ways of minimising loss and waste. By redirecting 'wasted' 'resources back into the supply chain, a more circular economy can be developed resembling Figure 1-3. Figure 1-3, the butterfly economy diagram, shows a system that is regenerative by design which works through a circular system whereby, in terms of biological nutrients, one takes (renewable material), makes, consumes and then regenerates. This model enables the cycle to feed back into the circular system where less needs to be taken from the natural environment (Raworth, 2017). Through adopting a system where sustainability is the key focus of the system's design, we may be more equipped to meet SDGs such as 'eradicating hunger' (Goal 2) and 'responsible consumption and production' (Goal 12) as economic and nutritional value that might have been lost through a more linear system has the potential to be captured and redistributed to areas that most need these resources.

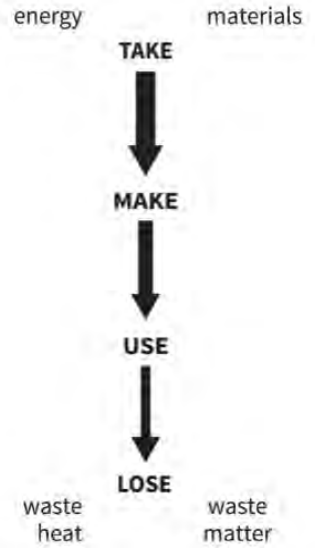


Figure 1-2: Linear system where the system is degenerative by design (Raworth, 2017, p. 212)

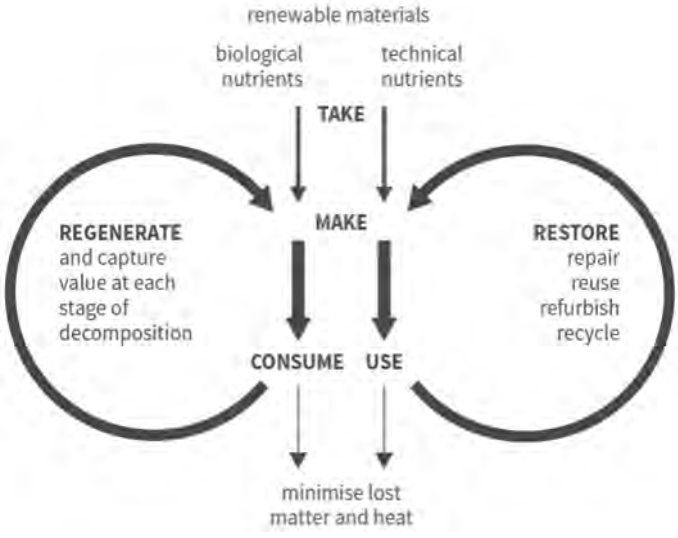


Figure 1-3: Circular Economy with a butterfly economy which is regenerative by design (Raworth, 2017, p.220)

The focus of the FFU project is on creating new value from wasted or lost food therefore reflecting principles of a 'Circular Economy'. It seeks to reduce the losses (economic, social and ecological) in the supply chain, instead enhancing value through utilising the value in 'waste' and feeding it back into the value chain based on Lacy and Rutqvist (2015) and Raworth's (2017) understanding of a circular economy.

1.3. A Project to Promote Food Security

The Food for Us project is a pilot social learning project aimed at promoting sustainable food systems. It manifests in the form of a mobile phone application project, which includes the design, development and introduction of a food distribution app (Jenkins & Ward, 2016). The pilot project was initiated in 2017 by a group of diverse partners in South Africa supported by the United Nations Sustainable Lifestyles and Education programme, which falls within the United Nations Environmental Programme's (UNEP) One Planet Network (Jenkins, 2016). UNEP's One Planet Network was formed to implement the goals of the 10 Year Framework Programme (10YFP) – a framework adopted at the 2012 World Summit on Sustainable Development which aims to accelerate the adoption of sustainable consumption and production practices within developing and developed countries (UNEP, 2018).

The FFU project trialled the use of the FFU mobile app, which aimed to link farmers to alternative markets to sell their surplus produce. The project ran over an 18-month period and was introduced in two case study areas: the Raymond Mhlaba municipality in the Eastern Cape and Worcester in the Western Cape. The aim of the project (not to be confused with the aim of this study) was to develop a mobile app, which would work as a technological solution for diverting surplus food to feed an alternative market. The project also aimed to encourage community learning (within the two case studies) to enable increased employment opportunities, which would be supported by educational research (conducted by project researchers) (Jenkins, 2016). The greater outcomes for the project include: (1) to produce an effective and useful mobile app that benefitted the communities involved, (2) to produce social learning research, and (3) to develop carbon and resources based research. These outcomes were met with the development and refinement of (1) two versions of the app, (2) extensive social learning research that explored value creation, transformative learning and boundary crossing (which takes the form of this masters study), and lastly (3) scenario-based carbon measurements.

The FFU app was an online platform that provided a virtual space where sellers of produce (farmers) where able to advertise their produce increasing their target market and potentially reaping increased economic benefits and reducing the on-farm waste. The FFU app enabled buyers to browse the adverts made by the farmers and express interest, which was communicated, to the farmer through an automated email. The app did not facilitate payment for the produce, which needed to be negotiated between the farmer and the interested buyer. The workings of the Food for Us app will be discussed in more detail in section 1.3.1 below.

The FFU project tracked the development and initial use of the FFU app through a series of introductory workshops, app training sessions and structured interviews which investigated the experiences of 36 app users across the two case study areas.

An introductory workshop was held in each of the case study areas (Sustainability Institute in Stellenbosch, Western Cape and Rhodes University, Grahamstown[6], Eastern Cape) at the start of the project in August 2017. This introductory workshop hosted over 130 diverse stakeholders from national government, businesses, community-based organisations, local farmers, feeding schemes, amongst others, who were invited to comment and make suggestions on what they believed this app should look like and what functionalities it should have.

After the introduction of the first version of the Food For Us mobile app in September 2017, interested stakeholders were asked to participate in two structured interviews – a baseline interview conducted in the early stages of the trial (November 2017 – January 2018) and a final interview conducted in the final stages of the app trial (May 2018).

The results and field learnings from each of the case study sites (Worcester and Raymond Mhlaba municipality) were shared with the project management group (which included app developers, project managers and researchers) through regular meetings that were held throughout the project via virtual Skype discussions or face-to-face project meetings. These meetings provided a space for the project team to collectively negotiate challenges and develop solutions.

The FFU project also drew on the meta-data of the FFU mobile app. Meta-data was used to understand the use of the app and monitor the *food waste* saving that might occur as a result of the introduction of the FFU mobile app.

The project concluded with a final consolidation dissemination event, which was held in July 2018. The FFU dissemination event, hosted at the Sustainability Institute in Stellenbosch, provided an opportunity for the FFU team to present and discuss the reflections and finding of the Food For Us project with an audience (50 participants) representing both national and international stakeholders (see Appendix T: Food for Us Dissemination Event Synthesis and Attendance Register).

The Food for Us project required 40 participants to be part of the FFU app trial with 20 participants in the Worcester case study and another 20 in the Eastern Cape case study (Jenkins & Ward, 2016).

In the Eastern Cape Raymond Mhlaba case study, on which this research is based, a diversity of farmers and sellers were encouraged to participate. After the initial contextual profiling meetings, it became clear that there was a need to include an intermediary user group into the FFU app trial as well. The producer, buyer and intermediary groups are described below.

[6]Grahamstown's town name was changed to Makhanda halfway through this study in June 2018. The majority of data collected for this study was before the name change with project reports, proposals and field notes all using the name Grahamstown. Therefore, for coherence, I have chosen to use the name Grahamstown throughout this thesis to ensure consistency and avoid confusion.

Producers: The producer group consists of users who are selling fresh produce. This user group included farmers and farming co-operative[7] members. It was important to encourage the participation of a diversity of farmers using different farming techniques and growing a variety of crops. Farmers from the Amanzi For Food's Imvotho Bubomi Network in the Raymond Mhlaba Municipality were invited to join the project as well as other farmers within the area. We encouraged the participation of both small subsistence farmer and farmers who were striving to supply the commercial sector. We tried to keep the producers concentrated around the Raymond Mhlaba municipality along the R61 road, with the epicentre of the project being Alice as seen in figure 1-4 below. A combination of male and female, young and old farmers were part of the Eastern Cape case study app trial.

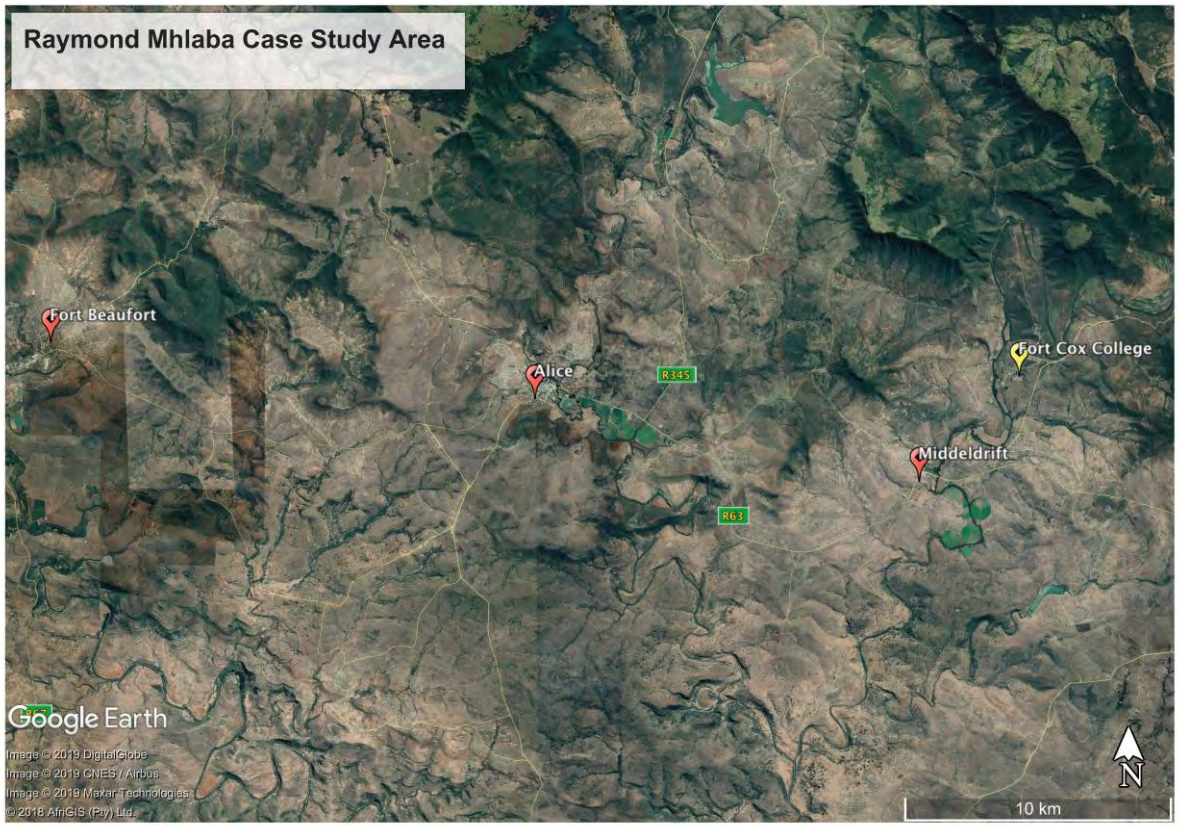


Figure 1-4: Map showing the key areas of interest for the Food for Us app trial in the Eastern Cape case study

Consumers: To select the consumer base, I worked alongside the Raymond Mhlaba Development Agency (RMDA) to pinpoint potential buying partners. The FFU project required a variety of local consumers to test how the FFU app would work for them. A guesthouse, cafe, supermarket, caterers, individual buyers and bakkie buyers were invited to be part of the project.

[7] In this study a co-operative is defined as a group of people who work on a business idea, farming activity or collective service together.

Intermediaries: The intermediary group emerged during the contextual profiling of the FFU project. The intermediary users included organisations or individuals who both buy and sell fresh produce. Any of the users can be both a buyer and seller of produce due to the app allowing for the users to log in as either a buyer or seller of produce. This group often played the role of matching buyers to sellers prior to the introduction of the FFU project.

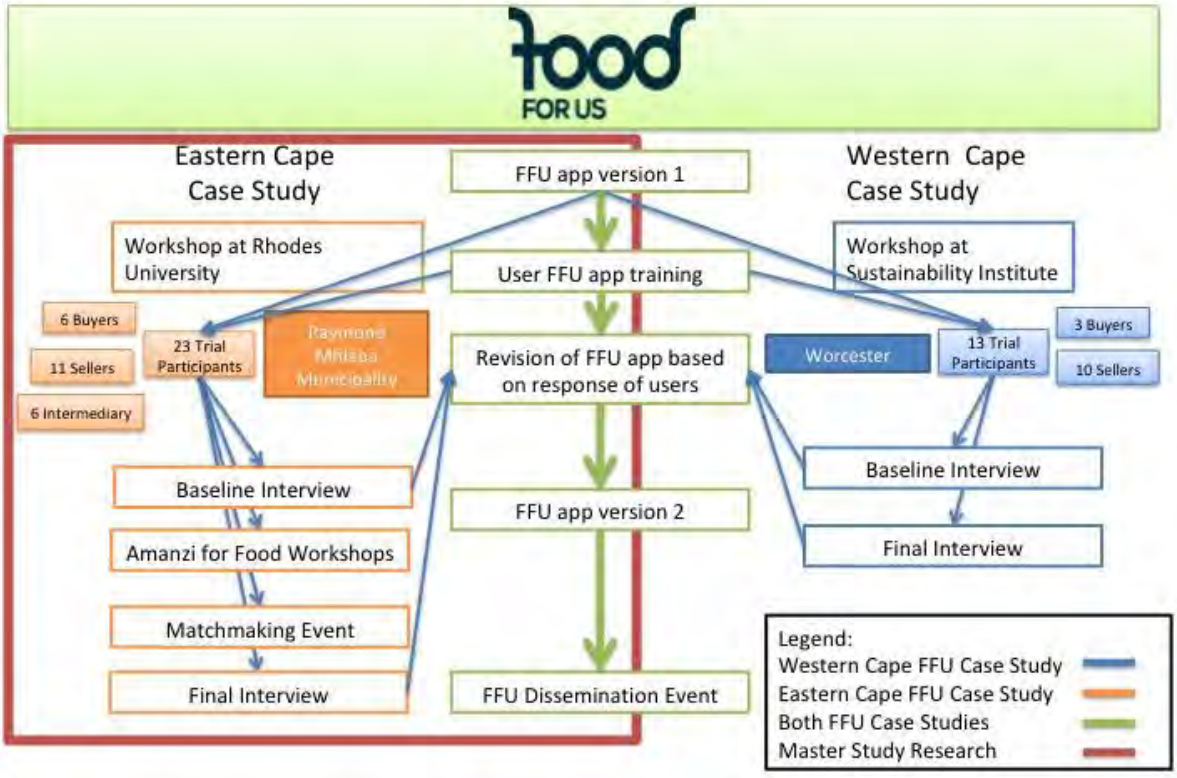


Figure 1-5: Food for Us (FFU) project and the two case studies situated within the FFU pilot project

The outcomes of the 18 month Food for Us project illustrated in Figure 1-5 above were to produce: (1) a final amended version of the FFU app, (2) research that explore the social learning enabled by the FFU app and FFU project, and (3) research on carbon saved through the use of FFU app in this FFU pilot project. In this master's study I focused on social learning enabled in the Raymond Mhlaba, Eastern Cape case study as indicated by the red outline in Figure 1-5.

1.3.1. The Food for Us App

The Food for Us app was designed, developed and introduced into the case study sites within the 18 month trial period. As described above, the Food for Us app aimed to create a virtual online space for local farmers to advertise their produce to local consumers, therefore reducing the occurrence of on-farm food waste. The app does this by creating a platform on which farmers and consumers can

register, log in and explore a virtual marketplace. The Food for Us app allows farmers to log into the app and upload adverts of their available produce. These produce uploads are displayed to the consumers on an online market space as seen in Figure 1-6 below. The consumers are able to view details of the produce available (including where it is, how much it costs and how much is available etc.) and furthermore express interest in purchasing the produce (as seen in image 4 and 5 of Figure 1-6 below). Once interest is expressed, the app backend sends an automated email to the farmer, giving the farmer the option to communicate with the interested consumer over email. The Food for Us app did not facilitate the logistics communication, but instead referred users to email to communicate transaction logistics.

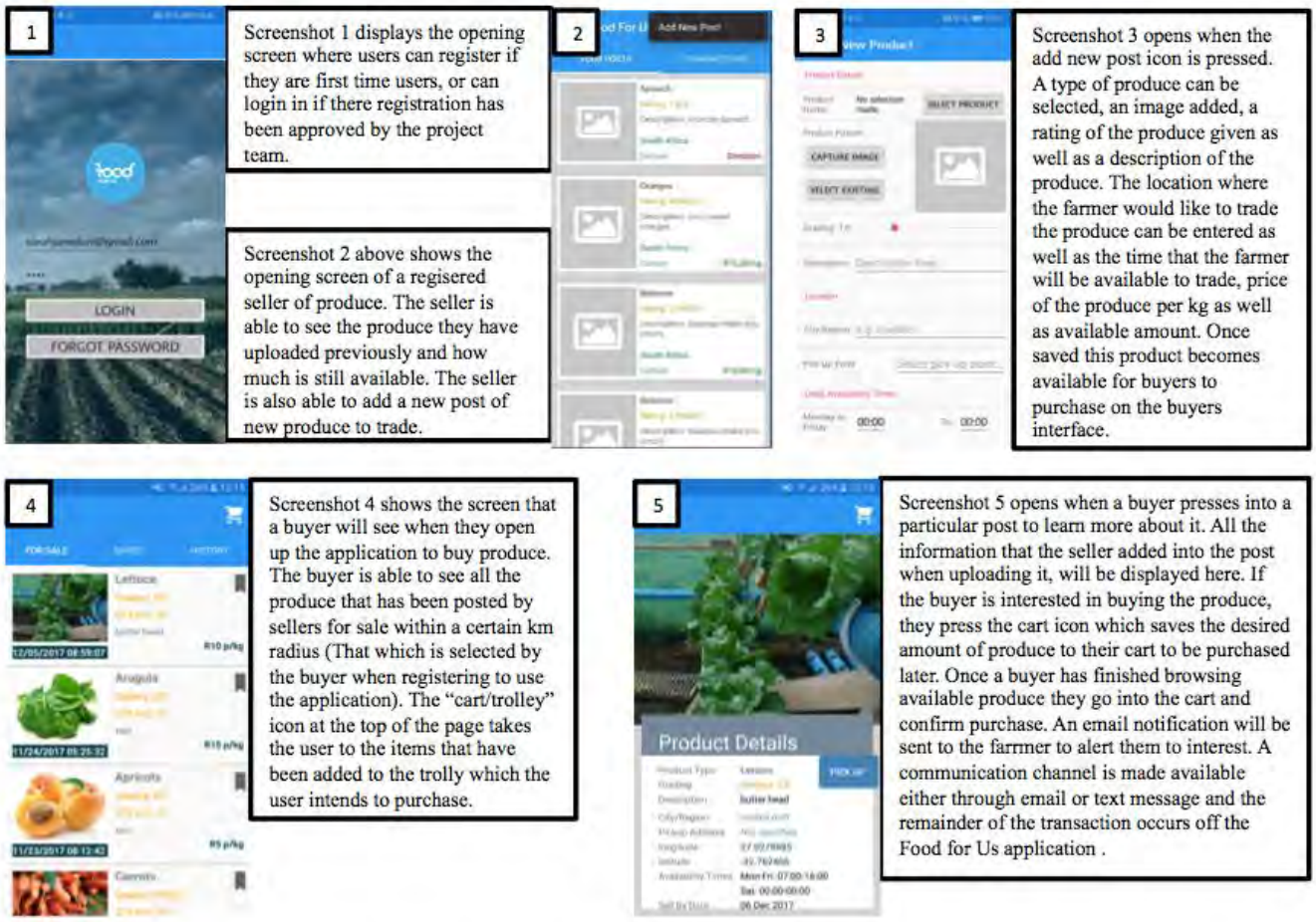


Figure 1-6: Description of the workings of the Food for Us App

Over the course of the 18 month project, the initial Food for Us app was changed and amended with new functions and features being introduced (these will be discussed further in Chapter 4). However, the Food for Us app maintained the core function of providing a platform for local farmers to advertise their available produce and where local consumers were able to browse an online virtual fresh produce market.

1.3.2. Where do I fit in?

I was part of the project as a researcher for the Eastern Cape case study site. The initial scope of the role required me to conduct two structured interviews; the baseline interview and the final interview and consolidate the information into research reports. However, I played an expanded role, managing the introduction of the FFU project and FFU app into the Raymond Mhlaba community. This required identifying potential participants, chairing meetings with potential partners as well as fielding the issues and challenges and developing solutions. While in the position of project researcher for the FFU project, I also conducted research and collected data for this master's research, which was embedded in the FFU project, but due to the scope of a master's study, I did not include the whole project in my analysis (this will be explained in more detail in Chapter 3).

1.3.3. Different Sites of the Project

The FFU app was trialled in two areas, Worcester, Western Cape and Raymond Mhlaba Municipality, Eastern Cape.

The Worcester case study included largely peri-urban[8] farmers using grown produce for home consumption. This network of peri-urban farmers took the form of a gardening club called the Avian Park Garden Club, which included 32 growers. The Avian Park Garden Club concentrates on food security and making more good nutritious food available to the people in the community (Swanepoel, 2018). This peri-urban farming network was connected to a thriving early childhood development network, the Worcester Early Childhood Development (ECD) Forum. The Forum included over 60 crèches and early childhood development centres in the area. These ECD centres and crèches all shared the challenge of high costs of fresh healthy food for children's meals (Swanepoel, 2018). The Club and Forum were connected through the app in the hope that through this technological innovation, challenges of lack of market for the gardeners and lack of access to inexpensive healthy food for the ECD centres might be addressed.

The Raymond Mhlaba case study involved a different community of farmers who were predominantly small-scale rural farmers based throughout the Raymond Mhlaba municipality. The research team here partnered with the Raymond Mhlaba Development Agency (RMDA) to connect local farmers and buyers of produce to improve the local supply chain and reduce wastage. The project also partnered with the Amanzi For Food and the Imvotho Bubomi Learning Network (IBLN) to promote the use of innovative technology to connect the local supply chain. The RMDA, Amanzi For Food and IBLN will be discussed in more detail in section 1.4 below.

[8] Peri-urban agriculture is described as farming that occurs in close proximity to urban centres on smaller plot, however does not occur in the city centre (Mougeot, 2000).

1.4. The Raymond Mhlaba Municipality Contextual Profile

The Eastern Cape FFU case study, on which this master's study focuses, was based in the Raymond Mhlaba local Municipality which makes up part of the Amathole District Municipality in the Eastern Cape Province of South Africa.

The Raymond Mhlaba Municipality covers 6 474 km and has a recorded population of up to 151 379 people (2016 census), 72% of which reside in rural villages, small holdings and farms (Raymond Mhlaba Municipality IDP, 2017). The municipality is considered a rural municipality with the economy driven by the agricultural sector, predominantly the citrus industry. The major towns in the municipality include Alice, Adelaide, Bedford, Fort Beaufort and Middeldrift. The FFU project concentrated discussion and interventions around the Alice, Middeldrift and Keiskammahoek area. The population is made up of a majority black demographic group with most of the population under the age of 34. The Raymond Mhlaba municipality experiences a very high unemployment rate, with 132 325 of the population being unemployed (87%) (Raymond Mhlaba Municipality IDP, 2017). Although this unemployment figure does not include the informal sectors, it is very high, highlighting the importance of interventions and programmes that promote the creation of jobs and the development of entrepreneurs. Furthermore, according to the poverty index, defined by Stats SA as "the level of consumption at which individuals are able to purchase both sufficient food and non-food items without sacrificing one for the other" (ECSECC, 2017, p. 60), around 64.7 % of the municipalities population is living in poverty. This is a very high percentage but has decreased from 70.35 % recorded in 2006 (ECSECC, 2017). This decline in poverty is expected to continue through the realisation of latent potential (agriculture and tourism potential) in the municipality.

The Raymond Mhlaba local municipality's access to technological infrastructure is of great interest to this study. According to the Raymond Mhlaba local Municipality Socio-Economic Review and Outlook (2017), people's access to telephone lines is 2.9% while access to mobile phones is close to 90% (ECSECC, 2017). Within the Raymond Mhlaba (2017/2022) IDP, as a means to combat climate change, the government aims to increase the use of technology in the area, with special mention being given to using technology to improve food security and to increase employment (Raymond Mhlaba Municipality, 2017).

1.4.1. Historical

South Africa's agrarian structure is incredibly complex and politicised due to the land ownership legacy left by the apartheid government. Under the apartheid government, black people were restricted to owning land in designated homelands, which made up 13% of the country (Lahiff & Cousins, 2005; Valente, 2009). This lack of land ownership amongst black South Africans resulted in

minimal large agricultural development in this group, with farms remaining small and mainly for subsistence use, as there was no economic support from the government for commercialisation of black owned farms (Lahiff & Cousins, 2005). With the turn of democracy and the introduction of a new government, there has still not been a substantial amount of agrarian reform with the food system and agrarian structure remaining predominantly unchanged (Lahiff & Cousins, 2005; Pereira, 2014).

South Africa currently has a dualistic agrarian structure which comprises of a relatively small (still predominantly white) community of commercial farmers (who produce much of the country's fresh goods) and a much larger (roughly 4 million farmers) small-scale farming community who are predominantly farming within the rural former homeland areas (Aliber & Cousins, 2012). There are a host of challenges, which accompanied the apartheid agrarian legacy that has made it very difficult for small-scale farmers to progress into the commercial farming sector. The need for agrarian reform has largely been unmet. Challenges associated with commercialisation of smaller scale farming operations include low education levels, poor management, lack of farming skills, poor access to formal remunerative markets, high transport costs, poor market information and insufficient support from the government (Musa & Phillip, 2015).

The Raymond Mhlaba Municipality includes part of the former Ciskei homeland as well as the former Cape provincial Administration (CPA). The Raymond Mhlaba Municipality has a history of land expropriation and disposition so that the Ciskei could be created in the 1960s as a 'Bantustan homeland' under the separatist development policy of the apartheid state (Raymond Mhlaba Municipality, 2017). There are a large number of small-scale farmers in the Raymond Mhlaba municipality who are trying to develop their farming business enter into the commercial space with increased local government support. The Raymond Mhlaba municipal government has identified rural development, food security and land reform as priority areas for future investment and development (Raymond Mhlaba Municipality, 2017). In any study situated in these areas, it is important to understand the historical context of the South African agricultural sector as it develops a foundation for research interpretations. This is needed to understand the possible contributing factors that have shaped the agrarian sector therefore allowing the researcher to make more accurate claims and recommendations.

1.4.2. The Local Agricultural Sector

The agricultural sector contributions makes up 8% of the Raymond Mhlaba Municipality's GVA (Gross Value Added)[9], with community service contributing the most with 46.5 % (ECSECC, 2017).

[9] Gross Value Added is a measure that determines the total production of a region based on the total value within that region (ECSECC, 2017).

However, as mentioned in section 1.4 above, the local agricultural sector is expected to grow, with agriculture's contribution to the GVA anticipated to grow between 2016 and 2021 with a 3.47% growth rate (ECSECC, 2017). The Municipality is home to a diverse range of farmers including backyard farmers, who manage small numbers of livestock or plant small areas, emerging small scale farmers, farming on rural smallholdings, and commercial farmers who are supplying pack-houses and markets on a regular basis. Livestock farming (cattle, sheep and goat rearing) emerged as the most common type of commodity farmed in the area with 80.9% of farmers rearing livestock. This was followed by 68% of farmers rearing poultry and 52.9% farming vegetables (ECSECC, 2017). When studying the types of farms and the scale at which farmers are producing, the majority of farmers (72,8%) only keep between 1-10 cattle, with only 2.5% of Raymond Mhlaba Farmers rearing cattle at a larger more commercial scale of over 100 cattle (ECSECC, 2017). This trend is similar with both sheep and goats, which made up only 15,2 % and 1.9 % respectively of farms with over 100 animals (ECSECC, 2017). This shows there is a high concentration of smaller-scale farmers that produce smaller amounts; it was therefore important to develop an innovative tool that could connect the farmers in the area to enable them to compete with larger commercial farmers.

1.4.3. The Local Consumer Sector

The Index of Buying Power (IBP)[10] of the Raymond Mhlaba Municipality is 0.0018. Relative to South Africa; this means that the people residing in the municipality are not able to spend their money on the goods and services produced in the area and are rather seeking products and services in other areas that they can afford (ECSECC, 2017). This shows a fragmented supply chain where the population is unable to buy the products developed locally or indulge in the local services (further explored in Chapter 4). In the IDP, the government singles out the need to "promote purchase of local agricultural produce – establishment of Alice Fresh Produce Market" to strengthen the local agricultural sector (Raymond Mhlaba Municipality, 2017, p. 56).

1.4.4. Existing Networks in the Area

There are several important networks that already exist in the Raymond Mhlaba Municipality. These include the existing Raymond Mhlaba Development Agency (RMDA) network, the Amanzi For Food network and its subsidiary network, the Imvotho Bubomi Learning Network (IBLN).

The RMDA is an economic development agency, which was formed by the municipality to stimulate economic growth and encourage the development of entrepreneurship and innovative business development in the region. The RMDA's vision is "a self-sufficient economy by 2030" (RMDA,

[10] Index of Buying Power is a measure of a region's overall ability to absorb products and services (ECSECC, 2017).

2017). The RMDA's areas of focus include agriculture, investment and enterprise development. Within the agriculture stream, the key concentration areas are citrus, rural market centres and small scale farmer development (RMDA, 2017). The RMDA has an extensive network of farmers they work with on a regular basis. They have also developed good partnerships and relationships with a number of retailers (SPAR, Fruit & Veg and Twins) within Alice and Fort Beaufort. The Food for Us project aimed to use the Food for Us app as a tool to connect local farmers to local markets, working alongside local communities and within existing networks, such as that of the RMDA's existing network.

The Amanzi For Food project, co-ordinated by the Environmental Learning Research Centre (ELRC) at Rhodes University and funded by the Water Research Commission, is a project that aims to assist food growers to implement rainwater harvesting, storage, and water saving practices to improve food production (Amanzi For Food, 2016). The Amanzi For Food project has been instrumental in facilitating the development of a dynamic learning network – the Imvotho Bubomi Learning Network (IBLN) – in the Raymond Mhlaba area. This networks aims to connect a diverse range of stakeholders to make information on rainwater harvesting more accessible and encourage collaborative exploration of sustainable farming and water-harvesting practices for improved crop productivity (Pesanayi, 2018). The Amanzi For Food project has a number of productive demonstration sites within the Raymond Mhlaba area where water-harvesting practices have been implemented.

The Amanzi For Food's most recent intervention in the Raymond Mhlaba area (November 2017 – May 2018) was a series of three two-day courses designed to train 'trainers'. The Training of Trainers (ToT) course encouraged participants to apply what they had learned (with regard to rainwater harvesting techniques and water saving farming practices) and not only implement this in their own farming practices, but also teach others about the important activities. The course was held at Fort Cox Agricultural and Forestry College. A good relationship exists between the Amanzi For Food project and Fort Cox as Fort Cox is part of the growing IBLN and is very supportive in the sharing of this type of knowledge. The training encouraged a number of different discussions around rainwater harvesting and water saving farming practices as well as equipped the course participants with skills to develop their own rainwater-harvesting curriculum and to demonstrate how participants could develop their own productive demonstration sites.[11] The FFU project partnered with the Amanzi for Food project and introduced the FFU app as an innovative tool to help market the produce harvested from productive demonstration sites, and therefore reduces wasted water, amongst other resources.

[11] Productive demonstration sites refer to gardens or land (both big and small) where the Amanzi for Food participant practices the learned water-harvesting techniques. They are considered productive demonstration sites as the site needs to be maintained and cared for, resulting in a good yield, rendering the technique successful (Pesanayi, 2018).

The IBLN developed out of the Amanzi for Food project (as mentioned above) as a network of farmers and agricultural stakeholders that resided in the Raymond Mhlaba area. The network includes a diverse range of members including small-scale farmers, agro-ecologists, agriculture lecturers, and government extension officers amongst others. The IBLN's main form of communication is a very active WhatsApp group with many discussions regarding agro-ecology, GMO free crops, water harvesting amongst other agricultural topics (Pesanayi, 2018). The IBLN, with guidance from the Amanzi For Food team, also has a monthly slot on the local radio station (Fort FM) where different topics regarding farming and water saving techniques are discussed. The Learning Network also tries to meet on a quarterly basis to perform an Ilima[12] as well as discuss the work that can be undertaken the following quarter by the network. The FFU project was introduced to the Imvotho Bubomi Learning Network at the Amanzi For Food Training of Trainers course where the use of the FFU app was demonstrated and explained. This allowed the app to be introduced into an already existing farming network.

The farmers who made up part of the Amanzi For Food and Imvotho Bubomi Learning Network were invited to trial the app to assist them in finding new markets for their excess produce. The RMDA acted as a supporting structure, assisting me to understand the local supply chain of the Raymond Mhlaba municipality and furthermore provide support in organising meetings and workshops.

1.4.5. This Study in the Context of the Food for Us Project

This study is written up as a Master's in Education thesis, conducted through the Rhodes University's, Environmental Learning Research Centre, but also informs the research conducted as part of the FFU transformative learning research as mentioned above. My position in the FFU project has not been solely to observe as M.Ed. researcher, but also to manage the introduction of the FFU app into the Eastern Cape Raymond Mhlaba community. Through partnerships with the RMDA and Amanzi For Food, I was able to introduce the FFU project to new and existing farming networks. This role meant I would introduce the FFU app to potential users, do the initial training and assist with any other technical challenges, or refer the challenges to other members of the app development team. This study has been an interventionist study with me, the researcher, playing an active participative role within the project. This role has meant I have developed a good understanding of the development process of the project, especially with regard to understanding the enabling and inhibiting factors of successful FFU app. This role hindered my research to a certain extent as the users interviewed and those who took part in workshops may not always have separated the app from my work as a researcher and thus may have withheld true feelings regarding the success or failures of the Food for

[12] *Ilima* is a traditional community farming practice where members of a community are invited to one of the members' plots to collectively prepare the land for planting. After the day's work, they are provided with a meal prepared by the plot owner (Pesanayi, 2018).

Us app, so as to maintain good relations with myself or the rest of the Amanzi For Food team. I reflect on this further in section 3.2.1.2.

1.5. Purpose, Aims and Research Questions

1.5.1. Purpose

As seen in section 1.3, South African communities are challenged with major environmental, social and economic issues, such as food surplus in a wasteful society, juxtaposed with mass hunger, malnutrition and poverty (FAO, 2017; WWF South Africa, 2017). As discussed in section 1.2.1, the food waste and food loss field is heavily under-researched (Pereira, 2014). Through this research I hope to contribute to the field by providing insight into how the small-scale farming communities within the rural Eastern Cape context experience and respond to this concern.

As mentioned above, a shift towards a circular economy is one way to address these issues and work towards a solution that finds value in waste. Advancements in mobile technology lead to an ever improving technological tool which can be used to promote solutions such as the development of a circular economy. The purpose of this M.Ed. study is to explore how people use and learn through mobile technology (specifically mobile application software) to build a more circular economy that reduces food waste and wasted resources. I specifically look at small scale farmers, and how they use (or don't use) the FFU app. As indicated in section 1.2.2, South African small-scale farmers struggle to transition from small farming enterprises to more commercial businesses due to various challenges (one being the lack of market access) (Khapayi & Celliers, 2016; Mpandeli & Maponya, 2014). By understanding the type of social learning value that was enabled by the FFU project and FFU mobile app, this research informs and contributes to future research within informal mobile learning in rural small scale farming food systems. I extend the concept of value beyond economic and social dimensions towards a more fine-grained analysis, drawing on the work of Wenger, Trayner and de Laat (2011) (see section 2.4).

In the 2014 International Handbook of Research on Environmental Education, there was a specific reference to the need for environmental education research to be conducted around mobile applications and the opportunities that this specific technological advancement presents for environmental education (Stevenson, Brody, Dillon, & Wals, 2014). This sentiment was echoed in the UNESCO publication, '*Rethinking Education, towards a Global Common Good'* where it is acknowledged that rapid developments in technology, specifically digital technology, have resulted in increased connectivity, increased knowledge sharing, increased mobility (to name a few) therefore requiring education to respond to these new learning frontiers (UNESCO, 2015).

This research directly responds to this research plea. It investigates the 'collaborative partnerships' and 'social learning' that is stimulated by the Food for Us mobile app at the farmer, buyer (producer/consumer) interface.

1.5.2. Research Aim

The goal of this research study is to investigate how the FFU app and FFU project support systems and activities enabled the creation of different kinds of social learning value to influence and disrupt wasteful value chains (emphasis on reduction of food waste, market transformation and contribution towards the development of a circular economy). This is achieved through investigating social learning and the enabling and inhibiting factors to value creation for individual users, communities of practice (buyers, sellers and intermediaries), and the landscape of practice as a whole. These terms will be conceptualised more fully in chapter 2.

1.5.3. Research Question and Sub-Questions

Main research Question: How can a farmer-buyer based mobile application enable social learning to stimulate value creation towards a circular economy?

Sub-Questions:

1. What affordances[13] have been enabled by the application and project?
2. How has social learning enabled by the application and project affordances stimulated different cycles of value for farmers and buyers over the duration of the project?
3. What factors limited or enhanced the social learning process and level of value created by the application?
4. In which ways has value created by the application contributed to the realisation of the project's aspiration of supporting circular economy principles and how could this be improved?

1.6. Overview of the Thesis Layout

In **Chapter 1** I have discussed the national and international challenges of *food waste* and food insecurity and engage with the ideas of developing sustainable, circular economies, illuminating the contextual needs for the Food for Us project. I situated my research within the broader project by firstly providing an overview of the FFU project and then orientating this M.Ed. study within the FFU project. I provided a contextual description of the Raymond Mhlaba community in which the FFU app

[13] Affordances have been used in this thesis to describe the preconditions required to allow for an activity (Turner, 2005). "*Affordances"*, and specifically "*technological affordances,"* will be defined and further discussed in section 2.2.2 in Chapter 2.

was introduced in the Eastern Cape case study. This research only drew on the experiences of the trial participants within the Raymond Mhlaba FFU app trial. I then outlined the purpose and aim of this study, ending with the overarching question and sub-questions that helped guide me through the research process.

Chapter 2 explains the key concepts which were used in this study such as the concept of 'technological affordances' and how they enable 'mobile learning', 'social learning' with specific reference to 'mobile social learning', as well as exploring the ideas of 'communities of practice' and learning socially within and between 'communities of practices within landscapes of practice'. I explore more vividly the concepts of 'boundary crossing' and 'transformative learning' that occur in and between these communities of practice. Lastly, I explored Wenger, Trayner and de Laat's (2011) 'Value Creation Framework' in detail exploring the different types of value cycles that occur in the tension between the grounded and aspiration narrative.

Chapter 3 describes the research orientation and the research methodology of this study. This chapter explains the interventions undertaken, the data generation methods, data management and data analysis methods that were used to explore the sub-questions and overall question described in section 1.5.1 and 1.5.2 above. This chapter also explores the validity challenges and an overarching theme of trust and respect which operated throughout the project to ensure that the research was conducted with the utmost ethical consideration and care for the participants and communities involved.

In **Chapter 4** I present the data that emerged from the data collection and analysis process. This chapter addresses sub-question 1, which identifies the affordances (potential and realised) that are enabled by the FFU app as well as the affordances of the networked social learning supporting systems (WhatsApp Group) and activities (Training workshops and #Match-Making event). This chapter gives some insight into what the app looks like and how it was used and what it is able to do, also describing enabling and inhibiting factors.

Chapter 5 presents the cycles of value creation that have been enabled by the various affordances discussed in Chapter 4. This chapter explores the social learning value created across the Food for Us landscape of practice by the use of the Food for Us application and the networked social learning processes. I explore the cycles of value creation according to Wenger, Trayner and de Laat's (2011) Value Creation Framework while also looking at the additional circular economy value that was enabled by the Food for Us project. Chapter 5 also includes three analytical statements which summarise this research, addressing the sub-questions and research question while bringing all the analysis of the data regarding affordances and value creation together. I discuss the possible future phases and way forward for the Food for Us project making a series of recommendations.

2. CHAPTER TWO: Mobile Learning Boundary Crossing and Value Creation – What Others Have Said

2.1. Introduction

This chapter provides the conceptual and theoretical framework for this study. Chapter 1 provided the contextual background of the FFU project and my M.Ed. study. In this chapter I explain the theoretical underpinnings of my M.Ed. study, exploring the importance of mobile learning (m-learning) and technological affordances, as well as social learning within landscapes of practice. Finally, I discuss the value creation framework, a theoretical, methodological and analytical framework that has been useful in shaping and furthering this research.

I start by outlining the rise of the smartphone and the increase in mobile learning in today's society. I look at what mobile technology enables users to do and how this contributes to learning together.

The key question of this study, as explained in Chapter 1, explores how social learning has been enabled by the app and social learning value has been created through affordances. I explore the varying definitions of social learning, touching on the gaps and challenges associated with the concept, and presenting one definition for use in this study. I continue to explore social learning within and between communities of practice within a landscape of practice and conclude the section by looking at boundary crossing as a rich space for social learning.

The framework used to understand social learning that is enabled by the FFU app in the food surplus and lack of market access context in the Raymond Mhlaba Case study is the Value Creation Framework developed by Wenger, Trayner and de Laat (2011). In the final section of this chapter, I explain how the framework helps to attribute social learning in networks and communities through value creation cycles that have been enabled by certain activities. I finish the chapter by exploring the different types of value that can emerge and the transformative value that social learning can facilitate.

2.1.1. The Rise of the Smart Phone

The postmillennial decade has led to a wave of two massive technological advancements in worldwide digital connectivity, the first being the spread of conventional Internet access via PCs and the second, an even greater worldwide surge in mobile telephone use, specifically the use of Internet on hand held mobiles (Donner, Gitau, & Marsden, 2011). Donner et al. (2011) explained that with the mobile phone's ability to be portable, flexible and allow for increased personalised control, there is hope that mobile Internet may increase the productivity, agency and access to information and data.

This in turn has the potential to increase the productivity and agency of individuals and organisations in developing countries (Donner et al., 2011).

2.1.1.1. Mobile Use in Africa and South Africa

The adoption of mobile communication handsets (mobile phones) has increased exponentially over the last few years. This has been a global trend but infiltration and adoption rates have been particularly high in Sub-Saharan African countries (GSMA, 2017; We are Social, 2017). According to the *We are Social 2017Digital Yearbook*, seven of the ten highest growing mobile adoption countries in the world are in Africa (We are Social, 2017). Aker and Mbiti (2010) explained that in many cases in developing nations, mobile phones are the first pieces of digital communication technology to have infiltrated rural areas where the installation of earlier technology was too expensive. In many instances, African technology has leapfrogged older communication technology such as landline phones and desktop computers (GSMA, 2017; Jiyane & Mostert, 2010). Akker and Mbiti (2010) believed that mobile phone infiltration in Africa is due to their ability to provide the most reliable and cost effective communication method for individuals, organisations and businesses in Africa. Aker and Mbiti (2010) predicted that as the price of mobile phones fall, the ownership of a mobile phone would progress from being an elite status symbol for the minority to a necessity for all adults at all income levels. According to the Mobile Economy Sub-Saharan Africa 2017 report, there were 420 million unique mobile subscriptions, which translated into 43% mobile subscription penetration in Sub-Saharan Africa (GSMA, 2017). Of these unique mobile subscriptions, a quarter are smartphone connections which enable the mobile phone user to access the Internet (GSMA, 2017). This number has doubled over the last two years which shows an exponential increase in smartphone infiltration within Sub-Saharan Africa (GSMA, 2017). According to the *We Are Social 2017 Digital Yearbook*, even though overall infiltration of Internet-enabled mobile phones is not as extensive in Africa as in other continents, seven of the ten fastest Internet growing populations are in Africa. The key factors for the growth in smartphone infiltration, and subsequent increased Internet use, has been the increased affordability of new devices and the increase in demand for the resale of second hand devices (GSMA, 2017). There is much optimism and excitement around the growing infiltration of mobile devices in Africa and the new possibilities that it offers the continent, specifically through making connectivity much more accessible "across urban-rural and rich-poor divides, mobile phones connect individuals to individuals, information, markets, and services"(Aker & Mbiti, 2010, p. 207).

The digital divide is understood broadly as the gap between those people who have access to digital technology (computers, laptops, tables and cell phones) and the Internet and those who do not (Singh, 2004). Regardless of the increase in technological infiltration discussed above, there is still a prominent digital divide in South Africa (Fuchs & Horak, 2008). South Africa's apartheid history has left the country with longstanding social challenges of poverty, high crime rates, social polarisation

and inequality (Fuchs & Horak, 2008). Singh (2004) believed that South Africa's digital divide is due to the legacy of apartheid which provided black and coloured people with inferior education, poor infrastructure and little learning opportunity. The education system for black and coloured children under apartheid did not encourage learners to interact with, or be exposed to Information and Communication Technologies (ICT), specifically computers. The same education systems did not equip people with the necessary skills required in high paying jobs, therefore inhibiting them from earning enough income to afford to buy ICTs (Mutula, 2005). Brown and Czerniewicz (2010) believed that the digital divide in South Africa is in fact widening, as they believe that the wealthy elite are prospering from ICT development, while poorer communities are being left behind without access. The digital divide does not only relate to access of technology, but also quality of technology given access to (Brown & Czerniewicz, 2010). Brown and Czernierwicz's (2010) study on university students in South Africa found that mobile phones where used by all students, both those from affluent backgrounds with high exposure to ICTs as well as students from low-income households with minimal ICT experience. Brown and Czernierwicz (2010) suggested that mobile phones might provide a platform to achieve digital democracy in South Africa as their infiltration continues to increase.

Mobile phone subscriptions in South Africa have increased dramatically in the last 20 years. According to ITU's country statistics, mobile phone subscriptions in South Africa have risen from approximately 8.3 million subscribers in 2000 to 33.9 million subscribers in 2005, 50.3 million subscribers in 2010, 87.9 million in 2015 and then starting to plateau with 88.5 million subscribers in 2018 (Itu.int., 2019). According to the We Are Social Digital Yearbook 2017 report, 92% of the South African population own their own mobile phone (We are Social, 2017). The same report explained that of the mobile phone owned, 69% of these are Internet enabled smartphones, with this number expecting to rise (We are Social, 2017). In a recent national survey, 53% of surveyed households had at least one member who had access to the internet with more than a third of this (33,7%), being through mobile devices (Statistics South Africa, 2016). Internet enabled mobile phones (smartphones) not only enable users to access the Internet, but also enable the download and use of mobile applications amongst other features (Sov.Tech, 2017).

According to Cullen and Kabanda (2018), the most active mobile phone users in South Africa are the adolescent population (15-24 years old). Of adolescents 72% own their own mobile phone, the majority of which are smartphones (Cullen & Kabanda, 2018). These smartphones are used not only for texting, but to engage in social media action, browse the internet as well as to download and use various mobile apps. Students reported they felt more comfortable using mobile phones to navigate the Internet than using desktop computers, laptops or other computing technology (Cullen & Kabanda, 2018).

Most telecommunication use research has been focused on mobile users in areas where constant Internet connection with unlimited data is the norm, while the situation in most developing countries is very different (Rey-Moreno, Blignaut, Tucker, & May, 2016). Even within Sub-Saharan Africa, research has been focused on mobile phone usage in urban areas as opposed to rural areas where the population remains 'isolated' (Rey-Moreno et al., 2016). In South Africa, signal coverage is intermittent and high data costs mean users spending a large proportion of their monthly income (Mathur, Schlotfeldt, & Chetty, 2015). Rey-Moreno et al. (2016) explained that in rural areas, where household income is significantly lower than urban areas, the population spend up to 11.25% of their monthly income on telecommunications. Even though the purchasing of a handset might be lower than I previous years, the cost of keeping connected is incredibly expensive for all South African, especially those in rural and low income communities. However, the use of the mobile phone, and specifically Internet enabled phone, continues to grow as the desire to be connected becomes prioritised, therefore resulting in greater percentages of income being spent on data and airtime as other forms of connecting to the Internet (via broadband connected computers and public or private WiFi) are not regularly available (Mathur, Schlotfeldt & Chetty, 2015). For wealthier communities, the availability of constant connection through broadband systems (such as ADSL lines) allows for WiFi in households or at work, therefore reducing mobile expenses exponentially resulting in the development of differing Internet use cultures (Mathur et al., 2015).

High data costs have led to a number of data cost managing strategies starting to develop amongst mobile users. One strategy is disconnecting one's mobile phone from the mobile internet for periods of time during the day or night. This reduces the background data use and the phone is reconnected to the mobile Internet only when the user needs this (Mathur et al., 2015). These types of data management strategies have implications for the use of the FFU app and how it influences the success and uptake of the app. The FFU app relies on constant connectivity to encourage immediate communication between the farmers (selling surplus produce that has limited time windows in which to be sold) and the buyer. The challenge of high data costs had the potential to reduce the number of small-scale, rural farmers and consumers able to experiment and take part in the Raymond Mhlaba trial. It may also have influenced the longevity of the project if the value created by the application does not match the cost of data. This challenge was acknowledged by the FFU project team in the Food for Us project proposal and therefore it was defined in the project scope, given to the app developers, that the FFU app download and use needed to cost the users as little data as possible so as not to create a substantive barrier that excludes a large portion of the Raymond Mhlaba local community involved in the local supply chain. Worked into the FFU project budget was also a small allowance for mobile data to be given to the users so as to ensure a diversity of users able to engage in rich collaborative social learning through the use of the FFU app.

2.1.1.2. Spotlight on Mobile Application Use

With technical advancements and mass mobile infiltration, mobile technology use has changed significantly with technological innovations enabling people to do more with their devices. With the surge in Internet use on Internet enabled mobile phones (smartphones), there has been a dramatic increase in the use of Application-Based Mobile Services, commonly known as mobile apps (Opera, 2016). Mobile apps are software applications that are specially designed to work off small wireless computing devices such as smartphones and tablets rather than off desktop computers or laptops (Rouse, 2013). There are several ways to host apps on a device: the first is to develop a web-based application which requires a working Internet connection to log into and use the app; the second type is a native application which is downloaded onto the device and can be used without web connection (Rouse, 2013). You also get combinations of web-based and native applications which require varying amounts of memory on the host device and varying levels of Internet connection (Rouse, 2013). The Food for Us app is a web-based application that requires a working Internet connection to update and work effectively.

According to the *2016 State of the Mobile Web Report*, South Africa is the leading African country in terms of application use with one third of the population using apps regularly (Opera, 2016). The most used application in South African in 2017, according to the Business Tech Report, was *WhatsApp*, a communication application (BussinessTech, 2017). WhatsApp was followed by *Wish* (an online shopping application), and third *Share It* (an information sharing platform) with fourth *Facebook Lite* (social media application) (BusinessTech, 2017). This collection of apps encompasses a wide range of categories showing that South African users are branching out to use their mobile phones to fulfil a number of services ranging from communicating over social media platforms to online shopping. This shift in use in the culture surrounding mobile phones (shift towards using additional features on mobile phones instead of only text and voice calls) has led to the rise of a new technological society (Potgieter, 2015). Not only is mobile technology and app technology development making communication more efficient and cost effective, it is also creating opportunities to improve other aspects of our daily life through providing other services to the mobile user through mobile apps (Aker & Mbiti, 2010).

Mobile applications are being used in a multitude of different sectors to achieve a number of different goals. The two sectors that are important to explore for this study are the mobile apps that exists to address issues of *food waste* as well as mobile apps that assist *small-scale farmers* in *rural farming communities*.

2.1.1.3. Existing Food Waste Applications

There has been a surge in smartphone use and mobile application development globally, but more specifically in South Africa in the last few years (Gomiwa, 2017). The application development sector has been an area of major growth with increasing demand for locally developed digital content (GSMA, 2017). A number of mobile apps have been developed globally and locally to address food waste and assist small-scale farmers, two of the key aims of the FFU app. Table 2.1 shows a number of food waste mobile applications, explaining how they work and how they contribute to reducing food waste.

Table 2-1: Existing mobile applications which address food waste

Mobile application	**Country of use**	**What does the application do?**	**How is it contributing to reducing food waste?**
11th Hour	Singapore	Online platform to advertise food that will go to waste to be collected at close of day (Wong, 2017) Use Geo-location technology and crowdsourcing of discounted food	Diverting soon to be expired food to add value rather than be dumped (Wong, 2017)
Too Good to Go	United Kingdom, Europe	Online market place for retailers and restaurants with surplus food to connect with consumers who would like to purchase discounted food (To Good To Go, 2018) Use geo-location technology & Crowdsourcing of discounted food	Diverting food that would be dumped to consumers who will pay discounted prices
Cheetah	Ghana	Uses geo-location technology to determine the most direct and fastest route to get the produce from the farmer to the market. The application exchanges traffic data and route information between the transporters, growers and traders. (Fadhil, 2016; Wong, 2017)	Reduces food wastage in the middle of the value chain by addressing the food waste that occurs through transport (Wong, 2017)
Winnow	Europe, UAE, Asia and Australia	Assist commercial kitchens to track and monitor their food waste while preparing meals. The application also suggests and monitors the implementation of food waste reduction strategies (Wong, 2017)	Reduces waste in restaurant by encouraging changed behaviour of chefs (Wong, 2017)
Just Now	South Africa	Application alerts users when produce is about to expire. The registered retailers register what is going to expire and buyers are encouraged to visit the retailer to receive a discount on the items when they display the application advertisement (Averda, 2018). This application is still in its early pilot phase.	Reduces food waste in urban setting at a consumer level by diverting food close to expiry using discounts as an incentive (Averda, 2018)
Ya No Desperdicio	Spain	An app that promotes the exchange of good food between people in a local community (Wong, 2017).It uses GPS location technology and the posting of photographs to determine quality and quantity providing a platform on which to discuss logistics (Wong, 2017).	Reduces wasted food at consumer level. When people have excess food they trade it with others in the community for what is needed (Wong, 2017)
Olio	United Kingdom, and internationally used	An online platform that creates a place for people to give left over food away to people in their neighbourhood. Olio use geo-location technology to detect food that is available to share in the area (OLIO, 2019).	Diverting individual and the retail food waste to other consumers on a free sharing platform
Food Cloud	Ireland and the UK	Application used to alert charities of food that is up for donation from local supermarkets, farms and food manufacturers (Wong, 2017)	Diverting retail food that is about to expire to charities (Wong, 2017)

MintScraps	US and Thailand	Using gaming features, Mintscraps helps to monitor food waste of restaurants and individuals in real time so that individuals can identify wasteful habits in a fun innovative way (Fadhil, 2016; Wong, 2017)	Promoting changed behaviour to reduce amount of waste created by restaurants(Fadhil, 2016; Wong, 2017)
No Food Waste	India	Use geo-location technology to notify the No Food Waste Organisation of places where there are large amounts of surplus food (after parties or events) to be donated to charities or homeless. Users are also able to identify points of hunger requesting food (Wong, 2017).	Diverting food that would be wasted to charity organisation
Hello Compost	United States	This application incentivises lower income families to collect organic waste by awarding the users with credits buying more fresh produce. The organic waste is then turned into compost by the centre and sold to fund the project. The application assist the users by keeping a tally of credits as well as providing information about how to keep organic waste and how to follow a healthy diet (Fadhil, 2016).	Diverting organic waste from the landfill to be used in compost making project to regain value from waste

The mobile applications explained in the table above describe a variety of apps using different functionalities to reduce food waste. *11th Hour*, *Too Good to Go* and *Just Now* are three apps that create an online platform to advertise food nearing its expiry date for resale at discounted prices. *Winnow* and *Mintscraps* encourage changed behaviour of the user to reduce the amount of organic waste created in the kitchen therefore providing strategies and acting as a waste monitoring tool. *Ya No Desperdicio* and *Olio* both use a sharing of food model where they create a localised online platform where users can swap food items with each other (*Ya No Desperdicio*) or give away leftovers to neighbours (*Olio*). *No Food Waste* (India) and *Food Cloud* are two apps that redistribute left over food from events and retailers to charities through using the application to accumulate available surplus food. *Cheetah* is a unique app developed in Ghana, which addresses the food waste that occurs on Ghana's congested and deteriorated roads between the farm and market (consumers). The *Cheetah* app assists drivers to find the fastest route to the market so as to reduce the food's time in transit. The final app described above is *Hello Compost*, which reduces food waste dumping through encouraging families to bring organic waste to a central point to receive remuneration.

The Food for Us app hopes to reduce on-farm food wastage by diverting the food to other channels (alternative markets) where economic value can still be gained. It is therefore using similar mechanisms to *11th Hour*, *Too Good to Go* and *Just Now*, however being designed for a rural context where small-scale farmers need to access feasible markets. The FFU app shares a similar ambition to the *Ya No Desperdicio* application as it hopes to create a circular economy where produce is consumed locally within a community.

The growing application development movement has also led to a large number of easy to operate applications being developed to assist farmers in producing larger volumes of food and to avoid food wastage (Stutzer, 2016) some of which I describe in Table 2-2 below.

Table 2-2: Existing mobile applications which support and assist small-scale farmers

Mobile application	**Country of use**	**What does the application do?**	**How is this app assisting farmers to reduce waste?**
Rainbow Agri	India	A mobile platform that aims to improve communication between farmers (Stutzer, 2016). The application has a number of different functions including an online market platform, information platform and a communication platform. The applications (more than one application for different needs of the farmer) are used to empower farmers to partake in innovative agricultural commerce (RainbowAgri, 2015).	Assists farmers to reduce their wastage through improving connections to the market and providing information for more effective use of resources
Esoko	Kenya	*Esoko* aims to make market information available to all small-scale farmers therefore increasing small-scale farmers opportunities to grow. *Esoko* also developed a feature that connects the buyers and sellers of produce (Esoko, 2017). *Esoko* organisation developed a series of agricultural best practice videos to assist farmers in gaining access to information to improve the sustainability of their farming (Esoko, 2017)	Assisting small-scale farmers to reduce their food wastage by opening up communication channels between buyer and sellers and increasing market access by providing a platform on which farmers can advertise. *Esoko* is also reducing food wastage by providing farmers with access to information to help them improve their farming output and save natural resources.
Mfarm	Kenya	The *Mfarm* Technological platform (text messages and mobile application based) shares up-to-date market information and enables greater market access through creating a virtual market place allowing for group buying and group selling of produce (Solon, 2013)	Similar to *Esoko, Mfarm* provides farmers with up to date information on market prices as well as climate and planting information (Solon, 2013). Improved access to information is anticipated to improve farming practice and reduce wasted resources.

All three of these apps are based in developing countries (India and Kenya) and aim to improving the profitability of small-scale farming within rural areas, similar to the Food for Us app. As discussed in section 1.2.3, one of the main challenges for African small-scale farmers is access to market information and access to markets themselves (Mpandeli & Maponya, 2014; Khapayi & Celliers, 2016). All the above apps aim to improve small-scale farmers' access to information as well as markets through providing an online platform on which to access market information and open up alternative markets for their produce. The Food for Us app shares particularly close parallels to the Esoko app, especially with regard to how it was introduced in the Raymond Mhlaba municipality, that is to the IBLN network of farmers where FFU became part of a collection of projects (rather than the introduction of a single application).

It is important to note the successes and learnings of all three apps when implementing the FFU project in a similar context (rural small-scale farming context within developing communities). The CEO of *Mfarm,* Abass, explained that there are other issues to be addressed before technology can be

used to improve the running of the agricultural system. Abass described one major challenge of the *Mfarm* initiative as getting the farmers to trust the service:

> Others have come to the market using technology to create a trading platform that farmers are not ready for. They have also been set up by non-profit organisations and run out of money, leaving the farmers high and dry. This makes them sceptical. (Solon, 2013)

The rise of the Internet and smartphone 'era' and the strengthening of application development in combination have enormous potential to assist users of the application. However, the context in which an application is introduced needs to be thoroughly understood to ensure that the users are not left feeling sceptical of the project and the intervention, as noted by Solon (2013).

2.2. Mobile Learning and Affordances

In section 2.1 above I discussed how mobile technology has changed in a fast developing global and local context. Mobile phones have become ever present in our daily lives. Not only are people using mobile phones to reduce waste in their kitchens (*Mintscraps*), find discounted local food (*Just Now*) or gain relevant information on best practice farming methods (*Esoko*), users are also learning while interacting with apps. Mobile phones have a number of functions (capturing photographs, geo-location, digital display) that make learning as well as communication possible. In this section I explore types of formal and informal learning linked to mobile use (mobile learning) as well as understand the role of technological affordances or functions that enable this learning.

2.2.1. Mobile Learning within a Social Context

Peters (2007) believes that the distinguishing feature of our society today is how quickly technology and society are changing. Mobile learning is a learning model that uses mobile devices as the primary tool to facilitate learning (Naismith, Lonsdale, Vavoula, & Sharples, 2004; Peters, 2007). This learning model is similar to its sister model, electronic learning (e-learning) with similar features such as multi-media content and ease of communication (Cheon, Lee, Crooks, & Song, 2012). Mobile learning enables more flexibility than e-learning with regard to where and when learning can take place due to mobile devices being more easily transported, therefore giving learners access to information wherever and whenever they want (Cheon et al., 2012). This mobility extends the opportunities for learning that occur outside of the formal classroom (Cheon et al., 2012). The introduction of ICTs into formal learning environments has led to a change in the roles of the learner and teacher and a shift to a more learner-centred model where the teacher becomes a 'guide on the side' rather than the only source of information (Motiwalla, 2007). Naismith et al. (2004) believed that mobile phones add a new dimension to learning as they are personal devices that enable learners to engage in personal interactions in numerous environments.

With mobile technology developing at such a rapid rate, mobile learning itself is continuously evolving (Khaddage, Muller, & Flintoff, 2016; Traxler & Kukulska-Hulme, 2016). Traxler and Kukulska-Hulme (2016) and Khaddage et al. (2016) believed there has been a shift in the understanding of mobile learning from a form of 'techno-centric learning', where mobile learning was simply defined as learning that took place on mobile digital device to "learning for mobile and connected societies, where the technologies of mobility have transformed the balance of what can or must be known and learnt because they have or they are transforming the societies themselves" (Traxler & Kukulska-Hulme, 2016, p. 4).

Mobile learning is used in both formal institutionalised learning environments and as part of informal learning in our everyday lives (Naismith et al., 2004; Khaddage et al., 2016). The uptake of mobile devices in formal educational institutions is slowly increasing as barriers to successful mobile learning are being breached (such as lack of skills, control of content amongst others) (Khaddage et al., 2016). In this research, I focus on understanding the informal learning that occurs through using mobile devices as a tool to interact within social context.

Informal learning has a relatively unclear definition and is often understood as everything that is not formal learning (Khaddage et al., 2016). The widely accepted definitions of informal learning include the learning that occurs outside of institutionalised education establishments (such as schools, universities, colleges etc.) in the daily experiences that happen in households, during work or in social interactions with one another or during various activities of interest (McGivney, 2006). McGivney (2006) explained that informal learning often happens unintentionally during unplanned tasks and activities and therefore does not follow a specified curriculum and is often not pedagogically planned. Informal mobile learning might occur as people interact with their mobile phones every day and learn through intentional (not institutionalised) or unintentional ways (Naismith et al., 2004). Naismith et al. (2004) explained that to enable informal learning through mobile devices (which are small, easy to use and used in our everyday lives), mobile devices need to support intentional and accidental learning episodes that might occur at any time, anywhere. According to Livingstone (2000), adults learn informally everyday of their lives with most of their learning occurring through informal learning. It is understood that this is so due to personal relevance, personal motivation and learner control (Jones, Scanlon, & Clough, 2013). Mobile phones enable users to take such control through allowing personalised, authentic, location orientated learning (Jones et al., 2013; Naismith et al., 2004). With information at your fingertips, in the form of information on the worldwide web, using smart mobile phones as a learning tool has become second nature to many mobile phone users. This shows the possibilities that lie in further developing m-learning to harness fast developing mobile technologies (Peters, 2007).

As explained by Khaddage et al. (2016) and Traxler and Kukulska-Hulme (2016), the definition of m-learning has expanded to mean more than purely learning that occurs with the assistance of mobile devices. Traxler and Kukulska-Hulme (2016) explained that mobile devices are able to deliver learning to individuals and communities in places where previous educational interventions have been too dangerous, costly or demanding. Taxler and Kukulska-Hulme (2016) and Khaddage et al. (2016) agreed that mobile devices have enabled the context of the individual to be more central to their learning experience. Improved mobile features on mobile devices have enabled a user's location to be collected, the proximity of users to other devices, the time of day, amongst other information, that allows learning to be tailored more specifically to fit the context (Metcalf & Hamilton, 2016). The three most notable characteristics as described by Cheon et al., (2012) are: (1) portability: mobile devices are able to move to different locations; (2) instant connectivity: mobile devices allow users to connect to each other or the Internet instantly in areas of signal, and lastly (3) context sensitivity: which allows mobiles to collect real-time situated data about the context of the users. Klopfer, Squire, Holland and Jenkins (2002) proposed similar mobile phone characteristics naming them "unique educational affordances" for learning. These include portability, social interactivity, context sensitivity, connectivity and individuality. In Klopfer et al.'s (2012) understanding, mobile devices give users the ability to create a 'unique scaffold' that can be changed and customised to the individual's wants, needs and subject of research enabling a desired environment for learning (Klopferet al., 2002). Naismith et al. (2007) explained that it is this feature of mobile devices enabling personalisation of the device that enables effective informal mobile learning.

Not only do mobile devices allow improved context specific learning but they also enable more collaborative learning between mobile users. Collaborative learning can be enhanced by mobile phones in informal and formal learning environments (Jaldemark, Hrastinski, Olofsson, & Öberg, 2017). According to Jaldemark et al. (2017), collaborative learning can occur during dialogue, activities or experiences that occur between a group of two or more people in either intentional or intentional learning environments. Mobile phones allow for easy connectivity between individuals and between groups through allowing data to be shared (pictures, documents, location etc.) as well as text messages to be communicated instantly (Naismith et al., 2004). According to Naismith et al. (2016), mobile devices have enabled users to connect and interact in real time allowing for collaborative learning. The technological affordances of mobile devices and their extensive use within modern society has led to them being considered useful tools to enable collaboration (Naismith et al., 2004).

However, there are a number of challenges that inhibit successful use of mobile devices to achieve the best circumstances of effective mobile learning (Cheon et al., 2012). These inhibiting factors include: (1) small screens with low-resolution display; (2) inadequate memory on some mobiles; (3) slow

network speed; and (4) the lack of standardization and comparability of m-learning technologies. While this is the case, these hardware (camera, voice recorder, battery life) or software (applications and processing systems) issues are quickly being resolved with the development of the field (Cheon et al., 2012). New technologies are improving the capabilities of mobiles (i.e. the technological affordances) to effectively organise, collect, manipulate and generate information for teaching and learning, unfolding a very exciting future for m-learning (Cheon et al., 2012).

The physical inhibiting factors of mobile learning are often also accompanied by psychological limitations, such as the hesitant acceptance of mobiles as a learning tool in schools (Cheon et al., 2012). The perception is changing rapidly as mobile phones become more entrenched in the workings of society. Peters (2007) believed that there is still a large portion of the population that does not feel at ease with fast changing technology resulting in a noticeable gap between the adoption of m-learning in mobile users born in the age of technology and those born before. Those born into a world of mobile communication, sophisticated web connectivity and immediate communication are able to embrace m-learning, in a formal and informal sense, much more willingly (Peters, 2007).

Understanding the concept of m-learning is important for this research, as the Food for Us redistribution app has been designed to enable informal collaborative mobile learning in social spaces. The FFU app has the potential to enable users to learn from each other through interactions facilitated by the app (communication through the chat and sharing market information through the virtual market) as well as interactions that occur around the FFU app (the conversations spurred by the FFU app and the troubleshooting discussions between FFU users). This form of mobile learning will not be individual, but rather a type of social learning that is situated within the FFU user's community, home or place of work. In the following section I explore what enables learning to take place and the significance of the term affordances, and what it means with relevance to this research.

2.2.2. Affordances of Mobile Devices and their Importance in Learning

The term affordance has come to mean more than action possibilities (Turner, 2005) with emphasis being placed on the important relationship between the user and the artefact (Doering, Miller, & Veletsianos, 2008). An affordance can be described as a precondition for an activity. However, because an affordance exists, does not mean than that the desired outcome is guaranteed (Pozzi, Pigni, & Vitari, 2014). Pozzi et al. (2014) explained that affordances require action from the actor to realise the potential of the affordance for which it was designed. Bernhard, Recker and Burton-Jones (2013) agreed believing that a combination of the existence of (1) the affordance, (2) perceptions of the affordance and finally, (3) the actualisation of the affordance all determine the realisation of an affordance. Therefore, the perception (understanding) that surrounds the affordance is equally important as the actualisation (action) of the affordance, if not more important (Bernhard, Recker, &

Burton-Jones, 2013). Norman (1988) explained that perceived affordances are those that the user intends the object to enable. These intended affordances, according to Norman (1988), help the users identify how they act to achieve a realised affordance.

'Technology affordances' refers to "an action potential, that is, to what an individual or organisation with a particular purpose can do with a technology or information system" (Majchrzak & Markus, 2012, p. 1). While the physical technological features of a tool are important in realising an affordance, the action and use of the feature and the context in which it was used is significant in the realisation of the affordance (Egbert, Akasha, Huff, & Lee, 2011; Haines, 2015). In Haines's (2015) research on teacher's use of technological affordances to enable mobile learning, Haines (2015) explained that the characteristics of the teachers also played an important role in the affordances perceived and those realised. Haines (2015) therefore explains that teachers' interaction with technological affordances is "a holistic picture of seeing possibilities and exploring these in action and over time with affordances being emergent properties of both the teacher and her context"(Haines, 2015, p. 166). This M.Ed. research will look particularly at the need for there to be action to realise affordances. As described in section 2.2.1 above, technology cannot cause change by itself and requires the users' agency and action to do so. Similarly, as Haines (2015) described, I will explore how affordances emerge within the Raymond Mhlaba context with a diverse range of users who use mobile devices differently, and have different perceptions of what the FFU app will afford.

Technological affordances play an important role in improving the learning environment for mobile users in formal and informal learning contexts. There are several important mobile technological affordances that can enable a good learning environment, including: (1) portability, (2) evidence and data gathering, (3) communication, (4) interaction with interface, and (5) interaction with the outdoor environment (MacCallum, Day, Skelton, & Verhaart, 2017). According to MacCallum et al. (2017), these affordances enable users to move around accessing information anywhere, any time, and to interact with the environment capturing their learning on their devices, further developing their own understanding by sharing the new or old knowledge with others.

Today's mobile smart phones include features such as High Speed Packet Access (HSPA) Connectivity (3.6 Mb/s and higher wireless mobile broadband connectivity), built in or virtual keyboards for fast and accurate text and digit input, high resolution still and video camera, reduced noise interference recording, built in GPS, high storage capacity, high resolution touchscreen interface as well as a variety of pre-installed and optionally downloadable applications (Cochrane & Bateman, 2010). All these features enable a magnitude of new activities and actions for users, changing practices and behaviours that were the norm in the past. Examples of technological affordances from Cochrane and Batman's (2010) study include the ability to capture high quality images, enter text easily, GPS location tracking and instant connectivity. All these affordances are enabled by a

collection of hardware and software components or features. These features might be available to a user but without the tools and software being used effectively, the affordance cannot be realised.

As discussed in section 2.1.1.2, there are a number of existing mobile apps that deal with food waste and share technological affordances that enable people to reduce food waste in specific areas using different strategies. Fidhil (2016) explored four approaches using technological affordances, to addressing food waste: (1) geo-location, (2) gamification, (3) crowdsourcing, and (4) quantified-self. What appeared to be most common in many of the mobile applications explored by Fidhil (2016) was the redistribution of food prior to the food being too spoiled to consume. The applications discussed in section 2.1.1.2 (Good to Go, Just Now, ya No desperado etc.) used approaches such as geo-location and crowdsourcing which required certain affordances such as the ability for the mobile application to geo-reference the user (using GPRS technology) thereby mapping them in relation to other users and the food being redistributed.

It is important to understand the complexities surrounding affordances, as it is the application affordances that enable users to potentially learn in a collective way stimulating value creation amongst the trial participants and researchers alike. Differentiating affordance perception and affordance actualisation is important when researching what affordances are facilitating the most value creation during field trials. For example, an affordance such as the ability to upload photographs might be considered useful, however app users may not actualise the affordance due to the cost of data required to upload the photographs. With this theoretical understanding of 'affordances' it is possible to more accurately understand how to identify affordances of the Food for Us app and identify where affordances are realised or not and how they result in value creation or not.

2.3. Learning Together Through Social Learning

Understanding the concept of social learning, and how this is enabled by affordances of mobile application technology is of interest to this research, as the Food for Us application hopes to facilitate a type of informal mobile learning with potential to create social learning value as stipulated in my research question articulated in Chapter 1 section 1.5.3. The FFU app enables users to advertise produce, aiming to facilitate user interactions, and assist in the building of networks, therefore potentially enabling learning to occur anywhere, anytime within and between communities of practice within a greater landscape of practice (Food for Us, 2018). In this section I explore social learning and how social learning occurs between and within different groups of people, called communities of practice. I then explore the landscape that a network of connected communities of practice create described as a 'Landscape of Practice' by Wenger-Trayner and Wenger-Trayner (2014) and the types of boundary crossing that can be facilitated within such landscapes of practice.

2.3.1. Social Learning in Everyday Life Through Mobile Technology

The concept 'social learning' is not a new term, but has been used more extensively in the last decade within a wide variety of disciplines (Reed et al., 2010). Social learning has been used in environmental resource management, developmental studies, and education amongst many others with slightly different understandings within each discipline. Kilvington (2007) used 'social learning' within the environmental management field, defining it as the way different agencies (stakeholders) and different ways of knowing or knowledge sources are brought together to discuss, learn and make decisions about complex problems. This definition concentrates on collective decision-making and resource management in complex settings. With the rise of consciousness regarding the decay and rapid degradation of environmental systems, there has been a movement towards finding a new, more inclusive way (including discussion from a number of different voices) to approaching decision making and management of wicked problems (Kilvington, 2007; Wals, Van der Hoeven, & Blanken, 2009). In the past, within the resource management field, a top-down approach to decision making and actions plans were used. However, today, in order for decisions and actions to have a long lasting effect, it is important to re-evaluate the decision making process and the implementation of policy (Medema, Wals, & Adamowski, 2014). Social learning, within the environmental management discipline, describes a more bottom-up approach to social interaction and natural resource management discussion amongst a large variety of stakeholders so that those parties not often given a voice are given an opportunity to contribute to the discussion. Romina (2014) explained that this type of bottom-up learning includes a more participatory approach and a transformative type of change process often called social learning. Through repeated interaction, as part of participatory activity, "participants can learn, enhance knowledge and develop shared understanding", which is understood as an important part of social learning within the environmental management field (Romina, 2014, p. 16).

Wals, Van der Hoven and Blanken (2009) share a similar definition for social learning describing social learning as the type of learning that is needed in today's risk society (Beck, 1992). Life as we know it is changing at a rapid rate resulting in society continuously facing new problems that have never been encountered before with no readymade solutions (Wals et al., 2009). Against this backdrop of a risk society, Wals et al. (2009) believed that, in essence, social learning is all about "bringing people of different backgrounds together", therefore allowing for a collection of varying perspectives, knowledge and experiences that are "necessary in order to come to a creative quest for answers to questions for which no ready-made solutions are available"(p. 5). This type of learning is well suited to the current risk society (Beck,1992) providing a collective and creative way of approaching problems and building creative innovative solutions. Through the process of social learning, a more reflexive society can be nurtured – one that takes into consideration all perspectives, develops new

strategies, and is able to critique and continually redefine approaches therefore exploring new solutions, new approaches and new ways of thinking (Wals et al., 2009).

Wals et al. (2009) described several characteristics that defined their understanding of social learning: (1) involves learning from each other together; (2) assumes that we learn more from heterogeneous discussions where all the participants do not think alike; (3) aims to develop 'social cohesion' and a respect for different ways of seeing the world; (4) is about creating 'ownership' (of the process and the solution) amongst those involved; and lastly, (5) social learning is about collective meaning making and sense making.

Definitions of social learning have been critiqued for their vague nature which is described as too broad to be useful (Reed et al., 2010). Reed et al. (2010) tried to narrow and focus the description of social learning by defining it as "a change in understanding that goes beyond the individual to become situated within wider social units or communities of practice through social interactions between actors within social networks" (p. 6). This resonates with many of the characteristics that were described by Wals et al. (2009). Reed et al. (2010) defined the three main components they believed crystallised the social learning process. The first component is that there is a change in understanding among those involved in the learning. This change in understanding can happen at a more shallow surface level or a deeper level where the attitudes and world views of the learner are changed. Cundill, Lotz-Sisitka, Mukute, Belay, Shackleton and Kulundu (2014) agreed with this important concept of change-orientated learning. They reported on a social learning process where those involved develop competencies, capabilities and knowledge that equipped them to change behaviour that were related to changing socio-ecological conditions.

The second component of social learning noted by Reed et al. (2010) is learning that goes "beyond the individual to become situated within wider social units or communities of practice within society" (p. 5). This describes social learning as learning that occurs within a group of people with the opportunity for the learning to catalyse and expand to larger communities or networks. This concept is agreed upon by Cundill et al. (2014), who explained that social learning should go beyond small groups of people in a specific context and should affect the wider, more diverse social units.

The final concept elaborated on by Reed et al. (2010) is that social learning occurs through interactions between actors within a social network. These interactions can be direct interactions such as in personal conversations or through other forms of media such as mass media or mobile phones. The most important requirement is that social interaction and the exchanging of ideas occurs (Reed et al., 2010). According to Reed et al. (2010) with interaction comes a number of power dynamics, which are able to influence the learning outcomes.

What Reed et al. (2010) did not elaborate on is the need for heterogeneous groups in social learning processes, as well as the importance of creating a sense of ownership through social learning processes. However, all the above authors agreed that over time social learning has been increasingly associated with collective action, problem solving, conflict management and relationship building amongst varied stakeholders. This learning occurs through dialogue, debates, experiments and other mediums that promote interaction between diverse stakeholders who are often connected via shared practices, interests, matters of concern or landscapes of practice.

My study investigated social learning that has – or has not – been enabled by the Food for Us project and app. Through understanding the multiple definitions of social learning according to Reed et al. (2009), Cundill et al. (2014) and Wals et al. (2010), I decided to define social learning in this study as: learning that happens through interactions with (1) a diverse set of people to (2) achieve a new way of thinking that (3) addresses problems in society, for which there are (4) no tried and tested solutions, and with the influence of the learning spreading further than with only those who are directly involved in immediate interaction with each other. What is equally important is the need for the learning process and solution to be 'owned' by the participants to enable engaged and meaningful implementation of their interests and shared objectives. Social learning cannot be concisely defined in one statement as it can take so many different forms being situated within varied social contexts and social relationships.

This research explores the type of social learning that is enabled by the Food for Us app, through its use in seeking to redistribute farm surplus to alternative markets. Users from different backgrounds were given the opportunity to communicate and interact with one another through the FFU app, training workshops, #Match Making event or the WhatsApp[14] support group (see Chapter 3 where this is discussed and explained more fully). Once the diverse set of users were linked by the FFU app, supporting training events, workshops or WhatsApp group, they could potentially jointly solve shared matters of concern (such as on-farm surplus, wasted resources and lack of market) through discussion and dialogue in communities of practice in a landscape of practice. In the next section 2.3.2 I explore the idea of communities of practice within a landscape of practice more extensively.

[14] WhatsApp is a social network platform that enables users to engage in individual chats, share images, videos, contacts and other information with fellow users. The WhatsApp social media platform also allows the users to create groups of people where the chat becomes a group chat allowing all members to communicate into an open forum.

2.3.2. Social Learning across and within Communities of Practice within a Landscape of Practice

Wenger (1998) described learning as a social process with no beginning or end, which most often takes place through social engagement in groups and networks of people with common understandings and interests. Communities of practice describe groups of people who share a common goal and work together collaboratively to solve issues, share best practice and create areas of support (Lave & Wenger, 1991). Communities of practice are everywhere, with any given person generally being involved in more than one community of practice at a time, sometimes without even knowing it (Lave & Wenger, 1991). These communities of practice can take a number of forms including formal organisations or informal groups of friends with shared leisure interests (Lave & Wenger, 1991, Wenger, 1998). Wenger (1998) described the key features of communities of practice as (1) shared interest, (2) common identity, (3) shared information and knowledge, (4) voluntary participation, (5) autonomy in setting goals, (6) awareness of social protocols and goals, (7) awareness of membership, and (8) effective means of communication. Wenger (1998) described people as constantly searching for, or pursuing, 'enterprise' of all kinds. This may include seeking physical and material enterprise or seeking 'lofty pleasures'. They suggested that we define these enterprises and engage in their pursuit together as a 'community of practice'. Therefore, "these practices are thus the property of a kind of community created over time by the sustained pursuit of a shared enterprise", and these we call communities of practice (Wenger, 1998, p. 45).

According to Wenger (1998), for a community of practice to function properly it needs to generate the appropriate ideas, symbols and language so the accumulated knowledge can be successfully shared to members (new members that exist on the periphery and older member) so the pursuit of the common enterprise may be more efficiently or successfully achieved (Wenger, 1998; Buscher, Gill, Mogensen & Shapiro, 2001).

The communities of practice theory is informed by Lave and Wenger's (1991) situated learning discussion based on the theory of situated cognition defined by Brown, Collins and Duguid (1989). Brown et al. (1989) defined situated cognitions as the way people learn more effectively through apprenticeships situated in the social and environmental context in which the learning is used. This situated cognition was a critique of the popular learning theory of the time which promoted learning facts and memorising pieces of information, therefore removing the learner from the context in which the knowledge would be used (Herrington & Oliver, 1995).

Lave and Wenger (1991) explained that learning occurs as one becomes part of a community of practice and as one becomes familiar with the shared language, tools, ideas and activities that define the community of practice. The idea of cognitive apprenticeships was explained by Brown et al.

(1989) as a method to "enculturate students into authentic practices through activity and social interactions" where the students would learn from the more knowledgeable colleague (Brown et al., 1989, p. 37). Their understanding of cognitive apprenticeship was supported and drawn on by Lave and Wenger (1991) to formulate their understanding of situated learning and more specifically legitimate peripheral participation (Herrington & Oliver, 1995). Legitimate peripheral participation can be described as the learning that occurs through being situated in a community of practice and learning as one moves from the periphery of the community – where one does not have a thorough understanding of the community or the shared practice to the centre (Lave & Wenger, 1991). It is the trajectory from the periphery to the centre where the social learning occurs (Lave & Wenger, 1991). As newcomers become more familiar with the language used to share information, and become well acquainted with the activities and aim of the community of practice, they start to move towards the centre (Lave & Wenger, 1991; Wenger, 1998).

Brown and Duguid (1991), Lave and Wenger (1991) and Wenger (1998) explained that communities of practice are always evolving and adapt and change as time goes on and new people come into the communities of practice and others leave. The production and sharing of knowledge is described as especially important by Wenger, McDeromott and Snyder (2002) as knowledge changes very quickly over time, therefore requiring more than one individual to master and engage with the knowledge in different ways (Wenger et al., 2002). Wenger et al. (2002) explained that knowledge is not static, but dynamic, changing all the time with new discoveries, discussions and experiences; however, one must not neglect the stable core knowledge that acts as a foundation for a community of practice. According to Wenger et al. (2002), in all fields there is a need for a stable common understanding of baseline knowledge around which communities of practice establish themselves. Those that are unfamiliar with the core knowledge are those on the periphery of the community of practice; they move towards the centre as they become more accustomed (Wenger et al., 2002). The newcomers do not simply acquire the knowledge on their own; the process is considered a social process of participation where the entire community engages with one another as knowledge continues to be built and redefined (Wenger, 1998).Wenger (1998) explained that learning takes place through engagement and understanding rather than by simply doing an activity. For Wenger (1998), communities of practice are important spaces where people collectively create, negotiate and renegotiate identity and meaning while learning from one another.

As mentioned above, the boundaries of a community of practice are not static, but continually moving as newcomers move from the periphery to the centre introducing new thoughts, new ideas and new ways of doing things (Brown et al., 1989; Wenger et al., 2002; Wenger-Trayner & Wenger-Trayner, 2014). These boundaries between communities of practice that expand and shift as newcomers

become part of the communities of practice are where Wenger-Trayner and Wenger-Trayner (2014) believed the most learning occurs.

Community of practice theory has been widely applied in organisational learning research and is slowly being adapted in many other disciplines (Gee, 2004) but not without critique. Gee's (2004) first critique is that the term 'community' is associated with a sense of belonging and close knit personal ties which may not always be the case. His second critique is that membership of communities of practice is not easily defined and it can be difficult to determine whether a person is on the periphery of a community practice or if they are outside. Gee's (2004) final critique is not of Wenger's (1998) community of practice definition, but instead of how others have used the term to describe a wide range of social forums that do not fit into the careful definition given by Wenger (1998). This critique is important to note when recognising the communities of practice that exist in the Food for Us project and how they relate to one another.

In the more recent work around communities of practice, the idea of collections of communities of practice all interacting with one another is being explored in understanding the 'landscape of practice' (Wenger-Trayner & Wenger-Trayner, 2014). Our societies are made up of a collection of diverse, complex communities of practice that all differ in the goals, practices, mind-sets and languages used by members. All these different communities of practice have their own competences, histories, domains and ways of thinking which interact and change as new people become part of the community of practice and as communities of practice start to interact with each other (Wenger-Trayner & Wenger-Trayner, 2014). Landscapes of practice are explained as the collection of communities of practice which interact with one another and together negotiate their boundaries to develop a complex social landscape where the boundaries and peripheries of the communities of practice are defined by the practice and not affiliations with institutions (Wenger, 1998; Blackmore, 2012). With the existence of multiple communities of practice within a landscape, boundaries develop between the communities of practice (Wenger, 1998). These boundaries are not defined by geography, but instead by practice and knowledge and are constantly changing and emerge "because sharing a history of learning ends up distinguishing those who were involved from those who were not"(Wenger, 1998, p. 3).

As communities of practice are not static with changing boundaries, neither are landscapes of practice. As communities of practice evolve, emerge and dissolve, the landscape on which they exist, constantly changes with the power dynamic between these communities of practice changing (Wenger-Trayner & Wenger-Trayner, 2014). Wenger-Trayner and Wenger-Trayner (2014) discussed how not only are complex connections and relationships existing within communities of practices, there are also complex relationships which help to developing meaning and identity that exist between different communities of practices within a landscape of practices. Transcending these different

communities of practice is becoming more common with people often straddling a number of communities of practice (Mercieca, 2017). It is in the tensions, uncertainty and opportunity for collaboration that exists on the boundaries and periphery of communities of practice where the potential for social learning emerges (Wenger, 1998; Wenger-Trayner & Wenger-Trayner, 2014). It is also these boundaries that hold the most potential for cross-disciplinary learning and knowledgeability (Wenger-Trayner & Wenger-Trayner, 2014), which I will discuss further in section 2.3.3. Wenger (2000) explained that there are ways to bridge the boundaries between two communities of practice through (1) brokering, (2) boundary objects, and (3) boundary interactions. These bridges will be discussed further in section 2.3.3 below.

A landscape of practice is inherently political with power dynamics existing between different communities with competing claims to knowledge (Wenger-Trayner & Wenger-Trayner, 2014). Recognising this, Wenger-Trayner and Wenger-Trayner (2014) also explained that no matter the power that one community of practice has over another, "one practice cannot have such control over another that it replaces the internal logic and local claim to knowledge of that other practice" (p. 16). Wenger-Trayner and Wenger Trayner (2014) also said that the internal logic and the knowledge will always be present in the individual, even if it is not able to influence the more dominant community of practice. As Wenger-Trayner and Wenger-Trayner explained, "there is local knowing in each practice, whether or not this local knowing is recognized as knowledge in the broader landscape" (p. 16). This local knowledge is important to recognise in the landscape of practice in this study as each community of practice may interact differently with the Food for Us app and project, bringing their own local knowledge to the project and influencing the project with their own community of practice's knowledge. One of the important things that communities of practice need to successfully achieve is to develop and prepare materials, concepts and language that can be understood by those outside of the community of practice to enable boundary crossing and learning to occur at the peripheries of the communities (Buscher et al., 2001).

By understanding the landscape of practice, it may be possible to understand how to negotiate boundary crossing between the various communities of practice (i.e. the buyers, sellers and intermediaries) with various tools (brokering, boundary objects and boundary interactions) to connect and improve the local Raymond Mhlaba supply chain in the FFU project. Based on this theoretical perspective, it is through these boundaries between the communities of practice that the users of the application and participants of the project might experience social learning value.

2.3.3. Boundary Crossing within Landscapes of Practice

As introduced above, Wenger (2000) proposed that within landscapes of practice there are bridges that allow for the boundaries of community of practice to be crossed, allowing for boundary crossing.

These bridges include brokering, boundary objects and boundary interactions. Brokering is explained by Wenger (2000) as the individuals who exist between communities of practice and introduce elements and characteristics of one community of practice to another and vice versa. Brokers often exist between the periphery and centre of communities of practice, close enough to have legitimacy when referring to the community of practice, but far enough from the centre to develop new ideas (Wenger, 2000). Boundary objects support and facilitate connections between different communities of practice through either artefacts, discourses or processes (Wenger, 2000). The last boundary crossing bridge described by Wenger (2000) is boundary interactions where individuals from different communities of practice interact with one another either through encounters, through shared practices or through interactions on the periphery of the communities of practice. These individuals, objects and interactions are important parts of the landscape of practice, facilitating potential social learning (Wenger-Trayner & Wenger-Trayner, 2014).

In Wenger's earlier work, the notion of 'competencies 'within communities of practice was discussed referring to the ability of members within a community of practice to understand the same repertoire, languages and processes (Wenger, 1998). In furthering the framework of communities of practice to discuss landscapes of practice, Wenger-Trayner and Wenger Trayner (2014) introduced the idea of 'knowledgeability' in relation to 'competences'. 'Competence' is described as a "dimension of knowing negotiated and defined within a single community" (Wenger-Trayner & Wenger-Trayner, 2014, p. 13). Knowledgeability is described as something that a person embodies when they have relations with a number of different communities of practice across a broad landscape (Wenger-Trayner & Wenger-Trayner, 2014). It is therefore knowledgeability that is strengthened through the use of tools that allow for boundary crossing between communities of practice where an individual, object or interaction can transcend boundaries and use the boundaries as a learning asset (Wenger-Trayner & Wenger-Trayner, 2014). It is at these boundaries that Wenger-Trayner and Wenger-Trayner (2014) believed that there is potential for misunderstandings and confusion between communities of practice due to differences in value, ideas and regimes. However, accompanying these misunderstandings and potential conflict zones, is also huge potential for learning. Wenger-Trayner and Wenger-Trayner (2014) warned that the "innovation potential is greater but so is the risk of wasting time"(p.18).

The FFU app aimed to fill the role of a boundary-crossing tool, connecting different communities of practice within the Raymond Mhlaba local supply chain landscape of practice (as introduced in Chapter 1, section 1.3). Wenger-Trayner and Wenger-Trayner (2014) asked the question "What kind of boundary activity, joint project, visit, mutual storytelling or learning partnership can serve as a productive encounter for negotiating and exploring a boundary?" (p. 18). As explained in Chapter 1, section 1.3, the FFU mobile app and project hoped to act as an effective boundary activity, which

created a safe social learning space to facilitate negotiation and discussion so that value can be created for all trial participants and hopefully for all future users.

2.4. Value Creation within a Landscape of Practice: A Means of Understanding Social Learning

Wenger, Trayner and de Laat (2011) developed an analytical framework to determine the value created within communities of practice and networks calling this frame a *Value Creation Framework*. The Value Creation Framework was used in this M.Ed. study to identify and analyse the social learning that occurred within the FFU project. Wenger et al. (2011) explained that the Value Creation Framework narrates the importance of multiple value cycles which "emphasizes the importance of audience and perspective" (p. 15). The Value Creation Framework therefore allows people to understand the many different levels of value and how value is context specific. One of the strengths of the Value Creation Framework is that it offers room for structured analysis and information sharing as well as for understanding the history and context behind the information and value shared (de Laat, Schreurs, & Nijland, 2014). According to de Laat et al. (2014), "it is within the context of these stories that we can appreciate the learning that takes place and what value is created" (p. 254).

The multiple value cycles narrate the type of value that is created between the ground narrative, people's current experience, and the aspirational narrative, what people hope to achieve through a social learning/shared practice process (Wenger et al., 2011). The framework acts as a (1) methodological tool guiding researchers on the type of indicators to look for, and (2) an analytic tool which assists the user to map the value across five value cycles. The different cycles that are presented by the Value Creation Framework are: (1) immediate value, (2) potential value, (3) applied value, (4) reframed value, and (5) transformative value (Wenger et al., 2011).

Wenger et al. (2011) described value creation as the value of learning that has been enabled and made possible through communities of practice interactions. Learning value is created through communities of a similar or dissimilar nature interacting with one another around a common concern or common goal, using experiences and ideas as learning resources (Smith & Smith, 2017). As explained in section 2.3.3, Wenger-Trayner and Wenger-Trayner (2014) believed that the greatest potential for learning occurs at the boundaries of communities of practice where there is tension between what is familiar and what is unfamiliar. This theme is investigated in the Value Creation Framework were the cycles of value occur in the tension between the ground narrative and the aspirational narrative as seen in Figure 2.1 below. The ground narrative explains the activities and practices that are currently in practice and are part of the current way of being in a community (Wenger et al., 2011). The aspirational narrative encompasses what the community or network perceives as success, what they

aspire too, what the desired practices and activities are. Wenger et al. (2011) believed that it is in this space of tension where social learning in the form of value creation exists.

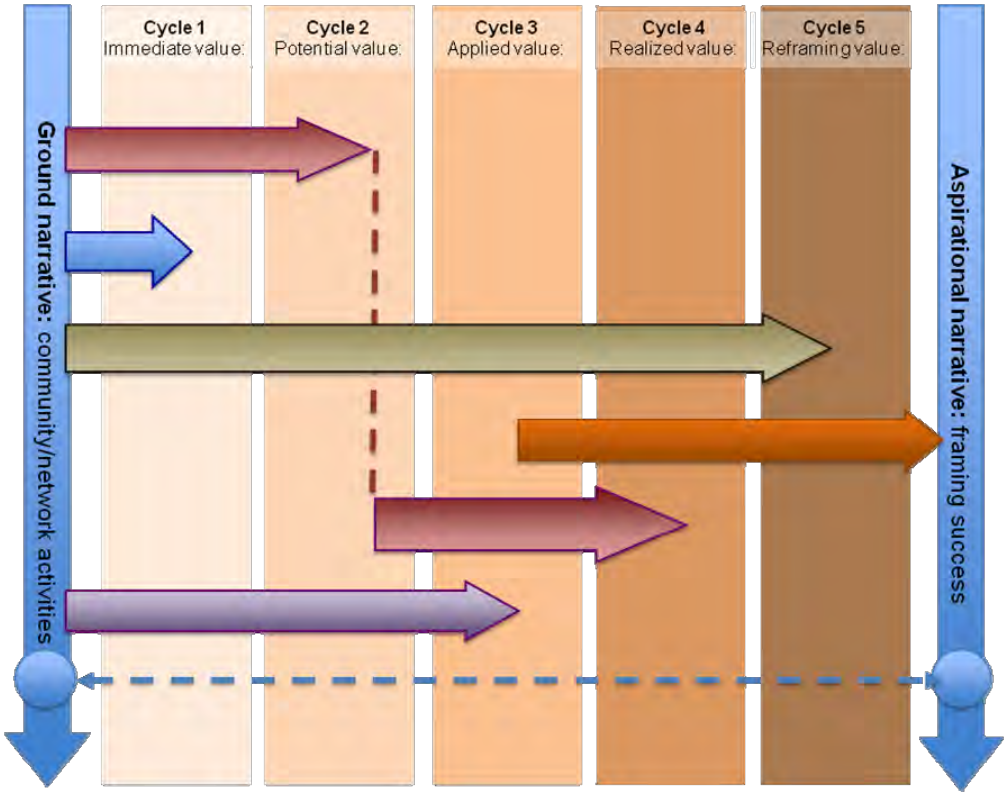


Figure 2-1: Value Creation Framework, which is made up of five value creation cycles between the ground narrative and the aspirational narrative (Wenger et al., 2011, p. 34)

2.4.1. Different Types of Value

Wenger et al. (2011) named five cycles of value that occur between the ground and aspirational narrative. These cycles don't exist on their own in individual silos, but are interlinked and feed off one another as seen in Figure 2.1 in section 2.4 above. In many instances the value created does not follow a linear pattern progressing from one value to the next, but rather weaves back and forth between different value cycles with no cycle of value being more important than another (Wenger, Trayner, & de Laat, 2011; de Laat et al., 2014).

2.4.1.1. Immediate Value

Immediate value has been described as the most basic form of value where activities have "value in and of themselves" (Wenger et al., 2011, p. 21). This type of value includes such things as inspiration, excitement, ideas for a solution to a problem, or enjoyment of an activity which is encountered immediately while engaging in the activity. The indicators that Wenger et al. (2011) outlined for this type of value include indicators of number of participants, level of participation, levels of activity, level of engagement, quality of interactions, value of participation, networking and collaboration

amongst others. These types of indicators highlight the immediate value that participants experience in a social learning activity. In my research on the FFU app and project, I identified the immediate value that the FFU app affordances and the FFU project affordances enable, specifically looking at the immediate short-term value.

2.4.1.2. Potential Value

Potential value follows immediate value in Figure 2.1; however, it is important to note that in many cases of value creation there is no immediate value, with the value story starting with potential value. Not all value is realised immediately during an activity and is rather experienced through potential value in the form of value that is yet to be realised (Wenger et al., 2011). Wenger et al. (2011) gave potential value another name: "Knowledge Capital". Knowledge Capital is further divided into human capital, social capital, tangible capital, reputational capital and learning.

- **Human capital** refers to the learning of new skills, the formation of a new idea, the awakening of passion or the learning of a key piece of information. These forms of Human Capital are potential value for a network or community as the individual (or group) improves their ability to engage or lead future activities, therefore becoming able to develop the value creation cycle further to create applied or realised value.
- **Social capital** takes the form of relationships and connections, which have the potential to turn into realised collaboration. Social capital implies that value has been created in the relationships that have been made for future extension of social learning.
- **Tangible capital** is the resources, tangible artefacts and objects that emerge out of an activity, which have potential value. Documents, information resources and network lists are only a few examples. As people communicate across community of practice boundaries they start to share tangible resources which holds great potential for future collaboration or change in practice.
- **Reputational capital** describes the value that one gains from being part of a community or negotiating with a community that is considered to be good at what they do. By an individual associating themselves or their organisation with reputable organisations or networks, the reputation of the individual become more favourably recognised providing opportunity for opening of access, positive associations and future success.
- **Learning capital** explains value that lies in participants of a social activity being able to learn from an activity and then later potentially transferring that learning to others through further discussion and interactions. This acts as a catalyst for further value creation in the proceeding value cycles. (Wenger et al., 2011)

Many of these types of potential value might be realised in the FFU project, either through the use of the FFU app (a piece of tangible capital providing potential value in itself) or through the FFU project support systems (this will be reported in the results section of this thesis in Chapters 4 and 5). The FFU project aims to develop the social capital, therefore connecting people and enabling space for relationships to develop (which can be viewed as social capital). The FFU project also aims to develop learning capital through the FFU app training workshops and through the support systems that were put in place in the Raymond Mhlaba case study. Potential value is not realised until action is taken to put it into practice, when action that is taken on potential value, results in applied value (Wenger et al., 2011).

2.4.1.3. Applied Value

Applied value includes all the activities and practices that were put into place due to social interactions and learning that occurred between the grounded narrative and the aspirational narrative (Wenger et al., 2011). The applied value interlinks and interacts with the potential value, as it is the action that is taken to realise the potential value described in the previous value cycle. Potential value can be applied in different contexts in various ways resulting in different practices and therefore different applied value. The indicators of applied value are the implementations of solutions, changed practices, use of new resources, and innovation in the system or peer-to-peer learning opportunities, amongst others. In the FFU project, applied value might take the form of use of the FFU app, change in farming practices, development of contacts or increased communication. Wenger et al. (2011) explained that applied value might not be successful in achieving the aspirational narrative and therefore it is important to include all practices in analysis, not only those that are successful. Even if a practice is not successful, it enables a learning loop where a new idea may be developed (potential value) and a different practice may be applied until realised value is achieved.

2.4.1.4. Realised Value

Realised value describes the value that emerges from practices that have been successful in achieving success in the light of the aspirational narrative of the community (Wenger et al., 2011). Realised value recognises performance improvements, for example, increased number of local transactions, or increased number of FFU app registrations. This realised value can change for each individual, community or project as the aspirational narrative, or what is desired, is not all the same. Applied practices and activities are not always successful and therefore it is important to investigate where they have been successful or not and what lead to this success. The realised value is the achievement of the aspirational narrative, however the Wenger et al. (2011) framework does not end here claiming that as an aspiration is achieved or if previous activities render it impossible to achieve, the aspirational native is changed which enables reframing value.

2.4.1.5. Reframing Value

The final value cycle depicted on the Value Creation Framework displayed in Figure 2.1 earlier in this section is reframing value. Wenger et al. (2011) described reframing value as the last cycle of value creation which is "achieved when social learning causes a reconsideration of the learning imperatives and the criteria by which success is defined" (p. 23). It is in reframing value where transformative learning takes places through communities redefining their aspirational narratives. This reframing value amalgamates the learning that has been experienced in the previous cycles and provides an opportunity to embark on a new value creation journey with new aspirations. It is the reframing value where the richest transformative social learning occurs as it is through social discussion and activity that new ways of thinking and new ways of defining success are explored which can result in a new way of thinking and defining success (Wenger et al., 2011).

2.4.1.6. Strategic and Enabling Value of the Value Creation Framework

Wenger-Trayner (2014) added to the original framework developed by Wenger, Trayner and de Laat (2011) to include an element of strategic value and enabling value as seen in Figure 2.2 below.

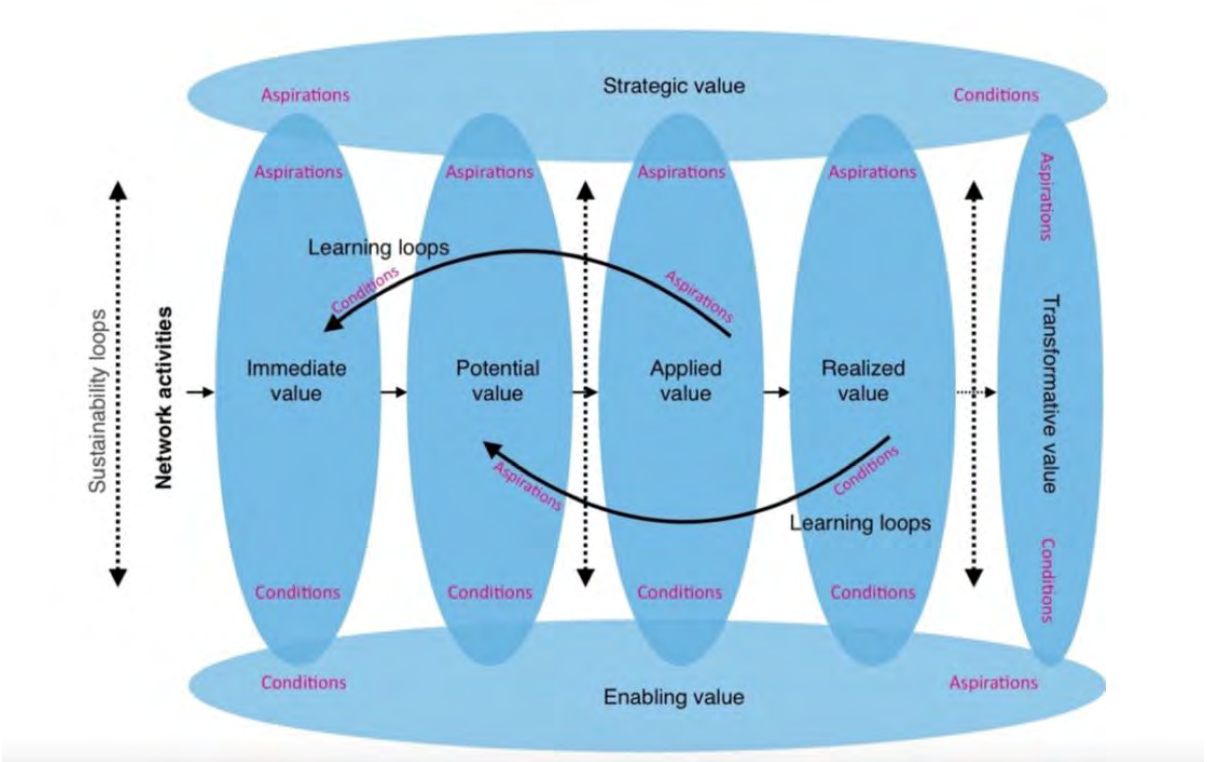


Figure 2-2: The different learning loops and value cycles in the Value Creation Framework with the addition of the Strategic Value and Enabling value (Wenger-Trayner, 2014, p. 9). **The fifth learning cycle has been named 'transformative value' instead of 'reframing value' which is how this M.Ed. study refers to the final cycle of the value creation cycle.*

Wenger-Trayner (2014) explained that value creation does not happen in a vacuum and instead exists within already existing landscapes of relationships and available resources. Therefore Wenger-Trayner (2014) suggested the addition of strategic and enabling value, which contributes to building the five value cycles (immediate, potential, applied, realised and reframing) that exist between the grounded narrative and the aspirational narrative. In Figure 2.2, Wenger-Trayner (2011) named the final value cycle 'transformative value' instead of 'reframing value' (as referred to in section 2.4.1.5 above). Strategic value is described as clear strategic context in which a community or network is working and therefore facilitating strategic conversations to occur which further allows value creation (Wenger-Trayner, 2014). Enabling value is described as the support processes that make the network or communities' life possible. These include, but are not limited to, external support, a dynamic support team, logistical support and resources. Wenger-Trayner (2014) explained that it is important to understand enabling value as it informs the sustainability of the value and of the community itself.

2.5. Conclusion

In this chapter I have provided a comprehensive overview of the theoretical underpinnings of my study. I have introduced the importance of the adoption of mobile technology in learning spaces and the increasingly important role that mobile learning plays in our community. I have discussed informal mobile learning and how technology has enabled informal learning to grow and develop in our current highly technologically inclined society. I followed this discussion with exploring the theory of affordances and specifically technological affordances and the importance of the relationship between the user and the artefact.

Following the discussion on technology, I explored the definition and presence of social learning in our technologically inclined society. Through exploring social learning I touched on understanding communities of practice within landscapes of practice and the learning that occurs within these systems. I discussed the importance of boundary crossing tools, activities and relationships, which enable social learning between and within communities of practice.

To conclude this chapter, I discussed Wenger, Trayner and de Laat's (2011) Value Creation Framework and how this framework can be used to understand the social learning that occurs within communities of practice and networks on a landscape of practice. In this study, the Value Creation Framework is used to understand the value that has been enabled by the affordances of the Food for Us app and the accompanying networked-social learning processes that surround the Food for Us project.

CHAPTER THREE: The Process of Exploring Social Learning enabled by FFU within the Raymond Mhlaba Landscape of Practice

3.1. Introduction

This chapter explores the research orientation, how this M.Ed. study was designed, the data generation methods, as well as how the data was managed and analysed. I explain how this study makes up part of the greater Food for Us study, with not all the data generated in the broader Food for Us project (two case studies) being used in this research due to the scope of a M.Ed. study. A basic project timeline is included to show the chronological process of the Raymond Mhlaba case study activities and data collection. This project generated a large amount of data and therefore it was important to manage and index the data effectively. The indexing strategy and management theory is explained in this chapter. I also explain how the data was coded and analysed using the affordance and value creation theory. I explore the analytical progress that was used for this study and complete the chapter with important ethical and validity considerations. This chapter aims to give a holistic understanding of how and why research processes were undertaken and data collected and analysed.

3.2. Research Orientation

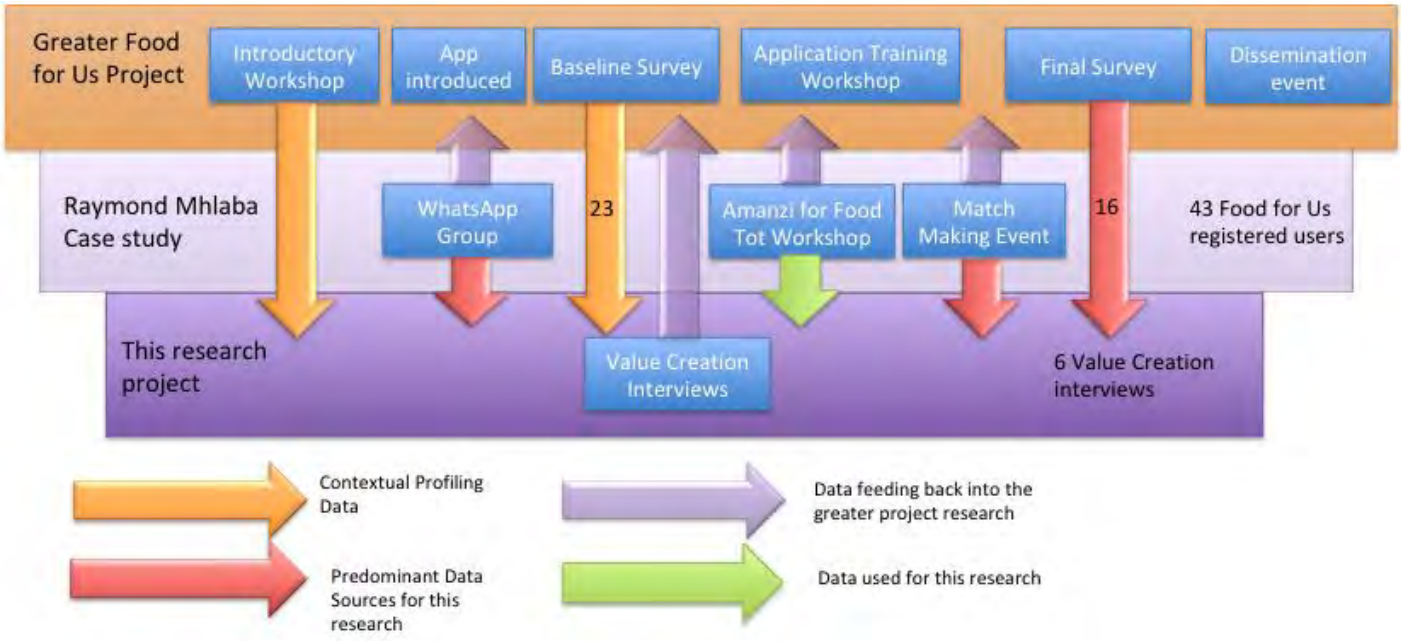


Figure 3-1: Orientation of this research within the greater project

This M.Ed. study is situated within the Raymond Mhlaba case study of the greater Food for Us project as illustrated in Figure 3-1 and explained in Chapter 1, section 1.3.

As explained in section 1.3, the Food for Us project aims "to reduce food loss and waste that occurs both pre- and post-harvest on farm in South Africa, by redistributing produce that would otherwise be wasted for not meeting the specifications of the originally intended market" through the development of a mobile application (Jenkins & Ward, 2016, p. 11). The Food for Us app was developed through a collaborative process where the users were part of informing the development of the application (Food for Us, 2018). According to the project proposal, the direct beneficiaries of the FFU project were to be the produce growers and the customers within the two case study sites with the indirect beneficiaries including the wider community, retailers and government and policy makers (Jenkins & Ward, 2016). As explained in section 1.3, the two case study sites were Worcester in the Western Cape and the Raymond Mhlaba municipality in the Eastern Cape. After the collaborative introductory workshop, where the aim and design of the FFU were discussed, the app was built and participants of the introductory workshops (in Worcester and Raymond Mhlaba) were invited to be part of the app trial. The trial participants were asked to be part of a contextualising baseline survey interview and a final experience survey interview. This data was used to record the experience of the trial users for the greater FFU project.

According to the FFU proposal, the FFU project also aims to undertake research which would "inform capacity building of key actors within the food value chain" in order to "support robust processes of social learning and change in the context of food waste and insecurity, growing Internet connectivity through cell phones" (Jenkins & Ward, 2016, p. 11).

The Food for Us project (illustrated in Figure 3-1 as the orange bar) gained data through tracking the use and value that emerged from 40 trial participants, 20 in the Eastern Cape and 20 in the Western Cape (interviews) as well as the feedback and experience that emerged from the supporting activities that accompanied the introduction of the FFU project in the case study sites (workshops, app trainings and WhatsApp group data). The trial participants in the study sites include a combination of produce growers, consumers and other intermediary stakeholders who were involved in the local supply chain. The trial participants joined the project on a voluntary basis and were able to leave the project at any time (see Appendix A: Ethical Clearance for Greater Food for Us project).

The Eastern Cape case study (indicated as the light purple bar below the orange bar) included all the experiences of the Raymond Mhlaba FFU trial participants, as well as their wider community of practice. The WhatsApp group, Amanzi for Food Workshop and the #Match Making event are all features that were unique to the Raymond Mhlaba case study.

The dark purple bar in Figure 3.1 represents this M.Ed. study which was situated in the greater FFU project within the Raymond Mhlaba case study. My study drew on contextual data from the greater FFU study as well as workshop and WhatsApp data that emerged from the Raymond Mhlaba case

study data to build a strong contextual understanding. This study used the final survey interview data (part of the FFU project) as well as the data generated from value creation interviews (unique to this study) to answer the research questions described in Chapter 1. This M.Ed. study drew on some of the data generated by the greater FFU project as indicated in Figure 3-1 (which I was also involved in generating), as well as importantly feeding research findings and insights back into the greater FFU project, fulfilling the research component of the project aims as described above. Due to the scope of the study, this M.Ed. study does not draw on all the data generated in the Raymond Mhlaba case study context but draws contextual insight from the baseline data developed for the greater FFU project (as illustrated in Figure 3-1). In addition to the general baseline data, I generated other sources of data for more in-depth insights.

The Raymond Mhlaba interventions, particularly the WhatsApp group, the Amanzi for Food Training of Trainers workshops and the #MatchMaking event, emerged as unplanned interventions as the FFU Raymond Mhlaba case study unfolded. These interventions supported the implementation of the FFU project in the Raymond Mhlaba case study and were defined opportunities to collect important data sources for my study which sought to focus in depth on one case study site only.

The layered character of this project, as well as the multi-levelled roles I was required to fill (researcher and FFU Raymond Mhlaba case study manager), has led to my positionality within the greater FFU project being important to understand within my M.Ed. research orientation.

3.2.1. Positionality

I was offered a National Research Fund scholarship to complete my Master's in Education and be part of the FFU project while being based at the Environmental Learning and Research Centre (ELRC) at Rhodes University. The research I was asked to do by the FFU project was to investigate the social learning processes enabled by the FFU project. This research became the theme of this master's research project, but as the scope was large, across two provinces (Western Cape and the Eastern Cape), I focused only on one province and one case study in my study.

As I was the only FFU project member based in the Eastern Cape, I became responsible for developing the Raymond Mhlaba case study sites and implementing the introduction and continued use of the FFU app in the Raymond Mhlaba case study. During the proposal stage of the greater FFU project, it was not anticipated that the implementation and management of the FFU project in the case study sites would require as much work as they did. As the FFU project progressed, I took on more of a managerial role within the Raymond Mhlaba case study, organising workshops and events, as well as creating and facilitating the discussion on the FFU WhatsApp group. I played a supportive role during times of application instability, assisting and supporting those users who were experiencing

software challenges. I become the 'face' of the project in the Eastern Cape and was thankfully assisted by colleagues at the ELRC as well as those who were part of the Amanzi for Food programme.

I therefore played two roles within the Raymond Mhlaba case study, the first as a researcher (for the greater FFU project and to complete this M.Ed. study) and the second as a case study manager for the Raymond Mhlaba FFU case study. This dual role resulted in a number of important ethical considerations, which will be discussed further in section 3.9.

3.2.2. Research Orientation of this Study

This study has been designed with a critical realist ontological underpinning where it is understood that the empirical experiences exist within the actual events that are situated within the real (Lotz-Sisitka, Fien, & Ketlhoilwe, 2013). A critical realist perspective allows us to understand that other dynamics and power relations that may not be visible, often affect events and empirical experiences. According to Easton (2010), critical realism is particularly well suited to case study research as it "justifies the study of any situation, regardless of the numbers of research units involved, but only if the process involves thoughtful in-depth research with the objective of understanding why things are as they are," (p. 118). This M.Ed. research aimed to investigate the social learning and value that has been enabled (or not) by the FFU project, understanding what type of value is enabled and how it was enabled within the Raymond Mhlaba context (see Chapter 1 for research questions). I analyse the value generated with an understanding that there are many dynamics that lead to the presence of value creation. These dynamics can affect how an individual, community of practice or landscape of practice interact with the project therefore requiring the researcher to remain thoughtful and open to unexpected findings.

This research can be described as a qualitative exploratory nested case study, which is situated in, and informs, a greater generative project (the FFU project).

3.2.2.1. Qualitative Nested Case study

Qualitative Research Design

Qualitative research focuses on understanding that meaning is socially constructed by individuals through interaction with the world they live in (Merriam, 2002). According to Merriam (2002), there is an understanding in qualitative research that there are multiple ways of interpreting and understanding the world, which can change over time. According to Yin (2015), there are three important objectives of qualitative research: to aspire to achieve transparency, methodicalness and adherence to evidence. Yin (2015, p. 9) explained that there are five defining features that encapsulate qualitative research:

1. Studying the meaning of people's lives, in their real-world roles;
2. Representing the views and perspectives of the people (referred to as participants) in a study;
3. Explicitly attending to and accounting for real-world contextual conditions;
4. Contributing insights from existing or new concepts that may help to explain social behaviour and thinking; and
5. Acknowledging the potential relevance of multiple sources of evidence rather than relying on a single source alone.

My M.Ed. study takes a critical qualitative approach to research, by trying to understand how people used the FFU application and how the role and influence of networked social support structures (WhatsApp group, workshops, courses etc.) influenced their learning in their real life settings, while ensuring that the participants' perspectives and opinions are accurately highlighted in the study as discussed in Chapter 1. I used the concepts of social learning and value creation developed by Wenger et al. (2011) (explained in Chapter 2) to explain how people interacted with the FFU application and networked support structures (WhatsApp group and workshops) by drawing on a number of different types of data sources and forms of evidence (surveys, interviews, WhatsApp data and secondary data). Qualitative research does not use one method of research but a collection of methods according to the research questions and research traditions (Flick, von Kardorff & Steinke 2004). The research design of this study includes not only research on social learning but also an investigation into the type of affordances enabled by the FFU mobile application designed to potentially facilitate social learning. Qualitative research encourages researchers to engage in a reflexive research design process that enables stages of the design process to happen simultaneously with data collection, data analysis, working with and modifying theory and dealing with validity as part of a nonlinear process (Maxwell, 1998). Due to the greater FFU project being new, innovative and unfamiliar, this research study also needed to be reflexive to the changes and developments of the project – this iterative design is accommodated in qualitative case study research, therefore it was suitable to the study object and context.

A critical qualitative research approach assumes meaning is socially constructed, however political and social aspects of a situation shape reality (Merriam, 2002). This study takes a critical realist qualitative approach understanding that there are larger institutional and political aspects dormant or activated at the level of the real that affect how value creation and social learning is experienced and perceived by the participants at the level of events and empirical experiences. To gain this depth perspective, this study also investigates the larger aspects that act as enabling or inhibiting factors to value creation in the Raymond Mhlaba case study.

Case study research

The greater FFU project is conducted as a case study with my research being a critical realist qualitative nested case study situated within the Raymond Mhlaba case study. A case study involves researching one instance in depth (Easton, 2010). According to Yin (2003), the reason case studies are used in social science, using qualitative research approaches, is to understand complex social phenomenon in some depth. Easton (2010) concluded his description of case study research as a research method that, "involves investigating one or a small number of social entities or situations about which data are collected using multiple sources of data and developing a holistic description through an iterative research process" (p. 119). In this study I aim to understand the complex social relationships and how they contribute to learning.

One of the key critiques of case study research, as described by Easton (2010), is that it only provides a small sample and therefore does not allow for large claims to be derived from such contextualised research. This weakness of case study research was important to recognise when developing the findings in the Raymond Mhlaba case study area which emerged as very different from those that in the Western Cape case study. However, critical realism allows one to generalise across cases at the level of the real mechanisms, which allows one to also find similarities in generative mechanisms operating across case study sites. For example, the generative mechanism of apartheid era power relations could affect more than one case study site albeit in different ways.

Nested case study research

This research was conducted through a nested case study design, as defined by Lotz-Sisitka and Raven (2004). The nested case study design explains a way of conducting research in a number of case studies within the context of a greater case study (Lotz-Sisitka & Raven, 2004). This M.Ed. study engages with three levels of nested case studies as shown in Figure 3-2 below. The nature of the nested case study design allows for several different cases to explore different aspects of a larger case and together inform a more contextualised understanding of the greater case (Lotz-Sisitka & Raven, 2004).

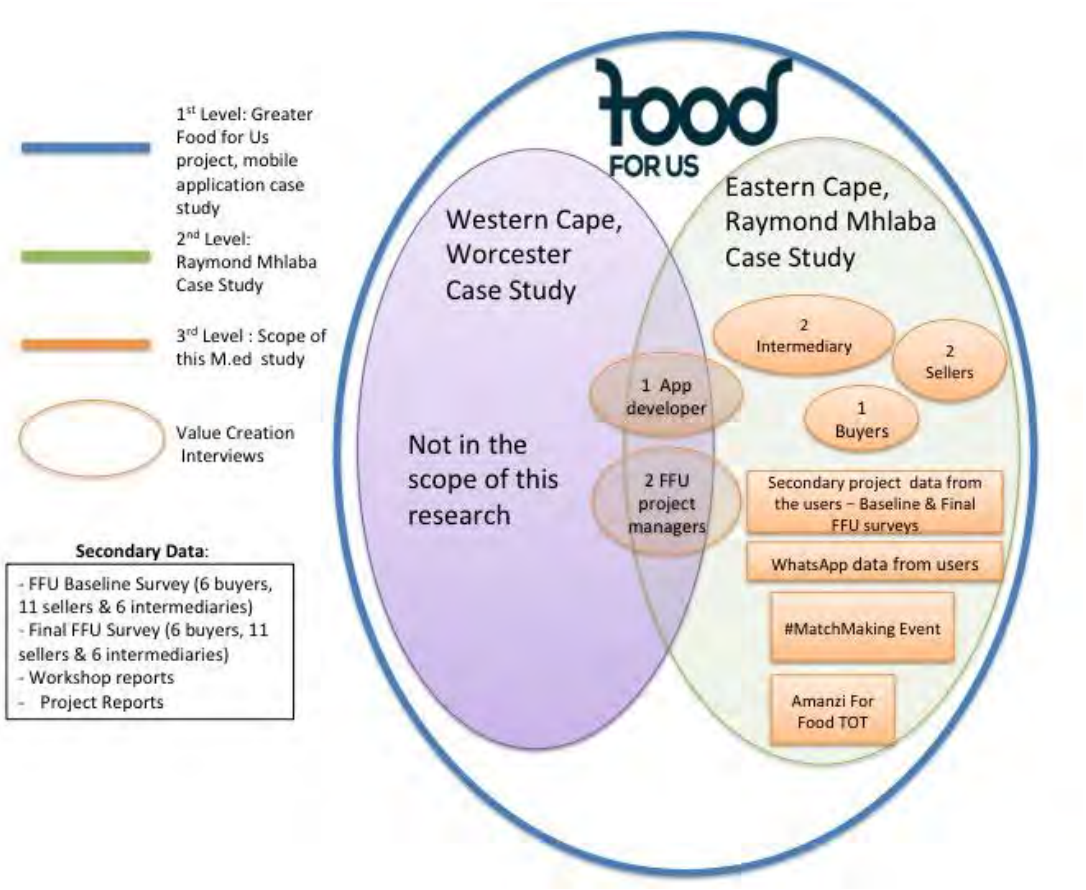


Figure 3-2: Nested case study nature of this research

My study is nested is the larger case study of the FFU project, which is a case study of a Food surplus redistribution mobile app which aims to reduce on-farm food surplus and transform local markets to assist in building a circular economy as described in Chapter 1 and earlier in this chapter. This level can be seen as the blue ring within which the other case studies situate themselves in Figure 3-2. This level of case study has been examined to determine the value that the project has had across the entire Landscape of Practice, which includes both study sites, the FFU users within these sites, as well as the researchers, project managers and app developers.

The second level is the two case studies that are determined by geographical location, the Western and Eastern Cape cases. A fellow researcher investigated the Western Cape case study, indicated in purple in Figure 3-2, using a different research methodology, which enabled her to generate a rich understanding of the Western Cape social landscape. I researched the Eastern Cape case study, indicated as the second level of the nested case study circled in green in Figure 3-2, in great detail with a comprehensive understanding of the context and the stakeholders involved. Understanding the contextual background of the case study was of great importance to the development of comprehensive and credible value creation stories, which were developed for the different communities of practice within the Eastern Cape case study site. The Eastern Cape and Western Cape

FFU case studies were not designed as part of comparative study, but rather as two exploratory case studies.

Baxter and Jack (2008) described case studies as being useful as the context of the study remains constant, yet one is able to look at the bounded context through a variety of lenses therefore being able to gain a deeper insight into that particular context. Case study research might not allow the researcher to make generalised statements, but it does allow in-depth understanding of the 'nested' cases (Diefenbach, 2009) and the phenomenon being explored; therefore, as explained above, this allows for an element of critical realist generalisation.

3.3. Data Generation Techniques

This qualitative research design used both qualitative and descriptive quantitative data generation methods. Qualitative methods of data collection predominantly answer the questions 'what', 'how' or 'why', whilst quantitative data generation methods answer the questions 'how many' or 'how much'(Mccusker & Gunaydin, 2014). This study has used a number of methods of data generation to collect data to answer and explore the question and sub-questions described in Chapter 1. Both qualitative data (surveys, interviews and observations) as well as descriptive quantitative data (application metadata) has been generated and used in my qualitative nested case study. As described by Yin (2003), a combination of qualitative and descriptive quantitative data provided a good mixture of data to develop a strong understanding of the context of the study. In my study, this has enabled a good understanding of how value is created and of the factors that enable or inhibit this value creation.

The data set from which I drew my evidence consisted of primary data used for constructing the Eastern Cape case and secondary data from the wider project that I used, where relevant, to add perspective to the case. I did not use all the data that emerged from the study as part of my analysis so as to manage the scope of the study. Most of the secondary data from the wider project fell outside of this scope, but I have included some of it where relevant and useful. For example, I used meta data for the app – here I drew on data relevant to the case mainly: final report; final surveys; baseline surveys; final interviews with project managers and app developers.

3.3.1. Data Generation Timeline

The data collected for this research was collected throughout the project to develop a value creation narrative that captured each part of the project. The timeline of the project data collection is recorded in Table 3-1 below. The activities highlighted in green are primary data collection activities while those highlighted in blue are secondary.

Table 3-1: Main events and activities in the Raymond Mhlaba project journey

Date	Activity	Destination
1 Aug '17	FFU Introductory Workshop	SI, Stellenbosch
3 Aug '17	FFU Introductory Workshop	Rhodes University, Grahamstown
30 Aug '17	FFU application first went live	Google Play store
1-10 Sept '17	Migration of FFU app to a stable secure server	-
7 Sept '17	Application Training Workshop	RMDA, Alice
7 Sept '17	Application Training Workshop	Rhodes University, Grahamstown
26 -27 Sept '17	FFU app challenges registering & logging-in	-
3 Oct '17	Raymond Mhlaba Farmers Market	Alice
4 Oct '17	FFU app server issues	-
17 Oct '17	Created the Raymond Mhlaba FFU WhatsApp group	Alice, Eastern Cape
2 -3 Nov '17	Amanzi For Food ToT	Fort Cox, Middeldrift
6 Nov '17	FFU application updated	-
5 Dec '17	First independent FFU upload and transaction	app & IBLN WhatsApp group
7 Dec '17	FFU available on iPhone devices	-
5 Feb – 8 May '18	FFU Baseline Structured Interview Surveys	Alice, Eastern Cape
5 Feb '18	VCII2 - Value Creation Interview	RMDA board room, Alice
6 Feb '18	VCIS5 - Value Creation interview	Middeldrift Agricultural Extension Office, Middeldrift
6 Feb '18	VCII3 - Value Creation interview	RMDA board room, Alice
8-9 Feb '18	Amanzi For Food Tot	Fort Cox college, Middeldrift
13 Feb '18	Mid-term FFU meeting	Soil for Life, Constantia, Cape Town
27 Feb '18	Fort Community FM- application	Fort FM Radio, Fort Hare University, Alice
23 Mar '18	Value Creation Interview with App developers	Durban
23 Apr '18	FFU #Match-Making Event	TRC Hall, Alice
3 – 4 May '18	Amanzi For Food ToT	Fort Cox College, Middeldrift
3 May '18	VCIS6 - Value Creation Interview	RMDA office, Alice
4 May '18	VCIB4 -Vale Creation Interview	Kofu Bar, Alice
9 May '18	New version of FFU on Google Play store	-
24 May '18	FFU application version updated	-
24 May '18	FFU Business Canvas	ELRC, Rhodes University, Grahamstown
11 -22 Jun '18	FFU final Structured Interview Survey	Conducted telephonically
25 Jul '18	Final FFU consolidation & closing meeting	SI, Stellenbosch
1st Nov '18	Project Manager (1) interview	Rhodes University
8th Nov '18	Project Manager (2) Interview	Skype, Virtual Platform

3.3.2. Structured Interview Survey

As part of the greater FFU project, a baseline structured interview survey and final structured interview survey were conducted to collect data for the greater FFU project report. A survey can be defined as a "information gathered by asking a range of individuals the same questions, related to their characteristics, attributes, how they live, or their opinions" (O'Leary, 2004, p. 152). O' Leary (2004) proposed a number of different types of surveys including those that are descriptive, explanatory and statistical amongst others. The baseline survey that was administered at the beginning of the project took the form of a structured interview of a descriptive nature and sought to describe the contextual background of the interviewee. The final survey was more explanatory as it tried to "establish why things might be the way they are" (O'Leary, 2004, p. 153).

The format of the structured interview surveys (which were taken in both case study sites) followed the format of a structured interview rather than a quantitative survey. A structured interview, as defined by Lune and Berg (2017), is the most standard form of interviewing and does not allow for deviation from the questions presented in the interview schedule, the language and order of questions asked. Structured interviews and surveys, as described by Lune and Berg (2007), are the preferred data generation tool when more than one researcher is conducting the interview. This was the case in the FFU project with the baseline structured interview survey and final structured interview survey being conducted by two different researchers (myself and the Western Cape researcher).

According to Fowler (1995), surveys are very effective means of collecting information; however, they need to be contextualised – "a good survey instrument must be custom made to address a specific set of research goals " (p.78). The goal for the baseline structured interview survey was to collect background data for the FFU project to lay a foundation for understanding the use of the FFU app and how the users used it. The baseline structured interview survey also aimed to collect data regarding carbon used in farming to fulfil the carbon research related objectives of the FFU project. The research goal of the final structured interview survey was to gain an understanding of how the users gained value from the FFU app and FFU project and to explore their experience of being part of the FFU project. In this M.Ed. research, the baseline structured interview survey data was used to contextualise the app users, while the final structured interview survey data was used to understand the value that was enabled and explore the experience of the users.

According to Fowler (1995), there are a number of important principles to take into account when designing and conducting surveys. These included: (1) surveyor needs to ask the respondent about their own first-hand experiences, (2) one question asked at a time, (3) the survey must provide a script for the interviewer to assure consistency, (4) make respondents aware of an adequate answer, and (5) make the reading and answering of questions as clear and easy as possible. When developing the structured interview surveys for the FFU project, I tried to follow the above principles to ensure I would get the best data as well as not frustrate and confuse the respondents.

Both the baseline structured interview survey and the final structured interview survey included three different adapted versions, one drawn up for the buyers, one for the sellers and lastly, one for the intermediaries. The surveys all included similar variations of the same questions, which were most suited to the user group (see Appendix B for examples of the baseline structured interview survey and Appendix C for an example of the final structured interview survey).

The baseline structured interview survey acted as secondary data for this M.Ed. study assisting to contextualise the study. The FFU research team, through a collaborative workshop process, designed this research instrument. This structured interview survey had elements of a standardised interview as

well as sections that required the interviewee to select the most correct answer from a collection of options (an example of the baseline structured interview survey and the final structured interview survey can be found in Appendices B and C). The questions asked in the baseline structured interview survey predominantly included a collection of closed questions. According to O'Leary (2004), closed questions are a collection of predetermined answers, from which the respondents are asked to select. These closed questions make the data easy to code, manage and statistically analyse. However, closed questions do not allow for the respondent to give reasons for answers and might not provide a full understanding of the situation (O'Leary, 2004). The FFU structured interview survey was conducted through either face-to-face or phone calls between the researcher and the participant. According to O'Leary (2004), conducted face-to-face structured interview surveys are the most effective method of conducting surveys as "this mode of surveying allows surveyors the opportunity to establish rapport, build trust, motivate respondents, clarify questions, read non-verbal cues, and probe appropriately" (p. 154). The baseline structured interview survey was conducted between 5February 2018 and 8 May 2018 and was administered as users agreed to be part of the FFU project when registering and downloading the FFU app. There were a total of 23 users who participated in the baseline structured interview survey in the Eastern Cape case study. Of these 23 baseline surveys conducted, six were buyers, eleven were sellers and six were intermediate entities.

One of the downfalls of the baseline structured interview survey data generation tool was that the questions were not open enough for users to give their own interpretation and therefore rich insight into their expectations and aspirations of the project was lost. The structured interview survey was also very long which fatigued the research participants and made them weary of engaging with further questions.

The final structured interview survey, which was conducted at the end of the FFU project, made up part of the primary data for this M.Ed. study. I was responsible for designing the final structured interview survey for both case study sites and for implementing the baseline structured interview survey and final structured interview survey in the Raymond Mhlaba case study. The final structured interview survey presented the interviewees with more of an opportunity to articulate their opinions and share their experiences. This structured interview survey included more open questions, which O'Leary (2004) explained allows for respondents to construct the answers in their own words, providing more insight into the answers and might include opinions. This type of data is not as easily analysed and coded as closed questions (O'Leary, 2004); however, the final structured interview survey data was not meant to be used as comparable data and was more a source of data explaining the users' experience of being part of the FFU project. The final structured interview survey was meant to be conducted through face-to-face sessions; however, due to time constraints and the high cost involved, the final structured interview survey was conducted by means of telephone interviews.

O'Leary (2004) explained that even though telephone structured interview surveys do not get the kind of response that face-to-face surveys receive, they do enable a relatively inexpensive time-efficient way of surveying a large number of respondents in a large geographical area. The final structured interview survey was conducted between 11-22 June 2018 through 20-30 minute telephonic interviews. The interviewee was asked a series of questions which were filled in by the researcher. This was an opportunity to really understand the enabling and inhibiting factors of value creation in the FFU project. The final structured interview survey followed up on several of the questions asked in the baseline structured interview survey such as the question regarding the users' expectations of the study (see Appendices B and C for full structured interview baseline and final survey schedules). Unfortunately not all the users who partook in the baseline structured interview survey completed the final survey. Of the 23 users who completed the baseline structured interview survey, only 16 completed the final structured interview survey. Of the 16 final participants, three were buyers, eight were sellers and five were intermediary users.

Both the baseline structured interview data and the final structured interview data were recorded into an Excel document where the data was stored and later coded for analysis.

3.3.3. Value Creation Semi-Structured Interviews

One of the main primary data sources of this M.Ed. study were the value creation interviews. O'Leary (2004) described semi-structured interviews as "a method of data collection that involves researchers asking respondents basically open-ended questions" (p. 162). Interviews, even though a very popular method of data collection in social science and qualitative research, can be incredibly complex (O'Leary, 2004; Miller & Glassner, 2016). Miller and Glassner (2016) explained that through semi-structured interviews, respondents share narratives with the research:

> … we believe that qualitative interviews provide us with access to social worlds, as evidence both of 'what happens' within them and of how individuals make sense of themselves, their experiences and their place within these social worlds. (p. 179)

The value creation semi-structured interviews aimed to give a more in-depth understanding into how the users part of the project were using the FFU app and how the FFU app and the associated FFU support structures (WhatsApp group, workshops) and social networks influenced their social worlds. Miller and Glassner (2016) explained that interviews cannot provide a mirror reflection of the social world to which many positivist researchers aspire, but they do allow the researcher some insight into how the respondent constructs meaning around the experiences they have had and an understanding of how they perceive the social world.

There are many things that further influence the credibility of an interview. As O'Leary (2004) explained, people (including the interviewers) are all very complex and complicated and successful semi-structured interviews require in-depth engagement with people. Issues such as power dynamics, language issues and feelings of being judged, play a role in influencing the responses. Miller and Glassner (2016) explained that in some instances respondents will answer interviewers with a familiar and widely accepted narrative, rather than a narrative that is different, and one that provides more insight into their subjective opinion of the activity. There are often important power dynamics that propel the interviewee to say what they believe the interviewer would like to hear, therefore misleading the researcher and affecting his or her ability to produce a true representation of the social world (Miller & Glassner, 2016). The second challenge that Miller and Glassner (2016) described was the challenge of language "which is our window into the subjects' world (and our world)" (p. 182). Language is not only a problem when the same language or dialect is not shared between the interviewer and the respondent, but also creates a problem when words mean different things to different people due to their cultural understanding and background (Miller & Glassner, 2016). Both these challenges need to be recognised and taken into consideration when interviewing respondents to ensure they don't adversely affect the accuracy of the data.

According to Fowler (1995), the job of an interviewer is incredibly difficult as the interviewer needs to manage the interview, make the interviewee feel comfortable, listen to the answers, figure out if an adequate answer has been provided by the interviewee and if not, plan how the best to ask probing questions to elicit adequate information.

In this study, the value creation interviews took the form of semi-structured interviews with several articulated questions and associated prompts, which guided the conversation (see Appendices D, E and F). The semi-structured nature allowed for the interview to flow like a conversation between the respondent and interviewer, allowing space for different topics of interest to the study to emerge as the interview unfolded (O'Leary, 2004). O'Leary (2004) believed that semi-structured interviews allow the interviewer and interviewee to remain flexible and reflexive in their engagement rather than being constricted by set or structured questions.

The value creation interviews were designed to answer open-ended questions that probed into the kind of value created by the FFU project for the respondents. The interview schedule included questions that looked into the background of the interviewees, uncovering the role they had played in the FFU project. The questions, which were guided by Wenger, Trayner and de Laat's (2011) value creation framework, opened up discussion around the value that was enabled (or not) by the FFU app and the FFU project. As described in Chapter 2, section 2.4, the value creation framework explores cycles of value that include 'immediate', 'potential', 'applied', 'realised' and 'reframing value'(Wenger et al., 2011). Finally, a set of questions was asked about the challenges and inhibiting factors encountered by

the users of the app in the FFU project, highlighting the challenges that were experienced. These questions were set against the research questions described in Chapter 1 to ensure that all the necessary data was generated. I drew up the interview schedule (see Appendices D, E and F) and then piloted it with a fellow researchers so as to refine the questions and revise the interview schedules where needed.

There were eight value creation interviews conducted in total throughout the project. These value creation interviews were conducted as primary data for this M.Ed. study. One consumer, two produce growers and two intermediary users were interviewed to represent those stakeholders who were using and experimenting with the FFU app within the Raymond Mhlaba community (see Appendix D: Value Creation Interview Schedule for the Food for Us Key Users). I also interviewed one of the app developers who made up part of the FFU app development team, based in Durban. I interviewed the app developers to gain a more holistic understanding of the learning that was occurring outside of the confines of the Raymond Mhlaba, but which affected the learning in the case (see Appendix E: Value Creation Interview Schedule for the Application Developers and Technical Liaisons). The final group I interviewed at a much later stage of the project were two of the FFU project managers (see Appendix F: Value Creation Interview Schedule for the Application Developers and Technical Liaisons). I interviewed the managers to gain an understanding of the kind of value that was enabled at an overarching project scale as well as how the FFU project has fared in its ability to realise the goals and aspirations laid out by the FFU project team.

All of semi-structured interviews were conducted in English through face-to-face interactions where the respondent was encouraged to speak freely and openly about their thoughts and feelings around the FFU project and application. In all eight interviews the respondents felt comfortable with their command of the English language and therefore there was no need for a translator. However, it was important to remember while transcribing and analysing the interview data that many of the respondents were English second language speakers. To mediate for this, during the interviews, I tried to ensure that there was a good understanding between the respondents and myself by asking questions clearly and repeating answers and opinions back to the respondent to clarify where necessary. The interviews were recorded (with the respondents' consent which was requested at the beginning of the interviews) with a recording device. All of the interviewees were asked to sign a consent form to be part of this M.Ed. research (consent and ethical conduct within the project will be discussed later in section 3.6). I also took notes during the interview, which accompanied the transcribed interviews. The transcriptions and interview notes where printed, coded, analysed and filed for safekeeping.

3.3.4. Amanzi For Food Training Of Trainers: Observations

As described in Chapter 1, the project worked in partnership with the Amanzi for Food project in the Raymond Mhlaba community. The Amanzi for Food project was conducting three Training of Trainers (TOT) workshops during the FFU project (November 2017; February 2018; May 2018). I was able to facilitate a 30-45 minute discussion on the FFU project and app at each one of the Amanzi for Food Training of Trainers courses. At the first Amanzi for Food course (November 2017), I provided the participants with a 20-minute introduction to the FFU project and facilitated a 10-minute question and answer session where the TOT participants were able to ask questions about how to download the FFU app and more logistical concerns. In the second Amanzi for Food TOT, I provided the workshop participants with 15-minutes training on how to use the FFU app and furthermore facilitated a 15-minute discussion on the potential value and the potential challenges the participants felt might arise with the introduction of the FFU project. In the final TOT, I facilitated a 30-minute discussion on how people thought the FFU app should be adapted to suit the local farmers of the Raymond Mhlaba district.

I collected observation data from these three TOT courses. O'Leary (2004) described observations as "a systematic method of data collection that relies on a researcher's ability to gather data through his or her sense" (O'Leary, 2004, p. 170). Observations are considered a good data source to document what is actually being done through observing actions, instead of interviews which record what people say is being done (O'Leary, 2004). The main challenges of observations, as described by O'Leary (2004), is that the researcher is solely responsible for the recording of their own observations and therefore is susceptible to their own inherent bias. It is for this reason that O'Leary (2004) explained that observations need to be recorded systematically and methodically to ensure credibility. Due to this underlying weakness of observation data it is suggested that researchers couple observation data with other data collection methods to triangulate the data and back up observations.

I developed an observation schedule (see Appendix G: Amanzi for Food TOT – Observation Schedule), which I used as a tool to ensure that all three TOT workshops were systematically observed and recorded. The observation schedule also prompted special attention to the important attributes that this M.Ed. study addressed such as the value created and the inhibiting and the enabling factors to value creation. The observation schedule was not filled out during the facilitated discussion, but was instead completed after each session.

I took part in the TOT activities and therefore made the observations as a participant of the TOT FFU discussions. O'Leary (2004) described a benefit of being a participant in an activity being able to create a more natural setting and gain perspective from the group observed. I was facilitating the discussions during the TOT courses and therefore was unable to take notes during the activity. I did

take an audio recording (with permission granted from the participants under the Amanzi for Food consent form) of all of the discussions. After the discussion, I filled in the observation notes and used the recordings to provide additional evidence to my observations, therefore addressing the challenges that O'Leary (2004) discussed with regard to observer bias and the suggestion of a second form of data collection. The discussion recording acted as a second form of data to triangulate my observation data.

The observations were recorded on the observation schedule (see Appendix G for a completed TOT Observation schedule) with evidence drawn from the recordings, which were later analysed.

3.3.5. #Match-Making Workshop Recordings

The #Match-Making Workshop, which included a number of presentations, introduction activities and focus groups, formed part of the Raymond Mhlaba case study. This workshop aimed to enable and facilitate networking, discussion and relationship building between different stakeholders of the local Raymond Mhlaba supply chain. A number of stakeholders were invited from the Raymond Mhlaba community; these included growers of produce (farmers), retailers, consumers, restaurants, guesthouses, caterers, intermediary business, bakkie sellers amongst other stakeholders (for full list of attendees, refer to Appendix H: Attendance Register for the Food for Us and RMDA hosted #MatchMaking Event). The workshop included a collection of activities, including an introduction from the RMDA CEO and an introduction activity to introduce participants of the workshop to one another while showcases the existing produce available on the FFU app. I facilitated an FFU app-training presentation, which was proceeded by the group workshopping component of the event. #Matchmaking event participants were put into groups (including a diversity of stakeholders) and asked to brainstorm buyer-seller connection challenges faced by the Raymond Mhlaba community. After the lunch break, the participants were asked to form new groups and brainstorm solutions to the problems that they had pinpointed in the previous activity (for the full #MatchMaking event programme, refer to appendix I: Food for Us #MatchMaking Event Programme).

The smaller focus groups of stakeholders intentionally included a grower (or producer) and a seller of produce in each group. Focus groups were described by Yin (2016) as facilitated group discussions between a number of selected participants who either share a common idea or have a common factor that binds them. Focus groups are commonly used as a data collection method in many quantitative studies as they allow for more perspectives to be collected and shared over a shorter period (Yin, 2016). There are a number of positive attributes to focus group discussions, however group dynamics hold challenges in themselves with power dynamics having the potential to override the voices of some in the group (Yin, 2016).

As discussed by Reed et al. (2011), social learning is often encouraged in spaces where there is diversity of thought. We tried to create these kinds of social learning spaces in the #MatchMaking event by ensuring there was a representative of each community of practice within each focus group. Each of the groups were asked to discuss and jot down challenges that were experienced in the Raymond Mhlaba community from the consumer's side as well as the producer's side. We tried to encourage diverse opinions to emerge and rigorous discussion to develop through three members of the FFU team acting as facilitators, approaching each focus group (five focus groups in total) and asking probing questions about their discussions.

The #Match-making event fell under the greater FFU project ethical clearance, however I requested at the introduction of the workshop for permission to audio record the workshop proceedings and capture photographs. The participants responded positively giving me consent for both. According to O'Leary (2004), audio recording allows the researcher the freedom to fully be engaged with the activity, be it an interview, discussion or panel and not worry about taking down notes of what is said. Audio recording does have negative downfalls which include the potential pressure of being recorded which might prevent participants from expressing themselves freely (O'Leary, 2004). The second challenge is that audio recordings do not record non-verbal cues and actions and therefore might omit a fair amount of important additional non-verbal evidence (O'Leary, 2004).

The #MatchMaking event was audio recorded with participants' permission and then after the event, I made a full transcription. It was preferable that I made the transcription as I had a thorough understanding of the FFU project and therefore could ensure the transcription was accurately reflecting the discussions that occurred. The posters created by the participants of the #Match-Making workshop (outlining the buyer-seller connection challenges and solutions) were collected and filed with the consent of the workshop participants. These posters and the photographs taken during the workshop served as secondary data. This secondary data was used as a form of triangulation, providing evidence for what emerged out of the workshop recordings.

3.3.6. Ongoing WhatsApp Data

One of the most successful components of this M.Ed. research was the Raymond Mhlaba WhatsApp support group. A WhatsApp group is described as a Mobile Instant Messaging (MIM) application, which allows the exchanging of messages over an Internet based application without paying for the fees of conventional SMS messaging (Robinson et al., 2015). Robinson et al (2015) explained that there is little literature on the use of MIM applications in learning to facilitate the development of social networks and social fabrics and therefore I drew on Hai-Jew's (2015) discussion on virtual focus groups for an understanding of how to use WhatsApp data as part of my M.Ed. research design.

The FFU WhatsApp group can be described as a type of virtual focus group. Hai-Jew (2015) explained that generally virtual focus groups are described as a selected group of individuals who have agreed to participate voluntarily in moderated and structured online discussion in order to understand a particular topic. The FFU WhatsApp group does not fully fit this description as the WhatsApp group facilitated a more prolonged discussion, which was very loosely moderated and explored a number of different topics throughout the FFU project.

Hai-Jew (2015) and Robinson et al. (2015) explained that the use of online technology for data collection has become increasingly popular and more mainstreamed allowing research to push the boundaries of what was possible in previous research. Internet supported research tools allow the researcher and the respondent a number of advantages; these include decreased costs and decreased collection time for the interviewee, reduced geographical limitations to respondents and higher methodological rigour and accuracy (Hai-Jew, 2015). Hai-Jew (2015) explained there are benefits for the participants as well as virtual focus groups can allow for higher participant anonymity, participant control over the input that is shared, increased convenience and a familiar easy to use format of communicating. Even though many of these benefits might be the same as a WhatsApp group focus group platform, there are some differences with the WhatsApp group not allowing for absolute anonymity and also providing a more long-term platform on which longitudinal discussions can be facilitated. With this new form of data collection, one needs to re-evaluate the research ethics so as to address issues of informed consent, ensuring participant anonymity, as well as how to store and manage the data (Hai-Jew, 2015). One of the limitations around virtual focus groups is that access to online virtual focus groups might affect the possible participants and therefore exclude those who do not have the correct software or those who are technologically illiterate (Hai-Jew, 2015). Having said this, the FFU project relied on participants having a smartphone that was able to connect to the Internet and download Internet enabled applications (as a requirement to be part of the study participants), and therefore these participants were able to connect to WhatsApp as well.

The WhatsApp group was created on 17 October 2017 to support the users in their use and navigation of the FFU app. I created the FFU WhatsApp group and loosely moderated and encouraged discussion on the group. The participants were asked whether they would allow the discussions on the group to be used as data for my M.Ed. study – all participants gave their full consent. I assured anonymity by blacking out user names when I collected the data (see Appendix J for examples of WhatsApp data). I remained sensitive to what was included in the study by ensuring that the content did not misrepresent the participants.

There was ongoing discussion and sharing of text messages, pictures, video and documents on the FFU WhatsApp group. This information was recorded with the date and time of the discussion and printed out to form part of the data that was analysed to determine social learning value that was

enabled through the FFU project (see Appendix J for an example of the WhatsApp data). The WhatsApp data was tracked from 17 October 2017 till 15 August 2018 (after the official closing of the first phase of the FFU project). After the closing of the first phase, there was much discussion on the FFU WhatsApp group on what should happen in the second phase of the FFU project and how to ensure the project continued and was successful in the Raymond Mhlaba community.

The FFU WhatsApp group was more than a data collection tool; it provided a platform for the users to discuss important pieces of information and it assisted in the development of a local community of practice centred around the FFU app trial.

3.3.7. Secondary Data: Application Meta-Data and Screenshot Surface data

As part of the greater FFU project, I took screenshots[15] of all the produce that was added onto the FFU app by users as a form of data showing activity on the FFU app on the front-end[16]. The FFU app stored meta-data, which included all FFU app activity history, user history and transaction history on the back-end.[17] The FFU app was designed to hold all the information from the actions made on the application on the back-end, therefore developing a history of information and accumulating a large amount of meta-data, which was analysed by the app developers to report on to the FFU project managers. I drew on the screenshots and FFU app meta-data as a secondary source of data to understand the extent to which the FFU app was being used and to understand how people were using and interacting with the FFU app.

Gerber and Lynch (2016) explained that with the rise of social media research there has been an increased interest in tapping into applications' meta-data which, when combined with front-end data, can develop a holistic picture of the extent of use and learning that has been enabled. The same applies as described above in the discussion on ethics of using WhatsApp data, for Meta-data and front-end data and there is a need to look carefully at ethical considerations (Gerber & Lynch, 2016). There is some debate as to whether the use of meta-data is an ethical infringement on application user privacy. Some authors explain that the activities and the information shared on the platform is already made public (Zimmer, 2010), while other researchers explain that the use of this information is not implied and therefore the user has not given willing consent (Gerber, Abrams, Curwood, &

[15] A screenshot is a feature enabled by recent smartphone software. A screenshot allows the smartphone owner to capture exactly what is on the screen at any given time as a picture, which can be easily shared.

[16] The frontend refers to the view of the application that the users are exposed to, therefore the virtual market interface for the users and the space where producers upload their produce for the sellers of produce.

[17] The backend refers to the interface that is not visible to the users and is only accessible to the application developers and manager of the application. The backend is where all the changes to the application are made and where the meta-data for the application is stored.

Magnifico, 2017). This challenge of informed consent was addressed in the first phase of the FFU project through the FFU app only being introduced to a small sample of users as pilot trial. This small number of users was introduced to the FFU project and FFU app through app training and workshops where the aim of the FFU project was explained and informed consent for primary and secondary data requested. The users were aware they were part of an app pilot trial which required user feedback and app activity monitoring to improve the FFU app for future users. Even though the FFU app was open to the public, use by those outside the pilot group was limited (and not monitored for this study).

The meta-data that was recorded on the backend of the FFU app included: (1) the input information of those who had registered, (2) when a user logged into the application, (3) when a user uploaded produce onto the application, (4) when a transaction was made between the buyer and seller, and (5) when users communicated over the application to fellow users. The FFU app statistics were taken from its introduction on 30 August 2017 and tracked until the end of the trial or pilot phase on 30 May 2018.

I used screenshots to capture what was being observed by the users on the front-end of the app. I methodically took screenshots of the produce that was uploaded to keep a recorded of what the buyers were observing on the FFU app. The screenshots were collected between 30 August 2017 and 30 May 2018 (these screenshots did not include test posts that were uploaded by the app developers to test the stability of the FFU application). This collection of screenshots was ordered chronologically, capturing the date of upload, who uploaded the produce and the description of the produce (see Appendix K for an example of the Screenshot Data) The screenshot collection displays what the users were able to see if they navigated to the buyer portal of the FFU app. This chronological screenshot collection complements the application meta-data, value creation interviews as well as baseline and final structured interview surveys and provides a holistic picture of the activity that occurred on the FFU app as recommended by Gerber and Lynch (2016). Gerber and Lynch (2016) suggested it is important to combine meta-data with a multitude of other data sources such as interviews and focus groups which will "provide richer data for researchers to understand the social media meta-data that they have harnessed" (p. 171). The meta-data and screenshot catalogue was particularly useful in providing additional evidence to compliment the interview, WhatsApp, structured interview survey and workshop data and therefore played an important role in triangulating the data. This encouraged a holistic understanding of the FFU project journey and the value created throughout this journey.

3.4. Choosing the Research Participants for the Primary Data Collection

For this project I was not able to select the participants for the secondary data, as this made up part of the greater FFU project, independent of my research. However I was able to select (1) the participants

I interviewed (my primary source of data), (2) who was invited to the workshops, and (3) who was invited to the WhatsApp group.

I wanted to ensure that I interviewed a selection of users and therefore had a representative of the producers, consumers and intermediary app user groups. I decided to interview the producers, consumers and intermediary users who were most active on the FFU app, as they would be able to give me the most insight into what they had experienced from the FFU app. I recognised that only recording the opinions of the users who used the application would skew the data to show a mass uptake of the application; this is why the use of the meta-data and the final surveys was so important to counterbalance this. The FFU app developer and FFU project managers were not selected, but interviews were requested of them. The project managers were approached too due to the role they played in the development of the FFU project, therefore ensuring that I got a holistic perspective of the value created by the FFU project as a whole.

For the #MatchMaking workshop, I invited a wide range of stakeholders to attend, including farmers, food street vendors, retailers, caterers, agricultural extension officers, intermediary companies, guest house owners, restaurants amongst others (see Appendix H: Attendance Register for the Food for Us and RMDA hosted #MatchMaking event). This workshop was not exclusionary and invited everyone who was part of the local Raymond Mhlaba local supply chain.

The WhatsApp group also had no specification with regard to who was invited to be part of the group. The WhatsApp group remained a closed group with members only being able to join when referred by FFU app users. Through referrals the group grew to more than 50 participants and included farmers, buyers of produce, intermediary partners as well as other interested stakeholders. .

3.5. Gaining Access

Gaining access is of the utmost importance to ensuring the research participants feel secure, relaxed and open to discuss their true feelings and experiences. This is also an important component of ensuring the study follows ethical conduct (O'Leary, 2004). Yin (2016) explained that we all live in a real world and interact in a real world and when someone wants to study and research another person's interactions in their own world, permission needs to be asked from those individuals. As Yin (2016) said, "doing research in these settings requires special attention to the way you might gain permission to study them and your subsequent access to them" (p. 121). O'Leary (2004) suggested several tips for gaining access, including being willing to discuss the research study, being aware of research protocols, being respectful of participants' wishes, and offering to keep the participants aware of the research and make the results available. I took particular care to make sure that my potential research participants felt they had a choice about whether they would like to be part of the FFU project and engage in more in-depth interviews and regular researcher participant interactions or

not. I made sure to explain the aim of this M.Ed. study and then furthermore, the aim of the data generation tools (interview, focus group and structured interview survey) so as to make the participants aware of what would be asked of them. I provided the members of the value creation interviews with an information sheet, which explained the aim of the research and what the users were requested to do. This made up part of the consent form, which will be discussed in more detail in section 3.8.

To ensure I was including the correct people within the local supply chain, I requested assistance from the Raymond Mhlaba Development Agency. The RMDA assisted me with ensuring that all the appropriate stakeholder had been included in discussions and workshops thus allowing me to get good representation across the Raymond Mhlaba landscape of practice. Having the support of a local stakeholder (the RMDA and the Raymond Mhlaba Farmers Association) enabled increased local support for the FFU project from the local community. This was enabled due to the RMDA and Raymond Mhlaba Farmers Association being entities that the local communities trusted and therefore bring associated creditability to the FFU project.

Yin (2016) explained that it is not only important to gain access properly at the beginning of the research, but it is also incredibly important to maintain access. Yin (2016) described gaining access as a process rather than an event. To maintain access, I ensured that I remained in communication with the research participants and FFU app users, providing technical advice and relaying solutions for issues that might have been experienced on the FFU app. The WhatsApp group provided my main channel of communication, as this portal allowed me to constantly provide messages of support to all those participants who had played a part in the FFU app trial and who were research participants in this M.Ed. study.

3.6. Data Management

Because data was being generated both within the broader FFU project, as well as within the Eastern Cape case study more specifically, there was a danger of generating an overly large amount of data for this M.Ed. study. The large amount of data that was generated at different levels of the FFU project (overall project, case study, M.Ed. study) required careful management so as not to lose the richness of the data or overlook important emerging findings.

Both baseline and final structured interview surveys were captured on survey sheets, which I then entered into an Excel spreadsheets which were stored on the shared FFU project online Google Drive folder. Each of the users, who was part of the 20 Eastern Cape trial participants were coded to ensure anonymity and to allow for easy management and analysing of data. A user code, for example B1 (Buyer 1), was used across all the interviews and survey that related to that participant to ensure that there was continuity across the data and the analysis thereof.

All the interviews were recorded, transcribed and coded with an associated user index code as seen in Table 3-2 below (for example VCIB4). The TOT workshop recordings where transcribed and observation notes drawn up from the recordings which were then coded chronologically (for example TOTW1O). The #MatchMaking event recordings were transcribed and coded MMWR. The WhatsApp group data was downloaded and saved on a monthly basis to ensure that the data was not lost. This data was coded FFUWD. The FFU application data was downloaded from the back-end and updated monthly and consolidated on 30 May (final day of the trial) and given the index code FFUAS. All the data generated was saved on a desktop, saved on an Internet backup server as well as printed and filed chronologically.

Table 3-2 below, provides a summary of the data that was generated for this M.Ed. study. It shows what data generation tool was used, and where the data was sourced.

Table 3-2: Summary of data generated for this study

Data Index code	Data Index in full	Data Generation Tool	Data Source
BSCR	Baseline Survey Consolidation Report	Structure Interview Survey	FFU Application Users
BBS	Buyer Baseline Survey	Structure Interview Survey	FFU Application User
SBS	Seller Baseline Survey	Structure Interview Survey	FFU Application User
IBS	Intermediary Baseline Survey	Structure Interview Survey	FFU Application User
VCIB4	Value Creation Interview Buyer 4	Interview	FFU Application User
VCIS5	Value Creation Interview Seller 5	Interview	FFU Application User
VCIS6	Value Creation Interview Seller 6	Interview	FFU Application User
VCII2	Value Creation Interview Intermediary 2	Interview	FFU Application User
VCII3	Value Creation Interview Intermediary 3	Interview	FFU Application User
VCIAD1	Value Creation Interview Application Developer 1	Interview	FFU Application Developer
VCIPM1	Value Creation Interview Project Manager 1	Interview	FFU Project Manager
VCIPM2	Value Creation Interview Project Manager 2	Interview	FFU Project Manager
TOTW1O	Training of Trainers Workshop 1 Observation	Workshop Observation	Amanzi For Food ToT workshop
TOTW2O	Training of Trainers Workshop 2 Observation	Workshop Observation	Amanzi For Food ToT workshop
TOTW3O	Training of Trainers Workshop 3 Observation	Workshop Observation	Amanzi For Food ToT workshop
TOTW3C	Training of Trainers Workshop 3 Comments	Workshop Feedback	Amanzi For Food ToT Workshop
MMWR	#Match-Making Workshop Recording	Workshop Recording	FFU #MatchMaking workshop
FSCR	Final Survey Consolidation Report	Structure Interview Survey	FFU Application Users
BFS	Buyer Final Survey	Structure Interview Survey	FFU Application Users
SFS	Seller Final Survey	Structure Interview Survey	FFU Application Users
IFS	Intermediary Final Survey	Structure Interview Survey	FFU Application Users
FFUWD	WhatsApp Data	WhatsApp Group	FFU WhatsApp group participants

FFUAS	Application Statistics	Application Meta-data	FFU Application backend data
FFUS	Screenshot	Application	FFU Application Front end
FFUMAU	Meeting and Activities Updates	Observations	FFU meeting visits with project managers and activity meetings with users
FFUFR	Final Report		All FFU data
FFUCMR	Consolidation Meeting Report		FFU consolidation notes and observations

Once collected, the data was analysed through a three-phase analytical process that was guided by Wenger, Trayner and de Laat's (2011) Value Creation Framework which will be discussed in section 3.7 below.

3.7. Data Analysis

Yin (2016) explained there is no global standard formula for analysing social data, therefore making qualitative research vulnerable to accusations of being selective and biased. To remedy this, Yin (2016) encouraged researchers to continually acknowledge their inherent bias, to continually check the accuracy of the data collected and to make one's analysis as thorough as possible. There is a common formula that is often used in qualitative research; this includes: (1) compiling of data, (2) the dissembling of data, (3) the re-assembling of data, (4) interpreting of re-assembled data, and then final (5) concluding of arguments based on interpretations (Yin, 2016). Within my research I worked through all these stages.

The first stage, compiling of data, is when all of the data is organised into an easily readable and ordered fashion (Yin, 2016). I compiled my data in a hard board file, which housed all of the primary and secondary data, organised in chronological order as it occurred throughout the FFU project. Each piece of data was given an index code, which can be seen in Table 3-2 described in section 3.6.

Yin (2016) and Merriam (2002) reminded us that in good qualitative research, analysis starts during the data collection stage where the researcher needs to remain engaged and reflexive and recognise where data might be absent, weak or present bias. I tried to remain reflexive and aware of my bias through keeping a research journal which I filled out after each of the field visits (see Appendix L: Example of Filled in Back to Office Field reflection used to track bias).

The second stage of Yin's (2016) analysis process is the dissembling of data which includes breaking the data down into smaller fragments. I first dissembled my data by sifting through the data (primary data, as this project's scope did not allow for all data to be analysed in such depth) looking for affordances (as described in Chapter 2, section 2.2.2). I used a highlighter to highlight and code instances where affordances had emerged due to the FFU application (app aff) and then further affordances that had emerged in the networked social learning support structures that supported the introduction of the FFU application (proj aff). I sifted through the primary data a second time

highlighting all the instances of value with Wenger et al.'s (2011) Value Creation Framework in mind. Rapley (2016) warned that one must be cautious of losing the context of fragmented pieces of data that have been highlighted. It is important to always have an "eye on the broader picture" (Rapley, 2016, p. 911) when dealing with pieces of data from fragmented sources.

The re-assembling of data is explained by Yin (2016) as the re-grouping of fragments of data into substantive themes. Yin (2016) reminded us that it is during this phase that one must remember the context of the fragments of data, so as not to develop patterns that are removed from their context. The remaining steps in the analytical progress that I used for this research were divided into three phases which have been summarised in Table 3-3 below.

I employed an abductive mode of inference in analysing my data with theory assisting me throughout Yin (2016)'s analytic process. Abductive inference is an analytic inference which is underpinned by theory, however remains critical and open to emerging ideas that become evident through the analytical process (Danermark, Ekstrom, Jakobsen, & Karlsson, 2002).

Table 3-3: Three analytical phases in this M.Ed. study

Phase	Type of Analysis	Theory		Data Used	Output	Analytical step
One	Abduction	Affordance theory	SQ 1	-Value Creation Interviews (primary data) -Final Structured Interview Survey (primary data) -Tot Workshop Observations (primary data) - FFU Report (secondary data) - FFU WhatsApp Group data (primary data) -#MatchMaking Recordings (primary data)	2 Affordance Analytic Memo (1) App enabled (2) Networked social learning support systems	- Re-assembling -Interpreting of data
Two	Abduction	Social Learning Value Creation Community of practice Landscape of Practice	SQ 2	-Baseline Surveys (secondary data) -Value Creation Interviews (primary data) -Final Survey (primary data) -FFU WhatsApp group Data (primary data) -ToT Workshop Observation notes (primary data) -#MatchMaking Recordings (primary data) -FFU Project Reports (secondary data) -FFU application statistics (secondary data)	2 Value creation analytic memo for landscape of Practice (1) App enabled (2) Networked social learning support systems	- Re-assembling - Interpreting of Data
Three	Synthesis	Social Learning Value Creation Community of practice Landscape of Practice Circular Economies	SQ 3 and 4	Affordance Analytical Memos Value Creation Analytical Memos Value Creation Relationship connection memo	Analytical statements	- Interpreting - Concluding / Synthesis

3.7.1. Phase One

My first phase of data analysis included the re-assembling and interpreting of data for sub-question one, *What affordances have been enabled by the development and initial use of the application?,* which explored the types of affordances that were enabled by the FFU app and the FFU project for the

diverse set of stakeholders directly involved in the project. This phase of analysis was guided by understanding that affordances depend on the relationship between the artefact and the users in order for the actualisation of affordances to occur as discussed in section 2.2.2 by Pozzi, Pigni and Vitari (2014) and Bernhard, Recker and Burton-Jones (2013).

I re-assembled my data into two sets of analytical memos, one set for the affordances of the FFU app (see Appendix M: Example of first 10 data fragment entries of the affordance memo for the Food for Us App) and another set for the affordances that emerged from the networked social learning support systems (see Appendix N: Example of first 10 data fragment entries of affordance memos for the networked social learning support systems). I organised the data fragments into four columns: (1) realised affordances, (2) enabling factors, (3) potential and perceived affordances, and (4) inhibiting factors. These columns were guided by affordance theory and based on the premises that affordances only existed when actions are taken to realise them (Bernhard et al., 2013; Pozzi et al., 2014). Once organised into the four categories, I grouped the data into clusters with similar ideas (for example, such as a piece of data discussing the affordance to reach more people). I then looked for patterns to emerge within the clustered data to develop emergent themes. This formed part of Yin (2016)'s interpreting process where I started to interpret and organise the data to develop a new narrative. The Affordance analytical memo's provided a good platform from which to start exploring the value creation social learning that these affordances enabled.

Throughout this process, I remained conscious of potential bias due to my positionality within the FFU project. I tried to remain reflexive and engaged, keeping the larger picture of the project in my mind, and not allowing myself to romanticise any individual success stories or stories of challenges.

3.7.2. Phase Two

The second phase of analysis concentrated on exploring the value creation enabled by the FFU project in the Raymond Mhlaba community. This phase addresses the second sub-question: *How has social learning been enabled by the development and initial use of the application and what different forms of value has been stimulated by these affordances for farmers, buyers and researchers, app developers and project managers over the phase of the project?* As in the previous phase, an abductive mode of inference was used in this phase of analysis. I used Wenger et al.'s (2011) Value Creation Framework to assist me to identify different kinds of value (immediate, potential, applied, realised and reframing) as well as to assist me in building a story of value creation across the 18-month FFU project. I drew on the data that had already been re-assembled in the affordance memos in phase one. This data provided a good foundation on which to build the value creation narratives as it described the type of affordances that were created and these affordances were divided into the value creation cycles that they enabled. I divided the value creation (that was enabled by the affordances)

into the five different cycles of value based on the theoretical definition given by Wenger et al. (2011) explained in Chapter 2. This re-assembled data took the form of two Value Creation analytic memos, one for value creation enabled through the app and a second one for value created through the networked social learning support systems enabled by the FFU project (see Appendix O: Example of part of the Value Creation Analytic Memo for the Use of the Food for Us App and Appendix P: Example of the Value Creation Analytic Memo for the Food for Us app and the Networked social learning support systems). To ensure that I did not miss important data that was not included in the affordance memos, I sifted through all the primary data a second time, coding the value created and then filling in the gaps that the affordance data had left out.

Value creation was tracked across the Food for Us Raymond Mhlaba landscape, therefore developing a value creation story for the Raymond Mhlaba case study area as opposed to individual stakeholder value creation stories. All the primary data was used to develop the value creation memos, with the secondary data assisting with triangulation of data and ensuring that a more holistic story was told. The pieces of evidence that were added into the value creation memos acted as indicators of value. Wenger et al. (2011) explained that they use strings of indicators to act as evidence to substantiate and strengthen stories about value creation. Wenger et al. (2011) gave examples of the types of indicators to look out for in each of the value creation cycles. Examples of these indicators are recorded in Table 3-4 below.

Table 3-4: Examples of types of indicators suggested in the Value Creation Framework (Wenger, Trayner, & de Laat, 2011, p. 31)

Value Cycle	**Examples of Typical indicators**
Immediate Value	Level of participation (Attendance at meetings & Website statistics) ; Level of activity (Number of queries & Frequency of meetings); Level of engagement (Intensity of discussion & Length of communication threads); Networking (New connections made); Value of Connections (Frequency of interactions); Collaboration (Joint projects).
Potential Value	Skills Acquired (self-reported or explained in interviews); Information received (interviews); Confidence (self-reported & community reported); Types of intensity of social relationships (interviews)
Applied Value	Implementation of advice/ solutions/ insights (follow up interviews); use of tools and documents to inform practice (website and application usage logs); use of social connections (focus groups and interviews)
Realised value	Personal performance; Organisational performance; Organisational reputation
Reframing Value	Community aspirations; Relationships with stakeholders; New frameworks

The indicators that were divided into the different value creation cycles were then clustered into groups with similar themes. This type of thematic analysis was developed through clustering similar concepts together that were described by the stakeholders who were part of the primary data collection (O'Leary, 2004). O' Leary (2004) explained that this type of thematic analysis occurs inductively without being influenced by literature. O'Leary (2014) argued that in inductive analysis one must not develop themes prior to going through all the data as the researcher can be influenced to fit the data into the themes instead of letting them emerge without pre-conceived ideas. As indicated, through abductive analysis guided by theory, I developed main categories but via induction, I was

able to develop insight into these categories. The clustering of ideas started to show a pattern that had emerged through the value creation memos.

Wenger et al. (2011) explained that value does not exist in silos and instead the value cycles interact with one another with the relationships between the value cycles being as important as the indicators of value. As a form of interpreting, I looked at the value creation memos and pinpointed the connections and relationships between the value cycle which was created (1) through the use of the app and (2) through the involvement in the networked social learning support systems (to see the relationships see Appendix Q: Value Creation Analytic Memo showing the relationships between the cycles of value enabled by the use of the Food for Us Mobile Application and Appendix R: Value Creation Analytic Memo showing the relationship between the cycles of value enabled by the Networked Social Learning support systems).

Wenger et al.'s (2011) value creation framework was amended slightly with a circular economy value component added as well as providing a space where inhibiting and enabling factors to value creation could be identified in each value creation narrative. This was to accommodate the critical realist interest of the study which seeks to explain why things are the way they are.

The analytic memos and narratives that emerged from phase one and phase two of this analytic process were used to address sub-questions three and four which look at the inhibiting and enabling factors of value creation (sub-question 3) and the realisation of the projects aim to support the project's aspiration of supporting circular economy principles (sub-question 4).

This phase of analysis was long and required me to understand and then re-understand the meaning of the different cycles of value and therefore continually be reflexive in my understanding of the theory and not let this 'drive', yet inform the analytical process.

3.7.3. Phase Three

In the third analytical phase I did the majority of interpreting and concluding as discussed by Yin (2016). Yin (2016) explained interpreting as the development of a new narrative through using the re-assembled data and in this case, literature. Concluding is the wrapping up of interpretations to conclude one's entire study (Yin, 2016). In the third phase of my analysis, I collected all the data that I had re-assembled in the previous two phases (the Affordances memos, Affordance Memos and Value Creation relationship memos) and then interpreted the data using affordance theory and value creation theory and then furthermore tried to understand the interlinkages between affordances and value creation. I also tried to pinpoint where circular economy value was created throughout the FFU project. I based my understanding of circular economy on Raworth's (2017) (see Chapter 2). I looked across the analytical memos and identified the value that contributed towards achieving a circular

economy, one that limits waste and concentrates on building circular value chains where waste is reused in the value chain. The circular economy value that I identified was found in any of the value cycles (immediate, potential, applied, realised or reframing) and in some case existed across all the cycles.

I concentrated on answering the last two sub-questions through this phase, the third sub-question being: "*What factors limited or enhanced the social learning process and level of value created by the application?"* and the fourth: *"In which ways has value created by the application contributed to the realisation of the project's aspiration of supporting circular economy principles and how could this be improved?"*

This final phase of analysis provided an opportunity to look for any gaps that might arise through the previous phases of analysis as well as allow myself to step out of the intense analysis phase (which characterised the previous phases) to get a clearer understanding of the data and how it fitted into the Raymond Mhlaba case study as a whole, and furthermore the larger FFU project. In the section below, I discuss how I took certain actions to ensure that this research can be considered trustworthy, reliable and valid.

3.8. Ensuring Validity and Quality

In any study, it is important to employ reflective activities throughout the research to ensure that the work that one is doing is valid and can be deemed credible, meaning that it accurately represents the findings and feelings that emerge within the case study (Yin, 2016). Yin (2016) and Creswell (2014) explained that validity needs to be central to the research right from the design stage and be continually referred to throughout the data collection and analytical phase. According to Shenton (2004), there are four criteria that have been widely adopted to ensure validity in qualitative case study research; these are credibility, transferability, dependability and conformability (Shenton, 2004). To improve the validity of my research, I tried to employ activities that would improve the credibility, transferability, dependability and conformability of my research. From a critical realist perspective, I tried to give insight into why things were the way they were.

3.8.1. Credibility

Credibility is described as the congruency of research to reality (Shenton, 2004; Yin, 2016). To ensure that this was a credible study and that I was accurately representing what was occurring in the field during the implementation of the FFU app and project, I adopted a number of strategies: triangulation, member checking and the reflexive monitoring of bias. Triangulation of data is described by Creswell (2014) as data collected through multiple sources to provide evidence for a claim. Yin (2016) explained triangulation more explicitly saying "the principle pertains to the goal of seeking at least

three ways of verifying or corroborating a procedure, piece of data, or finding"(Yin, 2016, p. 87). Researchers not only use triangulation in combining different sources of data, but also in combining data from different investigators, different theories, and different methodologies (Berg, 2011; Yin, 2016). Yin (2016) explained that it is important for researchers to continually apply their minds to triangulating their research; therefore "always seek to develop converging lines of inquiry about all your research actions and assumptions" (Yin, 2016, p. 87). Berg (2011) explained that maintaining one data collection method means that the data presents a one-dimensional perspective; therefore to gain a number of different perspectives to ensure the research is truly representative of the different perspectives in the study, one needs to use different methods in social research.

I adopted methods of triangulation throughout this study, collecting evidence from a series of data sources using different types of data collection as explained in section 3.3 above. I collected data through semi-structured interviews, through structured interview surveys, through workshop discussions and through meta-data collection. I knitted this data together to support developing 'converging lines of inquiry' through the use of affordance theory and Wenger et al.'s (2011) Value Creation Framework. Triangulation is encouraged through the Value Creation Framework, which uses indicators (substantive evidence) from various sources of data to build value creation stories.

Credibility can also be ensued through member checking, where participants of the research confirm the accuracy of the data collected (O'Leary, 2004; Shenton, 2004; Yin, 2016). Member checking most often happens towards the end of the study where the researcher takes the data collected back to the participants for them to check. However, Yin (2016) explained that one can also introduce member checking into the research methodology earlier, and plan to include the participants in ensuring the credibility of the work from an early stage. I used member checking throughout my data collection process in the interviews and workshops in particular. I enabled member checking during an interview, asking the respondents to confirm what I had written down, or whether what had been recorded was what they meant or intended. This led to there being a large amount of repetition in the raw data, however it ensured that what was captured was true to what was meant by the participants.

I remained reflexive through keeping a series of journals, in which I wrote field notes and questioned the experiences that I had throughout the FFU project. This activity helped me to remain reflexive, giving me a space to reflect on what I had experienced.

Through member checking, triangulation and remaining reflexive of my own bias, I tried to ensure that all this research remained credible.

3.8.2. Transferability

The second characteristic that Shenton (2004) described as playing an important role in ensuring validity is transferability. Transferability is explained as the ease of using the findings of one study in other similar situations (Shenton, 2004). Yin (2016) explained that qualitative studies are, by their very nature, particularistic, meaning that they understand that different studies and different cases have various patterns, nuances and therefore results that are specific to the context of the study. Having said this, Yin (2016) explained that transferability does recognise that there is a uniqueness of local conditions and therefore involves more modest claims, not all of which can be transferred between studies. Yin (2016) explained that to enable transferability, the researcher should aim to develop a working hypothesis, rather than a sought-after generalisable conclusion. This working hypothesis can then be further built on by later studies instead of being considered an absolute infallible conclusion (Yin, 2016). Yin (2016) encouraged researchers to make the research propositions and the working hypothesis clear at a conceptual level which is higher than describing the conclusion specific to the conditions and context of the study. This is not to say the specifics are not important to make known. Yin (2016) acknowledges that the detailed specifics of a study are not easily transferable. Having said this, O'Leary (2004) and Shenton (2004) explained that best indicator of transferability is the inclusion of incredibly thick, highly detailed descriptions of the research context, the research methods and the limitations and enabling factors that affected the outcome of the study. Having made these factors clear, readers of the research can gauge the applicability of the research to another account.

This research concentrates on the experiences of a small sample size (between 16 – 23 people) within in a particular case study, therefore there are a number of contextual nuances that makes using the findings that emerge from this study difficult to generalise. The lessons, conceptual findings and working hypothesis that were developed, as well as insights into the underlying mechanisms or causal factors, however, can be explored and tested in alternative studies, building further on this research, either strengthening the claims made by this study, or providing opposing claims. In order to encourage this, I followed the advice of Shenton (2004) and O'Leary (2004) and included a thick description of how the project unfolded and who was involved. I commented on the important enabling factors and constraining factors to the success of the project. I got to know the Raymond Mhlaba municipality well from regular visits and interactions with many different stakeholders during the initial profiling stage of the research. I included a thick description of the context in Chapter 1, and gave a detailed explanation of the introduction of the FFU project in Chapter 4. The baseline structured interview surveys provided a good base from which to draw data to understand the background and contextual setting of the key users of the FFU app who made up some of the participants I interviewed for value creation. When I concluded my study, I acknowledged the situated nature of the research conducted in this single case study, and used social learning literature and the

value creation framework to assist with developing a more conceptual working hypothesis which can built on by future research in this area of work.

3.8.3. Dependability

According to Shenton (2004), dependability refers to research that is deemed reliable because if it were to be conducted again, the findings would carry some resemblance. O'Leary (2004) explained that reliability and dependability enable consistency that characterises good social learning research. O'Leary (2004) explained that reliability is concerned with internal consistency of research methodology, however dependability recognises that reliability is not always possible in social research and therefore, "attests that methods are systematic, well-documented, and designed to account for research subjectivities," (O'Leary, 2004, p. 58). O'Leary continued to explain that dependability is evident "through methodological protocols that are designed and developed in a manner that is consistent, logical, systematic, well-documented and designed to account for research subjectivities," (O'Leary, 2004, p. 60).

I employed a systematic way of recording the activities of the project through a 'back to office' research note which I developed after every field trip to the Raymond Mhlaba municipality. This back to office reflection was guided by the same questions, which encouraged me to continually comment on important developments in the project, which were specific to my research questions in a systematic way (see Appendix L for an example of a completed Back to Office report). I also kept a comprehensive timeline as a chronological record of the activities, challenges, interventions or major events that occurred during the FFU project (see Appendix S for full timeline of the project). I ensured that all of the data collected was well organised, and managed to ensure that the data collection, and furthermore data analysis, was systematic and dependable. I continually remained cognisant of my potential bias subjectivity and maintained a systematic and logical system to my research which assisted me in recognising my subjectivity, noting it in section 3.2.1 in my discussion regarding my positionality in the FFU project and M.Ed. researcher.

3.8.4. Confirmability

Finally, Shenton (2004) described confirmability as the researcher's concern with objectivity. In qualitative research, the idea of objectivity is understood as flawed as the subject of study are humans who are in a research relationship with a human investigator, each of whom hold their own subjective thoughts and experiences (Shenton, 2004). Anney (2015) explained that confirmability ensures that the findings are not figments of the researcher's imagination, and rather that they emerge from the data i.e. are not fabricated by the investigator. Shenton (2004) explained that through ensuring confirmability, one needs to take extra precautions to ensure that the findings are built from the experiences, ideas and emergent realisation that come from the informants, rather than those that are

pre-supposed and pre-empted by the research. Shenton (2004) and Anney (2015) suggested that triangulation is one activity that is effective in ensuring that the emergent ideas are substantially supported by a number of data sources. A reflexive journal or a reflexive practice is also a strategy to use to ensure that the research is deemed confirmable and the underlying biases of the investigator is recognised (Anney, 2015).

As discussed earlier in section 3.2.1., I recognised that my positionality in the greater FFU project affected how I conducted research and also might have affected how the respondents answered my questions. To remain aware of the potential biases of my positionality and the threat that this could have to the confirmability of my research, I kept a personal reflexive journal where I wrote down my ideas and thoughts about the project over the duration of the FFU project. This journal included planning of events, ideas on who to include in the discussions as well as challenges throughout the research project. As described above, I also filled in Back to Office Reports after every field trip to monitor what was happening in the field, and not allow any important information to be lost. The outcomes of the FFU project were not known and what emerged from the research was unexpected; this made me vulnerable to pre-imagining outcomes and therefore influencing data generation and data analysis. To counteract this, I remained open to allowing themes and claims to emerge from the FFU project and analysis process through collecting a variety of data from a variety of participants through semi-structured and open-ended data generation tools and careful triangulation of data to support concluding claims. These strategies were used to ensure rigour and to ensure systematic analysis and claims that were based on evidence synthesised.

I also tried to ensure the voices of all the participants was well articulated throughout this M.Ed. research by including the stakeholders in all components of the FFU project, allowing the roll out of the project to be collaborative, with all stakeholders having an opportunity to influence the conversation. The WhatsApp group was particularly important in allowing the participants the opportunity to voice their opinions and give suggestions and insight throughout the FFU project.

The combination of these activities assisted me in designing and then executing a research project that can be deemed trustworthy with outcomes and conclusions that are credible, transferable, dependable and confirmable.

3.9. Ethical Considerations

Knowledge is developed out of research, which is produced by researchers who interact with research participants and therefore is shaped by the research practices and approaches used (O'Leary, 2004). It has become increasingly clear that in research there needs to be a strong emphasis on the ethics and political dynamism of the research to ensure that groups of people and types of knowledge are not misrepresented or marginalised (O'Leary, 2004). A vital part of good research is good ethical

considerations. Kara (2018) explained that research cannot simply be rendered ethical through ticking off an activity or receiving a signed permission statement; the ethics of one's research needs to be at the core of all research activities. One of the most common ethics theories that has been adopted by many researchers is the 'do no harm approach' to research (Kara, 2018); however Kara (2018), Hughman, Pittaway and Bartolomei (2011) and O'Leary (2004) all agreed that the 'do no harm' model is not enough. While it may be a good starting point, there is increasing shift towards ensuring that researchers take active steps to improve the situation of those they are basing their research on (Hugman, Pittaway, & Bartolomei, 2011). Hugman et al. (2011) continued to say that 'do no harm' needs to be "integrated with respect, beneficence and justice in a more relational approach that can be gauged in terms of what is offered back to the participant in ways that are meaningful to them" (Hugman et al., 2011, p. 1284). I engaged with the Raymond Mhlaba local supply chain stakeholders and the FFU project with a social justice approach where I aimed to work towards developing knowledge and resources to address the inequalities that impose vulnerabilities on groups of people (Kara, 2018). The project's aims, which were explained in Chapter 1, sought to contribute potential value to the small scale farmers in the area and address wider social-ecological and social justice ethical challenges such as wasted resources, unemployment, poverty and malnutrition. This research also took on an active research component, where I (as the researcher) was part of implementing interventions to try and achieve the aim of the FFU project. Kara (2018) reminded me that ethical research needs to enable mutual learning where 'knowledges' are respected and honoured by both the investigator and the participant.

Orb, Eisenhauer and Wynaden (2001) explored three important ethical principles: autonomy, beneficence and justice. Autonomy encompasses the acknowledgement that everyone is their own person, that people are entitled to full knowledge of the study and to freely decide whether to participate in the study (they also have the right to withdraw from the study at any time) (Orb, Eisenhauer & Wynaden, 2001). Autonomy is often enabled through the signing of a letter of informed consent, which outlines what the study is about and what the participant's involvement will include (Orb et al., 2001). In my M.Ed. study I requested all those who I conducted in-depth semi-structured interviews with to sign a consent form which explained the aims of this M.Ed. research and gave participants the background of the FFU project and then requested permission to use photographs of the participant and also asked whether or not the participant would like to remain anonymous (see Appendix T for an example of a completed signed consent form). Before any semi-structured value creation interview, I carefully explained the project to the participant, emphasising the participant's role in the research, after which I asked the interviewee to read over and sign the consent form, before requesting permission to audio record the interview. Participants were able to leave the project at any point. There were some instances of participants not responding to invitations to workshops,

discussions and interviews, which were respected and taken as the participant's wish to be removed from the trial, or an indication that they did not have the time to be involved, which I respected.

The participants that made up part of the larger FFU project fell under the broader FFU project ethics, – this required informed consent, which was part of the registration process of the FFU app. I ensured that there were constant communication channels open between the participants and myself as the researcher so that the participants felt informed about the research and were informed of ongoing findings at all levels of the FFU project to ensure consistency of an ethical approach.

Beneficence was described by Orb et al. (2001) as a principle that promotes "doing good for others and preventing harm" (Orb et al., 2001, p. 95). Beneficence needs to integrate with autonomy; otherwise it may become something of an extreme, which resembles paternalism. In this M.Ed. study, I tried to encourage beneficence by letting the participants know what the research would be used for, offering anonymity and ensuring the participants that the research would be conducted in good faith which does not put the participants in harm's way. Beneficence needs to be integrated with autonomy and justice in order to develop an ethical set of principles, therefore doing more to address inequalities as discussed by Kara (2018).

Orb et al. (2001) described consent as a 'negotiation of trust', which needs to be continually re-negotiated with the participant. I ensured that I continued to manifest trust between myself and my participants by ensuring that interviews, discussion or workshops were organised in advance and were kept to the suggested time, therefore respecting the time and resources that being part of the FFU project cost the participants. Even after receiving initial consent through consent letters described above, I continued to ask permission to record any interaction to ensure that participants felt that they were not being taken advantage of.

The last principle that Orb et al. (2001) discusses is the need for justice in research. Orb et al. (2001) presented a very brief discussion of justice, explaining it as the presence of equal share and fairness and avoiding exploitation and abuse of participation. This description does not include the important responsibility of researchers to act to achieve social justice within their research case study, which was made clear by Kara (2018). In this M.Ed. study I tried to ensure that the research work and the interventions (i.e. workshops, app training and WhatsApp group) all added to building the community not for the sake of the FFU and M.Ed. research, but for the benefit of the community to address the social challenges mentioned earlier in this section. The FFU project rollout took a very collaborative approach where the participants of the project where part of the planning and implementation of the FFU project, therefore helping to ensure they were consulted in the development of the project on an ongoing basis.

Transparency and honesty were two important ethical consideration in enabling research integrity (Yin, 2016). Yin (2016) explained research integrity as the research and the data truthfully representing the actual positions and statements of participants. Transparency is described in its rawest form as the truthful recording and managing of data, which is available to anyone to scrutinise to ensure that research is trustworthy and accurate (Yin, 2016). I recorded, transcribed, printed and filed all the data that was generated in the FFU project as part of the Raymond Mhlaba case study so that if need be, it can be referred to in the light of any incongruences or weaknesses discovered within the findings. It must be said that this data is not freely made available to the public so as to protect the anonymity of the research participants.

Honesty and transparency was also needed to keep the participants informed on what was happening in the FFU project. Through the WhatsApp group, the user participants were kept up to date with the working of the app, when it was not working and the predicted updates and application amendments that were made through out the FFU app trial. This WhatsApp group also provided a platform for me to discuss when project management meetings would be scheduled and ask for comments, questions and suggestions that the users might like to raise in meetings that they were not able to attend. The WhatsApp group also provided a place where feedback and progress in developments of the app and interventions could be communicated immediately with the participants. It was disclosed at the beginning of the FFU project that this was an application trial phase that would only last for 18 months; however this information needed to be relayed to the community on several occasions so as not to create false promises and miscommunication. Having said this, seeing the impact that the FFU project had on the participants involved and its untapped potential encouraged the management team to pursue a follow-up phase in the Raymond Mhlaba area to continue working with those involved in the phase one trial which is continuing to this day (mid-2019), with ongoing engagement with the project participants.

3.10. Limitations

There were several methodological limitations to the success of this project. Due to the project being a pilot project, there was not a mass rollout of the project and therefore only a small sample size was included in the research. The sample size was between 16 and 23 in the Raymond Mhlaba municipality, with 8 interviews of the key stakeholders. The participation within the project was also limited due to access to the required software. This meant that the research sample was limited. The resources needed to roll out the FFU app to a larger sample size in the time allocated would have also been difficult due to the lack of resources. Also, it was important not to expand the project too widely before the FFU app was fully developed.

This research is only based on one case study and therefore is only partially representative of one geographical area, Raymond Mhlaba municipality, specifically in Alice, Middeldrift and the surrounding small villages. Due to the small sample size and the limited geographical area of introduction, one cannot make generalised conclusions based on this nested case study.

The FFU project had a very short life span with the project being over 18 months, with the application only being trialled for around 7 months. This meant that through my M.Ed. research I could only detect the short to medium term value that might be enabled by the FFU app and FFU project.

Another methodological limitation of this project was that the scope of the greater FFU project was much larger than that of this master's research project. This made it difficult to fully capture the extent of the learning that occurred within the greater FFU project within this M.Ed. study. To remedy this I tried to keep the research question and sub-questions concise and the data generation tools well designed so that the data collected was specific to my M.Ed. research focus.

The final major limitation was that I was not a resident in the Raymond Mhlaba municipality and was residing in Grahamstown during the duration of the FFU project. This meant that I was not able to go out to the field as regularly as I would have liked and had to schedule as many interactions, meetings and interviews into short timeframes while visiting the field. Not being a local in the area also made it difficult to pinpoint potential stakeholders and pursue buying partners. This issue was addressed through employing one of the local farmers to act as a part time project assistant in the area for a small stipend of R1000 per month for three months. This farmer was paid a small stipend by the greater FFU project to provide assistance to registered users and to report any issues that surrounded its use.

These limitations influenced the rollout of the FFU project and progression of this M.Ed. study but were dealt with reflexively to ensure that the outcome and outputs of this M.Ed. study remained valid, credible and trustworthy

3.11. Conclusion

This chapter has explained the research design and orientation of this qualitative, nested case study, which uses a combination of data generation methods to collect both qualitative and descriptive quantitative data. The project was made of several interventions, which supported the introduction and use of the FFU app. The different interventions were observed and primary and secondary data was collected through a series of data generation methods including interviews, observations, and workshops, amongst others. The research process was reflexive and changed as the project evolved and new activities that showed important findings emerged. A timeline of major project events and data collection episodes has been briefly mentioned to show the progression of this study and the

greater project. This study forms part of the greater FFU project whose first phase was completed in July 2018. My positionality within the greater project was discussed, with emphasis as to how this affected this research. The benefit and need for the project was acknowledged and therefore the project team recognised that a second phase of the project would be beneficial to the community to realise latent potential. I discuss the important validity and ethical principles that lay at the foundation of this research to ensure that my research was trustworthy, as well as contributed to benefiting the community with whom I worked, instead of simply doing no harm. I ended this chapter with a description of the major limitations that hindered further development of this project. The following chapter presents the value creation stories, learnings and challenges that emerged as the project progressed.

CHAPTER FOUR: Discovering the Affordances of the Food for Us project and Mobile Application

4.1. Introduction

The food redistribution mobile application and networked social learning support systems (WhatsApp group, meetings, workshops and FFU project events) all played a role in enabling a diverse set of affordances that provided FFU app users (intermediaries, farmers and sellers), Raymond Mhlaba community members and FFU researcher, project partners and project managers an opportunity to develop value within the Raymond Mhlaba case study. This chapter starts by building the landscape in which the affordances were identified. I look at how the introduction of mobile phone applications within one's agribusiness was received in the Raymond Mhlaba community. The process of building the FFU app and the activities that added to the community's input into its development are reported. The alignment of the project with the Imvotho Bubomi Learning Network and the Amanzi for Food project and how this partnership resulted in creating a foundation in which affordances were imagined is considered. The bulk of this chapter describes the diverse set of affordances that were enabled by the FFU app and FFU project networked social learning support systems (workshops, meeting, WhatsApp discussion and app training). The enabling and inhibiting factors to the realisation of these affordances are also discussed in this chapter in preparation for a discussion on the value created as a result of these affordances in Chapter 5.

4.2. Understanding the FFU Application in the Eastern Cape Case study

4.2.1. Developing the greater Food for Us project in the Eastern Cape Food for Us Landscape of Practice

With reference to the Eastern Cape Food for Us landscape of practice, it is possible to see a number of different communities of practice who all play different roles within the Food for Us project including: (1) the researchers, (2) farmers (both small scale and commercial), (3) buyers (including retailers, restaurants, guesthouses and bakkie sellers), (4) the intermediary organisations, and (5) the varying institutions such as Fort Cox Agriculture and Forestry and Rhodes University who play an important part in the landscape. The Raymond Mhlaba case study landscape of practice includes a magnitude of different stakeholders all playing an important role in the local supply chain. The aim of the first phase of the Food for Us project was to facilitate the strengthening of a circular economy in the Raymond Mhlaba municipality by improving the relations and communication between the different communities of practice. It is at the cusps of these communities of practice that rich social learning occurred as individuals with differing ways of doing things interacted and negotiated shared issues of concern.

As explained in Chapter 1, the Food for Us app was developed after two extensive workshops, which were held in the Western Cape at the Sustainability Institute on 1 August 2017 and in Grahamstown, Eastern Cape on 3 August 2017. This study concentrates on the affordances that developed out of the Eastern Cape case study and therefore only focuses on the Eastern Cape process of application development and rollout as explained in Chapter 3. Approximately 60 people from a range of diverse sectors attended the introductory workshop held at the Education Department at Rhodes University, Grahamstown. The aim of FFU project (as explained in Chapter 1) as well as the planned process and interventions were explained to the workshop attendees followed by a lengthy discussion and brainstorming session around what stakeholders envisioned a mobile application could look like to achieve such objectives.

One of the important points of discussion to emerge from the introductory workshop was the concern that one needs to manage the perception of *food waste* and *food surplus* amongst the users and community in which the FFU project is to be introduced. A participant from one of the economic development organisations based in Alice believed that many people do not understand the notion of 'food surplus' and therefore the FFU project needs to manage and educate the community on the value that lies in food surplus (ECIWBF).

Following the introductory workshop, the app developers took the information collected from the Western Cape workshop and the Eastern Cape workshop and started to develop a mobile application that included some of the functions that were discussed within the workshops. The first version of the FFU app went live on Google store for Android devices on 30 August 2017 (see Appendix S with the project timeline for further details). The FFU app was then taken offline and was unavailable to download between 1-10 September 2017 for software developments and was migrated from the server on which it was developed to a more stable and secure server. The FFU app was then re-launched for download on 10 September 2017.

The app being made available and then unavailable for download caused confusion and difficulties

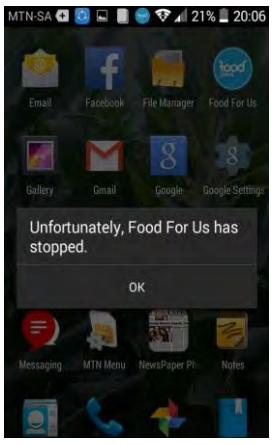


Figure 4-1: Error message displayed when the FFU app was not stable and crashed

during the Eastern Cape app training sessions, which were held on 7 September 2017 in Grahamstown and Alice. The Grahamstown app training attracted 10 users who went through the FFU app together. A second app training was held in Alice for potential users and important stakeholders. Unfortunately the FFU app was not stable to show the users and the app developer broker, who was leading the training, had to use a series of screenshots to acquaint the users with the FFU app interface. Even though the FFU app was not fully functional and stable, the Eastern Cape FFU team tried to raise awareness and create enthusiasm around the application through launching the FFU app at the Alice Market Day. This day, hosted by the Raymond Mhlaba Farmers Association (RAYMAF)[18], took place on 3 October 2017. The FFU team received continued confusion and questions from the FFU trial users, specifically the enthusiastic youth co-operative, on why the FFU app kept 'crashing' and displaying error messages as shown in Figure 4-1.

The FFU app was not stable for several weeks after the training and Alice Farmers Market. This caused some frustrations and loss of confidence as described by Mike Ward, the application trial project manager: "reliability and stability of the app itself, that was a huge hindering factor … it frustrates the people who are trying to use it and undermines our confidence to put it out there and take it forward" (VCIPM1.40).

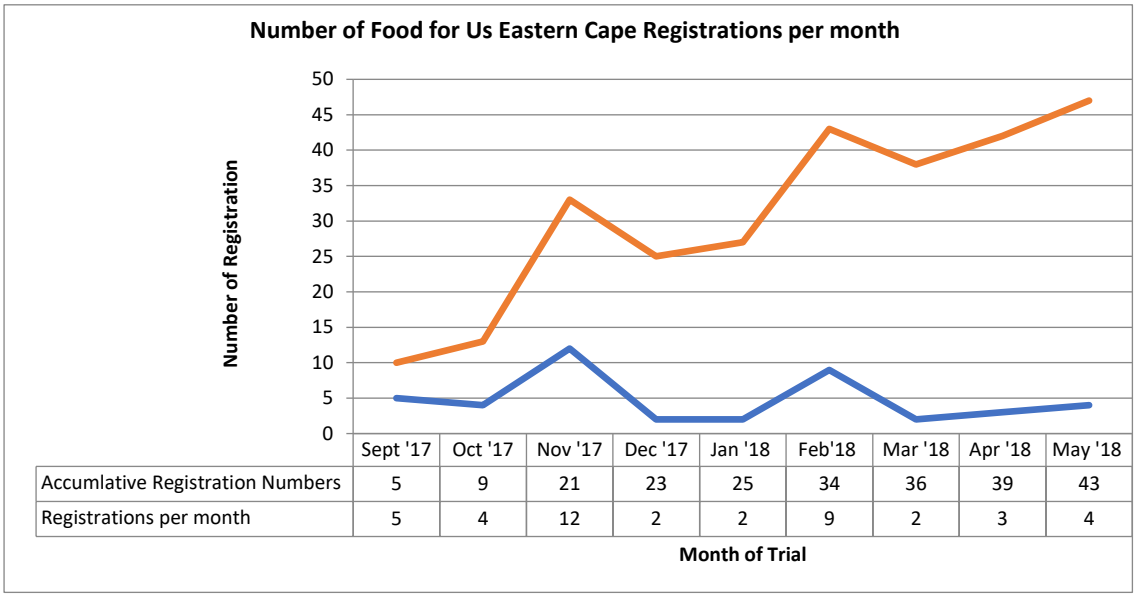
As one of the remedies to the instability of the FFU app, as well as to provide a platform for social and technical support, I created a WhatsApp group for all the FFU app users. This WhatsApp group also included the FFU project managers and the FFU application developers. The group was started on the 17 October 2017 to discuss the challenges being experienced by interested stakeholders and FFU app trial users. The WhatsApp group also provided a platform to potentially grow the Food for Us network. The introduction message on the group was:

> Good Morning All, I have developed this WhatsApp Group to create a support network to help those who have agreed to be part of the mobile application trial. We hope that you have been able to download the application and are slowly starting to be able to use it in your daily activities. Please let me know if there is anyone else you would like to add to this group who is interested in being part of this exciting project. (FFUWD.8)

The WhatsApp group grew to include up to 60 participants (April 2018) of the project (18 months in duration). The WhatsApp group was used to ask questions about the FFU app, as well as to discuss available produce and trade produce amongst themselves, outside of the FFU app. The role of this networked support platform (the WhatsApp group) was to provide space for effective social learning, which will be discussed further in section 4.3.2.1 of this chapter.

[18] RAYMAF was a farmers' association that brought a number of farmers in the Raymond Mhlaba municipality together to organise collaborative events such as market days and information days. Unfortunately RAYMAF was dissolved in early 2018 due to a number of internal issues (MMWR1.79).

There were improvements in the stability of the FFU app which occurred between October and early November 2017 before the first Amanzi For Food Training of Trainers course[19] which was held on 2 and 3 November 2017.



	Sept '17	Oct '17	Nov '17	Dec '17	Jan '18	Feb'18	Mar '18	Apr '18	May '18
Accumlative Registration Numbers	5	9	21	23	25	34	36	39	43
Registrations per month	5	4	12	2	2	9	2	3	4

Figure 4-2: Graph showing the increase of FFU app registrations over time (FFUAS)

As can be seen in Figure 4-2 on the previous page, the registration per month (the blue line) had two notable spikes, the first in November 2017 (12), and the second in February 2018 (9). The November spike correlates with the Amanzi for Food's first Training of Trainers Course, where I facilitated an introductory workshop and training around the FFU app. Many of the people in the FFU app workshop (as part of the Amanzi for Food ToT) registered at this time, which may be the reason of the extensive spike in registrations. The second spike in registration was in February 2018 which correlated with the second Amanzi For Food Training of Trainers meeting on 8 and 9 February 2018. The graph also shows that in February 2018 there were particularly high levels of activity on the WhatsApp group in terms of number of messages circulating within the group as presented in Figure 4-3 below.

[19] During the same time the FFU app was being trialled in the Raymond Mhlaba area, Amanzi for Food was running three Training of Trainers courses at Fort Cox Agriculture and Forestry college. The TOTs aimed to train a diverse group of people on how to become trainers of rainwater harvesting practices, therefore developing participants' skill sets.

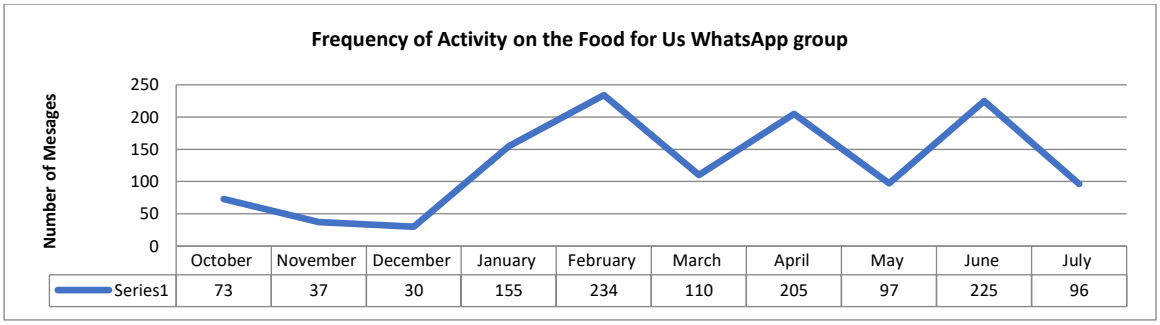


Figure 4-3: Graph showing the frequency of activity on the WhatsApp Group (FFUWD)

It was also during February there were a number of research interviews and baseline surveys conducted amongst the potential users and existing users (for full view of the timeline of activities see Appendix S).

Following the second Amanzi For Food Training of Trainer course, the #MatchMaking event took place on 23 April 2018 in Alice. The Food For Us team (Distinguished Professor Heila Lotz-Sisitka, Dr Tichaona Pesanayi and I) co-hosted the #MatchMaking event with the Raymond Mhlaba Development Agency (RMDA). The #Matchmaking event aimed to bring consumers of produce (including retailers, local restaurants and businesses) and farmers together in one place to discuss the need to develop a local supply chain supportive of local producers and cognisant of the challenges of the local consumers. This #MatchMaking event aimed to create a space for networks between buyers and sellers of produce and where challenges of the local supply chain can be discussed and a solution collaboratively co-designed. This #MatchMaking event also created an opportunity to encourage the use of the FFU app as a tool to re-connect the local supply chain (MMWR1). The excitement and enthusiasm surrounding the #MatchMaking event might have led to a spike in the activity on the FFU WhatsApp group as seen in Figure 4-3 as well as the increase in produce uploads shown in Figure 4-4, discussed in more detail later in this chapter.

The final Amanzi For Food Training of Trainers course was held on 2 and 3 May 2018 and provided a last opportunity for feedback from the TOT participants on their thoughts regarding the FFU app and their suggestions on how to improve it.

Shortly after the final Amanzi For Food Training of Trainers Course, a second version of the FFU app was released for users to experiment with, based on the feedback that was reported to the app developers through messages circulated on the WhatsApp group and through informal discussions between the FFU app users and the FFU team. On 24 May 2018 the second version of the app was made available for users to re-download and experiment with. This version of the FFU app introduced a number of different functions such as (1) a chat function, (2) an alert function, and (3) a function that saves and 'remembers' the user's credentials to reduce the inconvenience of re-entering email

addresses and passwords every time one logs into the app. Many of the users commented they preferred the second version of the FFU app due to the new features: “after the second version of the application it was much easier as the application improved dramatically and it became slightly easier” (IFSA2).

The final FFU structured interview surveys were conducted between 11-22 June 2018 as a concluding activity to gain final insights from all the trial users on their experiences of the FFU app trial and FFU project.

The concluding activity of the first phase of the Food for Us project in the Raymond Mhlaba case study was the final dissemination meeting, held in Stellenbosch at the Sustainability Institute. Mr Passmore Dongi, the logistic manager of the RMDA and a collaborative partner in implementing the project in the Raymond Mhlaba community, joined myself and the other FFU project team members to give feedback on the learnings from our interaction with the FFU project and the FFU application in the field (see Appendix U for report notes from the Food for Us Dissemination event).

In the sections to follow I give a more detailed description of the activities and interactions that have been briefly mentioned above and how these activities and events resulted in the enablement of a set of affordances.

4.2.2. Understanding the Raymond Mhlaba Food System

There are a number of urbanised centres in the Raymond Mhlaba municipality; these include Alice, Fort Beaufort and Seymour. All these urbanised centres have a large chain store, such as SPAR, as well as a collection of smaller fresh produce stores (such as Fruit and Veg in Alice). Many of these stores buy their produce from bulk pack houses or major fresh produce markets, which are based in either King Williams Town, East London or Port Elizabeth (BSCR). The caterers and other small business owners (such as the bakkie sellers) also explained that they buy from bulk sellers rather than local farmers to save on costs as produce could be bought cheaper from the large commercial entities (BSCR). The farmers that formed part of the FFU project explained that most of their produce was sold to their neighbours or to people who pass by their farms, as there was no sustained demand from the formal markets in the urban centres (BSCR).

There is currently a large amount of work being done by the RMDA to connect the local farmers with large retailers. Over the duration of the FFU project there were several instances where the RMDA facilitated bulk buying of spinach and cabbage from small-scale farmers.

4.2.3. Presence and Understanding of Food Waste amongst Trial Participants

Food surplus and resulting resource waste was discussed as part of the introduction of the Food for Us project in all the meetings, interviews and events. In the baseline structured interview survey the trial participants were asked what *food waste* meant to them and to explain some examples of *food waste* in their communities. The descriptions of food waste were diverse and explained different elements of *food waste*, which were recognised by the buyers, sellers and intermediary users. Several of the buyer's shared a common understanding that waste was as a result of consumers buying too much produce and keeping it till the point of rot, or there not being enough buyers to buy the available produce (BSCR.B). One of the buyer respondents explained that *food waste* correlated to the distance that produce travelled: "When you buy from far and when the produce arrives the food is no longer fresh and has gone through several hands before it arrives at the buyer. This results in food waste. The produce is no longer fresh." (BSCR.B.C3).

A number of definitions of food waste included a definition that explained that food waste was due to lack of demand for produce from local small-scale farms and therefore fresh produce subsequently going to waste. This was described as a demand supply issue. As a farmer explained, "Food waste is the food that is not available for people to use and ends up in the field. This food is considered a loss to the business of the farm. This is often as a result of not enough access to big enough markets." (BSCR.F.C3). There were a number of comments about needing to manage the supply and demand of produce more holistically. Interestingly, amongst the farmer FFU app users a number explained that the challenge leading to *food waste* was that there was not enough agro-processing occurring in the local supply chain. One farmer explained that "Food waste means that there has been a lack of processing the produce. Secondary food production stops the rotting of food." (BSCR.F.C3).

When asked to give examples of food waste in the interviewee's communities, the buyers spoke mainly about the food waste that occurs at the consumer level of the supply chain where food waste occurred at guest houses, restaurants and after functions such as funerals or weddings. One of the buyers explained that food waste occurs from over-spending when there is not the infrastructure to keep such food fresh (BSCR.B.C4). One of the intermediary users explained: "people don't really waste food. It is the retailers that waste food as they keep the food for too long and don't bring down the prices to sell it"(BSCR.I.C4). This data shows that people recognise the occurrence of food waste at different levels of the local supply chain, with diverse causes.

The farmers explained food waste that often occurred in their fields due to either weather or climatic conditions (hail, heavy rains or drought) or produce oversupply. Amongst the farmers, instances of cabbages being left in the field due to lack of markets were given as examples of food waste by four of the 13 interviewees (BSCR.F.C4). One of the farmers also explained that food waste happens "if

there are bad tactics of running a farm, if a farm is well managed then there is no spoilage" (BSCR.F.C4).

According to Bagherzadeh et al. (2014), the main cause for *food loss* in developing, low income countries is due to insufficient farmer training, lack of technology and infrastructure, and weak marketing systems. It is the lack of technology, infrastructure and weak marketing systems that appear to be key reasons for food wastage within the Raymond Mhlaba municipality.

4.2.4. Understanding Mobile Phone Usage amongst FFU Project Members in the Raymond Mhlaba Municipality

As discussed in Chapter 1, section 1.4, the Raymond Mhlaba local municipality socio-economic review and outlook (2017) stated that the infiltration of mobile phones in the Raymond Mhlaba municipality is relatively high; however, a number of important contextual aspects arose when this was probed with the community through various data generation methods. In some cases, it appeared that Internet enabled phones had not infiltrated into as many of the households in the Raymond Mhlaba case study area as was initially thought. One of the issues linked to involving the hawker[20]community of practice in the project was that this group of entrepreneurs, on average, did not have access to mobile devices compatible with the FFU app which required Internet enabled smartphones. The hawkers were interested in the concept of the FFU project but were discouraged from direct activity due to their lack of compatible technology (FFS.C5).

One of the active FFU app users and WhatsApp group members was asked to advertise produce, specifically livestock, on a neighbour's behalf due to the neighbour not being able to download the FFU app or communicate over FFU WhatsApp group without an Internet enabled phone. The community member who wished to advertise produce contacted an active FFU app user via her sister's phone after hearing about the Food for Us initiative (FFUWD.86). This culture of phone sharing between households, specifically family, was experienced as a common element of the mobile phone use culture in the case study community.

Not only was the absence of a compatible device a hindering factor to the introduction of the FFU app to communities, many of the TOT course participants who wished to download and register were not able to download the FFU app due to their mobile phones having no memory. Many of the participants' phone memory storage was full of photographs and other applications as explained by

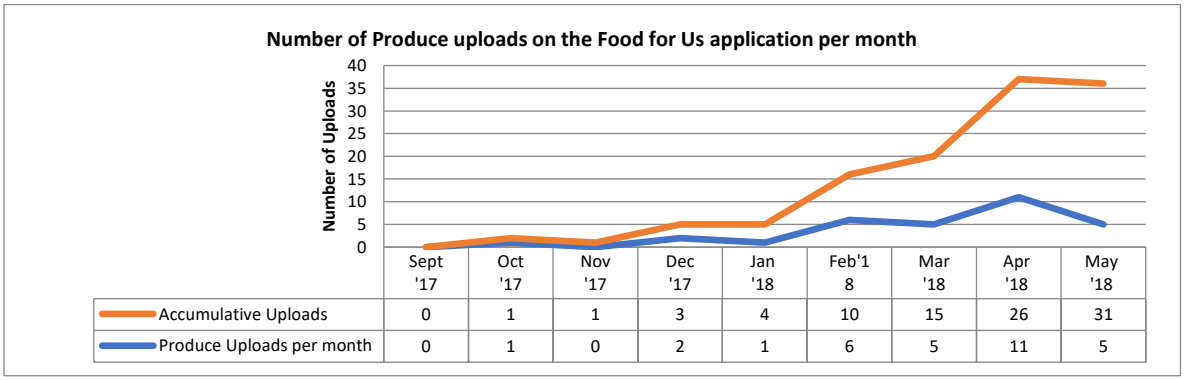
[20] Hawkers are the groups of informal produce traders that often sell produce on pavements or roadsides. The informal traders often buy their produce in bulk from large pack houses where they can get large amounts of produce for the least cost.

one of intermediary users who was interviewed: “these people normally take a lot of pictures. So we find that our phones don’t have enough space to actually download the system” (VCII3. 100).

According to the baseline structured interview survey data, it was possible to see that many of the users in the FFU app trial (2 of 4 intermediaries; 5 of 6 buyers and 8 of 13 farmers) were between the age of 25 and 44 (BSCR). This meant that the sample was characterised by young application users who were confident with mobile technology (BSCR). In an interview with one of the youth farmers, neither myself as interviewer or the interviewee were able to define a term used in one of the questions of the structured interview survey. The interviewee immediately used her mobile phone to ‘Google’ the answer; phones are seen as tools to seek information (FFUMAU65). There was, however, also a large degree of enthusiasm from older farmers who were willing and eager to trial the FFU app: “It’s quite fascinating Sarah, let alone the fact that we were born before technology so sometimes we get stuck with technology but I think when we get used to the app, it will be helping us a lot” (TOTW2O).

4.2.5. Culture of Use developed around the FFU Application

As can be seen in Figure 4-2 in section 4.2.1, the registration rate was quite low until the FFU app started to gain momentum in November 2017. As described above there were two spikes in registration in November 2017 and February 2018. These registration numbers precede the spikes that are observed in the upload of produce on the FFU app that can be viewed in Figure 4-4 on the following page. Figure 4-4 shows the number of product uploads between October 2017 (when the FFU app became available to download on Google play store) and the end of May 2018 when the FFU app trial officially ended. The orange line displays the accumulative number of produce uploads on the FFU app that were made during the duration of the trial. From the graph, it can be seen that the most uploads occurred in the last four months of the trial (6 in February, 5 in March, 11 in April and 5 in May).



	Sept '17	Oct '17	Nov '17	Dec '17	Jan '18	Feb'18	Mar '18	Apr '18	May '18
Accumulative Uploads	0	1	1	3	4	10	15	26	31
Produce Uploads per month	0	1	0	2	1	6	5	11	5

Figure 4-4: Graph showing the number of product uploads on the FFU app during the trial

The correlation between the high numbers of uploads in April (11 uploads) and the high level of activity noted in the WhatsApp group can be seen in Figure 4-3 where over 200 messages were circulated between the group members (FFUWD). The high number of uploads in April also corresponds with the #MatchMaking event, described above in section 4.2.1. which stimulated considerable interest in the FFU app and encouraged discussion on the WhatsApp group. We can see from this graph that uploads seemed to increase as the project gained momentum, though a drop off in May was evident. This could be because the number of transactions that occurred through the app was very low throughout the app trial (only one transaction in the Eastern Cape over the application throughout the 18 month project). One of the farmers explained that "We seem to be stuck in a place at the moment with just farmers posting and not new buyers coming onto the application and using the application" (FFS.C5). This lack of buyer involvement became a major concern to the furthering of the FFU app with much of the final feedback reporting on the need for more buying entities.

At the end of the FFU app trial, the total number of registrations was 43 in the Raymond Mhlaba municipality. Not all these users remained engaged and not all their activities were tracked nor feedback requested as part of the FFU app trial as explained in Chapter 3 in the FFU greater project methodology. As can be seen from Figure 4-5 that follows, there is more than double the number of farmers registered on the FFU app than buyers. Not only were there fewer buyers who took part in the FFU app trial, the buyers were not as active on the FFU app or as active in the WhatsApp group. This lack of buyer interaction within the Food for Us app can be seen in the number of log-ins made by the buyer group as displayed in Figure 4-6 below.

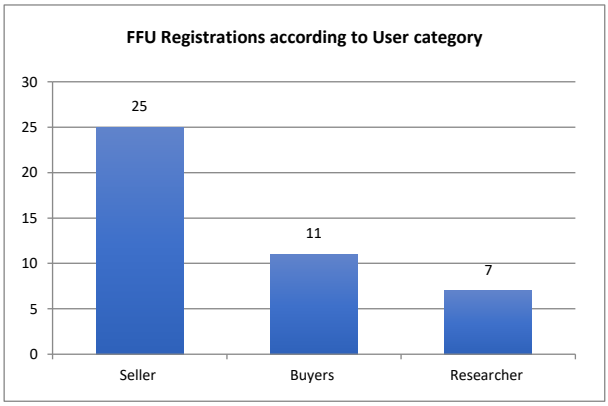


Figure 4-5: Graph showing the distribution registration between buyers, sellers and researchers (FFUAS)

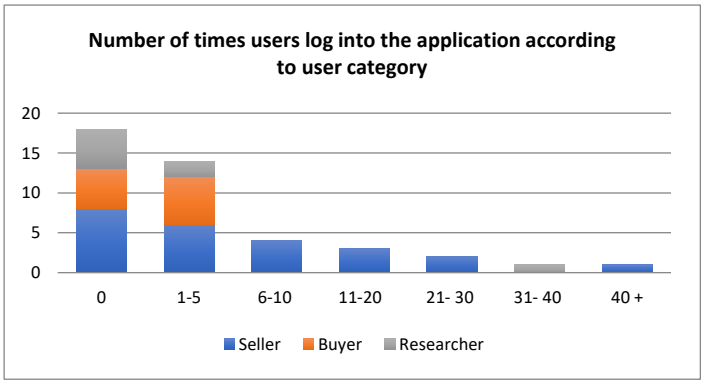


Figure 4-6: Bar graph showing the number of times a user logs into application according to category of user (FFUAS)

In Figure 4-6 the buyer group is indicated in orange while the seller group is blue, with the researchers in grey. As can be seen, the buyers only logged into the app between 0-5 times over the duration of the FFU project, with only six of the registered buyers (not all of whom were interviewed or tracked in the trial) out of the possible 11 logging onto the app at all. The seller (or farmer) users had a much higher number of accumulative log-ins with six sellers logging-in between 1-5 times over the course of the trial and nine sellers logging in between 6-30 times, with one seller logging onto the app over 40 times. There seemed to be a much higher uptake in the use of the FFU app in the trial period amongst sellers of produce rather than buyers of produce, indicating an interest in a market transformation mechanism for producers to reach consumers. The researcher column indicated in Figure 4-5 and Figure 4-6 were important for this research as the researchers included project managers, app developers and members of the FFU team who were interviewed on their understanding and experience of the application.

Use of the FFU app displayed some interesting insight into the local market of Raymond Mhlaba community. The aim of the FFU app trial was to allow the users to interact and work with the application in whichever way they felt useful. The FFU app was initially meant to be a virtual trading platform where surplus fresh produce (vegetables and fruit) would be traded, however this evolved as the FFU project progressed. On a number of occasions, the users were reminded that the application was only being used to trade fresh produce and not meat and livestock (FFUWD94). The users questioned the trading of purely fruit and vegetables on a number of occasions. The reason for not growing the FFU app to include livestock, from the FFU project management side, was due to (1) the original aim of the FFU app to be saving surplus fresh produce, and (2) due to the legislation and health risks that surrounded the trading of meat and livestock (FFUWD 288). The kind of produce that was traded on the application was expanded with the introduction of honey, which was announced on the FFU WhatsApp group in May 2017 (FFUWD28). The introduction of the honey as a product brought much discussion around the need to allow for the trading of livestock and meat products.

> Occasionally honey and why is that Sarah? The last time I checked the app was for the veggies and fruits only. We have a fraction of honey farmers in the RAYMAF but a magnitude of poultry and livestock farmers. We don't even have the commodity association of honey. I appeal that the honey be replaced with the poultry/livestock section. (FFUWD 286)

This suggestion was acknowledged and the barrier of legislation around the trading of meat and livestock was brought up as a challenge, which would need to be explored (FFUWD 288-290). In June 2018 a post was uploaded under the vegetable category of asparagus, however the photograph and the description implied that the seller was trying to sell cockerels (FFUWD 346). A screenshot of the post can be seen in Figure 4-7 below. The description read "Roosters quality for breeding"(FFUS) and could be purchased in Alice before 31 August.

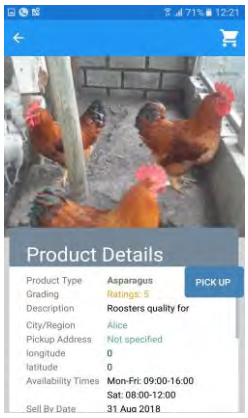


Figure 4-7: Screenshot showing the asparagus post created by a farmer to sell roosters

After much discussion, it was decided to make a category for livestock provided the livestock was being sold live. A livestock category was added to the FFU app to accommodate the uploading of livestock on the application. There was an influx of posts advertising livestock including laying chickens, geese and goats. After the conclusion of the trial at the end of May 2018 it was discovered that 7 uploads out of a total of 31 uploads over the duration of the FFU project were categorised as livestock as seen in Figure 4-8.

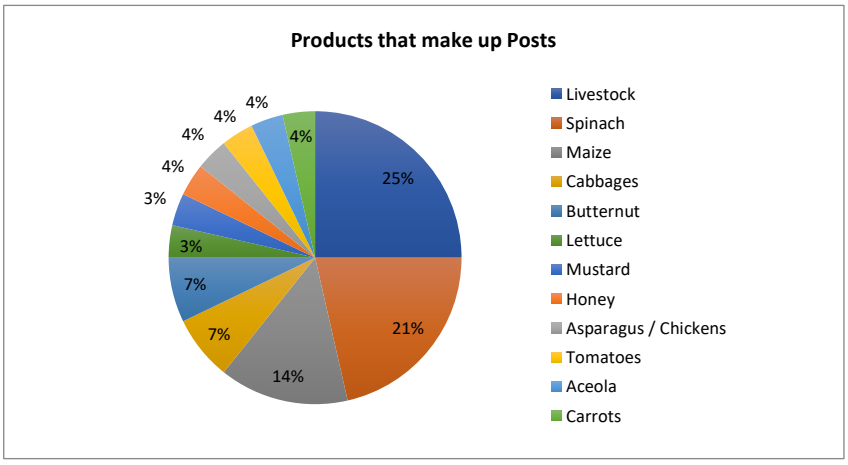


Figure 4-8: Pie chart showing percentage distribution of uploads within set categories(FFUAS)

After looking at the distribution of uploads, it is possible to see that there were definitely more uploads for livestock than had been anticipated, which suggests that the farmers in the area not only struggle to find markets for the fresh produce, but equally struggle to find markets for the high numbers of livestock available for sale, with livestock and crops making up the farming practices in the area.

Of these 28 uploads, only one transaction was made on the FFU app. However, in the final survey, a number of the trial participants claimed to have made a number new sales thanks to the FFU project through the WhatsApp group or other means of communication. It emerged that a number of users saw advertised produce on the FFU app and then used various other channels (such as WhatsApp and mobile calls) to secure the transaction. One of the intermediary users explained that he "did not complete a purchase on the application and instead completed a purchase through other mediums such as through phone calls and WhatsApp conversations. I sold chickens to Mhlobo after he saw my advert to the application" (IFS.A2). This sentiment was shared by most of the users who completed the final survey. A farmer explained that it was more convenient to communicate outside of the application:

> I made a purchase but this was not through the application, it was outside the application. I also made a 'transaction' through the application but there was no response. I knew the person so it was much easier to give the person a call and then speak through the call rather than through the application. If I did not know the person maybe I would have then gone through the application because I do not have access to the contact details. (FFS.A8)

This therefore portrays a use of the FFU app for advertising and sourcing produce in the local context, but not particularly for communicating and transactions.

These application-use characteristics that developed in the Raymond Mhlaba community are important to understand when understanding how the affordances enabled by the FFU app were used by the Raymond Mhlaba trial participants. Understanding how the affordances were used can provide insight into the type of value that was created.

4.3. Affordances Emerging from the Food for Us Application and Greater Food for Us project

As explained in Chapter 2 (section 2.3.2), this study is based on Majchrzak and Markus's (2012) definition of 'technological affordances' as "an action potential, that is, to what an individual or organization with a particular purpose can do with a technology or information system"(p. 1). Here I explore the action potential that was enabled through certain physical features of (1) the FFU mobile

app and (2) the FFU projects' networked social learning support systems. I have divided the affordances into potential/ perceived affordances and realised affordances.

4.3.1. Affordances of the Use of the Food for Us Application

As described in section 4.2.1, the first version of the FFU app was developed according to the feedback from the two introductory workshops in Grahamstown, Eastern Cape and Stellenbosch, Western Cape. There were many discussions and suggested features given to the app developers, however due to budget constraints and the objective to keep the application as simple as possible, the features included in the first version of the application did not include all the features suggested by participants. The physical features, potential, perceived and realised affordances have been summarised in Table 4-1 that follows.

4.3.1.1. Physical Features

The physical features of the FFU app include the software features designed by the application developers to allow for certain activities. Some of these features existed but were not used at all, such as the donations function, or notification alert. Both functions were included in the second version of the application, which became available in May 2018. I report on the physical features of the FFU app that enabled certain affordances (both potential and realised).

Physical features for both consumers and sellers

The physical features of the FFU app available for all users (consumers, sellers, intermediaries and researchers) included a number of features around the downloading, registration and ability for users to switch between interests (buying or selling produce). The Food for Us app is available on Google Play store for Android devices and on the Apple store for iPhone users. The application only became available to iPhone users later in the app development process on 8 December 2017. This was due to the fact that the Apple application store demanded a more rigorous testing of the FFU app than the Google play store

.

Table 4-1: Physical features of application and potential and realised affordances (discussed in more detail below)

Physical features	Potential / Perceived Affordances	Realised Affordances
Downloaded from **Google Play store and Apple store**. Register with a **Google email Account**, Name, Surname, ID number **Email communication** platform connected to the app. **App generated Password,** new one can be requested and set by the user if lost The application has **three different home screens according to users interest** (V2) The application **remembers users credentials** **Virtual online market** - uploaded produce made visible on buyers interface **Internet enabled** app **&** Requires **mobile network and data** to access the Internet **Minimal Data** is required to access the application. The users are able to **switch accounts** from viewing the buyer interface to viewing the seller interface and vice versa Able to **see the history of their transactions** and upload A**utomatic quantity counter** that reduces available quantity when produced purchased through the application The users are able to **view a 'public wall'** where miscellaneous information, adverts, event information or recipes are displayed A **Donation function** has been created to create an option for trade between NGO and civil society and large farmers with surplus. **Multiple different log-ins** on one device Labels and buttons in **English** (V2) **Icons and pictures** to assist in use	Secure log-in through individualised password Opening of market: -Way for buyers and intermediaries to source local produce -Way for farmers to find more buyers for their produce Bring local farmers into the local supply chain to produce for local retailers. - Tool to assist intermediaries who can assist farmers without appropriate technology to still be present on the application - Create new linkages in the local supply chain. - Build a community around a stronger supply chain - Increased communication between local supply chains. Improve logistics of the local trade – Transport / packaging - Geographical display of produce to reduce distance driven - Managing and recording of data about the farmers' produce – create records - Improve immediacy of the supply chain - Price Comparison Tool for buyers - Produce become more economically priced The app can develop and share market information on what is available at what price and what is demanded Improve quality of the produce Reduce on farm food surplus and wasted resources (water, seed, fertiliser, fuel etc.)	Increased interaction with technological innovations, specifically mobile applications and email. - Ease of use of the application for some users - Ease of registration and logging in Use of technology to market produce and search for local produce. - -Increase advertising audience for farmers - Buyers able to discover new local producers. Buyers are able to be sellers and sellers are able to be buyers therefore allowing for trading to occur between any users The information required for selling the products was simplified for the farmer Standardised information needed for marketing Share of information amongst buyers and sellers - Farmers able to see what other people are selling Encourage improved quality of produce Relationships built around a common interest Development of a database Excitement and enthusiasm created around the application and the potential effects it could have Positive reputation developed for the organisations that partnered with the team
Save produce that they are interested in to be looked at later stage to purchase. Buyers **select the quantity** (assumed to be kgs) of produce to **add to cart**. **More than one product** can be placed in the cart. In cart interface the **buy button** is pressed **to express interest** in the produce (V2) Buyers are able to **set alerts** that will notify them when a selected category of produce is uploaded onto the application. (V2) Users are able to **start a chat** with the seller in the produce advert		
The **user uploads a product** to the virtual market for immediate purchase The farmer can set their **location** /pick-up point by **using the phone's GPS co-ordinates** A **photograph can be captured** through the app or **uploaded** to the product advert. A produce category is required from an **existing list** **Produce is rated** (between 1 and 5) by the farmer A **description** is required by the farmers of the produce **Nearest town and available times, packaging type, sell by date selling price and payment method** is specified **Available times** according to day of the week and time A **pick-up point** is requested which can be either the **default location** of the farmer when registered or a **new current location** (all displayed to the buyer as co-ordinates) **Quantity available** recorded in Kgs only		
Successful registration once **administrator approves** Administrators have **access to the backend** which creates a record of the entire set of log ins, uploads, interactions and user information Only the administrator **can add to the public wall**. Can send **bulk messages** to all users or a select group		

All users and potential users were able to register on the application by filling in (1) their name, (2) surname, (3) email address, (4) mobile number, (5) interest (consumer/ seller), (6) distance willing to travel, (7) allow GPS co-ordinates to be used as well as enter (7) an ID number. The need to include one's ID number created some problems as some of the participants did not have ID books and therefore in the second version of the FFU app, which became available in May 2018, this feature was removed.

All the labels and instructions on the FFU app and in the emails sent to the users, were in English. The application's primary tool to communicate with users was email, using the email address provided during registration. Once a new user completed the registration form, the application auto-generated an email notifying the users that the registration would need to be approved by an administrator before the application could be used (VCIAD1). The email platform was used to not only communicate receipt of registration, but also to share the application generated password, interest in produce, and completion of transaction. This meant that all users also needed to be frequent email users in order to use the application effectively.

Users are able to request a new password if they lose or forget their passwords and furthermore are able to create their own passwords. The resetting of the password is confirmed through an email sent to the email that the user registered with.

Once the administrator on the backend of the FFU app has approved a newly registered user, the user is able to log into the FFU app with the email that they registered with and the email that was sent to them in their approval email. The opening page that the FFU app is dependent on the interest group which was registered initially. A buyer will be directed to the virtual marketplace that is displayed in Figure 4-9a, while the seller will be directed to a list of their uploaded posts shown in Figure 4-9b (in this case the seller has not made any post to advertise produce).

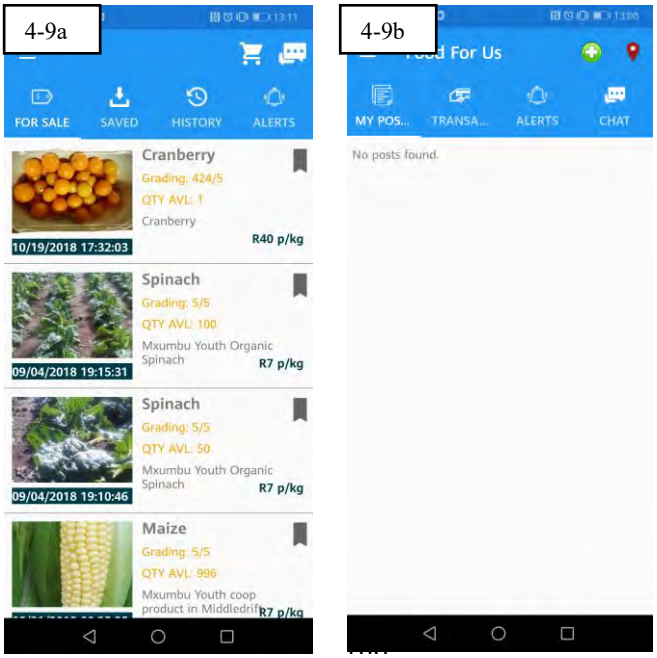


Figure 4-9: Screenshots of the FFU app home page for users when they log into the app.

Initially the user had to enter their credentials (email and password) into the login screen every time that they wanted to log into the FFU application. This changed with the second version of the FFU app after which the application automatically recalls the credentials and only requires the user to press the “log in” button.

Another important feature that is available to both the buyers and the seller users is the ability to switch accounts once in the FFU app. A buyer can switch interests to become a seller of produce and upload products while a seller can switch to express interest and see what is available on the virtual market (FFUWD; TOTW20; VCIAD1).

All users, both the sellers and the buyers, are able to see the history of their uploads and transactions as a seller of produce, or their transactions and interest in produce as a buyer. This history allows users to keep track of their previous actions. As the FFU app developer explained, “it shows you the history of your transactions, the people who you have been dealing with. That you bought products from and also every interaction that you have been having with that person. So that is the history part” (VCIAD1.97).

One of the features that was not used at all during the FFU app trial and had potential to be beneficial to the community was the public wall where both sellers and consumers of produce could view miscellaneous items added to the wall. The administrator, and not the users, could upload content to this wall. The users were encouraged to send the administrators information for posting on the virtual wall, but this was not done regularly. The public wall was described on the WhatsApp group as a feature where “events, recipes, or any other important pieces of information can be posted for the users of the application to see” (FFUWD).

The FFU application is able to allow a number of different users to log onto the application on the same device. The application is Internet-based and therefore stores individuals’ data on the backend server of the FFU app and not on the mobile phone, therefore being able to recall individuals data based on the login credentials. Due to the online nature of the application, the application requires a working Internet connection and available mobile data to work. (MMWR1)

Physical features available to consumers

The physical features that are specifically available to consumers include the consumer being able to find out more about any particular product by clicking on the product to determine the specifics of the advert including (1) the grading, (2) the description, (3) a large picture of the produce, (4) the closest town, (5) specific co-ordinates of pick-up point, (6) available times for pick-up, (7) the type of packaging, (8) the type of road that needs to be travelled, and the (9) the preferred payment method.

The consumers can also see the quantity of the advertised produce being sold (per kilogram) as well as the price per kilogram (kg).

The consumer can select the quantity (in kgs) that they are interested to buy, select the 'add to cart' button (a description of the workings of the application was given in Chapter 1, section 1.3.1). The consumer is able to select more than one product from different producers to be added to the cart at any one time. Once the consumer is finished browsing the available produce on the virtual market page, the consumer can select the button on the top right and be directed to the cart with the selected produce. If the consumer selects the 'buy' button, an email is sent to the sellers to notify them of interest in a product.

In the second version of the FFU app there were two new features for buyers: (1) the alert notification features and (2) the chat with the producer function. The aim of the first was to notify users registered as buyers of when produce was available that matched their specified interest. The alert notification needs to be set by the buyer in the menu bar. The buyer selects produce (up to three) they would like to be notified about, choosing three at a time, and he or she will be notified when this becomes available (VCIAD1). This function was made available in May 2018 and was not used extensively by the users.

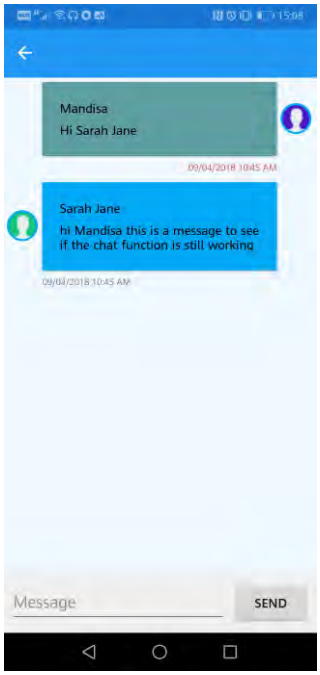


Figure 4-10: Screenshot of chat function available to buyers on second version of FFU app

The chat function was marginally more successful, but was also not used as widely as anticipated. The chat function created a key at the top of the screen which enabled the buyer to send a direct message through the application to the seller of the produce as can be seen in Figure 4-10 where I sent one of the farmers a test message. This function has not been used extensively with many of the users

claiming they used other channels to communicate interest in the produce because they already had personal connections with the farmer (FFS).

Physical features available to seller

The main feature for sellers (in this case study, mainly farmers) was being able to upload an advertisement for their produce onto the FFU platform. The seller is able to set a default location, with the FFU app gaining access to the users' live co-ordinates. This location can be manually changed for different pick-up points for collection by buyers. When the farmers want to add a product they open up an online information form, which needs to be completed for the produce to be added onto the virtual market wall. The information that is required from the farmer can be seen in Table 4-2 below.

Table 4-2: Information required from farmers to create a post

• A photograph of the produce, which can either be uploaded from the phone gallery, or be taken through the application's camera function
• A produce category needs to be selected from an existing list
• The produce needs to be rated by the seller with a grading of 1 – 5
• A more detailed description of the produce
• The nearest town
• A pick-up point (default location which is the co-ordinates of where the user was when registering, or a new location based on updated co-ordinates of current location)
• The available times for trading (day and time)
• The packaging type made available by the seller (self-harvest, plastic bag, no packaging etc.)
• The quantity of the product made available (in kgs)
• The selling price of the produce (per kgs)
• The payment method

Once the form is completed, the advert is immediately visible to all potential buyers and interest in the product can be communicated immediately. The application does not have a feature that allows the farmer to manually enter in an amount that has been sold outside of the application; therefore if all of the produce has been sold outside of the application, the seller has to delete the post.

Physical features available to the administrator

The physical features that are available to the administrator are relatively few and are features that are involved in the management of the application. The administrator is able to approve users and reject users based on the information filled in on the registration form. In this trial the administrators agreed to only approve registration of users who were in the case study area and who were known to the existing networks. As the FFU app developer explained:

> You will open the backend and the counsel and check who is the new guy, then he will have to read a description of what you say, if you qualify according to policy, if he is happy, he will activate you. (VCIAD1.93)

The approval by an administrator was specifically requested to ensure safety of the trial participants.

The administrators have access to the backend of the FFU app where they are able to see all the data that has been recorded by the case system that exists behind the application. All of the users' details and their interactions within the FFU app are recorded on the backend for the administrator to ensure good management of the FFU app. As explained in Chapter 3, working with application meta-data (such as that recorded on the backend of the FFU app) from online social spaces has opened up new ethical concerns. The research participants were asked to give consent for their personal data to be used for the FFU research. The personal data of the users was not made available to the general public and user anonymity was promised within the FFU project.

The public wall was explained briefly above, however one defining component of the public wall was that only administrators were able to put content on the wall. During the duration of the FFU app trial, only two things were added to the wall – a recipe and information for a local market day.

In the second version of the FFU app, the administrator was able to draft and send bulk messages to all the application users through notification messages that existed on the FFU app. This enabled administrators to interact directly with the FFU app users instead of going through other communications streams such as WhatsApp. This feature has also been underutilised since its introduction in May 2018.

These physical features make up the tools to allow for potential affordances and realised affordances that developed into fruition in the use of the Food for Us app during the trial.

4.3.1.2. Potential and Perceived Affordances

The potential affordances are understood in this study as the potential actions that could arise from the presence of the physical features of the application (which were described in 4.3.1.1). The perceived affordances are the affordances that stakeholders anticipated and believed would occur. Some of these potential and perceived affordances have been realised and can be described as realised affordances, which will be discussed in section 4.3.1.3. Other potential and perceived affordances were not realised due to a number of possible inhibiting factors, challenges, context and use culture of the participants, which did not allow for action to realise the affordances.

The potential and perceived affordances of the use of the Food for Us application included: (1) the development of a safe space in which users can trade, (2) finding local trading partners, (3) the opening up of local markets to both the buyers and sellers, (4) improving of logistics for the local supply chain, (5) increased sharing of information, (6) improved quality of the sellers' produce, (7) improved and fair pricing of local produce, and (8) reduction of on-farm food surplus.

The development of a safe space for local trade

The potential affordance to create a safe space, in which users can trade, emerges from the features of having a secure registration and logging in system in place (VCIAD1). The FFU app creates a safe space where the users are only those that are approved by the administrator and the personal details of each user are only available to the administrators (a trusted member of the FFU team). The second security function, which fell away due to the feature acting as a barrier to many people registering to use the FFU app, was the requirement to register with the user's South African ID number (VCIAD1).

Opening up local market to local producers

Finding local trading partners and opening up of the market to local buyers and sellers are two affordances that many of the users anticipated and therefore can be classified as perceived affordances. One of the participants at the first Training of Trainers courses explained that "it's very much easier now because we don't have to go now and approach the buyers, we just post on it and try and meet them"(TOTW10). The features of the FFU application can allow for this potential affordance to be realised, however even though the market was opened up for several of the farmers, who had found buyers they had not traded with before, there was not as much disruption of the markets as anticipated by the application by the users and project managers. The FFU project managers explained that from the onset of the Food for Us project, the idea was to create something that was disruptive and could change the current food system, which is monopolised by large retailers (VCIPM2). Nicola Jenkins, the project director, believed that the Food for Us app had not been truly successful in disrupting the food system to open up market access, however it was recognised that the FFU app could be viewed more as a tool that needs to be refined to shift the way local supply systems operate (VCIPM2).

An intermediary user believed that the Food for Us app was vital in bridging the gap between the buyers and sellers of produce in the Raymond Mhlaba area, explaining "So it's helping us to link the consumers as well as the producer which was a very very big gap that actually existed. Now this app is actually lessened or made it a little bit not wider [less] as [than] it was before" (VCII3.82).

This sentiment of connecting the buyer and the seller was shared by a seller who said, "I think the application in itself is something new; the app in itself is something. Of course people have been using Facebook and ya [yes] it is fine. This one it gives you direct contact with the buyer, for example if you are a producer" (VCII2. 121). This explains that even though other social media and technology was being used to advertise produce prior to the introduction of the FFU app, the users believed that the app would be more effective. Users believed that it would be more successful because it was a produce trading only platform and not a platform where people converse about unrelated social

discussion as explained by an interviewee, “but WhatsApp is not going to be effective for us in terms of marketing the produce because people are actually making a lot of conversations” (VCII3.80).

The potential affordance of bringing local farmers and local consumers together was an important potential affordance, and another perceived affordance of the Food for Us management team. This potential affordance was also recognised by the RMDA who, when addressing an audience of farmers and buyers at the #Matchmaking event, said “This App is very good instrument because it talks about local people and how they can be able to trade amongst themselves”(MMWR1). This statement brings to the fore the importance of bringing the local community into contact with the local farmers, rather than buying produce which has been brought into the community from large commercial farmers in other provinces. The perceived affordance of the Food for Us app to bring people in the local supply chain together to build a strong local supply chain and improve communication was anticipated. This affordance was believed to be realised through the application being available to anyone to use as long as they had a phone with compatible technology, a Google account, an email address, and lived within the Raymond Mhlaba municipality (the criteria used to approve the user registrations). This affordance was realised to some extent with farming entities, such as the Mxumbu Youth Co-operative, being introduced into the supply chain and the farming community they had not been exposed to before. The members of the Mxumbu Youth Co-operative became very involved in the Food for Us project interacting with the FFU app on a regular basis (tally of one member’s log-ins being 40 over the duration of the project) (FFUAS). This affordance was realised in some instances but much of the development of a network and increased linkages and communication occurred outside of the Food for Us app and therefore were due to the features of the networked social learning support systems, which will be discussed in section 4.3.2.

Improved logistics

The perceived and potential affordance of improved logistics was another focus of the FFU project managers and users. User anticipated that by using the FFU app, and its ability to geo-reference product uploads, the app would be able to reduce the distance that users travel to buy fresh produce, therefore reducing food wastage (BSB, BSS, BSI). The users also perceived that the use of the FFU app would be able to improve the logistics of the local supply chain. One of the intermediary users explained, “these are the top challenges that we are having and the app can actually solve these challenges in terms of cost effectiveness and expenses of transport” (VCII3.80). The affordance to reduce the transport was anticipated by a number of FFU app users. Users hoped that the app would help reduce the cost of taking the produce to market, thereby increasing the profit margin for the farmer. In an interview one of the users explained that he knew of one intermediary “who always drives to and from East London and he looks for prices on potatoes and that type of thing. Then it makes it more expensive for him to sell. So if they can know that they can get fresh produce twice a

week locally this will be good" (VCIB4.98). This intermediary sources produce from out of the local area due to not having access to the local farmers. According to the discussion that occurred at the #MatchMaking event, not only is the issue connection with local farmers, but similarly the need to have a constant supply of produce from the farmers, rather than the inconsistent supply that characterises existing small-scale farms in the area (MMWR3).

The ability to record and then manage farming practices and produce on the Food for Us application was another potential affordance that the app would enable for the farmer. The FFU app is able to store information entered into the application by the farmer for produce uploaded through the physical features of the app software, which allow for history to be stored. The data from the post is stored on the backend of the FFU app and is made available to the farmer in their history. This function had the potential affordance of providing a recording and marketing management tool for the farmers as one of the intermediaries explained, "So the app will sort of assist us to keep track and to try and do that, ya [yes] to keep track" (VCII3.72). This affordance was discussed on a number of platforms (WhatsApp group, #MatchMaking event, training workshops) as a very necessary function for the farmers so that they are able to manage their produce and analyse the viability of their farming business. On the WhatsApp group there was an interesting discussion around the perceived statistics recorded by the Food for Us application:

> Participant 1: Yes, my leader, the stats are very important.
> Participant 2: The stats are key [redacted] and we will also be in a position to see the real farmers and those that are just following the crowd. (FFUWD 539-544)

Another component of the improved logistics potential affordance was the improved immediacy of trade, therefore reducing *food waste* and improving efficiency of the supply chain. The immediacy that needed to be enabled by the Food for Us app was discussed prior to the launching of the second version of the FFU app when the chat function and the notification function were introduced. In the #MatchMaking meeting, the possibility of immediacy and the need for notification was discussed by one of the farmers who explained that a notification feature would be very important to realise the affordance of improving immediacy of trade (MMWR4.4). The farmer stated that:

> We will find that if there are notifications, turnaround time in terms of the response, it will be very quick, someone will be looking for produce to do catering at 12 o'clock so if I am on the farm as a farmer, and then I get to see the message after 12 o'clock I will be making a huge loss. (MMWR4.4)

The final perceived component of the improved logistics affordance was the potential for the Food for Us application to enable improved pricing. The users perceived that the FFU app would be able to be used as a tool to regulate the prices of locally produced fresh produce. The application does not have a set pricing system for the produce that is uploaded and therefore allows the producers to set their own

prices for the produce. The potential affordance was for the FFU app to allow for the development of a self-regulating system where the pricing of one product (or a collection of similar products) affects another (MMWR). The FFU app users also perceived the FFU app playing the role of a price comparison tool. In the final TOT workshop, one of the participants explained with the prices being advertised on the FFU application, one could compare prices and choose the cheapest option. The farmer described that, “Then I will be looking through the app and be saying, okay this one is selling it R90, this one is selling R100, this one said R110 and then I will say I will afford one for R90”(TOTW30). This potential affordance has not been fully recognised due to there not being as many produce uploads as the FFU project managers and farmers hoped there would be with a total of 31 uploads over the duration of the FFU app trial.

Sharing information

The potential affordance of sharing of information between the users of the Food for Us application was a perceived affordance that was noted and expressed by a number of users. An intermediary user explained, “immediately the app is going to assist us in terms of knowing who is doing what and where and what kind of interventions and what kind of challenges are being faced” (VCII3.68). This perceived potential affordance included the circulation of market information about demand in the local economy. The feature of having a space for produce in demand was suggested by a number of users. A farmer suggested that he would farm according to the demands of the community if he received such information (VCIS5). Unfortunately the sharing of information did not happen as intended through the FFU app. This might have been because of the small number of users, as well as the absence of a feature that allowed buyers to record and specify their demands. There was, however, a large amount of information sharing through other interventions such as the WhatsApp group, #MatchMaking event and Training of Trainers event that will be discussed in more detail in section 4.3.2.

Improved quality of produce

There was a user perception that the use of the Food for Us application would result in an improvement of quality of produce being traded in the local community. According to the farmers, due to the application requiring photographs of the produce, the farmer would be concerned about the look of the produce (VCIS6). The farmers also believed that through the FFU app they would be able to sell produce at a faster rate therefore selling the produce when it was fresh, resulting in increased quality of produce (MMWR4). This affordance started to be realised due to the interest that the photograph component of the application created. Users were interested to see how they could improve their photographs of produce on the FFU app to entice customers (MMWR4). It was discussed that it is important to monitor photographs as in some instances farmers might not be honest

with the photographs uploaded. This was noted as an inhibiting factor to the improvement of quality of produce.

Reduce on-farm food waste

The last perceived potential affordance was the key aim of the Food for Us project, to reduce on-farm food waste. Through the development of a virtual online mobile platform that is simple and open to all farmers and consumers, the FFU project management team believed that the FFU app, with all its functions and features, would be able to reduce the surplus food that was being wasted on farms in the case study areas. In the Raymond Mhlaba case study it was recognised that this potential affordance was not realised due to a number of contextual, project management and project implementation-inhibiting factors, which will be discussed in Chapter 5. One of the project managers explained that the Food for Us project and the focus of the FFU app started to shift after it was realised that in the case studies in which the project was being introduced, the occurrence of food waste and food surplus was due to a lack in market access and a disconnect in the supply chain. The FFU project focus started to shift away from concentrating solely on food waste and towards "democratising the food market, disrupting the food markets" (VCIPM1.6). There is little evidence that there was a reduction of on-farm food waste; however there were instances where farmers were exposed to new markets as commented on earlier in this section.

Above I have described some of the potential and perceived affordances of the Food for Us application that were enabled by the physical features of the FFU app. Some of these affordances were partially realised, while others, such as the reduction of on-farm food waste, might not have been realised at all. In section 4.3.1.3 below I explore those affordances that were realised through users actions and usage of the features of the FFU app.

4.3.1.3. Realised Affordances

The realised affordances of the Food for Us application are potential actions that were carried out and were successful in achieving an outcome. As suggested in the previous section, the initial intention of the FFU app might not have been fully met in the application trial phase (the phase that was studied for this research), however there were many affordances that were realised as smaller objectives of the project, or emergent affordances that were not recognised at all when the Food for Us project was developed.

Increased interaction with technology

The first realised affordance was increased interactions with technological innovations, specifically mobile apps and email. The Food for Us application trial increased the interactions that users had with an agriculture and food system mobile application, whilst the FFU project and associated feedback

channels around the FFU app encouraged users to engage more critically with the FFU app and give suggestions for improvements. Some users explained they thought the FFU app would be confusing and difficult to use, however once they used the application (downloaded, registered, logged in and browsed or uploaded produce), the FFU app did not seem as confusing and complicated as they had perceived "At first I thought it was all, technology, difficult things, I didn't buy it actually but as times goes on, I immediately managed to log in or download the application and see" (VCIS6. 54). This farmer continued, "it was explained at the launch, it was like it was going to be something difficult to enter. But when it came to it was just like… easy" (VCIS6.58).

The users interacted specifically with the Food for Us application through the downloading, registering, logging in and navigating through the app. The FFU app also prompted the users to, in some cases, re-discover, or create their emails (TOTW2O). With the assistance of a number of training platforms, such as the WhatsApp group, the #MatchMaking event, Training of Trainers courses and the training workshops, users were coached through the process of downloading, registering and using the application (these experiences will be explained in more detail in 4.2.3 below). One of the intermediary users and partners of the FFU project thought "people are technologically more confident after the use of the app" (VCII2.125), explaining that even by simply exploring the interface, users gained experience in using a co-created technological innovation and built up more confidence to take into exploring other potential applications.

There were a number of users who explained that the use of the application, as well as the downloading and registering process became easier as the trial progressed (FFSC9; FFSC12). According to the users, this was because of the improvements made to the FFU app, as well as the improved knowledge and experience of the users while using the Food for Us application (FFSC9; FFSC12).

Use of technology to market produce and search for local produce

The second realised affordance was the development of a technological space where buyers and sellers can upload and view produce in a virtual marketplace. This affordance was realised through the use of the uploading features by the farmers. There were 31 uploads including livestock, spinach, maize, butternut, cabbages, lettuce, mustard, honey, tomatoes and carrots (FFUAS). As seen in Figure 4-4 in the previous section, the number of uploads increased as the project progressed and peaked during the month of April. The FFU app and the virtual market provided an additional way for farmers to market their produce as one user explained, "I mean my brother put those chickens on there and then someone got in contact with him. He now has got people who want to buy more from him" (VCIB4.106). Many of the buyers of produce said that they would see the produce on the FFU app and then because they knew the farmer they would express interest outside of the application as

explained previously in this chapter. “The application added to existing methods of marketing, it links farmers that have not yet been connected”(FFSB10). Through a technological virtual online market, buyers are also able to learn about producers (farmers) in their area who they have not been exposed to before (BFSB1). This affordance was realised where one or two buyers explained that they were not aware of the number of farmers farming locally and had not been aware of the diversity of their produce. One of the buyers explained:

> The application created a platform to find new farmers that you didn’t know before. The [redacted] are one example of someone who I didn’t know was selling a certain type of produce. The [redacted] sell indigenous chickens as well as homemade honey. I didn’t know that they had these products for sale. (BFSB1)

Another buyer indicated the same feeling exclaiming, “there were more farmers than I expected which was good to see. I was also not aware that there were so many co-operatives around Raymond Mhlaba and therefore this was good to see” (BFSB4). These responses were directly in relation to the use of the application, however there was exponentially more exposure enabled by the networked social learning support systems. These will be discussed further in section 4.3.2 below.

Dynamic nature of the user accounts

Farmers were able to participate in the supply chain as buyers and sellers, and vice versa, rather than being confined to engaging in one activity only. Much of the interaction that occurred on the Food for Us application and off the FFU app was between the farmers in the trial (FFUWD). Farmers were not only able to upload produce advertisements to sell their produce, but were also able to recognise potential places to create partnerships and do business with other farmers that posted their produce on the FFU app (MMWR). The switch account feature allowed the farmers to own a seller profile, which they were immediately directed to following a successful log in; however, the farmer is able to switch profiles to view the application as a buyer and to view the virtual online market. Both the buyers and sellers believed this was a very useful feature and allowed everyone to be both buyers and sellers: “You not, you not permanently stuck to being a buyer. You can be able to switch and buy as well. Yes, that was an excellent idea” (VCIS6.100). The increased use of the FFU app by farmers to be both buyers and sellers of produce is possibly related to the smaller number of buyers involved in the trial, as well as due to the farmers taking a more active role in experimenting with the Food for Us application compared to the buyers as discussed in section 4.2.4 above.

Standardised application information

The set information required by the Food for Us application to enable the farmer to upload produce resulted in standardisation of advertising information for the trial group to a certain degree. The users believed it was just enough information to tell the buyer what they needed to know and also not too

long to be considered inconvenient for the farmer to enter (BSFA1; VCII3). There were suggestions for amendments on the upload information form, such as the way the quantity of produce is recorded (per kg) as well as the way the location of the produce is recorded (use co-ordinates) to improve this affordance. The users believed they would be able to develop this affordance to create a set standardised information sheet used in the community to record quantity harvested, sold and wasted, including the price of produce. The re-designing of the required information became a collaborative activity for the FFU users with the FFU project managers and the FFU researchers. One of the intermediary users explained that the FFU app had reduced the information required, "because people will really get frustrated when you spend three hours having to fill in a lot of information but now if you just make a few information, information that is currently being requested by the app" (VCII3.78).

Information sharing

As described in section 4.3.1.2, one of the potential affordances of the use of the Food for Us application was to share information between the users of the application. As explained above, this didn't happen so successfully through the FFU app; however, it did happen through the networked social learning supporting systems. Having said this, there were a number of instances where the sharing of information affordance was realised on the FFU app, especially between farmers. The farmers were able to see what other farmers were selling, and how much they were selling it for. This was considered important information to inform their own farming decisions (VCII3). One of the users also explained that they really enjoyed the public wall and the recipe that was uploaded on the wall for the users to see (VCIS5, FFUWD). The public wall was the feature where the initial stakeholders, including the app developers believed the most information sharing would occur, however this remained limited due to the content rarely being changed and updated, and furthermore because it was controlled by the FFU app administrators. Even though some users described this as a realised affordance, many of the users gained more information from the various other platforms and therefore there is great potential to improve the realisation of this affordance.

Improved aesthetic presentation of produce

Another realised affordance that was also explained as a potential affordance was the improvement of quality of produce afforded by the Food for Us application, specifically due to the photograph feature on the FFU app. According to section 4.3.1.2. (Potential and Perceived affordances), this affordance was perceived by many users to improve their quality of produce. The use of a self-regulated grading system and the inclusion of a photograph of the produce has, according to some FFU user respondents, encouraged users to improve their quality of produce in order for it to be more marketable. According to one of the FFU user respondents;

> People they started to be concerned about the quality of their produce because we said we need to see your pictures. So now people are seeing now, aiii, the quality actually needs to be good so whenever someone is producing now they know my produce is going to be seen by everyone, I need to make sure that I actually produce a very high quality produce before I upload it. So now people are concerned by the quality, of which before they were not. (VCII3.126)

The importance of the photograph feature to show the quality of the produce was an area of interest amongst many of the FFU users. The users worked hard to make sure their produce looked as good as the produce that was already uploaded on the Food for Us application, with one farmer respondent saying "now when I see the best butternut on the app and I try to improve my quality to that on the app" (VCIS6.86). This realised affordance was an emergent affordance that was not pre-empted by the FFU project managers as an outcome of the use of the application, however it has appeared to encourage farmers to look more critically at the presentation and quality of their produce in comparison to other fellow farmers. This improvement in quality was further enhanced through the affordances of the FFU project as a whole to allow easy sharing of information including farming practice discussions and demonstrations.

Common interest amongst local supply chain members

One of the important realised affordances enabled by the Food for Us application was the development of a common interest amongst farmers and buyers in the case study site (Raymond Mhlaba municipality) around which relationships and partnerships were developed. The FFU app created a common aim and a common innovative virtual space around which a group of buyers, sellers and intermediaries interacted. This shared interest in the FFU app encouraged users to connect with one another and take an interest in each other's work and farm processes. According to one of the users, the farmers used to meet each other in meetings, but this did not result in partnerships or relationship building, but since the introduction of the FFU app, "there is that interest, you see, shared interest in the application," (VCIS6.90). The realisation of this affordance was further supported by the networked social learning support system (WhatsApp group, workshops, trainings) affordances that enabled the users to come together, meet and discuss challenges and solutions.

Excitement and enthusiasm

The final, and most notable realised affordance of the Food for Us application was the excitement and enthusiasm created by the FFU app around using technology and new forms of marketing to include local farmers in the local supply chains. The FFU app created a large amount of talk about technology and the need to move toward forms of trading that are technologically inclined. One of the users explained:

> The application did well for the first phase of the project. It created significant awareness but there is need for improvement and there is opportunity to improve. Excitement and awareness has been made amongst several people but more people need to respond, the bigger the audience the better. (BFSB1)

As this user expressed, there was a large amount of enthusiasm and excitement due purely to the existence of the FFU app. The discussion due to this excitement often occurred in the networked social learning support systems that were put in place to introduce the application and facilitate such communication.

In the preceding three sections I have discussed the Food for Us application's physical features and their associated affordances (potential, perceived and realised). The features and affordances of the networked social learning support systems that assisted in implementing and introducing the use of the FFU app will be discussed in section 4.3.2 below.

4.3.2. Affordances of the Networked Social Learning Support Systems of the project

It was discovered through the introduction of the Food for Us application, that the working of the app and its use amongst the 23 users surveyed in the Raymond Mhlaba municipality, depended heavily on the many networked social learning supporting systems in place to assist users in gaining value out of the FFU app. Due to the important role that the networked social learning support systems played, I have outlined and further discussed the physical features of the networked social learning support systems as well as the affordances (potential, perceived and realised) they enabled. These networked social learning support systems included (1) introductory workshop, (2) the WhatsApp group, (3) the #Matchmaking event, (4) the Training of Trainers workshops, and (5) regular meetings and communication with users. Table 4-3 gives an overview of the features and affordances which are further explored in this section.

Table 4-3: Affordances of the Networked Social Learning Support systems (all are discussed in further detail below)

Physical Features	**Potential Affordances**	**Realised Affordances**
Introductory / Launch Workshop - Number of diverse stakeholders invited - Collaborative group activity to build an application vision - Question and answers session	Improve logistics of local supply chain: - Create a consistent supply of locally produced food - Platform to discuss demanded produce and goods	Network Building: - Developed a number of important connections - Link consumers to local producers - Search for demanded produce
WhatsApp Group - Send messages - Collection of diverse stakeholders in one group - Send screenshots - App developer liaison part of the group - Send photographs - Project managers present on the group Contact details of the associated buyers and sellers	Encourage use of technology for the furthering of the business - Bringing mobile technology into the agriculture sector. - Using mobile technology to address issues of supply consistency due to climatic conditions amongst the local farmers	Grow the community - Enable local trading of produce - Sense of community developed - Bring the youth into the local supply chain - Enthusiasm and excitement
	Developing farmers skills - Business skills and recording of data - Local pricing of produce - Build capacity for tech use	Communication - Communication between users (producers and consumers) - Communication between the users and app developers
#Match-Making Event - Diverse collection of buyers and seller in the Raymond Mhlaba municipality - Hand out flashcards to familiarise participant with the interface - Application training projected on the projector - Opportunity for buyers and sellers to discuss challenges and solutions in diverse groups during break-away discussions - Networking opportunity over lunch - Participants given opportunity to present challenges and solutions	Partnership - Networking opportunity between the buyers and sellers of produce. - Bringing in people into the conversation that were not previously in the conversation – Hawkers - Market access	Knowledge sharing and initiate discussion - Developed an interest in gardening and environmental matters - Recognise *food waste* - Strengthen understanding of aim of project - Shift towards organic crops and sustainable farming and lifestyles
		Support Platform - Technical difficulties - Experimenting with the application - Support new users - Collaborative trouble shooting between users and the app developers/ project manager - Communication about IT successes
Training of Trainers Workshop Meetings - Application walk through projected on the projector - TOT catering as an incentive to upload produce on - Opportunity for questions of how to use app. - Opportunity to make suggestions and comments to improve the application - Opportunity to bring up and discuss challenges	Opportunity to strengthen local businesses - Incentivise farmers to produce for local ToT workshop catering - Reduce the transaction costs of users	Collaborative app development and implementation - Negotiation of how the app will be used - Collaborative troubleshooting amongst users - Technology - Supportive feedback loops - Shared interest and ownership of the project - Active involvement in developing and implementation of the app
	Develop the Raymond Mhlaba community into an area of excellence and a preferred case study	Building Confidence: - Learn about IT - Confidence in using IT - Confidence to grow - support with market - Building business and marketing skills
Regular meetings and communication with users - Value Creation Interviews - Base Line Survey - Telephonic Final Surveys		Strengthen Local Supply Chain: - Recognise local supply chain importance - Strengthen local supply chain community - Recognise the need to buy and sell locally - Build vision for local supply chain - Marketing of produce - Market information - Healthy competition - Enable local trade

4.3.2.1. Physical Affordances

The collection of networked social learning support systems all had a number of physical features that allowed affordances to develop, some of which were realised and some of which are still perceived potential affordances waiting to be realised.

Introductory workshop

The first networked social learning support system was the introductory workshop, which was briefly described in section 2.4.1. There were two introductory workshops held within the greater FFU project, one in the Eastern Cape, in Grahamstown, and one in Stellenbosch at the Sustainability Institute. This study only examines the affordances enabled for the users, stakeholders and researchers directly involved with the Eastern Cape case study. The Eastern Cape Introductory workshop, held on 3 August 2017, invited a diverse range of stakeholders to attend the launch of the Food for Us project. Attendees were asked to comment and engage in discussion around the FFU project and its potential. The attendees included provincial and national government (Department of Rural and Agrarian Reform and Department of Trade and Industry) as well as municipal government partners such as the RMDA from the Raymond Mhlaba municipality. A number of small-scale farmers attended from the immediate Grahamstown community as well as from the greater Eastern Cape community, including members of the Mxumbu youth co-operative from Middeldrift, the chairperson and members of the Raymond Mhlaba Farmers Association as well as a number of members of the Imvotho Bubomi Learning Network. There were also several local charities and community development organisations, many of which were based in Grahamstown. There were also a number of researchers and project partners that attended the discussion. (The full list of attendees can be viewed in Appendix V).

Project team members, Mike Ward, Nicola Jenkin and Wayne Stead presented an outline of the aim of the Food for Us project and the potential of the FFU app. The aim of reducing on farm food waste was discussed with the sub-theme of strengthening the local supply chain becoming an important emergent aim. Wayne Stead, of Lead Associates, presented what the FFU app could look like and it potential features.

The workshop participants then divided into several diverse groups where they were asked to brainstorm the types of functions and features that they would like the application to have. This activity allowed for discussion amongst diverse stakeholders to develop a consolidated list of features that was presented to the rest of the participants though group presentations. The suggestions and functions that came from the participants are summarised in Table 4-4.

Table 4-4: Summary of suggested functions drawn from the Eastern Cape Introductory Workshop (ECIWBF)

Producers suggestions	**Consumer suggestions**
Alternative forms of payment	Indicate how the produce was farmed (permaculture, horticulture etc.)
Instruction language to include English, Afrikaans and isiXhosa	Create a communal market space or pick-up point
Involvement of taxis and agro-processors and other agro-services	Educate on agro-processing (how to preserve the produce that can be purchased)
Public wall function to promote information sharing amongst users.	Inclusion of informal consumers into the system – hawkers, bakkie traders
Publicise local events	Incorporation of a donation function that encourages the donation of produce.
Development of a portfolio for all the users	Farmers identify whether they are large scale or small-scale to filter appropriate producers.
Have known people behind the application to work through difficulties	Search function to search through the produce.
Allow one phone to have ability to have several log ins	Geo-referencing of produce to ensure local buying
Ability to work offline	Allow for easy sharing of adverts in the application to be easily shared in other social media platforms.
The application must be simple	
Have a rating functionality to rate the service of the farmer or the service provider as well rate the produce.	
Find a way to address quality and safety of food issues	
Create vegetable specific categories	

The participants were given an opportunity to engage with the FFU project managers on what they believed the application should be able to do for them in their context.

WhatsApp group

The second important networked social learning support system was the WhatsApp group, which was also introduced in section 4.2.1. As previously discussed, the WhatsApp group was very active with the exchanging of texts, photographs, screenshots and contacts shared between Food for Us participants on the WhatsApp group. The WhatsApp group was created on 17 October 2017 and included a number of diverse farmers, intermediaries, and consumers who were operating within the Raymond Mhlaba municipality. The total number of participants in the Food for Us WhatsApp group grew to 50 participants with 1262 messages being exchanged between October 2017 (when the group was created) and July 2018 (the end of the first trial of the FFU app). The Food for Us WhatsApp group also included a representative of the technical team as well as the FFU project managers and researchers. Whenever a member of the local community showed interest in the Food for Us project or application they were invited to be part of the WhatsApp group to learn more about the FFU project and be included in the discussions and sharing of information in the community. The WhatsApp group included a large number of farmers who were part of the Imvotho Bubomi Learning Network, as well as farmers from RAYMAF and the members of the RMDA. Consumers included restaurant managers, guesthouse managers, individual buyers and local retailers. The WhatsApp group included a diverse variety of farmers who farmed different produce, used different methods of farming and held diverse opinions. This opened opportunity for debate and discussion, which occurred on the WhatsApp group and will be discussed further in section 4.3.2.3.

The important features of the WhatsApp group included users' ability to send messages that can be received, read and replied to by all members of the WhatsApp group. Another feature is the ability of users to send photographs and screenshots of their mobile phone screens to the WhatsApp group to ask technical questions and to report any FFU app errors. One user explained an issue to one of the FFU app technicians on the WhatsApp group and technicians requested, "Can you do me a favour please? Can you take a screenshot of that, are you able to screenshot on that phone and then send it to me?" (VCIS5.25). The user then responded to the technician with a screenshot of the error message and together, the user and the technician, were able to determine the issue. The final feature of the WhatsApp group was that it housed the contact details of all those on the group. Users where able to meet new consumers and farmers through the chat component of the WhatsApp group and then access their contact details in the information area of the WhatsApp application. WhatsApp group participants were able to leave the group at any time. These features enabled a number of very important affordances (which were summarised in Table 4-3 above), which created value for many stakeholders.

The #MatchMaking event

The #Matchmaking event, co-hosted by the Food for Us project team and the Raymond Mhlaba Development Agency, was another important event that supported discussion and engagement. The FFU application was discussed, as well as the idea of developing a circular economy and a strong local supply chain in the Raymond Mhlaba area. As briefly explained in section 4.2.1, the #MatchMaking event took place on 23 April 2018. The event was held in Alice and a diverse collection of buyers and sellers of produce, with the number of attendees fluctuating between 15 and 40 participants throughout the day (see Appendix H for the full attendance register). The attendees included the Middeldrift youth Co-operative, Mxumbu Youth Co-op, a number of Imvotho Bubomi Learning Network Farmers as well as members of RAYMAF and other farmers in the community. The buyers included a caterer from Middeldrift, a cafe manager, Twins supermarket representative, a local guesthouse caterer (Mak and Mak) as well as a number of individual buyers. A number of municipality members and members of the RMDA also attended the day. The day had a full programme that included a variety of activities and opportunities for networking and discussion (full programme can be viewed in Appendix I). The first activity included the handing out of flashcards (Figure 4-11) to all the participants. These flashcards had a screenshot of the different produce already uploaded onto the FFU app.

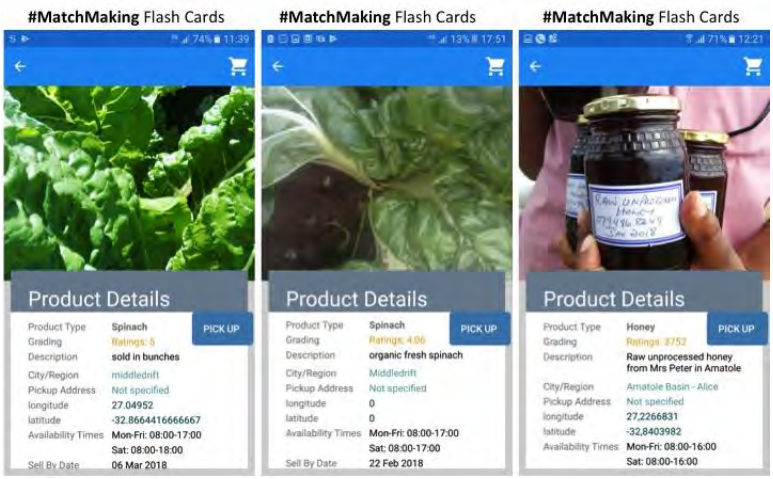


Figure 4-11: Flashcards handed out to #Matchmaking participants during an introductory activity

These flashcards show exactly what a buyer would see if they clicked on a product in the virtual market space on the FFU app to find more information about a product. These flashcards allowed the participants who had not yet interacted with the Food for Us application to see what the application looked like and how the interface appeared to the produce buyers. The flashcard activity required the participants to take a flashcard and then using the information provided on the flashcard, pretend to be the farmer who was trying to sell that produce. This activity was effective to gain insight into what information the participants believed was useful and what was not.

Another #MatchMaking activity was the Food for Us application training that was presented to the audience and included a 'full tour' of the FFU app. I projected my phone's screen onto the wall and navigated through the application so that the audience could see how the app looked and how it worked. This presentation took the attendees through the downloading, registering and use of the FFU app. The workshop attendees were asked to get into groups that included a diverse selection of people, therefore groups that included both a buyer and a seller. The attendees were encouraged to get into groups with people they were unfamiliar with so that they could build contacts and network. These groups were asked to brainstorm the challenges that consumers and farmers experience in the local supply chain. These challenges were then presented and discussed with the audience.

After a networking opportunity over lunch, the participants were asked to mix up their groups a second time and then engage in a group discussion around solutions for the challenges that were presented to the audience in the previous session. The solution brainstorming activity had an extra element to it with the activity being framed as a competition where the groups were given the opportunity to win a prize, which included a generous data voucher (R200 per person for first place, R100 pp. for second place and R50 pp. for third). The day was concluded with the different groups presenting their solutions. The solutions are summarised in Table 4-5 below.

Table 4-5: Solutions that emerged from discussions during #MatchMaking event

Group 1	Furthering of Agro-ecology farming within the small-scale farming community in the Raymond Mhlaba municipality. The application can be used to upload the organic produce and advertise the produce to a unique niche market.
Group 2	Need to have assistance from the Government departments for improving infrastructure Improved skills development opportunities to improve farmer's skills in agri-business and marketing as well as sustainable farming. Need to increase and scale the use of the application within the Raymond Mhlaba community.
Group 3	Develop a farmers' database for the Raymond Mhlaba region so that there is an understanding of who has produce available at any particular time. The application can be used to make the collection of data faster and more efficient. The database can assist consumers of produce who are able to determine who has produce and be able to create a more stable/consistent supply.
Group 4	Trainings for the buyers and sellers of produce especially around the pricing of produce and the marketing thereof. The use of training sessions, such as the #Matchmaking event, to improve the local supply chain and increase discussion. Use the application as a platform to encourage interaction and discussion between the different stakeholders in the supply chain.

This activity provided the participants with an opportunity to discuss and plan solutions they were encouraged to take forward and pursue after the conclusion of the #MatchMaking event (MMWR4).

Over and above the organised #MatchMaking activities, there was plenty of time for participants to network with one another and meet new people and develop business relationships. This aspect of the #MatchMaking event will be further discussed in section 4.3.2.3.

Amanzi for Food Training of Trainers

The Amanzi for Food Training of Trainers (TOT) course included a three-session programme that was run between November 2017 and May 2018. The sessions, which included three workshops, had a number of important features that encouraged the development of affordances that enabled increased social learning and value creation. The Amanzi for Food TOT encompassed a two-day programme, which included an opportunity for participants to engage with the rainwater harvesting material provided to the participants, an opportunity to discuss certain sections and for lecturers and presenters to present their area of expertise. There were also group activities and exercises that participants were required to complete and an assignment that participants needed to submit. One the second day of the three sessions, a practical demonstration of water harvesting techniques were presented to the participants so that participants were able to observe and learn. The Food for Us project was partnered with the Amanzi for Food TOT because of the overlap in the two projects aims to strengthening the ability of small-scale farmers to meet the fresh produce demand of the local community. Dr Tichaona Pesanayi, lead researcher on the Amanzi for Food project, explained that the application was needed to market and find consumers for farmers' produce as once the Amanzi For Food participants were creating productive demonstration sites, they would need to find markets for selling their produce (TOTW1O).

I was given one 20-45 minute session in each of the three courses. In these sessions I introduced and fielded questions around the FFU app. The first session provided an opportunity for a full run through of the Food for Us application including how to recognise the various icons, where to download the FFU app and how to register. A Wi-Fi hotspot was made available for the participants to use to download the application during all three of the courses. Unfortunately the network was not strong enough and the hotspot only allowed for a small number of people to access the Internet at a time. The screen was projected onto the wall and the participants taken through the FFU app slowly in all three of the courses. In all three of the workshops the participants were given an opportunity to ask questions and give comments.

In the third and final workshop, the participants were asked to write down any recommendations and suggestions for the Food for Us application to allow for improved value creation for the users. The participants were given a screenshot flashcard (the same as those used for the #MatchMaking event and displayed in Figure 4-11) to interact with, especially for those who had not yet interacted with the interface before. The participants were then asked to write down any suggestions on how to improve the FFU app on the back of the flashcards that were collected at the end of the session. A list of the suggestions can be seen in Table 4-6 below.

Table 4-6: Final comments and suggestions from participants in final Amanzi for Food TOT

Comments and suggestions written on the flashcards at the final TOT
• Include a price, quantity – to mention if plenty is available
• Include the stage of the layers (chicken layers), mention the breed type of the chickens, and mention how many eggs can be produced in a year.
• Type of onion that is being advertised, the size of the packets in which it will be sold
• Include a description of whether it is organic or GMO
• There is no price indication; selling weight absent (pack or kg); sell-by date is not specific, is it an expiring date of maize or the date till the sale is taken down? The name of the town near Mazotshwen Location would be helpful as there are many villages, e.g. near to Middeldrift or near to Alice; pick-up address not specified not sure whether the farmer will deliver him/herself
• Include the branding, price per kg/packet
• Better picture and description needed, but I would buy this product
• Need to include packaging date or start of selling date; include details on how the produce is grown, organically or not.
• There is no price; there are no contact.; Is it preserved or fresh leaves or seeds of the mustard? What is the pickup address? How many kg for how much?
• The type of spinach that is being sold because there are different cultivars; how are they going to be sold from 1kg – 20 kg?; The pick-up location of the product; there is no price; there are no contacts
• Price, Pick up address, sell by date.
• Include washed potatoes, the size of the potatoes – small, large or medium
• Include category or way of the production
• Type of packaging; the grading according to sizes; include the address; include the time
• The pictures must be clear and not have unnecessary objects or things to distract the buyer; write the name of the place with or without the co-ordinates

An important feature of the Amanzi for Food TOT workshops was that the same people took part in the three different workshops. The participants became familiar with each other, with the presenters (myself) and the aims and objectives of the Food for Us project and this provided an environment in which discussion, questioning and debate was encouraged.

The Amanzi for Food TOT required a substantial amount of catering for the 40 participants and the additional staff. One of the decisions made in the first TOT session was to source the produce from local farmers, specifically from those involved in the TOT who were employing water harvesting and sustainable farming techniques. As an incentive to encourage the participants to explore the app, we made clear that the TOT caterers would be sourcing all of the fresh produce using the FFU app. This was done for the second and third sessions (TOTW2O).

Research interactions around project interviewing and field-based surveys

The final support system emerged via the research-based interactions. As I conducted interviews and surveys, I also engaged with FFU participants in formal and informal discussions, which provided support throughout the trial period, August 2017 – May 2018. All participants in the trial first engaged in a baseline structured interview survey, which was conducted in person in the Raymond Mhlaba area, Alice, Middeldrift or Fort Cox Agricultural and Forestry College. The baseline structured interview survey asked questions around how the users were currently engaging with the current food system as farmer/producers, intermediary organisations or as consumer/buyers of produce. The baseline structured interview survey included a number of questions that enquired about the carbon components of farming which was used to the calculate carbon savings of the farmers (before and after using the Food for Us app) as described in Chapter 3, section 3.3.2. The survey also asked about how users had experienced food waste in their own local community (find a sample of the full baseline structured interview survey in Appendix B). In the Raymond Mhlaba community, a total of 23 baseline structured interview surveys were collected (required number being 20 from Eastern Cape and 20 from the Western Cape).

Following the baseline structured interview survey, I communicated through the WhatsApp group and through private WhatsApp message to follow up on trial participants' progress in downloading and registering for the Food for Us app. The participants were encouraged to contact me if they experienced any challenges or issues regarding the Food for Us app. As a researcher, I also visited Alice for a number of unrelated events to strengthen the relationship that had been developed with the users and to build an understanding of the context. I attended two market days, one in October 2017 in Alice and a second in November 2017 in Fort Beaufort. I also attended the Imvotho Bubomi Learning Network's quarterly meeting in January 2018. These events gave me an opportunity to further discuss

the Food for Us application with other potential partners (full timeline of my activities can be viewed in Appendix S).

After the Food for Us application trial, all the trial participants were asked to complete a final structured interview survey to gather final data regarding users experiences and the challenges and suggestions for the FFU app and project (sample of the final structured interview survey can be found in Appendix C: Data Collection Tool). The final structured interview survey was conducted through a telephonic interview where the users were asked to answer several concluding questions around the FFU app, particularly how they used the app and whether they received what they had hoped through being part of the trial. Not all the users who completed the baseline structured interview surveys completed the final structured interview surveys. In total 16 final structured interview surveys were completed amongst the Eastern Cape trial participants.

Over and above the baseline structured interview surveys and the final structured interview surveys were six value creation interviews with active users. The value creation interviews provided an opportunity for me to ask questions around the type of value that was emerging from the use of the FFU app and the users' involvement in the FFU project. These interviews were conducted in an informal relaxed manner and encouraged the users to reflect on the aims and objectives of the FFU project. This added a critical reflexive element to the introduction of the project and to the way people viewed and used the FFU app.

These abovementioned support systems all have particular functions that allowed for certain affordances; these affordances have been further categorised into perceived potential affordances and realised affordances which were summarised in Table 4-4 and will now be discussed in more detail.

4.3.2.2. Potential and Perceived Affordances

The physical features of these networked social learning support systems developed a unique set of potential affordances. Some of these affordances were fully realised while others were not yet realised due to inhibiting factors or were not realised to their perceived potential. The potential affordances which will be discussed include here include: (1) improvement of logistics of local supply chain, (2) the use of innovative technology to further local business, (3) the developing of farmers skills, (4) the building of partnerships, (5) the strengthening of local business, and finally (6) developing the Raymond Mhlaba case study into an example of excellence.

Logistics of local supply chain

The first perceived potential affordance of the FFU project was to improve logistics of the local supply chain, and to enable more consistency in supply from local small-scale farmers. On hearing about the FFU project and learning of the project's aims, many of the users, as well as the project

managers, believed that the Food for Us app, coupled with its networked social learning support systems, would be able to develop a more streamlined and logistically sound supply chain, one that did not occur at a great cost (BSCR;VCIPM1;VCIPM2). As one of the project managers explained: "the intention with the app that it would allow producers and consumers to come together in a low cost way that would reduce food waste"(VCIPM1.4). One of the intermediary users explained that the FFU app would make it easier for the buyers of produce as they would have access to a selection of farmers and easily see what produce was available, how much and at what cost. The user explained: "So when we say it's very important that we have the app, because it links you with the buyers. So it's going to be a sort of value addition to them and also to their business" (VCII3.104). To improve the logistics of the local supply chain the FFU app, #MatchMaking event as well as WhatsApp group all provided platforms that allowed for produce to be advertised and queries for demanded goods to be made in public spaces where farmers and producers could respond. One of the users explained that, "What I hope will happen is that people will see my produce through the application and through the WhatsApp group and then from there I will have a better chance of getting buyers which will be very good" (FFSB9). Similar to the above, another user explained in her final survey that the WhatsApp group would become an effective tool for people to use to voice and publicise their demands: "if someone is looking for something I will ask them to look on the application or I am able to ask on the group on people behalf. This is what I think will happen, or could happen" (BFSC4). Both these affordance were realised through the Food for Us WhatsApp group (this will be discussed in more detail in section 4.3.2.2) but widespread change amongst the users was not evident and therefore were not realised to their perceived potential.

Innovative technology to further local business

The second potential affordance involved encouraging the use of technology to assist in developing local business. This potential affordance was another of the objectives of the project, but the Food for Us application was not the only form of technology that was encouraged. The Food for Us WhatsApp group and the connection of the FFU app to G-mail, as well as the Google Play store also created a space where both these platforms could be explored to develop local business. One of the users explained that they believed the introduction of the FFU app and the introduction of the concept of using technology could assist with marketing: "I think it is going to break this fear around use of technology by small holder farmers and by subsistence farmers"(VCII2.135). The use of technology to improve business within the agricultural sector was a particular area of discussion in the #MatchMaking workshop as well as in the Amanzi For Food TOT course. During the #MatchMaking workshop, one of the representatives from the Raymond Mhlaba Development Agency said: "I think the use of mobile phones, we are not going to get to a point where we will say, Ah we have had enough of these things and not taking it back. We are going to continue to use them"(MMWR1.7). This comment shows an understanding that mobile technology is here to stay, and farmers need to

learn how to work with it to assist their farming enterprises. Therefore the potential affordance to incorporate technology into the agricultural sector in the area was a perceived affordance that was partially realised.

One of the potential perceived affordances of the FFU project was that the seasonal inconsistencies which occur as a result of climatic challenges and the seasonality of produce would be addressed. One user explained that they did not have produce to sell to retailers because "with us in the Amathole we have got long winters. We only start planting now in December and January 1st so it wasn't ready," (TOTW2O). The users perceived that through the use of the Food for Us app, consumers would be able to source the produce required from other local farmers where the weather was more favourable and the desired produce was grown.

Developing local farmers' skillsets

The third potential affordance of the project was the perceived affordance of developing the skillsets of the local small-scale farmers. Particularly during the #MatchMaking event, the importance of strengthening the skills of the local farmers and local retailers was discussed and the perceived ability of the Food for Us project to achieve this was discussed (MMWR4). One of the intermediary users explained that he believed that the FFU app and the WhatsApp group would build the skills of the farmers because "the farmers would be growing and learning, therefore adding value to the produce because it would be through interacting directly with the producer" (VCII3. 156).

One of the skills that the users and the intermediaries believed would be developed through the use of the Food for Us application was the users' ability to develop and maintain records of the produce they had planted, harvested and sold. A number of users, in particularly the RMDA partners, believed that the application would provide an appropriate tool to assist the users in developing records they could use to determine their profits and keep a record of their clients (VCII2). One of the users explained there were often times when farmers did not take note of who they were selling their produce to and therefore "how are we going to interact with the clients because someone comes only once to buy cabbage from you. He will come maybe three months back. But now with the app we will have records of that"(VCII3. 156). This perceived potential affordance of the application was not fully realised due to the FFU app not being used extensively enough to record the transactions of the users. The development of skill affordance was realised in a number of other ways, which will be described in section 4.3.2.2 below.

The additional skills that the users believed the project could develop, was the ability to appropriately price produce. This would ensure the price remains competitive, but also ensures that farmers are receiving enough income to assist in growing their farming enterprise and to cater for their family (FFSB12). This affordance was also not realised due to less extensive use than anticipated. If a second

phase of the project is introduced, there may be an opportunity for farmers to develop their skills around produce pricing.

Develop partnerships and networks

The fourth potential affordance was the networked social learning supports system's ability to assist in developing partnerships and networks. This affordance was well realised in most aspects. The affordance of developing relationships between small-scale farmers and buyers was one perceived affordance, however this was not fully realised and still remains a potential affordance. Unfortunately the number of buyers part of the trial was fewer than the number of sellers (as seen in section 4.2.4) and therefore the number of partnerships developed between producers and consumers was fewer than perceived (FFUW.974). This challenge was discussed on the WhatsApp group by one of the researchers who explained: "I have been discussing with a lot of people the successes and challenges of the project thus far. We are realising that the major stumbling block is our lack of buyers of produce. We need to work together to grow our network to include buyers" (FFUW.974). Many of the users explained that they expected to meet more local buyers from local retailers through the FFU project (FSCR). This is a suggestion and a challenge that needs to be addressed and taken forward to improve any further work done in the food system with this community.

The users also believed that the FFU app and the FFU project would be able to bring other groups or entities into the supply chain. This perceived affordance was specifically with reference to bringing the Hawking community into the discussions around local supply chain (FFSC7). This potential affordance however was not realised in the short period of the FFU project due to various inhibiting factors, the most prominent being that the hawkers, many of whom are older women, did not have access to compatible technology to engage in conversations over the WhatsApp platform and to explore the FFU app (FFSC5).

The FFU app users and the project managers also believed that the Food for Us project and the application would enable the small-scale farmers to gain more buyers. FFU users perceived this would open up market access for the farmers so that local people would consume more local produce. There were trial users who explained that opening up a potential market was the main reason they had joined the project (BSCR). One of the participants from the #MatchMaking workshop explained: "So I am happy to join you, because I am looking for the market for the maize"(MMWR1.89). This still remains a potential affordance of the FFU project and its unrealised potential is due to a number of inhibiting factors which include the lack of buyer users engaging in the application (FFUWD), the stability of the application (FFUWD; VCIPM1; FFS.C1) and the lack of participation in the project by the larger retailers (FFUWD; FFS.C1; FFS.C). Even though this affordance was not realised in its totality, there were components of the FFU project that did open up opportunity for partnerships and

allow for the development of new markets for some farmers. This will be discussed in section 4.3.2.2 below.

Strengthen local business

The potential affordance to strengthen the local business in the Raymond Mhlaba municipality was another perceived affordance. One of the buyers explained that she was very excited to be part of this project as she believed "that through involvement in an application such as this, she would be able to grow her business substantially," (FFUMAU34). One of the ways that the project tried to strengthen local business was through sourcing fresh produce from the local farmers for catering for the Amanzi for Food TOT course (TOTW2O). This activity was not only to support the local agricultural sector, but also to incentivise the small-scale farmers to use the Food for Us application to advertise their produce. This activity was not as successful as hoped due to many farmers not having any produce when required by the caterer due to the seasonality of the produce (TOTW2O).

The FFU app users and the FFU project managers also believed that the FFU app would be effective in strengthening the local supply chain through reducing the transaction costs of trading local produce. The project managers believed that the Food for Us application and the associated networked social learning support systems would reduce "the transaction cost between producers and users" (VCIPM1.4). This reduction in transaction includes the cost of resources, transport and opportunity costs (BSCR). These transaction costs might have been curbed slightly for some of the users (FFS.B8), but there was insufficient use of the FFU app and evidence from the social learning networked support systems for this potential affordance to be fully realised.

Development of a case study of excellence

The final perceived potential affordance of the networked social learning support systems was that the users strived to make the Raymond Mhlaba case study a successful pilot project, which could be considered as an area of excellence and innovation in the use of technology to further small-scale farming (MMWR4). During the #MatchMaking event one of the participants described how they hoped that the FFU app would look: "one would want this app to carry fresh good food and then buyers to be seeing this fresh food and see if they can be getting that food" (MMWR1.44). Due to a number of challenges, inhibiting factors and technical difficulties in the trial period, the Food for Us app was not as actively used as users and project managers would have liked. The FFU project in the Raymond Mhlaba municipality was a successful case study and a huge amount was learnt from the experience (VCIPM1), however the perceived affordance of a highly efficient case study and area of excellence was not achieved after this short first phase of the FFU project.

The perceived potential affordances discussed above describe a summary of those that emerged through the activities and support systems that were discussed in section 4.3.2.1. A full list of the perceived potential affordances can be found in Table 4-4.

4.3.2.3. Realised Affordances

As explained in section 4.3.2.2 above there were many affordances, both expected and unexpected, that were realised during the Food for Us application trial in the Raymond Mhlaba municipality. The realised affordances are those that were successful in achieving change. The full list of realised affordances can be seen in Table 4-4 and I discuss eight of these in the section below: (1) network building, (2) growing the community (3) increased and improved communication, (4) knowledge sharing and discussion, (5) the development of support platforms, (6) the building of confidence, (7) collaborative app development and implementation, and finally (8) strengthening of areas of the local supply chain.

Network building

One of the most successfully realised affordances was that the Food for Us app and FFU project networked social learning support system's enabling of network building within the local Raymond Mhlaba municipality, as well as the network building within major institutions at a higher project level. Even though many of the users explained they had not got what they had expected out of the FFU project, they had managed to make a number of important relationships and build important partnerships (FFSA; FFSB; IFSB, BFSC). One of the buyers explained that she believed that, "being part of the project has been a positive experience for a lot of people as it has enabled farmers to meet new people" (VCIS5.153).

One of the aims of the FFU project was for the local supply chain to be more connected so that local relationships could be made resulting in more open markets and less wasted produce (Jenkins & Ward, 2016). Networks were built and partnerships formed within and across communities of practice, thus between farmers, between farmers and buyers and between farmers, buyers and research and learning organisations. Farmers became more acquainted with one another and created relationships and partnerships where they would trade resources to the benefit of both parties (MMWR1; FFUWD; FFSB). During the #MatchMaking event, a poultry farmer was looking for a potential seller of maize for chicken feed. A maize farmer also attended the #MatchMaking event and required a constant market for her dry maize. These two participants' meeting and interaction at the #MatchMaking event resulted in the development of a trading partnership and strengthening of the local supply chain network (MMWR1).

The Food for Us app and the networked FFU project social learning support systems also assisted in connecting farmers with buyers. There were a total of 43 registrations to the application, including 25 farmers and 11 buyers (with the remainder identifying as researchers) (FFUAS). The support systems, specifically the FFU WhatsApp group and the #MatchMaking event, provided an opportunity for the farmers to connect with the buyers. At the #MatchMaking event there were approximately 11 farmers, eight buyers and 11 participants who were from either government or other institutions (see Appendix H for full attendance register). One of the FFU trial participant users noted the following:

> My expectations were definitely met and especially through the #MatchMaking event where I met guys and girls who I can have relationships with and partner with in business. I was able to connect [redacted] for spinach, which he sells in Alice and I also partnered with the man who has a piggery in Middeldrift. These were two people who I think I can work with in the future. (FFSB9)

The aim of the #MatchMaking event was to connect buyers and sellers of produce and to build a network to strengthen the local supply chain. A number of concrete partnerships developed from the #MatchMaking event. These included:

- Maize traded between farmer 1 and farmer 2
- Intermediary 1 connecting with farmer 2, farmer 3 and farmer 4 to sell their fresh produce
- Maize traded between farmer 3 and intermediary 1
- Mxumbu Youth Co-operative (farmer) and farmer 5 connected to collaborate on farming ventures
- The RMDA connected with all the farmers and sellers to assist in facilitating the local supply chain

(MMWR1, MMWR2, MMWR3, MMWR4)

The FFU project also assisted buyers to become aware of and connect with local producers in the area. One of the buyers described the FFU app as:

> Platform to find new farmers that you didn't know before. The [redacted] are an example of someone who I didn't know was selling a certain type produce. The [redacted] sell indigenous chickens as well as homemade honey. I didn't know that they had these products available for sale. (BFSB1)

Several buyers were unaware of the number of local farmers that were selling good, fresh produce and through the #MatchMaking event and being part of the FFU WhatsApp group and receiving updates of harvested produce, they were able to discover new suppliers (IFSB; BFSB; VCIB4).

Not only was the #MatchMaking event a platform for developing a network, the WhatsApp group was considered an important tool to further develop and nurture the newly created Food for Us network. One of the users explained she became more aware of locally grown fresh produce and developed

new relationships with the farmers through the WhatsApp group and not through the FFU app (FFSB1). She explained that when users uploaded a photograph of what they were going to add to the FFU app, she would see the produce and then contact the user directly (through a call or private message) to request more information and buy the produce outside of the application (FFSB1).

The network building was not only restricted to the users of the Food for Us application in the Raymond Mhlaba case study, there was also network building at a greater FFU project level. The FFU researchers and project managers started to develop partnership with other institutions who had done work in similar fields such as in the sustainable food systems, small-scale farmers, food waste and technological innovation fields. According to the project managers, there were a number of connections and relationships formed between the Rhodes University Environmental Learning and Research Centre and the Stellenbosch Sustainability Institute (VCIPM1 & VCIPM2). Through the Food for Us Introductory event in Stellenbosch and Grahamstown and the Food for Us Dissemination event in Stellenbosch, there was also networking that occurred between the diverse stakeholders, including private sector, retailers, NGOs, government officials and research and learning institutions. This networking encouraged discussions and knowledge sharing amongst those working and researching food systems thereby creating opportunities for collaboration (VCIPM2).

One of the best cases of network building that emerged from the project phase one in the Eastern Cape case study was the networking by the Mxumbu Youth Co-operative (see Box 4-1).

Box 4-1:The Story of the Mxumbu Youth Co-operative

The Mxumbu Youth Co-operative, based in the Mxumbu Village in Middeldrift, played a very important role in developing and testing the Food for Us application. This group of 13 youth farmers (VCIS5) invested much time and enthusiasm in the FFU project and played an important role in spreading the FFU app to many more farmers and buyers within their community. Prior to the FFU project, the Mxumbu Youth Co-op had not met or worked with many of the farmers or farming associations in the Raymond Mhlaba municipal area (VCIS5). With the help of the Food for Us project, the Mxumbu Youth members soon were introduced to many innovative and hardworking farmers, community members and active farming networks (Amanzi for Food). The chairperson of the Mxumbu Youth Co-operative became particularly involved in the local supply chain through becoming involved in RAYMAF (Raymond Mhlaba Farmers Association) as well as becoming a member of the Imvotho Bubomi Learning Network. The chairperson of RAYMAF explained how they initially met the Mxumbu Youth Co-operative members at a Food for Us meeting and the built a relationship from there. In a value creation interview with reference to the chairperson of the Mxumbu Youth co-operative and the Mxumbu Youth Co-op he said, “Ja he is actually our deputy secretary [Mxumbu Youth Chairperson]. Ja so last year we also co-opted him to also be part because those guys [Mxumbu Youth Co-operative], they work very hard, they work very very hard” (VCII3.50).

The Mxumbu Youth Co-op members also took part in the Amanzi For Food Training of Trainers course with

three of them (including the Mxumbu Youth chairperson) graduating from the programme. The Mxumbu Youth Co-operative grew from strength to strength over the period of the FFU app trial, as they became more integrated into the local agricultural community. The co-operative members explained that when they started the co-op they were not selling all their produce; now with all the new contacts and partnerships, especially with the RMDA, they were able to sell all their spinach at a very good price at the end of 2017 (VCIS5). Furthermore the Mxumbu Youth C-operative believed that many of the relationships that led to increased sale of their produce developed out of the connections made with the RMDA through early Food for Us discussions. One of the members explained:

> So we actually met through the app sessions. Then we actually call him [RMDA representative] to see if he knows any of the people who will be able to buy the cabbage in quantities. Yeah. he actually said no, he will come and see us. He came to see us and the spinach was nice. Nice, nice he took just one bunch [of spinach] and one head of cabbage and came back and said they wanted some. (VCIS5.222)

The Mxumbu Youth Co-op also worked with elder members of the communities who were not confident with mobile phones. The youth group worked alongside their elderly colleagues to assist with marketing their produce (VCIS5). Not only did the Mxumbu Youth co-op develop partnerships with the elderly community around Middeldrift, but they also encouraged other youth co-operatives to develop the same model (VCIS5).

> Yeah. That's why we as Mxumbu youth are trying to rope in the older people. Because most of the guys that are farming in small plots are the old people, so we are trying to rope them in when we're speaking about when we are speaking about the app. So when we don't have stuff to sell, we can sell their stuff. Through our phone on the app. (VCIS5. 254)

The chairperson of the Mxumbu Youth Co-operative was particularly enthusiastic to make the Food for Us app successful in the Raymond Mhlaba community and therefore became a spokesperson for the project in the local community. Due to the good work of this Mxumbu Youth co-operative chairperson, the FFU project started to pay him a small stipend to assist with on the ground training of users in the Raymond Mhlaba community for three months of the FFU application trial.

The Mxumbu youth co-op gained a huge amount from the FFU meetings and networking opportunities, as they were able to meet a large number of active and innovative farming partners, such as the partners involved in promoting organic farming practices and the development of a GMO-free maize zone in the area. The Mxumbu youth hosted a large World Food Day event on 16 October 2018 in Mxumbu village with the support from the African Centre for Biodiversity and the Imvotho Bubomi Network. The event was well attended by a multitude of different stakeholders, including researchers from Rhodes University and the University of Fort Hare, NGOs, local community members and the local small-scale farmers. This event did not fall under the Food for Us project, however its success shows how the Mxumbu Youth Co-operative has grown and become valued in the local farming community through their efforts to network with a diverse stakeholders and work hard.

The Mxumbu Youth co-op continue to be supportive of the FFU project even after its completion with the chairperson explaining that this application (Food for Us) was an important innovation that he would like to see turn into a successful innovation: "This is not just a project, this is something we need, we want our grandchildren to be able to get use from this application, let's make it work" (FFSC.5).

The network-building component was an important success of the Food for Us project and created a strong foundation for other affordances to be realised. Due to the development and building of networks, the community started to grow.

Grow community

It was recognised that in order to have an effective and efficient local supply chain, one needs to build a connected and integrated community network that is not working in individual silos. The Food for Us community was a collection of relationships that started to develop as the Food for Us application was introduced. Communication within the Food for Us community mainly took the form of the WhatsApp group. As people within the Raymond Mhlaba community became interested in the project, they were invited to be part of the WhatsApp group. Anyone was allowed to register to the Food for Us app and existing members of the app and WhatsApp group would invite other interested members to download the FFU app and try it (FFSC). One of the app users explained that "soon all our clients will come from the app. We as RAYMAF managed to recruit a buyer from Port Elizabeth, they are buying in bulk so be ready and upload your business quickly to the app" (FFUWD.305). The FFU WhatsApp group was the most common platform for introducing new users to the FFU project and inform existing and new participants of the aims and objectives of the Food for Us project.

The existing FFU users were asked to actively recruit more farmers and buyers to grow the network so the app could be used more widely and therefore benefit from mass participation (FFUWD). The call to ask existing users to invite and extend the network was effective with an influx of participants midway through the FFU app trial. This active recruitment by the existing users also allowed the FFU app and the FFU project to be 'owned' by the users, rather than recognised as an outsider intervention. One of the intermediaries noted, "the app has introduced a new concept that we've been talking about, the bottom-up approach. Now it's us that are going to the departments or government and saying this is what we want and we want it in this way" (VCII3.116). This idea of active involvement and community ownership will be discussed further.

To allow for the network to grow naturally and enable the existing users freedom to steer the growth of the application, I allocated WhatsApp user administrator rights to several key members of the group, enabling them to add contacts to the group. This saw the growth of the group and an increase in activity in early 2018 with activity peaking in February with 234 messages sent (see Figure 4-3) (FFUWD).

The WhatsApp group also provided a space where users were able to introduce themselves, inform participants of where they were living and what they were producing (FFUWD). For example, a new user recently added to the group said: "Hello everyone, I am [redacted] from King William's Town, I am farming with vegetables"(FFUWD.432).

A reoccurring theme that emerged from the final survey (users were asked what they had learned from being part of the FFU project) was that they learned how important it was to develop partnerships and grow networks and communities such as the FFU network. A farmer explained: “I have learned important lessons on how to enhance your product and how the people in the community help each other through assisting each other” (FFSB7).

What appeared to be unique about the Food for Us project was the supportive sense of community that developed around the FFU network. A sense of support and understanding developed around the use of the Food for Us application especially when users started to experience software challenges (FFUWD). There was a collective understanding that through reporting technical errors and sharing issues, the users and the app developers could work together to improve the application (FFUWD.68). A culture of positive feedback developed with users discussing on the WhatsApp group when they had successfully downloaded the FFU app or successfully uploaded a product (FFUWD). One of the participants posted on the WhatsApp group: “Hi guys, I have just downloaded the latest version. The people that are struggling to download just need to keep trying, maybe it’s a network problem” (FFUWD.85). This comment on the FFU WhatsApp group provided encouragement and support to other users who were experiencing problems. This supportive characteristic was common within the FFU network. The encouragement and support extended beyond the uploading of produce and included support for fellow users good yields, hard work and good leadership. One of the users showed their support on the application saying:

> 106: Beautiful leadership let’s join hand in hand to fight poverty.
> 107: We are on that motion sir (FFUWD.106 -107).

The #MatchMaking event also developed a strong supportive culture of collaboration as one of the RMDA hosts said, “It is not every day that you meet people that are very encouraging who are willing to participate, who are determined, you know the perseverance” (MMWR4.31).

When asked about the main things that emerged for users out of the FFU project, they explained that the Food for Us app and the WhatsApp group had developed a community where information and ideas were shared and where farmers looked out for and supported one another. One of the farmers explained: “This application and the use of the WhatsApp group has encouraged a sense of sharing between different producers. If you have and I don’t have, I will recommend a client to you”(FFSB1). This sense of security and togetherness had not been recognised by this user before.

The supportive culture of the growing Food for Us community was encouraged by the enthusiasm and excitement afforded by the social learning support systems. The #MatchMaking event and WhatsApp group played a particularly important role in nurturing an enthusiastic attitude towards the Food for Us application (VCIB4). When asked about the success of the FFU project, the interest and

excitement that the Food for Us projects created amongst the local Raymond Mhlaba supply chain community was mentioned. One of the buyers explained that they believed that "the application did well for the first phase of the project. It created significant awareness but there is need for improvement and there is opportunity to improve. Excitement and awareness has been made amongst several people but more people need to respond, the bigger the audience the better" (BFSB1). As one can see from this comment, there was a shared understanding that even though the network had grown and developed, there is a need to grow the network further to include more buyers, more intermediary entities and other important stakeholders in the discussion.

Improved communication

The third important affordance that was realised by the project's networked social learning support systems was improved communication. According to a discussion with a representative of the RMDA, there was no regular communication between different entities of the local supply chain prior to the FFU project (VCII2). Due to the lack of communication, activities with the local supply chain have become isolated leading to an absence of an integrated food system (VCII3). The FFU app and the networked social learning support systems aimed to improve the communication channels between buyers and sellers of fresh produce to reduce the amount of fresh produce that goes to waste (VCIPM2). Communication channels developed between (1) the buyers and sellers of produce, (2) the local sellers (farmers) and (3) the FFU app users and the technical team and project managers.

The FFU WhatsApp group, with its physical attributes, which allowed all participants to send texts, photographs and screenshots was a key communication channel that was used to communicate between different communities of practice. The WhatsApp group provided a platform on which to discuss a multitude of issues, ideas and to present suggestions. The users also used the WhatsApp group to discuss logistics, to gain more information about available produce and to manage produce transactions (BFSB1). One of the users explained that the FFU WhatsApp group was particularly effective in communicating with the local supply chain quickly and effectively: "the application and the WhatsApp group mean that things are communicated quickly, everybody has WhatsApp and they are all able to communicate quickly about what they have and what they can sell" (FFSB12).

The FFU WhatsApp group also provided a communication platform that enabled communication channels between the FFU app users and the FFU app technical team. Wayne Steed, the app development technical liaison was part of the WhatsApp group and therefore many of the challenges and applications were directed straight to him on the FFU WhatsApp group. The WhatsApp group provided a way for users to constantly be in contact with the technical team to ensure that challenges with the application were fixed as quickly as possible. I introduced Wayne to the FFU app users on the WhatsApp group by saying, "Hi all, I have added Wayne to the group so he can deal directly with

us to fix the problems as quickly as possible" (FFUWD.42). This communication channel allowed for the users to have more influence in how the application was developed as well as enabled challenges to be dealt with immediately. Users were able to make FFU app suggestions directly to Wayne with regard to features or ideas (FFUWD). One of the farmers suggested on the FFU WhatsApp group that the application developers don't make all of the fields compulsory as the produce sold by the farmers doesn't fit into the specified fields and therefore the buyers might not appreciate information that is inaccurate. As the farmer explained to the technical liaison on the FFU WhatsApp group: "well won't that be an inconvenience to a buyer, coz if I was a buyer it would be to me, can't you avail some field to be left empty" (FFUWD.420). This open communication channel also developed an important support platform for the users. Wayne, as well as other fellow users, used the WhatsApp group to assist new members with how to use the FFU app. This will be further discussed later in the section.

The opening of communication channels also allowed for there to be increased knowledge sharing through discussion and constructive debate between members of the Raymond Mhlaba community.

Knowledge sharing and discussion

Through network building, growing of the FFU network and the opening of channels for communication, knowledge sharing in the Raymond Mhlaba local supply chain became easier. Knowledge was shared through a number of the support systems: (1) discussions on the WhatsApp group, (2) through the #MatchMaking event in Alice, and (3) through the workshop sessions part of the TOT in the Amanzi For Food programme.

Food for Us project participants described the #MatchMaking event as a very successful event where people were able to share how they farm and other important information with fellow farmers, especially younger and less experienced farmers. One of the younger maize farmers explained that she learned from one of the farmers who she met at the #MatchMaking event that she should not grow beans during the winter months as they did not grow well during this cold season (FFSB6). She was not aware of this prior to their meeting:

> I have learned that building relationships is very very important, I have learned that it is incredibly important to ask others for help. I learned at the #MatchMaking event through one of our discussions, I found out from one of the other farmers that one cannot plant beans in winter, they will not grow. I did not know this before the #MatchMaking event. I realised that I need to talk to other people on what they think and what they know. (FFSB6)

Not only did this farmer learn to not grow beans in the winter, she also learned that it is important to consult fellow farmers and ask their advice on farming practices. There were many discussions about farming practices on the FFU WhatsApp Group. There was discussion regarding mulching, water saving practices and the correct way to create compost (FFUWD). Due to the FFU project being affiliated with the Amanzi for Food TOT course, many of the participants on the FFU WhatsApp

group had been part of the Amanzi For Food TOT training. The knowledge of the TOT participants provided an information source for the rest of the FFU WhatsApp participants. During the trial, one of the new participants requested assistance and advice on how to deal with issues associated with lack of water for planting:

> Speaker 1: 1002- Guys I hv [have] a challenge of water. Can you assist me. What I must do. Bcz [because] im using the tap water and they are off. They can take 2 wks [weeks] no water.
> Speaker 2:1003 - It's a very difficult matter but someone here will advise you sir.
> Speaker 3:1004 - Where you based? Is tap water the only water resource available or there are other resources but you don't have means to get from them?
> Speaker 1: 1005 - I do not have other resources so far….
> Speaker 3:1009 - During taps you can store water to the taps. For in a case of absence of water from the taps.
> Speaker 4: 1010 -Yes there are many ways to stretch rainwater, rainwater-harvesting techniques.
> Speaker 1: 1011- k [okay] (FFUWD)

The users described the FFU WhatsApp group as a type of "informal training" (VCII3.132) where discussions regarding farming and supply versus demand challenges were discussed in a secure and supportive space. The FFU WhatsApp group also created a space where people were able to debate important agricultural topics. One of the heated discussions that occurred on the FFU WhatsApp group about the FFU app was a debate around organic farming practices versus conventional produce advertised on the FFU app (FFUWD 146-181). This discussion became quite animated with two farmers leading the debate. There was disagreement around the promotion of exclusively organic produce as opposed to organic and conventional produce. The discussion was closed in good faith with a misunderstanding cleared up through discussion and a confirmation of decisions taken at the last meeting (FFUWD 179-180). Both organic and conventionally produced produce were accepted by the Food for Us application, however organic produce was specially requested by TOT members for catering at the Amanzi for Food TOT event. The two farmers ended their debate on good terms:

> A difference in ideas doesn't mean we are against each other but it's a sign a willing to hear and learn from others. This group is exactly for that kind of engagement. Keep well [redacted] and all the ILBN and RAYMAF team. Love you all. (FFUWD.181)

The flashcards used during the #MatchMaking event also enabled knowledge sharing. The participants were prompted to ask questions about the different types of produce on the cards during the introductory activity discussed previously in this chapter (MMWR1). A product that was of particular interest was the mustard that was advertised on the FFU app. There was discussion amongst the participants at the #MatchMaking event about what mustard was and how it was grown and what it was used for as this was a food many of the farmers where not familiar with (MMWR1).

Through knowledge sharing there was a deepening understanding amongst the FFU app users around what food waste looked like and how users were recognising it in their community. One of the users explained that she was now able to identify food waste and she no longer throws away food at her home, but instead puts this 'kitchen waste' into a 'hole in the ground' to develop compost (BFSB4). The same user explained that she was inspired by being part of the project to start her own garden. She explained how she hoped to start to grow her own plants and maybe even her own herbs (BFSB4).

Waste was also identified in the farming context. Not only was it identified, but ways to change practices to avoid wastage were also discussed within the FFU workshops, TOT courses and on the FFU WhatsApp group. One of the farmers explained that her approach to trading fresh produce in the nearest town has changed since being more informed about *food waste* and learning about different remedies (FFSB6):

> I used to take a bakkie through to town to sell my maize, my green maize, and then I would come back with waste as the green maize would be ruined and I would have only sold a small amount. So now I have learned that if people order and contact me then I only take that which was ordered to town so as not to ruin the rest. (FFSB6)

The FFU app encouraged many of the users to look into employing more sustainable lifestyles, for example changing practices to sustainable farming practices (including agro-ecological and organic), to use water saving practices as well as to grow non-GMO crop varieties (MMWR1, TOTW1O TOTW2O, TOTW3O). There were a number of farmers that had not been exposed to these farming techniques before engaging in discussions on the FFU WhatsApp group, during the #MatchMaking event and through the Training of Trainers courses. One of the farmers explained:

> I now have examples when one speaks of organic waste. It was also good to see how one can use organic waste to improve crops as a part of agro ecology. I have started to adapt through hearing the information on the group. I have started to change to make things organic. (IFSB3)

One of the other important knowledges that was shared was the knowledge of how to use technology and become familiar with a new applications (TOTW3O; FFUWD). The networked social learning support systems enabled the technical knowledge of the technical liaison to be shared with the FFU app users through the FFU WhatsApp group and FFU app trainings. This knowledge sharing will be discussed further below. Much of what was learned by FFU app users was through their ability to communicate and share knowledge with one another.

Support platform

The FFU WhatsApp group provided a support platform where users were able to seek technical assistance from the technical liaison as well as collaboratively troubleshoot app issues together. As

described in section 4.2 and the section above, the FFU WhatsApp group was created with a key function to provide technical support to the users anytime anywhere. The WhatsApp group was effective in this regard as the users were able to share screenshots of the Food for Us application error messages and share them on the group with the technical liaison, or send them straight to me (as one of the FFU team members) via private message to investigate (FFUWD 20; 21; 25; 40). The technical liaison, Wayne Stead, could determine, on receipt of the error message, how to assist the users in solving the problem (VCIS5). The WhatsApp group also provided a platform where the FFU app users could discuss and decide on how they would collectively understand the use of the application. One example of this was that many of the users did not feel that they could effectively use the FFU app's measuring system (per kg) to sell their produce as produce was normally sold per unit (per bunch, per bag or per head). It was collectively discussed on the WhatsApp group that the users would understand the per kg measurement as a per unit measurement (FFUWD).

> Speaker 1: 408 - No it's fine, I'm still testing the app.
> Speaker 1: 409 - Tell me, can I only sell in kg?
> Speaker 2: 410 - Yes the unit has not yet been changed so either guess the weight based on a 2 litre cool drink which then weighs 2kg.
> Speaker 2: 411 - Or place the number of items in the quantity section, and say in the description how you are selling it, bunch, packet, each etc.
> Speaker 1: 412 - Then 20kg would be 20 bunches of spinach?
> Speaker 3: 413 - That's right [redacted] as long as you say it in the description. (FFUWD)

On a number of occasions the technical liaison worked through a list of common issues with the users including: (1) lack of memory on one's phone (FFUWD.332), (2) limited signal (FFUWD)(FFSB), (3) outdated software (FFUWD.1041-1048), (4)password issues, and finally (5) application software bugs (FFUWD;BFSB; FFSB). The FFU WhatsApp group acted as an effective tool to explain the different features and functions of the FFU app as well issues on individual phones to the trial participants. The example below shows how the using the WhatsApp group was used to explain how to use the switch account function[21] (FFUWD).

Due to the culture of support that was developed within the Food for Us project, new users were provided with additional support and encouragement through the FFU WhatsApp group. Whenever new users were invited to be part of the FFU WhatsApp group, they would be welcomed to the group with warm messages of welcome such as "Welcome to all added in this group" and "Welcome indeed to the new members. We look forward to you being active on the Application itself! Thanks Sarah," (FFUWD.234 - 235). Over and above these supportive welcoming messages, the users also received encouragement from one another to keep trying to use and explore the Food for Us application. As

[21] Switch Account function on the *Food for Us* application allows the users to switch from viewing the application from a buyer's perspective to viewing the application from a seller's perspective and therefore someone can purchase produce as a buyer, even if registered as a seller and vice versa.

one of the WhatsApp group participants explained to a new user: “You just need to download the app and then register [redacted] and then [redacted] can help you through the registration process, welcome to the team” (FFUWD.441).

Many of the FFU app users struggled to use the FFU app when they first started the downloading and registering process (FFSC). Through the FFU WhatsApp group as well as through the training sessions, the new users where shown (1) how to find and download applications (any applications) in the Google Play store,[22] (2) how to search and identify the Food for Us logo, and (3) how to download the Food for Us application (MMWR2; TOTW1O; TOTW2O). These training sessions also took the new and older users through the application explaining (1) how to view produce as a buyer, and (2) how to upload produce as a seller. The transaction function was explained with a demonstration of the upload and transacting process. These training presentations provided support for the participants and also provided an opportunity for the users to ask to see how certain functions worked on the application (MMWR2; TOTW1O; TOTW2O; TOTW3O).

These FFU training sessions also provided a support platform where users could ask for assistance with other types of technology that was needed for the Food for Us project (WhatsApp and G-mail). Downloading the FFU app from the Google Store meant that the users needed a Google account and a G-mail (Google email) email address. During the second TOT workshops three of the participants asked for assistance to download and set up a Google email account (G-mail). I was able to assist TOT participants with downloading the necessary programmes and teaching the mobile owners how to use the G-mail and FFU technology. This provided users an opportunity to be introduced to and explore additional communication channels (such as email) rather than simply WhatsApp (TOTW2O).

The social learning support platforms (WhatsApp group, trainings and workshops) also provided platforms where users could showcase their successes in using the FFU app as well as successes in the agri-business enterprises. Users were able to notify the technical liaisons when the issues that they had reported had been corrected. Users were also able to explain to fellow users through the WhatsApp group how they overcame technical issues (FFUWD). Collaboration and communication, that was encouraged by the development of the Food for Us supportive culture, encouraged the affordances of the FFU app and FFU project to be realised and enabled value to be created (the value enabled will be discussed in Chapter 5).

[22] Google Play Store is an android mobile application store where mobile users can download applications they would like to use on their mobile phones. Google Play Store has thousands of applications that the mobile phone users need to either buy or can download for free.

Collaborative app development and introduction

The support platforms and the opening communication channels (discussed above) allowed for the Food for Us application development and introduction to be a collaborative activity. The networked social learning support systems encouraged feedback and input from the FFU app users encouraging them to take ownership of the project.

The networked social learning support structures, such as the FFU WhatsApp, enabled there to be a supportive feedback system that ensured that technical software challenges were being reported to the application developers as soon as they were being experienced (FFUWD). The WhatsApp group allowed constant communication with the FFU app technical team and me. This meant the FFU project participants were more involved in the managing of the FFU project. Many of the users started to take active roles in the project, making suggestions for changes and additions to the application and introducing it to friends and colleagues. Users made suggestions on the WhatsApp group to the app developers and the technical liaison about categories to include in the list of produce and made suggestions for functionalities on the FFU app (FFUWD). One of the users asked the technical team why the app could not keep the users logged in:

> Speaker 1: 917- Can't you make the app keep me logged in?
> Speaker 2: 918 - It should remember your user name and password so all you do is click login.
> Speaker 1: 919 -Yes that too, but other apps keep you logged in, whenever you click on the app it appears where you left off, can that be possible with the application too? (FFUWD.917-919)

The #MatchMaking event and the third TOT event was another opportunity for feedback and suggestions from the users of the application. Section 4.3.2.1 reported the comments and suggestions of participants of the Training of Trainers course (TOTW3C). These suggestions were passed onto the FFU project managers and FFU app developers, who used them to inform adaptations to the Food for Us application. One user commented that the co-ordinates and map were neither useful nor accurate (FFUWD; VCII3). These functions were not being used. After the feedback was reported back to the FFU project managers at the mid-term meeting in Cape Town (in February 2017), the map function was removed as it caused unnecessary software challenges and was not being used effectively by the trial participants.

The constant communication with the users through the workshops, WhatsApp group, FFU app training sessions, TOT workshops and interview also enabled the users to feel fully involved in the FFU project. One of the users felt part of developing the first version of the FFU app having been at the first Food for Us Introductory meeting held in Grahamstown. For this reason she felt it was important she stay involved in the FFU project (VCIS6). Community members and a variety of

stakeholders involved in the Food for Us project from the start (introductory workshop in August 2017) meant that many of the users felt a sense of loyalty to the FFU project and were active in trying to make it a success. Users explained that when they saw their suggested functionalities in the first version of the Food for Us application they felt a sense of pride in the project as well as a sense of ownership and responsibility for its success (VCIS6). An intermediary who identified with the project very closely explained:

> So the app has introduced a new concept that we've been talking about, the bottom up approach. Now it's us that are going to the departments or government and saying, "this is what we want and we want. We think it's going to work for us. Can you come and join us" (VCII3.116)

This intermediary believed the project came from the farmers rather than having been imposed on the community.

Another farmer with a similar understanding of the impact of the project explained that even though not everyone used the application fully to transact, the application and what it aimed to do (open market access for local farmers) resonated with many of the farmers and therefore became a common interest and encouraged collaboration, network building and knowledge sharing (VCIS6. 90).

The users started to become particularly involved in the introduction of the FFU app and FFU project through growing the network and making suggestions for new members. There were instances where the users on the WhatsApp group suggested ways forward to grow the FFU network and bring more buyers on board:

> Speaker 1: 548 – Let's rope in the buyers so that they could buy our products.
> Speaker 2: 549 - Yes my leaders how about the [redacted] no [redacted], or who is supposed to be going to these big buyers?
> Speaker 1: 550 - Let's chat tomorrow morning my leader and discuss this matter further. Teamwork is needed hard. (FFUWD.548-550)

Through the networked social learning support systems, the users became very vocal and active in making the first phase of the Food for Us project successful in terms of developing and nurturing a new social network, the FFU network.

Building confidence

Through the creation of support platforms and knowledge sharing, the FFU app and associated networked social learning support systems have been able to contribute to building users' confidence in their own use of mobile technology. The FFU project has been able to teach important IT skills to many of the users, one example being the learning about G-mail use described in the section above (TOTW3O). These learned skills have resulted in improved confidence in technology use for some users.

Through the FFU WhatsApp group, many of the FFU users learned technical lessons about mobile phone hardware and software. Through lengthy troubleshooting discussions between the technical liaison and the FFU users, the WhatsApp group members were exposed to information about how they could check and update their software on their phones as well as how to update the Food for Us application (FFUWD.1041-1048).

This knowledge on how to use technology and how to experiment with applications and communication platforms resulted in users becoming more familiar with the concept of innovative technological mobile tools to assist in agriculture and business. Reflection on the first phase of the FFU project showed that 12 of 23 users felt more confident about using mobile apps due to their involvement in the FFU project (FFSB). One of the users said: "I think people, generally I think people are technologically more confident after the use of the app" (VCII2.125). Another user felt that technology was incredibly important to developing farmers in modern times and therefore learning to use technology is vitally important; this was echoed in the #MatchMaking event (VCII3; MMWR1). The same user explained in an interview: "So when you introduce a new app to us, you are introducing us into new technology because the world is actually changing. So if you don't adapt as farmers it's going to be difficult for us to be sustainable"(VCII3.48).

Despite the FFU app not being used as extensively as initially hoped during this pilot phase, and considering the short period of 18 months in which two versions of the Food for Us application were developed, the users built up their confidence in working with technology to improve their agri-business opportunities (using Food for Us app, Food for Us WhatsApp group and email). One user highlighted the following form of learning:

> If we use technology, we are bound to improve and especially if we use technology to market things and market our produce. I have started to use the WhatsApp and other technology like this app and Facebook. People start to enquire about what they see online and they start to enquire if they don't have WhatsApp about how to be part of the new technology. (FFSB1)

Many users recognised the important role of technology in the future of their businesses and therefore there was a strong incentive for users to experiment with applications (such as the Food for Us application) and online marketing to improve their skills.

Strengthening the local supply chain

The final affordance of the networked social learning support systems draws on all the affordances discussed above together with the affordance of strengthening the Raymond Mhlaba municipality local supply chain. This affordance was recorded as a perceived affordance as well as a realised affordance as it was realised, but not to the extent that the FFU project manager and FFU app users perceived, as described in section 4.3.2.2 above.

The users who were part of the Food for Us trial started to recognise the importance of a strong local supply chain. There was a shift in understanding around the need to buy local produce and support local farmers as one of the users explained in the final survey: “I have also become more aware of local farmers and started to realise that it is important to support them in their endeavours. It is important to find local produce” (BFSB4). Buyers of produce started to note where produce came from and how it was brought to the point of consumption, a process they had not monitored closely before (VCIB4). One of the buyers interviewed explained that before the introduction of the Food for Us project they travelled to King Williams Town (a urban centre that is approximately 70 km from Alice) to buy produce for their business: “Yes, my understanding has changed. I now understand the distance and the economic savings that one can do. I have stopped travelling to King Williams Town to buy food” (BFSB2). Reduced travel to buy or sell produce became a collective vision for many of the FFU app users and project participants who envisioned a future where the Raymond Mhlaba municipality is self-sufficient: “We are going to have more supply. Where we really don’t have to go outside of the Raymond Mhlaba to try and get things” (VCIB4.92).

The networked social learning support systems also strengthened the local supply chain by marketing the local produce of the local farmers. The Food for Us application provided an online platform for people to advertise their produce. A total of 31 products were uploaded and advertised on the Food for Us app (as described in section 4.2.4) (FFUAS). On the FFU WhatsApp group, a number of trial participants also advertised their produce (some of which was not loaded onto the FFU app) (FFUWAD). Honey, drumhead lettuce, livestock, spinach and butternut were advertised on the WhatsApp group (FFUWAD). There were two instances where trial participants advertised on their neighbours’ or community members’ behalf due to lack of access to the appropriate technology for the FFU App or FFU WhatsApp group. One user asked on the FFU WhatsApp group whether someone would be able to upload a product on their neighbour’s behalf: “Njende is requesting that this be sent to the App, he says his phone does not have Google play store” (FFUWD). The Food for Us WhatsApp group became a place where many members of the community advertised their produce, not only those who were registered Food for Us application trial participants.

The #MatchMaking event was another networked social learning support system that provided an excellent opportunity for produce to be advertised. At the #MatchMaking event maize, ‘indigenous chickens’ and spinach were being advertised to all the participants; this promoted the development of new partnerships within the local community (MMWR1).

> 39 - Thank you very much so those who want maize, I know [redacted] also has, you can get in touch with him and he will give you this yellow maize.
> 40 - Is it ready now?
> 41-Yes, yes, the expiry date is 18 July 2018. So selling from now until 18 July.(MMWR1)

There was a designated time that was set for users to (1) introduce themselves, (2) introduce what they farm, and (3) advertise what they had available to sell or what they were looking for (MMWR1). One of the buyers made a potential sale through newly made connections by advertising her maize at the #MatchMaking event: “so it’s getting to feeding maize for the baby chicks, even now there is someone from Queenstown that I met at the #MatchMaking event and he wants to buy all my maize when its dry, totally dry, he is going to take all of it” (VCIS6.70).

Enabling produce advertising on the FFU WhatsApp group, through the #MatchMaking event and at the training courses, also strengthened the local supply chain by encouraging local trading amongst FFU project participants. There was a significant amount of trading that occurred between the FFU users, sometimes assisted by the FFU app. According to the FFU application statistics collected from the back end of the FFU app, only one successful transaction was made through the Food for Us application between a buyer in Grahamstown and a seller from the Fort Cox College (two heads of lettuce sold for R10 each) (FFUAS). The statistics from the FFU app only shows one transaction; however, many users reported attracting a market through advertising their produce on the FFU app and the networked social learning support systems and then received calls and messages outside of the app to enquire and organise transaction logistics. One of the users explained:

> I made a purchase but this was not through the application, it was outside the application. I also made a transaction through the application but there was no response. I knew the person so it was much easier to give the person a call and then speak through the call rather than through the application. If I did not know the person maybe I would have then gone through the application because I do not have access to the contact details. (FFS6)

There were a number of instances when there was discussion on the FFU WhatsApp group where the sale of produce was negotiated. One example was a discussion around the sale of cockerels:

> Speaker 1: 257 - Wow, beautiful cocks, can I buy one to add to my family chicks, pls
> Speaker 2: 258 - Yes please
> Speaker 2: 259 - The price is R250 colleagues (FFUWD. 257-259)

Approximately 20 transactions were made outside of the Food for Us application between the project participants whose experience we monitored (FFUWD, VCIS6, VCII2, MMWR1, FFSA6, FFSA9, FFSB1, FFSB5, FFSB6, FFSB10, IFSA2, IFSB3, BFSA4, BFSB1 & BFSB4). It is predicted that there were more transactions than these 20 as not all the participants in the FFU project were interviewed or completed a final structured interview survey.

Not only was there marketing of produce, but the networked social learning support systems also provided a space where additional market information was shared amongst the local farmers to assist them in their farming enterprises. This was particularly prevalent in the FFU WhatsApp group where farmers discussed what the local retailers and the wider market were demanding. One of the users

shared there was a very large demand for cabbage at the time of posting a comment on the WhatsApp group (FFUWD.1161). There was also discussion in the #MatchMaking event as users brainstormed how they could work together to strengthen the local supply chain. One of the ideas that emerged was growing high value crops, such as lemons or nut trees, in demand from the larger South African and international markets (MMWR4).

The nurturing of 'healthy competition' that one of the users explained was enabled by the Food for Us project, encouraged and inspired users to improve their crops. This ambition to improve further strengthened the local supply chain (VCIS6; FFSB1). One user explained that by being exposed to other farmers' produce on the FFU app, she was inspired to improve the quality of her own produce: "so I think it is more like a… more like a learning curve, not like competition" (VCIS6.86). This same user explained she felt the FFU app, with the help of the FFU WhatsApp group, encouraged people to get together and strive to improve (VCIS6). Another user expressed similar thoughts in a final survey:

> People are posting and the quality of the produce is good and improving. People see the good food on the application and become 'envious' and want to produce good food like that. This creates a space for people to improve. This shows where improvement can be promoted. (FFSB.1)

The project has been influential in encouraging more interaction and discussion around improving the local supply chain and therefore has taken steps to being successful in working toward the ambitious aim[23] that was set out for the Food for Us project at its inception.

4.4. Conclusion

This chapter has provided an understanding of what has been enabled by the Food for Us application and the networked social learning support systems that surround it. I started by sharing an understanding of how the project developed within the Raymond Mhlaba case study area and how the FFU app was used amongst the participants. This provided the context in which to understand the actions and feedback received from the participants. The chapter shows that it was fundamentally important to understand how people use a form of technology before changing the technology for improved results. Through exploring the data, it is possible to see that there is evidence of developing a range of technical as well as social affordances, some of which remain potential affordances and others that were realised in the short pilot period of 18 months. The Food for Us application enabled a variety of affordances; however, many of these remained perceived potential affordances that were surfaced in the project development period and interactions. The networked social learning support

[23] The aim of the Food for Us project was to develop a mobile application which would assist in diverting surplus food and to alternative markets. The Food for Us project aimed to open up market access and strengthen the circular economy of the Raymond Mhlaba municipality.

systems (WhatsApp group, #Match-Making event, TOT courses and research interactions) enabled more affordances than anticipated including network building, improved communication, knowledge sharing and confidence building. In the following chapter I explore how these affordances enabled specific levels of value creation.

CHAPTER FIVE: Value Creation through the Food for Us Project

5.1. Introduction

The affordances, which were discussed in the previous chapter, enabled value creation for many of the FFU project participants. Some of this value was expected, while other value emerged as something new. I used Wenger, Trayner and de Laat's (2011) Value Creation Framework to understand the type of value that was developed for the Food for Us participants, researchers and FFU team as well as for the broader Raymond Mhlaba community. I looked specifically at how value emerged from using the Food for Us app alone, compared to the depth of value that emerged from the networked social learning processes that accompanied the introduction and implementation of the Food for Us app. I also explored the value cycles, which can be recognised as contributing to strengthening a circular economy in the Raymond Mhlaba community.

As described in Chapter 4, there were inhibiting factors that prevented the realisation of affordances and prevented the full realisation of deeper levels of value creation. In this chapter I describe the different challenges and how this affected value creation.

Finally I synthesise this research by formulating three analytical statements, which tie my discussions together and present recommendations for further research. I also present an epilogue for the Food for Us project, explaining what has been going on in the project since the end of the first phase, which came to a close on 30 May 2018.

5.2. Value Creation Enabled by the Direct Use of the Food For Us Application

Using the theory described in Chapter 2, I explored what value cycle developed out of the use and interaction with the Food for Us mobile application. In Chapter 4, section 4.3.1, I listed all of the physical features, potential affordances and the realised affordances of the Food for Us mobile application. In the section below I explain the different levels of value that were enabled by these features and affordances. Table 5-1 provides a summary of the different value creation cycles that emerged through trial participants' use of the FFU app.

Table 5-1: Summarised value cycles developed from use of Food for Us application (for a more in-depth display of the relationships that exist within the value creation cycles see Appendix Q)

Immediate	Potential	Applied	Realised	Reframing
Excitement	Improve mobile use skills	Download and register	Increased confidence in mobile app use	Using technology as an agri-business tool
Exposure to new ideas	Develop relationships	Advertise produce on the application	Exposure to local produce	
	Connect buyers to local farmers	Search for demanded produce	Farmers record produce statistics	
	Share market information	View public wall		
	Technological trading platform			

5.2.1. Immediate Value Creation

As explained in Chapter 2, section 2.4.2.1, immediate value creation is described as value that is experienced immediately at the time of interaction with an object or activity (Wenger, Trayner, de Laat, et al., 2011). According to Wenger et al. (2011) indicators for immediate value can include participation, enjoyment of an activity, engagement with the object in question amongst others.

The use of the Food for Us application enabled a small amount of immediate value for the Raymond Mhlaba FFU project participants. For the buyers, sellers and the intermediary users, the introduction and use of the FFU app created an immediate air of excitement and enthusiasm around the use of the technology to improve agri-business and strengthen the local supply chain as explained in Chapter 4. In section 4.3.1.3 the enthusiasm and excitement that emerged was described by a realised affordance. This immediate value emerged with the introduction of the FFU app to the users, where perceived affordances were developed around the FFU app with users being able to 'dream' about what the FFU app might be able to do for them. These perceived affordances of the FFU app, which emerged from the aims and objectives of the Food for Us project managers and the users themselves, were described in Chapter 4, section 4.3.1.2.

The second immediate value cycle was the exposure to new ideas and new concepts, as can be seen in Table 5-1. Users, when dealing with the FFU app were exposed to new concepts, including technological concepts and concepts such as food waste. The idea of using technical innovation to improve one's agri-business was an immediate idea introduced to participants in their introduction to the Food for Us project. This value was enabled by the affordance of sharing information, which was discussed in section 4.3.1.3.

The rest of the immediate value that emerged from this project appeared to emerge from the networked social learning processes that were used to support the introduction of the FFU app into the community. The workshops, training sessions and #MatchMaking event were particularly effective in developing immediate value for the attendees.

The inhibiting factor that limited immediate value being enabled by the Food for Us application was the instability of the FFU app (as described in section 4.2.1) as well as limited transactional activity occurring on the app (as described in section 4.2.1). Many users explained they felt more comfortable to use other avenues to communicate their interest in locally available produce, rather than the FFU app as described in section 4.3.2.3.

5.2.2. Potential Value Creation

Building on the immediate value cycle, I explored the potential value that emerged from the use of the Food for Us application. Wenger et al. (2011) explained potential value creation as value that is not yet realised but has the potential to be realised at a later stage as described in section 2.4.2.2 in Chapter 2. Potential value is divided into a collection of different types of knowledge capital including human capital, social capital, tangible capital, reputational capital and learning capital (Wenger et al., 2011).

As reflected in Chapter 4, where I shared potential and perceived affordances, I identified potential value that emerged from the use of the FFU app. The potential value of the use of the FFU app was extensive, however much of this value remained potential value due to a number of inhibiting factors as well as due to the first phase of the trial being only 18 months.

Human capital

Human capital value creation is described as potential value that lies in the development of new personal skills, new personal ideas and new goals (Wenger et al., 2011). Many of the FFU app users developed their skills in using mobile technology confidently and explore how applications could improve their business. Through downloading the Food for Us application from the Google play store and learning how to navigate the FFU app, users explained they had improved their ability and confidence to use mobile technology (section 4.3.1.3 in Chapter 4). This human capital developed out of the excitement and enthusiasm to learn new skills and interact and learn about technology which was described as immediate value. Similarly, the new ideas around technology use and its association with farming also encouraged the development and refining of skills that are described as potential human capital.

Social capital

Social capital is described as potential value that takes the form of relationships developed and partnerships made (Wenger et al., 2011). The Food for Us app aimed to develop trading partnerships between the users. The use of the FFU app did allow for the development of a number of trading relationships, especially between farmers as described in section 4.3.1.3. There was also social capital developed by the use of the introduction of the application through relationships built by users assisting one another with technical difficulties and familiarising themselves with technology as described in section 4.3.2.3. Social capital can also be identified by the partnerships that developed between the producers that loaded their produce onto the application and the buyers that showed interest in the produce (as described in section 4.3.1.3). Much of the communication that surrounded these interactions did not occur through the Food for Us app, but instead through the networked social learning support systems affordances (FFU WhatsApp group, #MatchMaking event, training courses and research interactions).

The connections and relationships that developed from use of the Food for Us application resulted in information sharing on the application through the users seeing what was available and at what price (as described in section 4.3.1.3). The social capital developed through building relationships and opening communication lines strengthened the potential to improve the local supply chain logistics. Through the users collaborating, there was potential to communicate regarding sharing produce transport, business marketing and other trading logistics therefore improving local supply chain logistics. This social capital in the form of new collaborations also has the potential to result in less on farm food wastage for small-scale farmers due to an increased access to the local market that was not possible beforehand.

Tangible capital

Following social capital is tangible capital as potential value. Wenger et al. (2011) explained tangible capital as the material resources (for FFU app training guides for using the App see Appendix W: Food for Us Application Training Guide), lists (Raymond Mhlaba supply chain database list), documents (end of project full colour report) or tools (FFU app itself, FUU WhatsApp group and #MatchMaking cards) that are created and have the potential to further create value. There were several forms of tangible capital, the first being the FFU app training guides that were designed by the FFU app developers to familiarise the users with the FFU app. The second tangible capital that emerged from the use of the application was the beginning of a Raymond Mhlaba local supply chain database, which included the details of the local farmers and buyers. The list was developed out of the registration data that was stored on the backend of the FFU app case system as described in section 4.3.1.3. The database list had the potential to improve connectedness in the Raymond Mhlaba municipality, therefore adding to improving the development of relationships and partnerships and

furthermore, the strengthening of the local supply chain. The third tangible capital was the FFU report that was written and shared widely with research partners and potential donors. The Food for Us Final report reported on the progress of the FFU project and the main learning that developed from the trial in the two case study areas. The tools that form tangible capital were of particular importance. The Food for Us app itself was a form of potential tangible capital as it is a tool that can be used to improve the buying and selling of local produce in an effective way. The FFU WhatsApp group was another important potential tangible capital that allowed WhatsApp users to communicate and interact and potential develop valuable relationships. Finally the FFU #MatchMaking cards were an effective tool used within the #MatchMaking event to inform participants about the FFU project and furthermore act as a mediating tool to encourage the workshop participants to engage with the ideas and concepts being discussed.

Reputational capital

The next type of potential value identified by Wenger et al.(2011) is reputational capital. Reputational capital is described as potential value that comes from purely being associated with a particular network, company or activity (Wenger et al., 2011). One of the intermediary users explained they felt being associated with the Food for Us application project portrayed a very positive light over their intermediary organisation as the local community perceived they were partnering with a reputable project that develop concrete solutions, as explained by an intermediary: “So it has done some wonders for us because even though now the farmers they know we have an app that we can actually use it as a platform to sell our produce much much cost effective and much easier” (VCII3.80). The sellers also built reputational capital through consumers and fellow farmers trusting their produce due to their association and partnership with the Food for Us project and the Raymond Mhlaba Development Agency.

Learning capital

Learning capital, Wenger et al.’s (2011) final potential value, is described as potential of people to learn and then later relay that knowledge to other people. There has been learning capital experienced in the use of the Food for Us mobile application. Firstly, the skills that were discussed as human capital earlier in this section were learned by the users and in many instances, as described in section 4.3.2.3, the application users taught and helped each other to learn the skills for getting the most from the FFU app. The relationships that can be described as social capital provided spaces where users could assist one another in learning together how best to use the app. Not only was there learning capital in extending the technological skills that were learned by the users, but also the exponential sharing of ideas around Food waste and circular economies. One of the buyers explained that they now recognise food waste and can address it in their community: “The term is part of my field and therefore I have always been aware of what it means but since seeing it in real life it opens your eyes

and you are really able to really understand the phenomenon … It acted as a motivator ” (BFSB.1). This learning capital has the potential to grow the Food for Us community and spread the ideas of the Food for Us project to encourage improved behaviour around food waste and the use of technology to improve agricultural business enterprises and local economy development.

5.2.3. Applied Value Creation

According to Wenger et al.(2011) the following value creation cycle is applied value, which is defined as the value of actions. Applied value refers to ideas and discussions being put into action. This applied value is strongly related to the potential value cycle as the applied value is a result of different forms of potential value being used or put into practice. Applied value is in continual negotiation with the aspirational narratives as the actions that are taken are made in order to achieve the aspirational narrative (Wenger et al.., 2011). In many cases, the applied value might not result in realised value (realising the aspirational narrative) due to several inhibiting factors or assumptions.

The buyers on the FFU app applied their human capital of improved technical skills (explained in section 5.2.2. above) by exploring the virtual market on the Food for Us app. A total of 11 buyers downloaded and registered on the Food for Us app (as explained in section 4.2.4) thus testing their skills with downloading and registering mobile applications. Furthermore the buyers explained they had browsed the application for produce that they might need to buy from local farmers hoping to support local farmers and buy produce at a more reasonable price (as explained in section 4.3.1.3). The activities can be described as applied value, however these activities did not achieve the aspirational narrative of the FFU project stakeholders (users, project managers, Raymond Mhlaba community) which was to increase local transactions through the Food for Us app, as many of the buyers did not purchase or communicate with potential sellers through the FFU app. Therefore this buyer applied value did not trigger realised value (buying local produce over the app), as the aspirational narrative has not yet been met.

The sellers of produce (farmers) who were part of the Raymond Mhlaba case study used the Food for Us application more extensively than the buyers (as described in section 4.2). The number of farmer who downloaded and registered to be part of the FFU app trial in the Raymond Mhlaba community was 25 – more than double the number of buyers that registered (as explained in section 4.2.4). The farmers registered on the FFU app were much more active on the application, uploading produce as well as logging onto the application on a regular basis (as described in section 4.2.4). Not only were the farmers uploading produce and using the FFU app as an advertising tool, it was also found that farmers used the FFU app as a tool to source produce for their own farming enterprises as in section 4.3.2 illustrated with the example of the woman who sold her dry maize to a fellow farmer for chicken feed. These actions can be described as applied value as the users were using the Food for Us app,

exploring its functionalities and aspiring to turn the potential value, in the form of human capital, and social capital into realised value so as to fulfil the aspirational narrative of the project.

The most prominent applied value that can be recognised in the use of the Food for Us application was the downloading and registering of the Food for Us app. There were many users who downloaded the Food for Us app and registered (total of 43 FFU app downloads and registrations over the 18 month trial); however, of these people, only a much smaller percentage explored the FFU app more extensively. As mentioned above, the sellers were more visibly active on the application as opposed to buyers.

The second most prominent applied value was the advertising of produce on the Food for Us application. As explained in section 4.2.1, there were a total of 31 produce uploads on the Food for Us app over the course of the project. These included a variety of produce such as fresh produce and livestock.

5.2.4. Realised Value Creation

Successfully applied value, which progresses towards achieving the aspirational narrative, results in realised value. Wenger et al. (2011) explained realised value as applied value that is successful in affecting positive change.

The first type of realised value that emerged from the use of the Food for Us application and the affordances it enabled was the realisation of improved confidence, amongst FFU app users, in using mobile applications. Throughout the programme, users became more familiar with the Food for Us application through downloading the FFU app (Applied Value), registering (Applied Value) and testing the FFU app out by uploading produce or searching for demanded goods (Applied Value). This resulted in users beginning to feel more confident in using their mobile phones, and more specifically mobile trading applications such as Food for Us, to assist in developing their local business (as described in section 4.3.1.3 and section 4.3.2.3). Most of the realised value of improved technological confidence emerged through a combination of the use of the Food for Us app as well as the support process that accompanied the introduction of the Food for Us app which I explore in section 5.4.

The second realised value that users encountered was increased understanding and awareness around what was being produced and sold locally by both buyers and sellers of produce. Buyers became aware of what produce was being advertised by local farmers (described in section 4.3.1.3) and farmers were able to open their market to more buyers (as described in section 4.3.1.3) as well as to develop connections with other farmers with whom they might be able to trade commodities. This value did not meet the aspirational narrative fully as it was only realised on a small-scale with a small

percentage of the users using the Food for Us app to connect with the local supply chain while many of the other users used the support structures (such as the WhatsApp group) to connect with one another. Trading between farmers was more prominently realised with the support of the network social learning processes (WhatsApp Group, #Match-Making event and Training Courses) that were used to introduce and implement the use of the Food for Us app. The realised value of the network social learning processes will be discussed in section 5.4.

The Food for Us app also enabled the beginning of a simplified reporting and recording culture amongst the Food for Us users. The realised value of the use of the application has been that farmers have been able to create the beginning of a standardised information record around what they have been able to produce and the price and quantity they have harvested (as described in section 4.3.1.3). This enabled more records to have been developed than before, thereby positively contributing to the strengthening of the local supply chain (a stakeholder aspirational narrative).

The final realised value that emerged from the use of the Food for Us app is that app acted as a common interest for many of the stakeholders in the local supply chain and therefore acted as bonding agent which resulted in people sharing an interest and therefore developing a network (as described in section 4.3.1.3). Once again, the network social learning support processes provided a space for this common interest to be explored which enhanced this realised value (and will be further explored in section 5.4 below).

Much of the realised value that emerged from the FFU project did not emerge from the use of the Food for Us application alone. Through the interweaving of several network social learning support processes with the introduction of the Food for Us app, a large amount of realised value was created. I shall explain this in section 5.4 below.

5.2.5. Reframing Value Creation

The final cycle of value creation delineated by Wenger et al. (2011) is reframing value. Reframing value creation is defined as a transformative learning process where the community, or in this case the FFU app users, redefine the definition of success based on their aspirational narrative being met or re-evaluated.

The reframing value that emerged from use of the Food for Us app was the reframing of how technology could be used successfully to promote small-scale businesses and to strengthen the local supply chain. Many of the users started to realise the importance of adapting to using technology to improve their business with the use of the FFU app acting as an experience that started to encourage this change in mind-set. This changed mind-set built on previous value cycles such as the enthusiasm and excitement that surrounded the Food for Us project (Immediate Value), the improved

technological skills of the users (Human capital, Potential Value), the downloading, registering and use of the Food for Us app (Applied Value) and the increased confidence in technology use (Realised Value). These different cycles, intertwined with one another, resulted in a shift in users' mind-sets towards appreciation of the potential of technological innovation. As described in the previous chapter, users started to explain how they began to realise the potential that lies in using technology (such as the Food for Us app) effectively. This reframing value resulted from the use of the FFU app but also must be attributed to the strong influence that the network social learning processes took in assisting users to discuss this changed understanding and facilitate discussion around the use of technology by small-scale farmers.

5.2.6. Inhibiting Factors

There were a number of inhibiting factors that prevented value creation through the use of the Food for Us application, and further more prevented the realisation of several of the affordances. These included: registration challenges, login challenges, complexities with the FFU app workings, access to compatible technology and infrastructure, challenges with the trial user group, and finally software issues. These challenges have been summarised in Table 5-2 below.

Table 5-2: Inhibiting factors to realisation of application affordances and value creation

Registration process	Complexity of registration process
	Delay in registration process
Login process	Password barrier
Complex application process	Application system not easy to use
	Uncertainty around produce grading
	Location feature isn't clear
	Specifics on the application (recording of quantity)
	Limited produce categories
	Application limited to recording internal transactions
	No initial notification system - limited immediacy
	Not most convenient communication channel
Access to compatible technology and infrastructure	Memory on a device
	Compatible mobile phones
	Bad connection
	Data costs
Software issues	Resulting in the App crashing – unable to use the app

Registration challenges

The registration challenges were described by some users as tedious, requiring too much information from the users (BFSC; FFSC; IFSC). The delay between the user registering and being approved by the technical liaison on the backend also became an inhibiting factor as users were not able to explore the Food for Us application immediately after downloading it. This became particularly challenging during the training sessions where the users were taken through the registration process and registered

and downloaded the app (as described in section 4.2.1), however were not able to use the app immediately due to the need to be approved by the technical liaison on the backend (TOTW2O). A regularly occurring theme that developed from the training course was that the drop in users (meaning the number of users who did not continue to use the FFU app after downloading and registering) occurred when the user had not been able to explore and experiment with the Food for Us app on their own mobile phones whilst in a workshop, meeting or training.

Application login challenges

The login process was described as frustrating and an inhibiting factor for many of the users. The first version of the FFU app required the user to enter an email address and an automatically generated password every time they wanted to log in to the Food for Us app. This was described as an inconvenience (FFUWD). Improvements to the Food for Us app created a function where the FFU app software remembered the users' credentials and therefore allowed the users to log in by clicking a button rather than re-entering the credentials each time they opened the app. Prior to the 'remember password feature', many of the users would report that one of the greatest hindrances to their effective use of the Food for Us app was not being able to log in because they could not remember a password (VCIS5). The 'remember password function' improved this challenge considerably, however a number of the users requested why the application wasn't able to simply stay open in the background of the phone, comparing the FFU app to applications such as WhatsApp, amongst others.

Complex application processes

The complexity of the Food for Us app and the way that some of the features worked, were displayed and were used also acted as a hindering factor to the FFU app's contribution to creating value. Some of the users explained they felt that the Food for Us application was not guided by a simple and coherent process. This was with specific reference to the transaction and log in features (VCII2). There were also challenges with the produce grading systems as users were not sure how to grade their produce according to the 1 to 5 scale that was offered by the FFU app (MMWR1).

The location feature was another function that became a hindrance as the users were not able to use the map function in the initial version of the FFU app due to numerous software bugs.[24] Furthermore, the co-ordinates displayed in the produce upload information did not assist the users, as many did not know how to use co-ordinates to find a location (VCIS6; MMWR1).

[24] Software bugs refer to the technical software issues that are a result of poorly developed features of the application.

There were other functions that did not cater to the audience of the application. The quantity of produce was recorded on the Food for Us app according to its weight (per kg). This way of recording produce was not conducive to the users (small-scale farmers and local smaller retailer) that were part of the trial in the Raymond Mhlaba case study. There was much frustration and confusion expressed by the users, most of whom did not sell their produce per kg, but rather per bunch, per bag, or per unit (VCIS5; MMWR1).

The limited produce categories (which the user needed to specify when uploading a produce advertisement) resulted in users feeling uneasy to upload and advertise produce that was not part of the conventional list of commercialised produce. There were instances when users were not able to find an appropriate category to advertise their herbs, medicinal plants or diverse crops (MMWR4). Some users felt they could not participate in the application due to the produce, which they were trying to sell, not being put forward by the app developers. The technical liaison was able to add categories on request from the users; however this often took a while and mitigated against the ease and convenience of advertising on the Food for Us app. It was suggested by the users that they be able to create their own categories to cater for a diversifying market (MMWR4). This suggestion is yet to be developed.

As described in section 4.2.1, many of the users advertised produce on the FFU app, but transacted outside of the Food for Us application through other communication channels such as the WhatsApp group or via voice calls. This resulted in much produce advertised on the FFU app being sold outside of the app, and therefore not recorded as sales on the backend of the Food for Us case system. This created challenges for those trying to use the FFU app as a tool to develop records of harvested and sold produce. The FFU app does not allow the user to manually show that produce has been purchased outside of the app. This resulted in the FFU app recording produce which had passed its expiry date, as wasted produce rather than produce that had been purchased outside of the application (FFUWD). One of the users suggested a function be created to record the produce sold outside the app so as to accurately reflect what happened.

The earlier versions of the Food for Us app did not have any type of notification system to alert users when new produce was added. This meant that users needed to check the app on a regular basis which was increasingly time consuming and less convenient. A push notification system was introduced to the app in May 2018, but as the app trial was almost over, not many users made use of the function. The lack of a reliable and immediate notification system resulted in a lack of immediacy. Users did not receive immediate feedback from their actions on the Food for Us app. Buyers did not know when new produce was uploaded and therefore the likelihood of the produce finding a buyer before it became wasted was slim. This lack of immediacy resulted in major challenges in achieving the Food

for Us project team's aspirational narrative of the project, which was to reduce on-farm food waste (VCIPM1).

The Food for Us app was also considered complex due to the number of communication channels that were involved in its workings. The FFU app required users to have a working and regularly checked email address in order to register. This email address was used for communications between the FFU app backend and users. The email was used to notify the sellers about a buyer's interest and also provided a platform on which the buyers and sellers were encouraged to communicate logistics. This technology (G-mail and email account), additional to the new FFU app, posed a challenge for users who needed to become familiar with two different types of mobile software technology.

Access to compatible technology and infrastructure

A large number of farmers and buyers in the Raymond Mhlaba municipality had access to Internet enabled smart phones as discussed in section 4.2.2. But several farmers and smaller informal buyers were excluded from the FFU project because they did not own a mobile phone that was able to accommodate the application (as discussed with regard to the hawkers in section 4.2.3). In addition to the challenge of compatible mobile technology was the high cost of data. Many users were affected by this (VCIS5; FSC10; FSC11; FSC12).

Users without appropriate Internet-enabled technology were sometimes challenged by the amount of memory available on their mobile phones. The Food for Us app is not large (it requires 79 MB of internal storage on the mobile device) (VCIAD1) but memory on mobile phones is often filled with videos and photographs. Most entry-level phones do not have a large amount of memory space and therefore this challenge became a major inhibiting factor to the growth of the Food for Us app. Users would look for applications, photos or videos to delete in order to free more space for the FFU app, therefore the Food for Us app needed to provide clear benefits to the user in order to be kept on the phone (TOTW2O).

The lack of mobile signal in the Raymond Mhlaba Municipality, especially in the more rural areas, resulted in many challenges for the users who tried to connect to the Internet to upload produce to advertise, or in the case of buyers, connect to view what produce was available (VCIB4; VCIS5; FFUWD; MMWR4; FFSA10; FFSA 13; FFSC1; IFAS2; TOTW2O). The challenges with connection meant that the users weren't able to upload produce immediately and therefore the immediacy of local transaction that the FFU app aimed to achieve was lost.

Application software 'bugs' and technical challenges

The largest inhibiting factor arose from the persistent software challenges and application bugs that made the Food for Us app difficult to use during its piloted development. The users reported on the

WhatsApp group when the application would (1) 'crash', (2) show an error notification, or (3) close unexpectedly. These software challenges did not allow the users to explore or use the FFU app effectively (FFUWD). There were also re-occurring challenges with the login, camera, map, chat and produce upload functions, which discouraged users from using these features (VCIS6; VCII2; FFSA 11; FFUWD; FFSC 11; FFSC 12). The issues with these functions inhibited the realisation of their potential affordances (VCIS6; VCII2; FFSA 11; FFUWD; FFSC11; FFSC12). Not only did these software challenges deter users from exploring the Food for Us app, it also resulted in many users losing confidence in their ability to use the FFU app. Many users mistakenly attributed the application errors (software malfunctions) to their incorrect use of the FFU app instead of as a result of poor or inadequately pre-tested software development (FFUWD). The instability also deterred users from using the FFU app as it became unreliable and users were unconvinced of its workability (VCIPM2).

The instability of the Food for Us application earlier in the FFU app trial affected the success of application training. In all the training throughout the trial, either the technical liaisons or myself would run through the FFU app giving a demonstration of how the application worked as explained in section 4.2.1. We intended for the training participants to go through the FFU app with us on their own phones at the same time. This was often not possible as in almost every training session, either the participants, or me would encounter an application software challenge that would affect the successful workings of the application and therefore affect the application demonstration (TOTW1O; TOTW2O; TOTW3O). When the application was not working according to specifications during the training, this discouraged many users from trying the application at home.

To alleviate insecurities about the application instability, I reminded the participants at the workshops, trainings and meetings that the FFU project was only a trial and that the Food for Us app was not perfect, therefore there would be challenges with how the application works (TOTW1O; TOTW2O; TOTW3O; MMWR1). Users were encouraged to take an active role in improving the Food for Us app by reporting the software issues so the app development technical team could fix them to provide a better application experience.

The reason for the instability of the Food for us app was attributed to the short period of time application developers were given to design, build and test the app (VCIAD1; VCIPM2). There was a misunderstanding between the app developers and the project managers regarding the duration of time required to build a successful application. The app developers felt that the development of a simple working application in such a short time (3-5 months) was a "big success" (VCIAD1.133), while the project managers described the Food for Us app and its instabilities as a downfall of the project (VCIPM2). The instability of the FFU app definitely played a large role in deterring people from using the application and sharing it more widely within their communities.

All these inhibiting factors resulted in limited value creation and social learning being enabled by the use of the Food for Us application affordances alone. What emerged as enabling more deep fruitful social learning was the use of the Food for Us app alongside the FFU networked social learning processes that were introduced to assist with the app's introduction into the Raymond Mhlaba local supply chain community.

5.3. Analytical Statement One

Through gaining a better understanding of the value creation cycles that emerged from the use of the Food for Us application affordances reported on above, it is possible to see that the most prominent value creation cycle that emerged was the potential value. Much less applied, realised and reframing value was created. After analysing the data using the value creation framework, my first analytical statement to inform this study's research question is:

Analytical statement 1: Value creation from direct use of the mobile application was not fully realised to meet the expectations set out by the project aims and objectives in the available trial period of 18 months.

As explained above, there was little evidence of realised value that emerged from trial users use of the application that was successful in achieving the aspirational narrative for the stakeholders and the FFU project management team in the trial period of 18 months. As described in section 4.2.1, one of the objectives of the project was to: "To adapt and develop a mobile phone app to trade on-farm (informal through to commercial) surplus produce"(Food for Us, 2018, p. 4). The FFU project managers also aimed for the Food for Us app to be disruptive in altering the local supply chain (VCIPM2). In addition to the aims of the FFU project managers, many of the FFU app users also explained their aspirational narratives for the Food for Us app which included (1) perceived increased access to buyers and (2) increased revenue amongst other expectations (as described in section 4.3.1.2 in the potential affordances of the application). Unfortunately these aspirational narratives were not all met with a number of inhibiting factors preventing varying cycles of value from being created in the time available. Therefore this analytical statement comments on the inability of purely the independent use of the Food for Us app being successful in enabling the development of social learning value in the given time frame (18 months).

Based on the above analytical statement and the challenges discussed in section 5.2, I propose the following recommendations to improve the enabling of further value creation within projects that resemble the Food for Us project.

5.3.1. Recommendations

Complicated Application Processes: In future mobile application research projects that include the full design and building of an application, more research needs to be done to understand the 'use culture' (how smartphones and their physical functionalities are used) of the prospective users. It is important to understand what mobile functions the users are comfortable using and how these functions are currently used. In the case of the Food for Us app, on example is the redundancy of the co-ordinate recording function as few users made use of this information due to not being familiar with how to use co-ordinates to find locations. In addition to carefully crafting the functions of the application to suit the proposed audience, I recommend that there should be emphasis placed on the usability[25] of the application. This means there needs to be more emphasis on ensuring the users find the application easy to use and navigate.

Technology development: In future mobile app pilot development projects it is recommended that more testing of the app is done internally amongst project designers, before introducing it to case study app trial users. As described in the challenges, a mobile application that continues to crash and have software issues causes the participants to become despondent with the app and the project, therefore reducing the chance of rich positive feedback from participants and achieving the aspired narrative.

Appropriate equipment: projects such as this should supply users in pilot sites with compatible technology (compatible smartphones to download Internet enabled applications) or develop strategies for technology sharing as was done in the Raymond Mhlaba case study site. It is also recommended that users be assisted with connection costs (data costs) as this also acted as ah inhibiting factor for the inclusion of many users within the Raymond Mhlaba community. Assumptions about technology availability and use culture (e.g. smart phone use) need to be checked beforehand via more in-depth grassroots technology surveys at case study level because most of the available mobile phone use data currently available is macro level data.

5.4. Value Creation via the Networked Social Learning Support Systems on Landscapes of Practice

The value creation that emerged from the affordances of the networked social learning support systems, which included the (1) WhatsApp group, (2) training workshops, (3) Training of Trainers courses, (3) #Match-Making event and (4) the research interactions, enabled relationship building,

[25] According to the International Organisation for Standard (IOS), as cited in Yen's (2010) thesis, 'usability' is described as the relationship between humans and computer with two more specific definitions. In this study, I understand usability according to the IOS 9126 definition, which explains usability as "the capability of the software product to be understood, learned, used and attractive to the user, when used under specified conditions." (Yen, 2010., p3)

discussion and opportunities for information to be shared amongst different user groups as reported in Chapter 4. In Table 5-3 that follows I have mapped out a summary of the level of value that has been enabled by the networked social learning support system's affordances.

Table 5-3: Summary of value creation cycles enabled by the networked social learning support systems

Immediate	Potential	Applied	Realised	Reframing
Excitement	Network and relationship building	Increased communication	Strengthening of local supply chain	Using technology as an agri-business tool
Exposure to new ideas	Database	Community support	Transacting of local produce	Definition of waste in rural areas
Build contacts	Sense of community	Collaborative troubleshooting	Improved application	Bring youth into local supply chain
	Building skills	Supportive feedback loops	Ownership of the project	
	WhatsApp group	Marketing and trading of produce	Increased confidence in mobile use	
	Knowledge sharing	Recognize food waste		
		Interest in sustainable farming		

5.4.1. Immediate Value Creation

The immediate value that emerged from networked social learning support systems can be reduced to three main types of immediate value that developed within the Raymond Mhlaba case study FFU app trial. This included (1) meeting a diversity of people, (2) the introduction of new ideas, and lastly (3) creating enjoyment and enthusiasm around new ideas.

Meeting diverse people

The networked social learning support systems, which accompanied the introduction of the Food for Us app, enabled users to gain immediate value by exposing them to a diversity of people whom they may have not met before, as described in section 4.3.2.3. The #MatchMaking event was one networked social learning process that was particularly successful in providing opportunities for the participants to be introduced to a variety of people. The #MatchMaking event activities encouraged people to network and find out more about one another. The affordances of the #MatchMaking activities enabled immediate value in the form of introductions to unknown people, which could

progress into relationships as a form of potential value. The WhatsApp group also provided a platform where introductions could be made and a diverse set of stakeholders could be contacted (as described in section 4.3.2.3). The immediate value of being part of the Food for Us WhatsApp group also opened channels to unlock further cycles of value creation, such as potential value and applied value.

Introduction of new ideas

The second immediate value that I identified was the introduction of new ideas to the Raymond Mhlaba trial participants. As described in sections 4.3.2.3, the networked social learning support systems afforded the introduction and sharing of knowledge. The introduction of new ideas (around the use of mobile technology in small-scale farming and introduction of organic farming practices) acted as a form of immediate value, which further developed into potential value, and applied value as will be described in the sections to follow. Ideas around (1) sustainable farming practices, (2) the importance of trading locally, (3) the use of technology's role in improving local trade, and lastly (4) ideas around waste and the re-use of waste, were shared and explored amongst the Raymond Mhlaba Food for Us case study participants and larger stakeholders. These new ideas further provided users with solutions to challenges they were facing or new information that they were not aware of as described in section 4.3.2.3.

Enjoyment and enthusiasm

The last immediate value that I identified was the enjoyment that many of the users gained from being part of the Food for Us project. The enjoyment and positive environment that was created by the networked social learning support systems enabled an enthusiasm and pride to develop around the ideas (as described above) that were introduced. This positive enthusiasm encouraged the users to discuss, further explore, and put into practice the ideas and practices that were discussed in their daily routines. As described in section 4.3.2, users felt honoured and excited to be part of an innovative project.

These types of immediate value set a foundation on which further cycles of value creation started to build upon. Through the meeting of new, diverse people and being exposed to new ideas, which sparked enthusiasms and excitement, much potential value proceeded the immediate value creation cycle.

5.4.2. Potential Value Creation

The immediate value, discussed in section 5.4.1, grew into an extensive collection of types of potential value that was enabled by the affordances of the social learning support systems.

Human capital

The major human capital potential value that was enabled by the networked social learning support systems involved the skills that the users developed around application use and improvement in mobile technology competencies. Through the training courses (initial FFU app training course, TOT courses and #Match-Making) which provided a brief introduction to the Food for Us app as described in section 4.2, the participants were given a demonstration of how to explore the FFU app and encouraged to explore the FFU app on their own devices while in the training and report any problems. The affordances of the courses, workshops and meetings allowed users to ask questions, to experience a virtual journey through the application and become familiar with the online FFU app interface in a supported environment. The WhatsApp group also provided a platform that encouraged human capital to be developed and IT skills to be learned. There was much discussion around how to use the Food for Us app (as discussed in section 4.3.2.3), and how to use other types of technological innovation (email) on the WhatsApp group for all participants to learn from (as described in section 4.3.2.3). The human capital that was developed was therefore increased user capacity for mobile technology to build agricultural and retail business to encourage the production and consumption of local produce. This was enabled by affordances such as supportive learning environments and learning partnerships created by the networked social learning support systems.

Collaborative troubleshooting was another skill that the users learned as a type of human capital. Through discussion on the WhatsApp group and during the training courses, the users debated the possible causes for error messages or the Food for Us application unexpectedly closing. These discussions assisted users to gain important skills in understanding how to troubleshoot technical problems on their mobile phones as well as gaining confidence in their ability to use the Food for Us app.

Not only was there skill development with regard to technological use, but there was also skills development in learning about important skills needed for agri-business. There was much discussion around the need to have accurate records of one's crops and what was sold and what was not sold. This was discussed in several workshops described in section 4.3.1.2. Not only was keeping records considered an important skill that was touched on through the networked social learning support process, but so were lessons about pricing, high value crops and sustainable farming practice development.

Another means of human capital was the user identifying with the FFU project and its aims. Many users needed assistance with the marketing of their produce, or gaining access into the local market. There were also a number of farmers who had been experiencing farm food waste and wasted resources. This personal identification with the FFU project was a personnel asset. Wenger et al.

(2011) explained that human capital can be explained as personal assets which an individual has achieved after participating in an activity. In this case, the personal asset that emerged is the alignment of the goals of the individual with the goals of the FFU project. This alignment of goals is potential value as with aligned goals and ideas, further activities and discussions between the members of the community might lead to action and applied value for all stakeholders of the Food for Us project.

The most important human capital that was most extensively enabled by the networked social learning support systems was the building of confidence of the users. As explained in section 4.3.2.3, many users explained that they had become more confident in using their mobile phones, particularly the Food for Us app. The supportive WhatsApp group and the open safe space of the training course provided a space where users were able to ask questions, test the app, experiment and ask for advice, thereby building people's confidence in their ability to use the FFU app. This confidence building happened through collective discussion and interaction between the users about their different experiences of using the application.

Social capital

There were many relationships and connections (social capital) that emerged from the affordances of the networked social learning support systems. According to Wenger et al. (2011), social capital is an important potential value as it builds one's social connections so people have access to more information through colleges. By having more connections and relationships, people know whom to approach for advice and assistance with challenges or new ideas.

Network building was an emergent social capital that developed as result of the networked social learning support systems. An FFU network was developed through the formation of relationships in the training and courses and nurtured by the FFU WhatsApp group. The FFU WhatsApp group created a common place where all the users were able to discuss ideas around the Food for Us app and the goal of the FFU project. As described in section 4.3.2.3, the building of relationships was an affordance of the social learning processes, which enabled buyers, and sellers of the produce to meet and develop relationships. This new network was valuable for many participants who made new acquaintances and developed their business contacts further. The new partnerships, especially those built at workshops, allowed for knowledge to be shared more easily between the users as spaces for discussion were opened up.

The network building was as a result of the realised affordance of improved communication between the different members of the Raymond Mhlaba local supply chain as described in section 4.3.2.3. Improved communication was enabled through the WhatsApp group, #MatchMaking event, app training workshop and TOT courses, which provided a space for social learning and value creation to

occur. Improved communication was a major enabling factor in allowing for networks to be created and relationships and partnerships to be built by the trial users.

Improved communication, as well as users identifying with the FFU project (human capital described in section 5.3.2.1 above) also enabled the FFU network to grow. The growth of the FFU network can be described as social capital as it embodies the continued network building that occurred due to the WhatsApp group, workshops and the growing interest by the community in the use of innovative technology to strengthen the local economy. The growing of the FFU network has potential to further connect the local economy (connect farmers to buyers) and increase inclusivity of small-scale farmers as described in section 4.3.2.2.

Furthermore, with the network building, a sense of community emerged amongst the FFU app users who were part of the Food for Us WhatsApp group and training workshops. This social capital enabled a type of comradeship to develop. When users where struggling with elements of the Food for Us app, they felt empowered to talk with one another and encourage one another to keep working with the technology until it worked as mentioned the example displayed in section 4.3.2.3. This sense of community allowed for further value creation cycles to develop from the social capital as it created a strong support base for new applied activities.

The social capital that emerged from the networked social learning support structures has been very important to the users with three users explaining specifically that the social connections were the most successful part of the project (FFSB; IFSB; BFSB).

Tangible capital

The tangible capital that emerged from the networked social learning support systems was the development of a very basic database of all farmers and buyers in the Raymond Mhlaba community, as well as the WhatsApp group itself.

The database includes information on all of the Food for Us app trial participants including their names, mobile numbers, email addresses, location and the services they provide or produce they sell. This information was collected with the permission of the participants to enable improved communication within the local supply chain. The information was not made public and only shared with the Raymond Mhlaba Development Agency (with the permission of the participants) to develop the local agricultural economy further. The ethics of participants' personal metadata was discussed in Chapter 3, section 3.9. This resource allows for potential value as it enables users the resources to connect with people within the network. It also acts as a source of local supply chain information making people aware of different farming techniques, produce grown and services provided by the various stakeholders in the local community.

The Food for Us WhatsApp group conversation was another example of tangible capital that emerged from the FFU project. As described in section 4.3.2.1, the FFU WhatsApp group was a vital part of the project and a number of important discussions were housed on the chat history. There was sharing of knowledge and debate (FFUWD 146-179) as well as negotiation of trade (FFUWD 251-265). The chat history acted as a resource for members to look back on previous conversations to remind themselves of information shared, plans made and introductions of new people on the WhatsApp platform. This tangible capital holds potential value as it acts as a resource for members of the WhatsApp group, reminding users of sustainable farming techniques as well as providing a record of network growth including the contact details of new members. These resources allow users to pursue new actions to attempt to achieve the aspired narrative.

Reputational capital

Reputational capital is so much a part of the networked social learning processes, as explained in section 5.2.2 above. Farmers felt they had the support of a reputable organisation (Food for Us, Amanzi for Food and Rhodes University) behind them and therefore their produce would be trusted and more regularly bought. The association with the WhatsApp group and then attendance of the courses also allowed a reputation for innovation and action to build around the participants and users associated with the project.

Learning capital

Much learning capital emerged from the use of the networked social learning support systems. The WhatsApp group and workshops and courses provided a safe space were knowledge could be shared and ways of doing things explored, negotiated and re-negotiated. As described in section 4.3.2.3 there was much knowledge sharing that occurred between the different users and between the users and the project team. The topics covered included discussion on sustainable farming techniques, how to use them to improve the local supply chain, how to avoid food waste and wasted resources. This knowledge that was shared holds important potential capital as the information shared can be applied not only in the context of the case study, but also in the users' own context. Wenger et al. (2011) described learning capital as "transformed ability to learn" where those gaining potential value are able to learn something new and different. The networked social learning support systems created a space where knowledge could be shared and ideas expressed thus providing learning capital; specifically around growing a sustainable local supply chain and reducing wasted resources.

5.4.3. Applied Value Creation

As described above, applied value is “adapting and applying knowledge capital in different contexts”, (Wenger et al., 2011, p. 21). The applied value of the networked social learning support systems is evident in the changed behaviours and activities of the FFU project stakeholders.

Increased communication

The first most notable applied value that was enabled was increased communication within the Raymond Mhlaba local supply chain. The FFU WhatsApp group, the #MatchMaking workshop, the FFU app training course and the Amanzi for Food TOTs all provided a platform where people could easily communicate with one another. The FFU WhatsApp group in particular played a very important role in increasing communication between the Food for Us app users as well as between users and project managers, as described in section 4.3.2.1. As discussed in section 4.2.1, the WhatsApp group went through a period of the group being used on a regular basis with regular discussion, followed by a drop in interaction. The areas of high participation would often occur in conjunction with project workshops, community activities or updates in the application software. The areas of high interaction with the FFU WhatsApp group, can be termed a period of high applied value, as the users where taking action on the tangible capital that had potential value (as discussed in 5.3.2.2.above). All project participants, in particular the buyers and sellers of produce, experienced applied value from increased communication. The aspiration for this applied value was, in most cases, to make a sale so as to increase trade between local stakeholders to strengthen the local supply chain and reduce wasted resources.

Community support

The second applied value was community support within the FFU project. The networked social learning support systems enabled the development of a community of practice around the Food for Us project. As explained in section 2.3.2, Wenger (1998) believed that communities of practice develop when a collection of people share a common pursuit of an enterprise. These communities develop together, sharing a common history while using the same farming practices and the same language (Wenger, 1998). The newly developed Food for Us community of practice is a collection of people who have a shared pursuit to improve the sustainability of the Raymond Mhlaba local supply chain by using innovative technologies to promote local trade of locally grown produce therefore reducing food waste. The common innovative technology used in the community is the Food for Us app. The community support that has developed within this community of practice has been instrumental in growing the community. As described in section 4.3.2.3, the FFU WhatsApp group and the #MatchMaking workshop provided a platform for support for the development of the local supply chains from the community. This support came in the form of technical support (from technical

liaisons and from fellow app users) as well as emotional support where users would encourage one another to keep trying to use the Food for Us app and celebrate with one another when business was conducted through the use of the app. The users felt connected to one another with a common interest as described in 4.3.1.3. The Food for Us community was inclusive of all new members, warmly welcoming members into the community of practice through heartfelt messages being shared on the WhatsApp group (an example provide in section 4.3.2.3). These actions developed out of the potential value that existed in the (1) WhatsApp group (tangible capital), the (2) introductions made, networks built and the sense of community and comradeship that developed (social capital), as discussed in section 5.4.2 above.

Active advertising through support channels

Due to the culture that was created by the Food for Us community there were high levels of active participation by the users. There was active participation in the project through users marketing and seeking of produce through (1) the Food for Us app, (2) the Food for Us WhatsApp group and (3) the Food for Us events (see section 4.3.2.3). This was the most common and expected applied value. As explained there was a lot of activity in uploading adverts for fresh produce and livestock, on the Food for Us app (31 in total (FFUAS)) as well as on the WhatsApp group (21 +/- (FFUWD)). The enquiry of buyers after seeing the produce advertised on any of the platforms can also be considered applied value. Three of the buyers explained that they often observed the produce on the various platforms and then engaged with the sellers further through their own personal means of contact (BFSB). There was only one instance of a transaction being completed through the Food for Us app, however after discussing transaction with the users in the final survey, many users explained that the support structures had assisted many of the transactions that occurred outside of the Food for Us app.

Grow the project

There was also active participation in how the users took action to grow the FFU project and introduce it to community members and colleagues. There was an active drive by many of the users to find more people to start to use the Food for Us app. Users asked if community members could be added to the FFU WhatsApp group or could download the FFU app (see section 4.3.2.3). These actions developed out of the potential value that lay in the relationships and sense of community (social capital) and the identification with the Food for Us goal, which emerged out of the human capital as discussed in section 5.3.2.1 and section 5.3.2.2 above.

Collaborative troubleshooting

Applied value also emerged through the supportive feedback loops and collaborative error reporting of Food for Us app users. The FFU WhatsApp group, workshops, courses and meetings that occurred

on a regular basis enabled the users to be active in reporting issues linked to the Food for Us app. As explained in section 4.3.2.3 the networked social learning support systems enabled the users to (1) report technical and general issues, (2) discuss technical challenges in one forum, and (3) collaboratively work through solutions together as the Food for Us team. This supportive feedback and error report developed as a form of applied value where the users were applying action to achieve the aspired narrative which was an improved application that would enable increase local transaction between local farmers and local consumers. Action was taken due to the potential value that lay in the WhatsApp Group platform (tangible capital), supportive sense of community (social capital) and personal vested interest in the project (human capital) that existed within the Food for Us project.

Sustainable livelihood actions

Applied value also emerged through the changed actions of a number of users who used the knowledge capital they had gained (particularly with regard to food waste and the need to use sustainable farming practices) to change their practices. There were a number of users who started to recognise food waste when they had not done so before (as described in section 4.3.2.3). By recognising food waste, the users started to shift their mind-sets to change wasteful behaviour. There were also users who started to change their actions to resemble more sustainable living and farming practices due to their exposure to new information and new ideas (immediate value and potential value). One of the users explained that they started to build their own compost heap, while another started to adapt to growing GMO-free crops and employed water-saving methods of farming (as described in section 4.3.2.3). These actions have been applied, however the trial of the FFU app did not continue long enough to determine if these actions were successful in achieving the aspired narrative of a successful sustainable crop for the farmer, desired rich soil for gardening or a sustainable alternative use for kitchen waste.

There was much more applied value that emerged from the FFU project with the assistance of the networked social learning support systems compared to what emerged from the use of the Food for Us app by itself. This is where it is possible to see how important the networked social learning support structures have been in developing deeper levels of value creation.

5.4.4. Realised Value Creation

Wenger et al. (2011) explained that just because action has been taken, doesn't automatically mean there will be an improvement in performance and achievement of the aspirational narrative. Here I explore the realised value of the networked social learning support process. Realised value encompasses the applied value that has been successful in achieving elements of the aspirational narrative (the aim or goal of the participants or community).

Increase in transactions

Realised value was evident in the increase in transacted local produce. As discussed in the previous section (section 5.4.3), there was only one transaction made through the app, however outside of the FFU app there were a number of transactions made (as described in section 4.3.2.3). These local transactions resulted in improved performance in the farmers who benefitted from economic remuneration, increasing their buyer basis and avoiding the wastage of surplus food. A number of farmers explained that they had gained customers who they had not been supplying before and this had helped them to grow their agricultural businesses (section 4.3.2.3). The buyers also benefitted from the local transactions by gaining access to locally grown, fresh produce. This realised value is in-line with the aspiration of the users as well as aligned with the aspirations of the Food for Us project managers and project team.

Improvements in Food for Us application software

There was important realised value in the improvement of the FFU app from the first version to the second and then further updates thereafter. The improvements in the app were a result of errors, constant feedback loops and the update suggestions by the application trial users. The trial participants communicated the issues, bugs and frustrations with the FFU application through the Food for Us WhatsApp group, workshops, and research instruments (interviews and surveys). The application developers used these sources of information about difficulties and suggested improvements, to correct and fix software bugs on the Food for Us app. The combination of potential value in the form of identifying with the project (human capital), gaining confidence and skill in IT use (human capital) and understanding more about innovative technology (learning capital), followed by applied value in the form of application use, error report and support from the Food for Us community, has led to the development of an improved Food for Us app. The app developers explained that if users hadn't given such thorough and consistent feedback, the application developers would not have been able to improve the application to the extent they did in such a short time (VCIAD1). Several of the trial users described the second version of the application as easier to use than the initial version (as described in section 4.2.1). This realised value was aligned with the objectives of the project, as outlined in Chapter 1, section 1.3. The first objective was to develop an effective and useful mobile application that benefitted the communities involved (Jenkins & Ward, 2016). Here it can be seen that the aspects of the aspirational narrative of the Food for Us project had been realised. The Food for Us app was not fully successful in achieving the aspirational narrative, as in many instances the FFU app was not effective and useful, but as the project progressed, this aspiration was realised to varying degrees.

Ownership of the Food for Us project

Ownership of the Food for Us project has been viewed as partial realised value. The Raymond Mhlaba users have been involved in many aspects of the FFU project, particularly the growing of the FFU project as described in section 4.3.2.3. Through the continual reporting and active growing of the project, the Raymond Mhlaba community, led by the RMDA, started to take ownership of the FFU project and its goals. The ideas, relationships and networks that have been built from the project have been adopted and welcomed into the local supply chain community. The FFU WhatsApp group enabled increased communication and the inclusion of a number of different voices in the planning of the FFU project. The #MatchMaking event, app training workshops and TOT courses enabled the building of networks, creation of relationships and the sharing of new and experiential information. The FFU project has not been fully owned by the community, and therefore can only be described as achieving a small level of realised value. The users and the intermediaries often felt they did not have the technical expertise to change the application themselves and therefore needed the partnership with the Food for Us team.

Sustainable behaviour changes

Realised value can also be recognised in the comradeship and sense of community (potential value) empowering people to start to employ environmentally practices in their own homes. As discussed in section 5.4.3 above, there was a change in practice with users starting to change their farming practices. In one instance, one of the Food for Us team members was inspired to grow butternuts (FFUWD). The realised value emerged when the FFU team member harvested the butternuts and shared his success on the FFU WhatsApp group (FFUWD). There were other instances of farming successes and improved results that were shared through the WhatsApp group. Another example of successful sustainable behaviour was the implementation of water saving techniques such as mulching which yielded positive results (increased growth and reduced wasted resources) (FFUWD; FFS). This success was displayed on the WhatsApp group to all the users (FFUWD) and described in the farmer's final survey.

Strengthening of local supply chain

The final realised value that emerged from use of the affordances of the networked social learning support systems was the strengthening of the local supply chain. In this research this means the development of a more robustly connected local supply chain community where local trade, local business and entrepreneurship is encouraged. Some of the successes as part of strengthening the community included the shared transport logistics by farmers who connected with one another through the #MatchMaking event (FFS). Another example was the use of locally grown produce (purchased from those in the Imvotho Bubomi Network) for the catering of the Amanzi for Food

Training of Trainers course as described in section 4.3.2.1. This was an example of where the FFU WhatsApp group in combination with the Food for Us app was successful in enabling local trade.

There are a number of inhibiting factors that prevented much of the potential and applied value from being realised; these will be discussed in section 5.4.6 below.

5.4.5. Reframing Value Creation

As explained in section 5.2.5, reframing value is the value that occurs when the community or network re-imagines a definition of success and engages in transformative learning that involves learning to re-imagine a new definition of success (Wenger et al., 2011).

Mobile technology as an agri-business tool

The first type of reframing value that emerged was reshaping the way users imagined using mobile technology to build their agricultural businesses and strengthen the local supply chain. Though there may not have been much realised value (reduction in food waste, disruption of the local food system and mass increase in market access), there was a substantial amount of reframing value around the importance of technology and the use thereof to achieve the above goals. Many of the users, as explained in Chapter 4, section 4.3.2.3, felt more confident using technology and realised the importance of embracing technology going forward, especially as a tool for marketing, recording and connecting with networks. This reshaping of the users' ideas of mobile technology also included the understanding that technology was important to progress in a technology driven future, however technology on its own was not enough to affect improved performance. One of the users explained that they realised getting an app to work was very difficult saying, "It takes a lot of effort to make an application viable"(FFSB.4). Users realised that for innovative technology to be successful, it requires mass participation from the community of practice as well as commitment to learning to use new technology in the best way that contributes to the realisation of the aspirational narrative. The experience of being part of the Food for Us project was therefore important in breaking the euphoric idea of technology being the silver bullet to developmental problems which was in some way present amongst the Food for Us project team (perhaps most visible in the short time period allocated to the ambitious objectives of the FFU project) and Food for Us app trial users. These stakeholders learned that even though the Food for Us mobile application did not work as initially hoped, the use of technology still held important potential which needed to be supported with a number of other supporting structures (such as the WhatsApp group, workshops and courses).

Redefining food waste

The second reframing value that emerged was the redefining of what food waste meant for project participants in the Raymond Mhlaba Community. The Food for Us project was oriented around the

food waste narrative. One of the aims of the FFU project, as described in Chapter 1, was to reduce on-farm food surplus, however the understanding of food waste in the Eastern Cape rural context was not extensively understood by the Food for Us project team when designing the Food for Us project. Not only was the existence of food waste assumed by the Food for Us team in the Raymond Mhlaba community, many of the trial users had different understandings of what constituted food waste within their communities. Through being involved in the project, many of the users started to redefine what they understood as food waste. Many of the users started to explain that through hearing about food waste from the workshops, event and over the FFU WhatsApp group, they became more aware of food waste around them in their agricultural practices and daily lives (IFSB). Many of the farmers started to recognise where the resource wastage was occurring within their farming enterprises and started to take action to address the re-occurring issues of food wastage (as described in section 4.3.2.3). Through the Food for Us project the users, as well as the project managers and researchers, started to redefine what food waste means within the Raymond Mhlaba local supply chain context. The Food for Us researchers and project managers started to realise that there was not a large amount of food waste and food loss on small-scale farms that fits the Lipinski et al., (2013)'s definition; instead what was occurring was wasted resources on small-scale farms due to the lack of local demand for fresh produce. The produce that was harvested was not often dumped or disposed of, but instead re-used to feed the family, neighbours or animals of the farmer (BSCR). The reframing of this understanding therefore led to the realisation that what was required to assist small-scale farmers with their surplus produce was to shift the produce from the lower levels of the supply chain (being given away or fed to livestock) to higher levels (resold to alternative markets) where more economic value is recuperated. For the trial users the shift in mind-set (reframing value) occurred when users started recognising the importance of reducing the amount of waste that occurs within an inefficient local supply chain to improve the economic returns for the local community.

Youth included in local supply chain

The final important reframing value that emerged from the networked social learning support systems included reframing the inclusion of the youth farmers within the Raymond Mhlaba small-scale farming sector. The FFU project enabled youth members to thrive in the local supply chain by building inter-generational relationships with elder farmers therefore crossing inter-generational boundaries. The Food for Us project attracted many young farmers who were confident with using mobile technology as discussed in section 4.2.3. These young farmers became more active within the local supply chain as well as more connected within the local farming community. This can be seen through the growth of the Mxumbu youth co-operative within the local Raymond Mhlaba farming community. Another example is the growth of two other independent youth farmers, who made several connections and gained important knowledge from conversing with elder farmers through the opportunities that presented themselves at the #MatchMaking event, FFU app training and on the FFU

WhatsApp group. The overall age of the active participants was low, as described in section 4.2.3. The interaction between the young farmers and their elder colleagues was characterised by a two-way flow of information from both sides of the generational boundaries. Young farmers were assisting older farmers with their use of mobile technology, while older farmers were sharing their experiential farming knowledge with younger farmers (VCIS5). This reframing value therefore carries a transformative element as it has assisted in changing the way youth farmers perceive themselves within the future of farming, and has also enabled inter-generational knowledge sharing to occur within communities that were dominated by a narrative that portrayed only older community members as farmers.

The value created by the Food for Us app, accompanied by the networked social learning support systems, emerged to be more complex and in-depth in comparison to value creation that occurred through the use of the Food for Us app alone. Even though a considerable amount of social learning emerged, the value created did not fully achieve the aspirations of the project managers. There were a number of important challenges and inhibiting factors that prevented the maximum amount of value from being created during the 18 month FFU app trial.

5.4.6. Inhibiting Factors

Table 5-4 summarises the inhibiting factors that prevented value creation within the Food for Us project, focusing on the networked social learning support systems.

Table 5-4: Inhibiting factors that affected value creation from use of network social learning support structures

Users	No consistent supply from the users
	No mass participation
	Lack of buyers
	Dispersed users
	Not able to attend all of the supporting activities
	Range of mobile phone use skills
Trial Design	Length of the trial
	No permanent on the ground team members for support work and on the ground technical assistance
Resources	Resources for events, follow-up events
	More people to work alongside
Appropriate technology and infrastructure	Signal and connection
	Compatible devices to engage with the WhatsApp group
Technical challenges	Challenges in demonstrating

User group

There were a number of challenges surrounding the user group that inhibited meaningful value creation. The first issue was the relatively small sample of application users which did not enable a good understanding of how the FFU app might work with mass participation (which is the intended

application role out model). After the initial uptake of the FFU app, the Food for Us team realised that the success of the FFU app depended on mass participation allowing for more transactions to take place and more connections to be created between more members of a community. The users (both buyers and sellers of produce) were very sparsely dispersed across the Raymond Mhlaba Municipality. This resulted in buyers and sellers needing to travel further distances than anticipated to make transactions. The travel distance required of users also posed an issue, making fresh produce transactions through the application inconvenient (FFSA1; FFSC1; FFSC5; BFSA1; TOTW2O).

Another major challenge that arose with regard to the user group in the FFU app trial was the shortage of committed buyers. There was a large number of farmers who became vocal participants in the Food for Us project, interacting regularly with the Food for Us app, communicating regularly with the other participants through the network social learning platforms created (support WhatsApp group) and making active contributions to the furthering of the project. The same cannot be said for the buyer group of users, which was significantly smaller and less engaged in various aspect of the FFU project as described in section 4.2.4. Farmers became frustrated that they were not able to reach the large markets that they had anticipated. This emerged clearly in the final survey where many farmers (a total of seven farmers) expressed a need for there to be more buyer and large retailers interactions and engagement on the application (FFUWD; FFSA; FFSB7: FFSC4: FFSC5; FFSC7; FFSC11). Going into the second phase of the Food for Us project, the project team now understands the key importance of having an appropriate ratio of buyers to sellers (more buyers than sellers) in order to enable meaningful value creation for both parties.

Connected to the issue of few buyers is the challenge of having a consistent supply of new fresh produce being uploaded onto the Food for Us app. The buyers explained that one of the issues about purchasing produce from local farmers is that often the produce supplied is not consistent and farmers will go through periods of little available produce to sell (BFSC; MMWR3). This lack of consistent supply discourages buyers from engaging with the Food for Us app on a regular basis, as consistently available produce was not often available.

Due to the nature of participation in the trial being voluntary, it was not compulsory for all the participants to attend every workshop and engage actively with participants of the Food for Us WhatsApp group. There were some users who did not partake in all the supporting activities and events. This prevented some of the users from gaining value from full participation in the Food for Us project. Some of the buyers' reasons for not continuing participation in the networked social learning support systems included:

1) Not enough time to commit to the activity (VCIB4)
2) The application was not convenient and therefore took more time (FFUWD)

3) The instability of the application deterred the user and prevented continued support of the project (FFSC)

The last user inhibiting factor that acted as a barrier to value creation for the trial participants, was the number of users with limited understanding of mobile technology and of how to navigate their mobile phones. These challenges arose during the Amanzi for Food TOT workshops, where participants would ask for assistance to set up email, or to clear one's mobile phone of unnecessary photos, videos and games (described in Chapter 4, section 4.2.5). The FFU project team had assumed that the application trial community would have the mobile phone skills needed to complete these kinds of activities and therefore the training component of the project took longer than anticipated. The Raymond Mhlaba case study trial group included participants with varied levels of mobile technology phone skills. Some of the users were not able to navigate their phones to identify the mobile phone model number, while other were able to troubleshoot the challenges experienced on the Food for Us app with ease, taking screenshots of the errors and assisting fellow participants with their challenges. This range of skillsets made it difficult to deeply explore and test the FFU app as with every training session and application demonstration, I had to run through the working of the application at a very rudimentary and basic level. This low level of engagement with the application in training workshops prevented more robust discussions and learning to emerge from the participants in relation to the physical functionalities of the Food for Us app and the affordances that those functionalities enable.

Food for Us application pilot trial design

There were a number of issues that arose through the design of the Food for Us app trial that acted as inhibiting factors to value creation within the Food for Us project. The most prominent challenge was the length of the application trial. The project was run over an 18-month period, with the Food for Us app only being trialled for approximately seven of the 18 months. This did not give enough time for the trial participants to experiment with the FFU app and learn how to overcome software challenges and adapt to new features and functionalities introduced during the app trial. One user believed that the Food for Us app was not available for a long enough period for them to effectively learn how to use the app (VCIB4.40); they also felt that they didn't have the time in their daily life to allocate to learning to use the app (VCIB4.64; FFSC5); this also meant they didn't have enough time to exercise the new skills they learned at workshops in the daily routine (VCIB4.60).

The second major challenge with the Food for Us app trial design was that from the beginning of the Food for Us app's introduction, there was no one on the ground taking the role of the 'warm body'[26]

[26] The Raymond Mhlaba participants refer to a warm body as someone who is stationed on the ground in the case study area whose job it is to address technical challenges and grow the project. This 'warm body' provides a local face for the project and a person of reference if people in the community are looking to find out more about the application.

(IFSA2; IFSC2). I was the only Food for Us team member in the Raymond Mhlaba case study that was interacting and meeting with the users on a regular basis. My visits to the field would vary between twice a week to once every three weeks. This meant that on the ground support was not frequent or consistently available. There was no team ensuring that the Food for Us app was being appropriately used and that there was support to assist with local supply chain logistics including the managing of produce supply and facilitation of transactions (VCII2.129). Furthermore the logistics of registration approval became difficult as the farmers needed to be approved by the FFU project technical liaison who was removed from the local Raymond Mhlaba context (he was based in Durban, KwaZulu-Natal, South Africa) and therefore was not aware of good application trial candidates (IFSA2).

Finally, the FFU project was not being run by people with 'on-the-ground' contextual understanding of the Raymond Mhlaba community into which the project was being introduced (IFSA2). Going forward, many of the users expressed the need for a local entity (such as the RMDA) to manage the application locally to provide local technical assistance to users (with regard to the application), and to ensure transactions made through the Food for Us app were fair and successful.

Due to the persistent issue of not having local support in the area, the team decided to pay someone a small stipend to be the face of Food for Us in the Raymond Mhlaba community. One of the Mxumbu Youth co-operative members, whose story was discussed in text box 1 of section 4.3.2.3, was employed for the final three months of the project and received a small stipend from the Food for Us project (for his airtime and other necessary expenses) to act as a technical support in the area and grow the Food for Us community by encouraging more users to join the project. This on-the ground Food for Us liaison played an important role in creating awareness around the Food for Us app. Unfortunately the majority of the liaisons contacts were within the farming community, therefore resulting in the Food for Us app being promoted amongst farmers more than buyers which exacerbated the issue of 'lack of buyers' described above.

Resources

The third collection of inhibiting factors was the lack in resources available for the introduction of the Food for Us app in the Raymond Mhlaba case study sites. I was the only full-time project team member present in the Eastern Cape and therefore took on a number of roles and responsibilities. Having so many roles meant that some of the follow-up activities that would have been useful were not done due to a lack in manpower. Another scarce resource was the lack of economic resources allocated to assisting with designing and implementing follow-up and training events for the Food for Us project. Once again managerial manpower was a lacking resource to assist in organising and managing the growth of the Food for Us project in the Raymond Mhlaba community. As one of the

project managers explained, there were many assumptions about the role out of the Food for Us project, one of which was that it would be easy to introduce the Food for Us app to the case study community (VCIPM2). This was not the case and much of the researchers time was taken up by app training, application facilitation workshops and project management which took time away from other research related activity.

Appropriate technology and infrastructure

Availability of compatible mobile technology was described as a challenge for the uptake of the Food for Us app in the Raymond Mhlaba community (see section 5.2.6.4 above) but also acts as an inhibiting factor to value creation from the networked social learning support structures. If users did not have an Internet enabled mobile phone, they were not able to be part of the Food for Us WhatsApp group where much sharing of information occurred. As described in Chapter 4, section 4.3.2.1, the Food for Us WhatsApp group afforded participants the ability to circulate messages, share pictures, report errors and be connected to platforms on which they can advertise their produce (Food for Us WhatsApp and Food for Us app). As described in section 5.2.6, there were members of the supply chain, such as the hawking community, who were excluded from gaining any value from the project due to their mobile phones not being able to download Internet-based applications.

Signal connection challenges was another inhibiting factor of ensuring the application was inclusive. Without adequate signal, participants who lived in more rural communities were not guaranteed to be part of the discussion. As described in section 5.2.6. above, one user explained that due to intermittent signal, they were sometimes out of connectivity and were unable to participate in all the discussions on the Food for Us WhatsApp group.

The challenges with connectivity also became an inhibiting factor of value creation in the Amanzi for Food TOT's and the #MatchMaking event. The Food for Us team made a Wi-Fi Internet connection available for participants to connect to, to assist them with downloading and working through the Food for Us app during the workshop without incurring the data cost. This was not successful due to the poor Internet connection due to weak signal in the area. The slow Internet connection slowed the pace of the training workshops and demonstrations as the participants could only work on their mobile phones as quickly as the Internet would allow them to. This problem of securing a reliable Internet connection for the workshop participants was experienced twice, creating difficulties around the presentation.

Software challenges

The software challenges that resulted in the Food for Us app continually crashing created further challenges for value creation within the courses and workshops. The application training workshop,

#MatchMaking event and the Food for Us workshops that made part of the Amanzi For Food TOTs all used the live Food for Us app to demonstrate how the app should work. Unfortunately due to the number of software issues of the Food for Us app, there were often software bugs that prevented the application from working as it should during the workshop or training demonstrations (TOTW1O). This resulted in the Food for Us app crashing halfway through a demonstration, or certain functionalities not working correctly (TOTW1O). With these interruptions, it became difficult to give the users a full understanding of what the Food for Us app should be able to do and also created a shadow of doubt over the abilities of the application to work smoothly and successfully for the users.

These challenges, along with the challenges described in section 5.2.6, make up some of the reasons why the Food for Us project only achieved limited levels of value creation in the short period of time in which it was piloted in the Raymond Mhlaba case study.

Analytical Statement 2: The network social learning processes, which supported the implementation of the application in the Raymond Mhlaba community, enabled multiple levels of value creation within the Landscape of Practice, showing the importance of investing in social learning and network building (the social system of uptake and use) around mobile application design and use.

5.5. Analytical Statement Two

After exploring the value creation cycles that were enabled by the networked social learning support systems, it is possible to see that there has been a considerable amount of social learning that has enabled value creation. The value creation that emerged from the use of the Food for Us WhatsApp group, #MatchMaking event, application training courses, Amanzi for Food Training of Trainers workshops and research interactions appeared to be richer than the value creation that developed from the use of the application only. Having explored social learning through Wenger et al.'s (2011) value creation framework as reported above, it is possible to see there was much more potential, realised and reframing value that emerged from the use of the networked social learning support systems (section 5.4), as opposed to use of the application only (section 5.2). McNamara (2003) explained "ICTs enable change; they do not create it" (p. 6). This is displayed through understanding the different value creation that was enabled by the Food for Us app (app technology) coupled with the networked social learning support systems, where people were supported and encouraged to use the technology to affect change.

From the value creation analysis, there was much richer value creation that emerged from particularly the WhatsApp group and the #MatchMaking event. A substantial amount of the value appeared to grow from the ability to develop robust, and well-supported networks amongst the Food for Us community.

The development of relationships and shared interest across the Food for US project landscape has enabled boundary crossing (intergenerational boundaries and interdisciplinary varying communities of practice boundaries) amongst other forms of social learning to develop. Through the development of relationships and increased communication (between the youth farmers, and the elder, more established farmers) afforded by the application and it support structures, intergenerational boundary crossing was enabled using the Food for Us app and Food for Us WhatsApp group as a boundary crossing artefact as explained by Wenger (2000). The application acts as a boundary-bridging artefact that supports connections and communication between the different communities of practice. The processes and training events also provided an opportunity for boundary encounters between the communities of practice. As discussed as part of reframing value, the youth members of the farming community interacted with the elder members of the farming community more regularly. These interactions allowed for increased intergenerational knowledge sharing, with the knowledge being exchanged in both directions (as described in 5.4.5).

The application also enabled boundary crossing between communities of practice within the food supply food system Landscape of Practice. The Food for Us app and the networked social learning support systems provided opportunities for buyers to talk with sellers (farmers) and discuss challenges and potential solutions for challenges within the local supply chain. The FFU project therefore helped in enabling the opening up of communication channels between important members of the supply chain in the Raymond Mhlaba municipality.

One of the most important components of potential value that emerged was the shared interest that emerged around the application. The use of technology to empower local farmers and open up access to local markets enabling the strengthening of a more sustainable and lucrative local supply chain was an idea that drew much interest and support from the Raymond Mhlaba community. This common interest acted as a foundation on which partnerships and the Food for Us network was built. This common interest allowed for social learning value (analysed through Wenger et al.'s (2011) value creation framework) to emerge through the development of social networks (e.g. active Food for Us WhatsApp group), supportive relationships (between farmers and sellers) and collective knowledge sharing.

This is further backed up by feedback from Solon (2013) with regard to the *Mfarm* application. Solon (2013) explained that in some instances the introduction of applications had not been successful due to the farmers not being ready, or well supported enough to engage fully with the technology. As stated in the analytical statement, the use of the mobile application alone would not have been enough to support the level of social learning that was enabled by the networked social learning processes that enabled the building of relationships, the exchange of knowledge and critical discussion.

Based on the above analytical statement and insights gained into the study, I propose the following recommendations:

5.5.1. Recommendations

Users: In the design and implementation of future local trading mobile application trials, I would recommend that a more detailed, strategic and context specific plan be developed to guide how the app will be introduced and to whom. I would recommend that a number of key stakeholders (both buyers and sellers), within a concentrated area (to achieve the appropriate user distribution) be approached for insight into the context prior to the introduction of the application. It is important to have the appropriate number of buyers and sellers involved in the project to ensure there are enough buyers to buy from a diversity of sellers, and enough sellers to sell consistent good produce to the collection of buyers. The lack of buyers on the Food for Us app emerged as a major inhibiting factor to the local success of the application (see section 5.4.6). Not only was the use of the Food for Us app inhibited, but so was the social learning and network building enabled by the networked social learning support systems.

Trial design: As described above, the time period in which the project was implemented was very short which acted as an inhibiting factor to value creation. In future mobile application development projects, where the application is being designed, built and trialled within one phase of the project, it is recommended the time frame for the project be longer. Not only does the designing, building and testing of a new application take time, but the trial users also require significant time to learn to use the application, gain confidence in using the different functionalities as well as develop a use-culture around the new technology.

Resources: To address the challenges of limited resources, I would recommend that the research and implementation of the project be led by users who are part of the case study community. The Western Cape researcher observed that it was very difficult to infiltrate and disrupt a food system that one was not permanently part of. Therefore to address the issue of limited resources, and to ensure that the project is implemented according to a good understanding of the context, I would recommend that people within the local community (so as to avoid travel and accommodation costs) be employed to introduce and manage the application trial project. We tried to address this issue by bringing in a ‘on the ground liaison’ in the last three months of the Food for Us project. The community appeared to respond positively to a local member of the community managing the case study however three months was too short to gain real insight into whether this strategy was successful.

5.6. Surfaced Value Creation towards Local Circular Economy Development

As described in Chapter 1, the need to strengthen local sustainable supply chains is one way of adding to the development of a sustainable future with reduced environmental degradation and a more

integrated and circular system of consumption (Raworth, 2017). One of the important things investigated in this study was the type of 'circular economy' value that emerged from the use of the Food for Us app and its associated networked social learning support systems. As an addition to Wenger et al.'s (2011) Value Creation Framework, I added a sixth column. This column, titled 'circular economy value', draws on the five preceding columns (the five levels of value creation) and pulls out the value that contributes to building a circular economy (as seen in Appendix Q: Value Creation Relationship Analytic Memo – FFU App and Appendix R: Value Creation Relationship Analytic Memo - Networked Social Learning Support systems). I drew on Raworth's (2017) description of a circular economy, as a system that is regenerative by design. According to Raworth (2017) a circular economy aspires to reduce the amount of wasted resources that exit the value chain by redesigning our systems to stop creating waste and start creating value to put back into our natural environment (Raworth, 2017).

5.6.1. Circular Economy Value from the use of the Food for Us application

I identified a number of important instances of value creation that were enabled by the use of the Food for Us application and which have contributed to the strengthening of a local circular economy which aims to be redistributive in its nature and re-generative in its design within the Raymond Mhlaba Municipality.

Exposure to local produce (potential value)

The first type of circular economy value that I identified was users' (especially buyers') exposure to locally grown produce. Through the Food for Us application, the trial participants were exposed to various local farmers produce (as described in section 4.3.1.3). This exposure to local produce enabled user awareness around availability, pricing, and methods of farming in the Raymond Mhlaba supply chain (sharing of information). This increased exposure has the potential to contribute to an increase in the purchasing of locally grown produce, therefore potentially reducing the distance produce travels prior to consumption.

Awareness around local production and consumption (potential value)

The second contribution to a circular economy is the shift in mind-set around the importance of local production and consumption. Through facilitated discussion in the #MatchMaking event and introductory and training workshops and discussion in the WhatsApp group, the importance of support in local production and consumption was explored. Discussions led to knowledge exchange and vision building amongst diverse groups of people who represented different parts of the local supply chain (retailers, farmers, intermediaries, guesthouses and individual buyers). The group developed a vision for the Raymond Mhlaba municipality, which aimed to achieve a self-sustaining,

self-sufficient local economy within the near future. This idea, which can be seen as a uniting idea between the stakeholders of the local supply chain, contributes to the strengthening of a circular economy through (1) promoting local trade, therefore reducing travel, (2) supporting small, local business and not large corporations, and (3) designing a system were value is utilised at all levels of the value chain, rather than lost in the early stages.

Tool to connect (potential value)

Circular Economy value also can be recognised in the tangible capital potential value that is enabled by the Food for Us app being an available tool to connect. The application (specifically version 2 which had a chat function) provided a tool to connect local members of the local supply chain to one another. The mobile application software enabled the users to connect with one another therefore enabling the building of social relationships and local trading relationships, which have the potential to increase local trade.

Alternative markets (potential value)

The application also aims to find alternative markets for produce that is not sold to the farmer's direct community or retail markets. The Food for Us app tries to find buyers for local produce. The aim of the application is to find value (including economic value) in local produce through different streams of markets including mainstream markets (retailers, restaurants or caterers) or the alternative markets could include pig farms buying surplus food to feed their pigs, compost businesses buying damaged crops to convert to compost, or other business that finds value in produce that is not bought by retailers. The application aspires to be re-generative by design (Raworth, 2017), where it enables local members of the community to find value in local produce, therefore catching the value and reverting it back into the value chain rather than letting it leave the value chain as wasted resources.

5.6.2. Circular Value that developed from the Networked Social Learning Support Structures

The Food for Us project as a whole aimed to develop and strengthen a sustainable circular local supply chain. Here we look at the type of circular economy value that was enabled by the various affordances of networked social learning support systems (FFU WhatsApp group, FFU App training, #MatchMaking event & Research interactions). The project enabled the circular economy value that was discussed above in section 5.4.1, with several additions; (1) potential reduction in travel distance, (2) sustainable farming practices, (3) development of local rural small-scale farmers.

Reduced travel distance of produce (potential and applied value)

As discussed above, the Food for Us app, with assistance from the networked social learning support systems, encouraged and provided a tool to enable users to buy produce locally. The WhatsApp group and the #MatchMaking event were particularly important in encouraging the trade of local production and consumption to strengthen the local Raymond Mhlaba economy (as explained in section 4.3.2.3). One of the users explained that after being part of the Food for Us project, she realised that by transporting all her produce all the time (to a market in town and back) much of her produce became wasted and therefore value was lost (VCIS6). Therefore the project, including the networked social learning support systems encourage the users to reduce the **travel distance of produce** so as to reduce economic costs as well as to reduce food wastage.

Sustainable farming practices

The Food for Us project developed circular economy 'potential' value through knowledge sharing. The project encouraged discussion and knowledge sharing around the growth of diverse and organically grown produce, therefore encouraging sustainable farming methods. Food for Us partnered with the Amanzi for Food project and therefore encouraged farm users to employ water saving farming techniques, seed saving practices and the promotion of non-GMO crop production. All these practices were discussed in the Amanzi for Food TOT event, as well as mentioned during the #MatchMaking event and discussed on the Food for Us WhatsApp group. At the #MatchMaking event, having a diversity of crops using minimal pesticides, herbicides and fertiliser was encouraged. There were a number of farmers who started to explore how best to employ these alternative-farming practices that they had been exposed to, specifically in a time of looming climatic challenges (water challenges). Employing these farming practices contributes to a more regenerative farming system, one that does not take from the environment without giving back, therefore contributing to a circular economy where the environment is considered an important player in the economy that needs to be cared for and invested in (Raworth, 2017).

Development of local rural small-scale farmers

The final circular economy value that emerged from the Food for Us project was the encouraged development of local rural small-scale farmers. The Food for Us project aimed to improve market access for the local farmers by connecting the local buying base with the local farmers through the Food for Us app and Food for Us WhatsApp group. As described in Chapter 4, section 4.3.2.1.3, the #MatchMaking event provided a space where the local economy could be uplifted and strengthened while collaboratively developing a vision for the local supply chain, and building a support base on which to further their development. The knowledge-sharing opportunities (such as the Amanzi for Food TOTs and the #MatchMaking Event) provided the farming community with new resources to

explore in their own farming operations, while the network developing and relationship building tools (the FFU WhatsApp group, #MatchMaking event and Food for Us application) enabled the development of a strong social support system to draw on and receive networked assistance. These knowledge-sharing opportunities were particularly beneficial to the youth farmers who were involved in the Food for Us project as they were exposed to new information and new ways of farming.

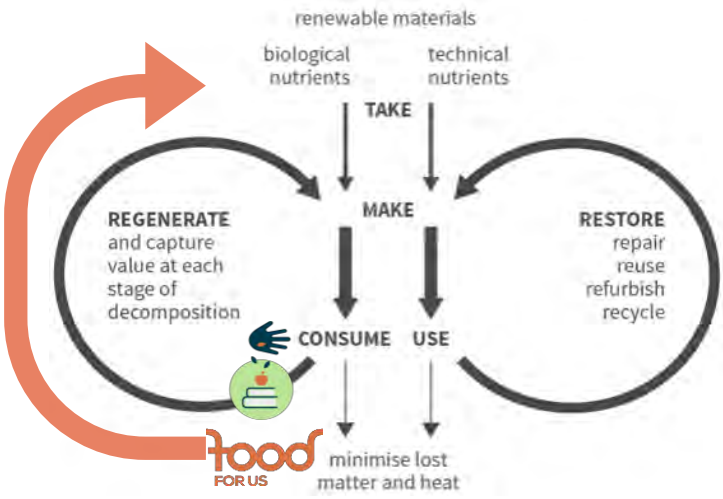
All the value discussed above is in the early stages of the value creation framework (potential and applied) and is not yet fully realised. Through continued discussion and work with the circular economy concepts within the Raymond Mhlaba community, there is great potential that the Food for Us project has the potential to enable and strengthen a circular economy in the Raymond Mhlaba community.

5.7. Analytical Statement Three

Analytical Statement 3: The application and associated networked social learning processes surfaced potential value creation towards a 'circular economy' within the Raymond Mhlaba municipality.

The data that was presented, and the value creation analysis that has been explained above, has shown considerable potential value emerged from the Food for Us project which contributes to strengthening a circular economy in the Raymond Mhlaba municipality. There has been a large amount of work by the Raymond Mhlaba Development Agency to develop the latent potential of the local community to uplift local farmers and strengthen the local economy (VCII2). The Food for Us project partnered with the RMDA and brought an important environmental lens to the pursuit of a locally flourishing supply chain. The Food for Us project brought into focus the importance of reducing the transportation of fresh produce, therefore making space for produce from local farmers to find their way into the local supply chain, as well as to reduce the food wastage that occurs during long distance produce transport. The Food for Us project encouraged users to reduce the resources that they were wasting (water, seed, fuel and fertiliser) through on-farm wastage and instead find alternative markets for the produce to receive increased economic value from surplus produce as well as reduce the occurrence of food waste.

Referring back to the literature, it is possible to see how the project has tried to address the disconnect



in the value chain, adding an extra loop so that produce that would have left the value chain earlier in the local supply chain, now is fed back into the supply chain to create a circular economy effect. As discussed in Chapter 1, section 1.2.3, Raworth (2017) discussed the adoption of a model (circular economy) that promotes reduced wasted resources and regenerates value from that which is lost. Figure 5 - 1 below is an adaption of Raworth's butterfly economy seen previously in Chapter 1. The Food for Us project intercepts the biological nutrients value chain at the bottom of the chain, trying to redirect resources (specifically on-farm surplus produce) back into the value chain to gain value and reduce waste. What the Food for Us mobile application has done is provide a platform, which has the potential to disrupt the Raymond Mhlaba food supply chain and to encourage the development of a regenerative, circular system. The FFU app situates itself towards the end of the supply chain, just before the food is lost, where it enables a process of food redistribution to alternative markets therefore turning so-called 'waste' into a valuable resource that is brought back into the cycle.

As portrayed above, the Food for Us project also enabled the development of a circular economy through the process of connecting people and building networks which encourage local trade. The development of networks also provides space for knowledge sharing around sustainable farming and livelihood practices as discussed in section 5.6.2 above. The building of social networks was recognised as an important component of using technological innovation to achieve a more sustainable and circular local supply chain. This chain needs to recognise the complexity of local systems, that concentrates on distributive systems to regenerate three of Raworth's (2017) seven recommendations to think like a 21st century economist.

This study only explores the first phase of the Food for Us project. Due to the rich learning that emerged from the Food for Us technological innovation project, the Food for Us team decided to explore possibilities of extending this project into a second phase. One of the avenues in this second phase of the Food for Us project will be using the Food for Us app (or a variation thereof) to explore other streams of waste which can be restored after use to be absorbed back into the value chain, therefore minimising wasted resources.

As has been synthesised in the analytical statement, it is possible to see there has been potential value created by the Food for Us project that aspires to enable the development and strengthening of a local circular economy supply chain in the Raymond Mhlaba case study. This has been done specifically through the enabling of a network development, which allows for knowledge sharing, local trade and community support.

5.8. Reflections on the Study and Recommendations for Further Research

Being part of the Food for Us project team and being given an opportunity to research the social learning enabled by the Food for Us project has been incredibly exciting. The social learning enabled

by mobile application projects is a relatively under researched topic of interest within the South African informal mobile learning, food systems and small-scale farming field. With much of the Food for Us team being new to the field, there were many components of the project, particularly with reference to the design and introduction of the application, that were managed on a trial and error basis. This research has also highlighted the effectiveness of the Wenger, Trayner and de Laat's Value Creation Framework as a tool to analyse social learning within areas of social innovation (such as the application and the networked social process that surrounded it). Below I briefly discuss my reflection on the Raymond Mhlaba case study context as well as a reflection on the methodology used in this research.

5.8.1. Reflections on the study in the context of the Raymond Mhlaba Municipality

This research focussed on the Raymond Mhlaba municipality case study, with the analysis exploring the affordances and value creation that emerged from the introduction of the Food for Us app. As described briefly in Chapter 1, the Food for Us project was introduced into an already connected network (Imvotho Bubomi Learning Network) within the Raymond Mhlaba municipality. The Food for Us project used the existing Imvotho Bubomi Learning Network as a leverage point to establish and grow a new network around the Food for Us project. This existing connection with the Imvotho Bubomi Learning Network was an enabling factor that allowed for easy access to innovative and enthusiastic farmers within the local community. Due to the positive relationship that the Environmental Learning Research Centre (the department in which this research is housed) had with the IBLN network, many of the users felt comfortable and eager to be part of this research. This was not the case in the second Food for Us case study sight in Worcester, Western Cape. There was no existing network and therefore more effort and resources needed to put into developing relationships and creating a foundation and network into which the Food for Us app could be introduced. The Raymond Mhlaba Food for Us case study was also introduced into an area that already had support from a number of local institutions such as the RMDA, the local agricultural government offices and the educational institutions (Fort Cox Agricultural and Forestry College and Fort Hare University). This meant that there was already a culture of trying innovative projects and new practices amongst the community, as well as an existing support structure that had developed. With all the existing support networks and culture of innovation amongst the farmers, the Raymond Mhlaba Municipality was the perfect site to introduce such a new piece of technological software. The willingness of the individuals involved in the project (buyers, sellers, intermediaries and other stakeholders) as well as the support culture that existed in the area (collaborative culture that had been built by the IBLN) were two invaluable factors that led to the strengthening of existing social processes and the development of new social processes and networks (Food for Us network and FFU WhatsApp group.)

I explored the Raymond Mhlaba municipality case study using Wenger's (1998) community of practice theory and Wenger-Trayner and Wenger-Trayner (2014)'s value creation in landscapes of practice theory, to get a good understanding of how the different communities of practice of the Raymond Mhlaba municipality interact within one another in the Raymond Mhlaba local supply chain landscape of practice. The various communities of practice that were identified to exist within the Food for Us landscape of practice include the small-scale conventional farmers, the small-scale agro-ecological farmers, the intermediary organisations such as the Raymond Mhlaba Development agency, the educational institutions such as Fort Cox college, Fort Hare University and the Environmental Learning Research Centre as well as the buying entities that included the retail buyers, the caterers, the bakkie sellers and community members. The government extension officers also were an important community of practice. The extension officers were not fully involved in the introduction of the first phase of the Food for US project, however their absence was recognised as a relationship that needs to be built upon in future developments of this project. There were a number of other stakeholders that existed in the Food for Us landscape, including the application liaison, the application developers, the Food for Us researchers and the Food for Us project team.

The Food for Us networked social learning processes enabled network building and communication and collaboration across the Raymond Mhlaba supply chain landscape of practice enabling interaction between the different communities of practice. The Food for Us project, with the Food for Us app being a focal concept, acted as a boundary crossing tool which connected all the stakeholders, providing a shared interest and focal point around which to share knowledge and build partnerships.

Wenger, Trayner and de Laat's (2011) value creation framework assisted in highlighting the value that was enabled by this project, effectively recognising the different types of value that emerge over time. The value creation framework was effective in depicting the interrelatedness of value creation and the importance of the different interrelated value cycles. As can be seen from the analytical statements, the value creation that emerged from the Food for Us project (including the value creation that emerged from (1) the use of the Food for Us app, and (2) the networked social learning processes) was predominantly achieved through the networked social learning processes that accompanied the introduction of the Food for Us app. I was able to recognise the type of value that different affordances were able to catalyse through combing the affordance data with a value creation lens. Many of the affordances that enabled communication, network building and opportunities to exchange information and knowledge appeared to be the affordances that enabled the richest form of value creation.

5.8.2. Reflections on the study in the context of the wider project

This research investigated social learning that was enabled in the Raymond Mhlaba Municipality case study, while a second case study was run in the Western Cape in Worcester. Within these two case studies there were very different set of results and experiences. Exploring the value created and challenges experienced in the Worcester trial was out of the scope of this master's study, however it is important to note that there were many socio-economic challenges in the Worcester study (gang violence, drug dealing and heavy police presence) which were not experienced in the Raymond Mhlaba case study. The lack of an existing network, as well as no previous research, or project relationship with the Worcester participants coupled with the collection of socio-economic challenges, resulted in two very different case study experiences within the two different sites.

As described in Chapter 3, I was working as a researcher for the Food for us project and therefore conducted research that was outside of the scope of my study (baseline surveys, reporting, etc.). I was also responsible for the implementation and management of the Food for Us app pilot within the Raymond Mhlaba case study. Working as a project manager and a researcher was a challenging task, which required me to remain reflexive to my impact on the research data collected. I was exposed to a large amount of data around the Food for Us project, unfortunately much of which exists outside the scope of this study and could therefore not be included, even though valuable insights exist in this data.

As described above, the Food for Us project created a large amount of data with many possible additional concepts and components to explore more thoroughly (the concepts of community of practice and landscape of practice, for example, became less central as the study unfolded) however due to this being a M.Ed study, I was unable to include all of the concepts in the scope of this study. Having said this it was still useful to include these concepts in the early stages of this thesis as they assisted me in formulating the study and provide tools for the reader to understand the contextual components of this study. Going forward the Food for Us team hope to explore these components more closely and work on publications that will comment on the community of practice and landscape of practice that was created around the Food for Us project.

There were many assumptions around the introduction of the Food for Us redistribution application in the Raymond Mhlaba municipality. These assumptions included (1) the assumption that food waste existed in the Raymond Mhlaba communities; (2) the designing, building and testing of the application would be smooth sailing and without complication, and (3) the Food for Us app would be quickly and readily adopted by the Raymond Mhlaba community with only limited application training. All three of these assumptions impacted on the design of the Food for Us project and meant that we had to re-orientate the Food for Us project as we began to recognise the reality of the context,

which required further reflexivity on my part. It also meant I had to remain open-minded and observant in the changing research context.

The first assumptions speaks about how we as a Food for Us team assumed that there were high levels of food waste in the Raymond Mhlaba community. There were high levels of wastage occurring in the Raymond Mhlaba community, however the challenge that was experienced relating to food wastage in the community was linked to the disconnect in the local supply chain with farmers having no access to local markets instead of challenges surrounding dumped produce in large landfills as is the case in international literature (discussed Chapter 1, section 1.2.1).

The second assumption was that the designing, building and testing of the Food for Us app was going to only take a short period of time. This was not the case as the building of the app took several months and once it was made available, the app would often 'crash', making the application difficult to use effectively. As discussed in section 5.2.6, the software challenges were a major inhibiting factor to value creation and resulted in many of the users losing trust in the application and its effectiveness.

The third assumption was that the new Food for Us app would be quickly and readily adopted by the Raymond Mhlaba community. This was not the case and much time was spent offering a series of training workshops to the participants. With the introduction of new technology, much energy needs to be expended to ensure the users feel confident when exploring the application. Through this research I recognised the importance of understanding how users use mobile technology before the introduction of a new innovation. Once one understands the use of 'culture of a community' around a certain type of technology, one can then work collaboratively with pilot users to develop a new use culture around the new technology. Learning to use (and more importantly trust) new technology is a lengthy process which cannot happen in such a short pilot project.

5.9. What Next for the Food for Us Project?

This research was situated in the first phase of the Food for Us project which was described as an initial pilot over an 18-month period. Over this period, the study has offered many insights into the types of social learning that have been enabled and the value creation that has emerged from the use of the application and engagement with the project support systems. As shown in the discussion above, the potential value of the project is only just starting to emerge as the users start to feel comfortable with using the application and associated support systems. With all the latent potential in the use of innovative technology to support the strengthening of local sustainable supply chains and circular economies, there have been efforts by the team to look for funding to develop the project further into a second phase.

As explained in the final dissemination event notes (as see Appendix U: Food for Us dissemination Event Synthesis and Attendance Register) and final report (Food for Us, 2018), the future steps for the project include the development of an appropriate business model which will allow for the application to be refined and adapted. Over and above improving the usability of the app, the second phase of the project aims to increase the uptake of the app in current case study areas, as well as upscale the adoption of the Food for Us app in other geographical areas.

The Food for Us team have also been exploring partnerships with major retailers in the Raymond Mhlaba community to build capacity on the demand side of the project. The concept of developing a supply chain hub initiative to encourage local interactions, partnerships and trading supported by mobile app technology appears to be an area of great potential. Similar to the realisations with regard to *Mfarm*'s mobile application introduction explained by Solon (2013), the issues of market access were more complex than purely opening up the space in the local market. Many of the Kenyan farmers who have interacted with *Mfarm* are producing in low volumes (much like those in the Raymond Mhlaba community) making it uneconomical for large buyers to purchase their produce (Solon, 2013). A similar issue is being recognised in the Raymond Mhlaba municipality through discussions that were housed by the various Food for Us facilitated workshops. What the *Mfarm* application aimed to do was to rather attract a number of farmers with a common product to group together to sell the produce at a central drop-off point (Solon, 2013). This type of model is what the Food for Us app in partnership with the rural hub initiative hopes to develop, therefore noticing that market access, rural small-scale farmer development and the reduction of on-farm food waste, are a series of interrelated challenges that cannot be solved with the introduction of a single technological innovation.

5.10. Conclusion

In conclusion, as can be seen from the results and discussion in the preceding chapters, there was much learning that emerged from the Food for Us pilot project. Through the value creation analysis, it becomes clear that technical innovations on their own do not change situations. What emerged, as a successful component of the project was the strong, networked social learning support structures that enabled connections, discussion and collaboration between the Food for Us trial users.

This research provides insight into the potential that mobile innovation holds in opening up social space for discussion, network building and knowledge sharing around important environmental and socio-economic challenges. The shared interest and open spaces that mobile innovations, such as the Food for Us application opens up allow for social learning to occur within and between communities of practice within dynamic landscapes of practice was clearly seen in this project. As discussed in Chapter 1, there is a need for research around mobile innovation and its impact on learning in a

technological future. Stevenson, Brody, Dillion and Wals (2014) noted in the *International Handbook of Environmental Education Research*, the gap in research surrounding mobile apps and the potential impact they might have in our changing environment in environmental education research. In this research I have explored this gap noting the potential of mobile innovation while recognising the importance of networked social learning processes in enabling effective learning through mobile application platforms.

The Food for Us project was effective in enabling informal mobile learning amongst the Food for Us participants and stakeholders in the trial period, although not all the aspirational value was achieved. Through engaging with the Food for Us app as well as the Food for Us WhatsApp group, participants engaged with important sustainability topics including sustainable farming practices, water saving techniques as well as food waste discussions in their everyday lives. This informal nature of learning was made possible through the affordances of the mobile applications and associated networked social learning processes.

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Appendices

Appendix A: Ethical Clearance for the Greater Food for Us project

RHODES UNIVERSITY
Where leaders learn

19 October 2017

Ethical clearance for Prof Heila Lotz-Sisitka

Ethical clearance number ED17101901

Title of research project

Baseline survey and social learning value creation research.

Details of researcher(s)

Prof Heila Lotz-Sisitka, SARChI Chair: Global Change & Social Learning Systems, Rhodes University, South Africa.

After due consideration of Prof Lotz-Sisitka's proposal and ethical protocols, ethical clearance has been granted for this project on behalf of the Education Faculty Ethics Committee

Prof Marc Schafer
Chair of the Education Faculty Ethics Committee

Appendix B: Data Collection Tool : Baseline Structured Interview Survey

Food For Us Farmer Baseline Survey

Baseline survey for trial applicants who are involved in growing fresh produce that will be traded on the Food For Us mobile application.

*Required

A. Background information

This section will collect some basic biographical information

1. **A1. Application user's name and surname** *

2. **A2. Application user's identification number** *
South African ID number

3. **A3. Application user's age**
Mark only one oval.
- 15 - 24 years
- 25 - 44 years
- 45 - 64 years
- 65+ years

4. **A4. Application user's mobile phone number** *

5. **A5. Application user's email address** *

6. **A6. First language** *

7. **A7. Gender**
Mark only one oval.
- Female
- Male
- Other: _____

8. **A8. Province**
Mark only one oval.
- Eastern Cape
- Western Cape

9. **A9. Farm physical address**
If more than one farming site, please list main site's address first, followed by others

10. **A10. Closest city/town to your farm/s** *

11. **A11. Name of business** *

12. **A12. When was the business established?**

13. **A13. How long have you been farming?**
Mark only one oval.
- Less than 5 years
- 6 - 15 years
- 16 - 30 years
- More than 30 years

14. **A14. How large is/are your farm/s?**
Tick all that apply.

	Less than 1 acre	Less than 1 hectare	1 - 5 hectares	6 - 20 hectares	21 - 50	Over 51 hectares
Main farm						
Farm 2						
Farm 3						
Farm 4						

15. **A15. Land status**
Tick all that apply.

	Owned	Rented	Other (please specify)
Main farm			
Farm 2			
Farm 3			
Farm 4			

16. **A16. How many people do you employ, if any?**
Tick all that apply.

	0	Less than 5	5 - 10	10 - 20	More than 20
Full-time	☐	☐	☐	☐	☐
Part-time	☐	☐	☐	☐	☐
Seasonal	☐	☐	☐	☐	☐
Volunteers	☐	☐	☐	☐	☐
Family members	☐	☐	☐	☐	☐

B. Mobile phone use

This section asks for information on how you use your mobile phone, which is relevant to the research because we are interested in how the use of technology can assist in solving certain societal and environmental problems (like food waste)

17. **B1. What type of mobile phone do you use?**
Mark only one oval.

- ◯ Android phone
- ◯ Windows phone
- ◯ Apple phone
- ◯ Other: _____

18. **B2. What do you use your mobile phone for in your business?**
Please tick all that apply
Mark only one oval per row.

	Often use phone for this function	Sometimes use phone for this function	Never use phone for this function
Communication	◯	◯	◯
Mobile banking	◯	◯	◯
Advertising	◯	◯	◯
Searching for information	◯	◯	◯
Organising time - Calendar	◯	◯	◯
Capturing photographs	◯	◯	◯

C. Food for Us trial participation

This section asks some questions about your participation in this trial

19. **C1. What do you hope to get from participating in this trial?**
Please tick all that apply
Tick all that apply.

- ☐ Find alternative markets for my unsold produce
- ☐ Find markets for my produce
- ☐ Find ways to ensure my produce is consumed by people as the first option
- ☐ Find more local markets
- ☐ Other: _____

20. **C2. Radius willing to travel to sell or buy produce?**
Tick all that apply.

- ☐ Less than 10 km
- ☐ +/- 10km
- ☐ +/- 20km
- ☐ +/- 30km
- ☐ +/- 40km
- ☐ +/- 50km
- ☐ +/- 60km
- ☐ +/- 70km
- ☐ +/- 80km
- ☐ +/- 90km
- ☐ +/- 100km
- ☐ more than 100 km

21. **C3. What does the term 'food waste' mean to you?**

_____
_____
_____
_____
_____

22. **C4. Can you give an example of food waste in your community?**

_____
_____
_____
_____
_____

23. **C5. Are you involved in any farming or food groups or networks? If so, please list these.**

_____
_____
_____
_____
_____

D. Farming details

This section asks for more information about your farming

24. **D1. What do you produce?**
If you produce livestock or dairy products, please also indicate this
Tick all that apply.

- [ ] Crop 1 = ...
- [ ] Crop 2 = ...
- [ ] Crop 3 = ...
- [ ] Crop 4 = ...
- [ ] Crop 5 = ...
- [ ] Livestock = ...
- [ ] Dairy = ...
- [ ] Other = ...

25. **D2. What proportion of your land is dedicated to each crop?**
Tick all that apply.

	Less than 10%	11 - 25%	26 - 50%	51 - 75%	76 - 100%
Crop 1	☐	☐	☐	☐	☐
Crop 2	☐	☐	☐	☐	☐
Crop 3	☐	☐	☐	☐	☐
Crop 4	☐	☐	☐	☐	☐
Crop 5	☐	☐	☐	☐	☐
Livestock	☐	☐	☐	☐	☐
Dairy	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐

26. **D3. How many kilograms of each crop do you produce each year (on average)?**
Tick all that apply.

	Less than 100kg	100 - 300kg	301 - 1000kg (1 ton)	More than 1 ton
Crop 1	☐	☐	☐	☐
Crop 2	☐	☐	☐	☐
Crop 3	☐	☐	☐	☐
Crop 4	☐	☐	☐	☐
Crop 5	☐	☐	☐	☐
Livestock	☐	☐	☐	☐
Dairy	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐

27. **D4. What is the average price per kilogram that you sell your crops for?**
Tick all that apply.

	Price per kilogram
Crop 1	☐
Crop 2	☐
Crop 3	☐
Crop 4	☐
Crop 5	☐
Livestock	☐
Dairy	☐
Other (please specify)	☐

28. **D5. What certification schemes do you belong to?**
Please tick all that apply
Tick all that apply.

- [ ] Certified organic
- [ ] Certified biodynamic
- [ ] Certified by participatory guarantee system
- [ ] No certification but adhere to organic practices
- [ ] GlobalGAP
- [ ] HACCP
- [ ] Other certification (please specify)

29. **D6. What tillage/ploughing practices do you use?**
Please tick all that apply
Tick all that apply.

- [ ] No tillage
- [ ] Reduced/limited tillage
- [ ] Regular ploughing with tractor
- [ ] Regular ploughing by hand
- [ ] Other: _____

30. **D7. Which cropping strategies do you use?**
Please tick all that apply
Tick all that apply.

- [ ] Crop rotation
- [ ] Mixed/inter-cropping
- [ ] Fallowing
- [ ] Cover crops
- [ ] Other (please specify)

31. **D8. What methods of soil amendment and fertilisation do you use?**
Please tick all that apply
Tick all that apply.

- [ ] Use of purchased synthetic fertilisers
- [ ] Use of purchased organic fertilisers
- [ ] Use of purchased compost
- [ ] Use of own compost
- [ ] Use of purchased animal manures
- [ ] Use of own animal manures
- [ ] Use of nitrogen fixing crops
- [ ] Other (please specify)

32. **D9. What methods of pest control do you use?**
Please tick all that apply
Tick all that apply.

- [ ] Use of trap crops
- [ ] Use of companion planting
- [ ] Use of purchased synthetic pesticides
- [ ] Use of purchased organic pesticides
- [ ] Use of homemade pesticides
- [ ] Use of animals for pest control
- [ ] Crop rotation
- [ ] Other (please specify)

33. **D10. What methods of weed control do you use?**
Please tick all that apply
Tick all that apply.

- [ ] Use of purchased synthetic herbicides
- [ ] Use of purchased organic herbicides
- [ ] Physical removal by hand/hoe
- [ ] Mechanical control (e.g. cultivator)
- [ ] Plastic covering
- [ ] Mulching
- [ ] Flaming
- [ ] Other (please specify)

34. **D11. How do you treat crop residue?**
Please tick all that apply
Tick all that apply.

- [ ] Burning crop residue in field
- [ ] Ploughing in of crop residue
- [ ] Physical removal of residue
- [ ] Composting of residue
- [ ] Use for own animal feed
- [ ] Sell for animal feed
- [ ] Other (please specify)

35. **D12. What are your general production challenges?**
Please tick all that apply
Tick all that apply.

- [ ] Reliance on rainfall
- [ ] Sourcing good quality seed
- [ ] Soil fertility
- [ ] Pests
- [ ] Costs of inputs (seeds, labour, fertilisers, pesticides etc)
- [ ] Cost of certification
- [ ] Storage facilities for harvested crops
- [ ] Finding customers
- [ ] Prices obtained for produce
- [ ] Meeting standards for markets
- [ ] Transport to markets
- [ ] Size and cost of land available
- [ ] Other (please specify)

36. **D13. How is produce harvested?**
Tick all that apply.

	Mechanical (please specify)	By hand	Other (please specify)
Crop 1	☐	☐	☐
Crop 2	☐	☐	☐
Crop 3	☐	☐	☐
Crop 4	☐	☐	☐
Crop 5	☐	☐	☐
Livestock	☐	☐	☐
Dairy	☐	☐	☐

37. **D14. Where is your produce stored once it has been harvested?**

38. **D15. How do you transport produce from point of harvest to point of storage?**
Mark only one oval.

- ◯ On foot
- ◯ Animal transport
- ◯ Diesel vehicle
- ◯ Other (please specify)

39. **D16. Approximately how much diesel is used for transporting harvested crops (to point of storage) per month?**
Mark only one oval.

- ◯ 0 - 100 litres
- ◯ 100 - 500 litres
- ◯ 500 - 2000 litres
- ◯ 2000 - 5000 litres
- ◯ 5000+ litres

40. **D17. Is the transport from point of harvest to point of storage owned/rented etc?**
Mark only one oval.

- ◯ Not applicable
- ◯ Owned transport
- ◯ Borrowed transport (no payment)
- ◯ Rented transport
- ◯ Shared transport
- ◯ Other (specify)

41. **D18. How is this storage unit cooled (or heated)?**
e.g. fridge, air conditioner

_____

42. **D19. How is produce cleaned after harvesting?**
Mark only one oval.

- ◯ Not cleaned
- ◯ Municipal water
- ◯ Borehole water
- ◯ Other (please specify)

43. **D20. Approximately how much water is used for cleaning produce per month?**
Mark only one oval.

- ◯ 0 - 100kl
- ◯ 100 - 1000kl
- ◯ 1000 - 10 000kl
- ◯ 10 000 - 100 000kl
- ◯ 100 000kl +

44. **D21. Please specify the number and types of machinery used in your storage facility**
Tick all that apply.

	Numbers of these types of machines
☐ Forklifts	
☐ Generators	
☐ Refrigeration machinery	
☐ Sorting machinery	
☐ Washing machinery	
☐ Other (please specify)	

45. **D22. If you experience problems finding suitable markets for your produce, please describe these.**

_____

_____

_____

_____

_____

46. **D23. How often do you sell your produce at your preferred price?**
Mark only one oval.

- ◯ Always
- ◯ More often than not
- ◯ Less often than I would like
- ◯ Never

47. **D24. When you are unable to obtain your preferred price, what are the reasons for this?**
Tick all that apply.

- ☐ Does not meet standards required by first choice of customer
- ☐ Produce damaged by weather/pests
- ☐ Oversupply in market caused prices to drop
- ☐ Other (please specify)

Appendix C: Data Collection Tool : Food for Us Final Structures Interview Survey :

Food For Us Seller Final Survey:

Name of User: _____

Circle the most appropriate: Buyer / Seller / Intermediary

A. Application Downloading and Use

A1: Date when became involved in the Food For Us project: _____

A2: How did you become involved in the Food for Us project? (by recommendation, if so through who) _____

A3 :How did you sell produce before/what is the main way that you sell produce?

A4: The process of downloading the Food For Us application was...:

Very Easy	Easy	Difficult	Very Difficult

A5: The Food For Us registration process was...:

Very Easy	Easy	Difficult	Very Difficult

A6:. What activities did you do on the application?

Download and register only	Download, Register and upload produce once or twice	Download, Register and upload produce more than five times	Download, Register, upload produce regularly and encourage others to use the application.

A7:. The information that was required to advertise the product on the application was…

Very little – not enough to truthfully represent my product	Little – there was information but I would have preferred more detailed categories	Enough – there was enough information.	To much – the information that was requested was too much, and redundant

A8: The method of completing the purchase on the application was…

Very Easy – the process was fast and easy and I received the confirmation email immediately	Easy- the process was easy to follow, but I did have some challenges	Difficult - needed assistance to complete the transaction	Very Difficult - transaction could not be completed

B. Outcomes of the application and Food For Us project

B1. Has the application enabled you to find local buyers who are willing to buy fresh produce that you were not aware of before?

Yes	No

B2. If Yes can you explain an example of this?

B3. How often have you posted?

Every Day	Once a week	Once every two weeks	Once during the duration of the trial	Never

B4. If you uploaded produced, what interest did you receive?

I received no interest	Some interest but communicated through other channels	1-3 interested parties	3-6 interested parties	6+ interested parties

B5. Do you believe the app has added to facilitating a more effective local supply chain? (Can you explain the reason for your answer)?

Yes	No

B6. Why ?

B7. Where you able to generate additional income using the app?

Yes	No

B8. Why ?

B9. Did you get out of the Food for Us project what you had hoped to get?

Yes	No

B10. Why ?

B11. Did you sell any produce using the app?

Yes	No

B12. If yes – what? (if possible include amount and cost e.g. one bunch of carrots R10)

B13. Did the use of the application reduce the distance you travelled to sell produce?

Yes, on more than three occasions	Yes, but only on one occasion	No, I received no interest through the application.	No, those who showed interest in produce were further than I normally travel to sell produce.

B14. How has your understanding of waste changed since the being of the Food for Us project if it has changed at all?

B15. What other things have you learnt by being part of this trial?

B16. Will you continue to use the app after the project is completed?

Yes	No

B16. If no, why not?

C. Recommendations

C1. What were your main challenges with regards to using the application?

C2. Are there any ways you would improve the application to ensure that it is easier to use and is more valuable to you as a seller?

C3. Will you recommend the app to others?

Yes	No

C4. If no, why not?

Thank you for your responses and being part of this Food for Us project.

Food for Us Team

Appendix D: Value Creation Interview Schedule for the Food for Us Key Users

Food for Us: a food surplus trading mobile application
February Interview

Who for :key users:

- Introduce myself and briefly introduce my study and what I am looking at.
- Request permission to record the interview.
- Explain that the interviewee can go back at any time to change what has been said or discussed.

Name:

Business/organisation:

Contact Number:

Email Address:

Role: Management team /App Developer / Producers / Consumer / Intermediary / Fort Cox /other

Q= Question| p= prompts

Q1: To give me some background, would you be able to explain what your occupation is and what you do to earn an income?

Q2: The food For Us application hopes to work closely with the local fresh produce supply chain, would you be able to give me more insight into the workings of the current supply chain in the Raymond Mhlaba area?

(p) Who is involved?

(p) What are the challenges experienced?

(p) What are the successes that have been experienced in this context?

(p) What do you believe is important allow for a successful and smooth running local food supply chain?

(p) Is there wastage?

Q3: Can you describe to me how you have been involved in the Food for Us project?

(p) How did you become involved?

(p) What has your role been?

(p) What is your understanding of what the Food For Us project is trying to do and where do you fit in this picture?

Q4: Could you explain the overall experience of interacting with the Food for Us application directly (downloading, registration, and application use such as tacking photographs, posting images of produce)?

- (p) If you haven't been able to use it can you explain why?
- (p) How have you used it?
- (p) Was it easy to download / Register / Use?
- (p) What did you like/ dislike about the application?
- (p) Inhibiting factors?
- (p) How can these factors be addressed?
- (p) What were you enabled to do that might have been more difficult without the application?
- (p) What support has been offered to you to address application challenges?

Q5: In your experience has the development (introductory workshop, app training, meetings, discussions and surveys) and use of the Food For Us application lead to new things being developed that have been of value to you? for example, produced any resources/tools/ideas/ developed new relationships

5.1 – Immediate Value: Has there been any developments, or anything about the application that has helped you and been valuable to you immediately after using the application, or immediately after being involved in a training and workshop?

5.2 – Potential Value: Did anything develop from the application that you can see might be useful/ valuable to you, or other people, in the future?

5.3 – Applies Value: Can you explain if they application, and the workshops and training around the application has resulted in changed behaviour or changed actions when the tools that the application has been used?

5.4 – Realized Value: Can you explain any successful experiences where you have used the application or used the tools acquired through the development process?

5.5. – Transformative Value: Has the application and its affordances changed how you view surplus distribution and the food supply chain? Has it changed the way you think of surplus distribution and trade?

(p) Why have they been valuable?

(p) Can you explain what these things might be and how you have used them or might use them?

(p) Have you been able to do things that you might not have been able to do before?

Q6: Do you think that your use of the application and your involvement in its development has helped you in achieving your aims of influencing the local food systems?

(p) If not, yet how do you think it might have the potential to?

(p) Can you explain how it has been successful?

(p) How does one think it can be adapted and changed to make it successful?

Q7: How did you aim to use the application or be part of the development process?

(p) What does it need to be able to do in order to be recognised as successful or valuable?

Q8: What have been the greatest challenges to the successful development/introduction and use of the Food for Us application in the Raymond Mhlaba area?

Q9 What have been the greatest success in the development and introduction and use of the Food for Us application in the Raymond Mhlaba area?

Appendix E: Value Creation Interview Schedule for the Application Developers and Technical Liaison

Food for Us: a food surplus trading mobile application
March Interview

Who for :Food for Us Application developers & Technical Liason

- Introduce myself and briefly introduce my study and what I am looking at.
- Request permission to record the interview.

Name:

Business/organisation:

Contact Number:

Email Address:

Q= Question| p= prompts

Q1: To give me some background, would you be able to explain your prior experience and knowledge surrounding mobile application technology and the development thereof?

(p) Have you studied in this field?

(p) How have you developed your skills?

(p) What has your experience been with technological innovation within the social, ecological systems?

Q2: Would you be able to briefly describe how you became involved in the Food For Us project and what your role within the project is?

(p) what does your role entail?

(p) Has your role changed over the duration of the project?

(p) In relation to the aim of the Food For Us project, how does your role allow you to contribute to this goal?

Q3: Could you explain your overall experience of being part of the developing process of the Food for Us application?

(p) From the workshop held in August 2017 up until now what has been your experience of the development process?

(p) How has the developing process changed over the period of the project?

(p) Can you explain if there has been any learning through your experiences?

Q4: Can you explain what the current version of the application allows the application users to do? What are the applications affordances?

(p) How is this different from the affordances requested at the early workshops?

(p) Why are they different?

(p) According to your understanding of the backend, have these affordances been used?

(p) The new developments to the application, what does this allow people to do that was not possible in the previous version of the application?

Q5: What are the challenges that you have experienced while developing the application and how have these challenges shaped further development of the application?

(p) Can you give me the examples of the challenges?

(p) Where you able to learn anything out of these challenges?

(p) Did these challenges change how you approached application development in other projects?

Q6: What successes have you experienced during the development process of the Food For Us application and how has this influenced further progression of the Food for Us project and other projects?

(p) Successes in terms relationships made, resources developed or skills gained?

(p) Has what you have defined as successful for this project changed?

(p) What do you aim to achieve at the end of this project to deem this application development project as successful?

Q7: In your experience what support mechanisms and social support systems are usefully to ensure that this application is well adopted in the communities in which we are testing them?

(p) Has the food for Us project managed to provide such support systems or social support mechanisms?

(p) How has the Food for Us app been made consumer friendly?

(p) Can the support mechanisms be improved, how so?

Q8: What levels of value have been created through the development process of the Food for Us application for you?

8.1 – Immediate Value: The activity: Can you describe any meaningful activities that you have participated in during the duration of the development process that has been meaningful. (This can be a conversation a working session a project, a workshop etc.)

8.2 – Potential Value: The output: Has there been any thing that has acted as an output from the activity that you previously described, for example was there any ideas that developed from any conversations regarding the application, or any documents or lists that came out of any meetings? Why do you think these particular outputs might be interesting or important?

8.3 – Applied Value: Application: How has the things that have been created as outputs or as ideas been used as resources ? What have these resources enabled you to do that might not have been possible without the resource? (This can be the planning of something and follow up meetings after an idea etc)

8.4 – Realized Value: Outcome: Can you explain how the use of the resources spoken about previously has resulted in any successes either for yourself or for your organisation? Did anything successful come out of any of the initial activities that developed into actions?

8.5. – Transformative Value: New definition of Success: Has how you have interacted with the Food For Us application and its development resulted in you changing what you viewed as success in this context? What do you believe will render the development of this application successful? Has this changed since the initial project brief?

Q9: Could you describe if or how your involvement in the development of the Food For Us app has changed how you view food surplus redistribution and the workings of our current food supply chain?

Q10: Do you think that the development of the app has helped in achieving the aim of Food for Us, to influencing the local food systems and reduce on farm food surplus in the two case study areas?

(p) If not, why not?

(p) Can you explain how it has been successful?

(p) What do you think needs to be adapted and changed to make it successful?

Q11: Is there anything else that you would like to add about your experience of working with the development and initial use of this Food For Us application?

Appendix F: Value Creation Interview Schedule for the Food for Us Project managers

Questions for Food for Us Project Managers (Mike Ward and Nicola Jenkins) :

1. According to the original project outline, what did the project team envision the application to enable and achieve?
    a. Did this change through the project? (Examples)

2. What does the latest version of the application allow people to do ?

3. What successes emerged during the development process and introduction of the Food for Us application on a project level?
    a. Relationships and partnerships made?
    b. Resources developed
    c. Knowledge shared / Knowledge created
    d. Activities / events / discussions that have resulted due to the project?
    e. Actions have been taken which have branched off from FFU project?

4. Can you identify any enabling factors that allowed for these successes?
    a. Examples
    b. Why was it enabling

5. What were the major challenges experienced by the project team during the development process and introduction of the Food for Us application at a project level?

6. Can you identify any inhibiting factors that hindered the achievement of the project aims and goals?
    a. Examples

7. Can you identify areas of social learning that occurred within the project management team and between project team and the multi-stakeholder consortium and users?
    a. Key role players in social learning (Between who)
    b. Enabling factors and tools
    c. Where (on what platforms / events/
    d. About what
    e. How can the learning of all those in the FU project, users and project stream be strengthened and improved?

8. In your experience what support mechanisms and social support systems were usefully or missing to promote social learning amongst the project team?

9. Do you think that the application has been successful in achieving the original aim of Food for Us, to influencing the local food systems and reduce on farm food surplus in the two case study areas?
    a. If not, why not?
    b. Can you explain how it has been successful?
    c. What do you think needs to be adapted and changed to make it more successful in the case studies being studied as well as in different communities?
    d. Is this still the aim?

Appendix G: Amanzi for Food TOT - Observation Schedule (Filled in – Workshop 1)

Tot Amanzi for Food workshop – first workshop

Details:	**Activities:** What happened:		**Evidence of Value Creation**
Date: 2nd and 3rd of November 2017 **Time:** 10:00 am – 16:30 pm **Where:** Fort Cox colleage Gymnasium, Middeldrift, Eastern Cape **Who:** Amanzi for Food Tot workshop participants, Imvotho Bubomi Network members **Why:** To introduce the Food for Us application to the participants of the Amanzi for Food Tot. To introduce the application, create a space for training and then to gain some users to be part of the Food for Us network. **Data Audio source :** Day 1 : Audio 3 – 57': 58" Day 2: FFU Workshop introduction audio – 32':49"	On the first day of the Amanzi for Food Tot, I introduced the Food for Us application very briefly. Day 1: ([redacted] talks and then translated) -Accessing the market for farmers once they have produced their food (thanks to water saving techniques learned through the Amanzi for Food project) has become a challenge for many farmers. -The FFU project has developed an application which is going to be trialled in the Raymond Mhlaba area which connect the farmer and the consumer. -Trying to remove the middelman so the farmer can trade directly with the consumer. -More produce sold therefore less surplus -Encourage all participants to be part of the trial – lead participants through the download and registration process. Offer a **wifi hotspot** with free data for the users to download the application so that can work further with the application tomorrow. – Encourage downloading and registering -Emphasis on use for everyone, for all of us. - The application uses very little data *Participants going onto the wifi to download to the application- several people downloading the application. (connection very slow due to high volume of people trying to use the limited wifi)	Explain a little more about the application and provide another opportunity for participants to download app. Day 2 : ([redacted] Presents and [redacted] translated) -No one was able to download the application the night before. -The need to find away to address on –farm food surplus – wasted resources, wasted money, wasted time and increased environmental impact -Need to create a circular economy – so there is no wasted value -Internet phones- whatsapp phones- *Large majority of the participants raised hands – 65% -Mention what internet phones can do – take photos, act as a calendar, have other features -Only introducing in the area. -Trial is an experiment – new project, there might be issues. We would like people to be part of the project to say what worked for them and what didn't. -Version one of the App -Explain that people from Raymond Mhlaba community were invited to Grahamstown to be part of App building. – Collaborative process -Training process in the area - *wanted to do at the Tot but there has been little time -Alice Market day – introduced the application *Demonstrate the way to download the application – how to get the Google play store (identify the icon for Google play). Demonstrate how to search the Google play …. Then what the Food for Us icon looks like . How to install. Then how to find the Food for Us icon on the desktop. Register – First name, surname, cell phone number, ID number. Explain the meaning of notification radius setting – you want to trade with someone that is close by and not someone who is far away who it will take long to get produce from . Explain the user group- seller- person who sells produce, buyer- person who buys produce. Longitude and latitude – automatically comes onto your phone because internet enabled phones often have this feature of GPS. Then definition of are- Fort Cox … Middeldrift. Explanation of the type of road that people need to travel on to get to the produce. 4x4 only, dirt road… next *demonstrate as a seller – interface - bad signal which inhibits us to be able to explore the interface. -quantity -what is the grading *demonstrate the buyer interface -basic description of buyer interface -rating -looking at the advertised produce	**Immediate** Day 1: Immediate value- Wifi connection and avenue to download the Food for Us application. Also created value in enabling participants to connect. Day 2: Immediate value Detailed explanation of how to get to the Google Play store application downloader and how to register to be part of the application and the trial **Potential** Day 1: Introduced to new ideas about using cellphone technology and app development to create a platform that assist trading between farmer and producer Day 2: Open discussion and ideas around the food surplus and the food waste that develops on farms and the wasted resources that develops from here. Opportunity to download and use the Food for Us application which may hold potential value in creating an alternative market for the farmers- (The comments and discussion after the brief discussion on day 2) **Applied** Day 2: Downloading of the application – an action Resources : Tools : Introduction to the Food for Us application Relationships : Relationships with the other Imvotho Bubomi Learning Network and participants within the Tot.

		Want to use the application to advertise fresh locally produced food which can be consumed locally. R: Do you think this application is of value? P: Yess R:Can you give me any comments on why you think it might be a good idea? 53':25" P1: I think nowadays it is best, because everything comes on social media more than it was you know, that would bring our customers all in one place at one time with all their services that they require under one roof. R: Any other comments or queries? 54':26" P2: Its an easy link for the farmers and the buyers. 54':41" P3: Its very much easier because now we don't have to go now and approach the buyers, we just post on it and try to meet them. 54:56 P4 : Its convenient, its smart its specific and it is cheaper. 55: 21 P5: I think it will create a transformation in the market cause now a people who are far away from you can also get access to your produce. R: Thank you, any other comments ? 55:45 P6: It is the easiest way to advertise on this platform especially when we don't have such a platform or much market, because we know that the market is owned by the commercial, so now if this one is now for everyone. R: Okay, very nice, thank you. 56:52 P7: It's a question, after you say you want to buy how do you transact money. R: The application doesn't facilitate payment on the app, it connects you as a farmer and a buyer and then it communicates over email, so once I have decided to buy the carrots, an email is sent to the person you has the carrots. [redacted] wants to buy x bags of carrots, here is her number and here is her email address and then we can communicate afterwards about how to pay. 58:26 P8: Is it just an email or is it an email and an sms ? If I don't have an email address, then what? R: Unfortunately to get the application, you need to have an email address, because it works off Google play store and to go onto Google play store you need an email address. Unfortunately. We also want to look into working on a system that works on SMS, but this will be much later. * left the wifi on for people to download the application and requested that people come and discuss their thoughts and concerns during the lunch break and this project and potential trading platform will be revisited at the next Tot in February of 2018.	Open corridors to communicate with Sarah through email or calls and whatsapp for more information about the project. Knowedge Sharing : Day 2: sharing of thoughts and comments about the application, coupled with ideas on potential challenges that are foreseen. Ideas : Day 1: Idea of using technology to adress farmer challenges Practices: Downloading of the application
Challenges to Value Creation Challenges experienced in activities Day 1: The connection was not strong enough and therefore the downloading process took too long for people to download the application off the hotspot. There were too many people trying to get onto the network and therefore the hotspot became overloaded not enabling people to download the application easily. *This was the first	**Enabling factors to Value Creation** - Excitement around the use of new technology to address farmer challenges - The presence of the a number of people who are interested and willing to discuss openly their thoughts on the project. **What is valued (Perception of Value)** - improved yield of production - economic prosperity - healthy nutrious food	**What are the outcomes / outputs of the activities?** Introduction to the project, displaying the workings of the Food for Us application as well as how to download and register. Opened the floor to questions and comments and received a positive response from several of the participants expressing a need for this type of platform

hurdel to getting the participants to be interested in the application and the value that it brought. Day 2: Bad signal for the demonstration of the use of the application. Several small challenges experienced while demonstrating the use of the application to the tot participants. Challenge with the wifi not being strong enough for people to be able to successfully download the application. The time limit that was stipulated for the introduction and discussion around the application was very short therefore making the time very limited to explore the idea in great detail with the Tot participants. Not all of the participants were able to download the application during the evening between the first and second day of the course. There were a number of people who had access to an internet enabled phone, but there were some questions regarding the need for an email address and many of the participants not having an email address.	**Social Learning Interactions** - Learning from each others queries and discussion with one another and trying to help one another. -Questions asked during the demonstration of the workings of the application	and then overwhelming support from a number of participants. Unfortunately the potential of the workshop could not be fully recognised, as the time was incredibly short due to the workshop starting very late. There were a number of other questions and queries that were scheduled however time did not permit for these to be explored and therefore will be touched on in the next Tot. Met a number of important stakeholders who will play an important part in this study.

Appendix H: Attendance Register for the Food for Us and RMDA hosted Match making Event.

food FOR US

Match Making Event: Hosted by RMDA &Food for Us: 25th April: TheTRC Hall, Alice

REGISTRATION

	First Name	Surname	Organisation		Signed
1.	[redacted]	[redacted]	DRDAR Alice Extension Office	[redacted]	
2.			Fort Hare		
3.			Farmer		
4.			Farmer		
5.			Kofubar		
6.			Co op Qanda		
7.			Vegado		
8.			Mxumbu Youth		
9.			Mxumbu Youth		
10.			Mxumbu Youth		
11.					
12.			Yunik Trading Comp		
13.			Mak and Mak guest House		
14.			Twins Supermarket (Manager of Vegetables)		
15.			RMDA		
16.			Raymond Mhlaba Municipality		
17.			Raymond Mhlaba Municipality		
18.			Raymond Mhlaba Municipality		
19.			University of Fort Hare Development Studies Department		
20.			Raymond Mhlaba Municipality		
21.			RMDA		
22.			RMDA		
23.			RMDA		
24.			Alice Farmers Association		
25.					

FOR US

Match Making Event: Hosted by RMDA &Food for Us: 25th April: TheTRC Hall, Alice

REGISTRATION

First Name	Surname	Organisation	Email Adress	Signed
1. Th	[redacted]	DRDAR Alice Extension Office	[redacted]	
2. Si		Fort Hare		
3. M		Farmer		
4. B		Farmer		
5. N		Kofubar		
6. M				
7. B		Co op Qanda		
8. M		Vegado		
9. S		Mxumbu Youth		
10. T		Mxumbu Youth		
11. X		Mxumbu Youth		
12. Z				
13. N		Unik Trading Comp.		
14. T		Mak and Mak guest House		
15. E		Twins Supermarket (Manager of Vegetables)		
16. K		RMDA		
17. U		Raymond Mhlaba Municipality		
18. S		Raymond Mhlaba Municipality		
19.		Raymond Mhlaba Municipality		
20. T		University of Fort Hare Development Studies Department		
21.		Raymond Mhlaba Municipality		
22.		RMDA		
23.		RMDA		
24.		RMDA		
25.		Alice Farmers Association		

	First Name	Surname	Organisation	Email Adress	Signed
26.	[redacted]	[redacted]	University of Fort Hare ADRI	[redacted]	
27.			RMDA		
28.			University of Fort Hare Agric Department		
29.			RMDA		
30.					
31.					
32.					
33.			Co-op Qanda		
34.			Sizinzo		
35.					
36.			ELRC		
37.			ELRC		
38.			ELRC		
39.			ELRC		
40.			ELRC		
41.			Alice Hawkers association		
42.			Sibonile Catering and Sewing		
43.			Ayagcoba Trading n Project		
44.			Hawkers Representative		
45.			FARMER & SELLER		
46.			Farmer & Buyer		
47.			farmer + seller		
48.			FARMER		
49.					
50.					
51.					
52.					
53.					
54.					
55.					
56.					

	First Name	Surname	Organisation	Email Adress	Signed
26.	[redacted]	[redacted]	University of Fort Hare ADRI	[redacted]	
27.			RMDA		
28.			University of Fort Hare Agric Department		
29.			RMDA		
30.					
31.					
32.					
33.			Co-op Qanda		
34.			Sizinzo		
35.					
36.			ELRC		
37.			ELRC		
38.			ELRC		
39.			ELRC		
40.			ELRC		
41.			Alice Hawkers association		
42.			Sibonile Catering and Sewing		
43.			Ayagcoba Trading n Project		
44.			Hawkers Representative		
45.			[illegible]		
46.			Rmm		
47.			Rmm Tourism Unit		
48.					
49.					
50.					
51.					
52.					
53.					
54.					
55.					
56.					

CONTACT DETAILS:

	First Name	Surname	Organisation	Cell number	Network (MTN/Cell C/Vodacom/Telkom)
57.	[redacted]		Farmer Ibu	[redacted]	
58.	[redacted]		RM Municipality	[redacted]	Vodacom
59.	[redacted]		RM Municipality	[redacted]	Telkom
60.	[redacted]		FARMER	[redacted]	[illegible]
61.	[redacted]		YUNIK TRADING	[redacted]	MTN
62.	[redacted]		Unisonge [illegible]	[redacted]	MTN
63.	[redacted]		ZPM Agric Co-op	[redacted]	MTN
64.	[redacted]		Mxumbu Youth Co-op	[redacted]	MTN/Cell C
65.	[redacted]		MSobomvu	[redacted]	MTN
66.	[redacted]		R.M MUNICIPALITY	[redacted]	MTN
67.	[redacted]		Mxumbu youth co-op	[redacted]	MTN
68.	[redacted]		Mxumbu Youthco-op	[redacted]	none
69.	[redacted]		Iphi Clone	[redacted]	Telkom
70.	[redacted]		FARMER	[redacted]	MTN
71.	[redacted]		~	[redacted]	~
72.	[redacted]		[illegible]	[redacted]	[illegible]
73.	[redacted]		Buyer Twins	[redacted]	MTN
74.	[redacted]		Sibonile SC	[redacted]	MTN
75.	[redacted]		Thuthe thu	[redacted]	MTN
76.	[redacted]		farmer	[redacted]	MTN 07905 80774
77.	[redacted]		RMDA	[redacted]	MTN
78.	[redacted]		Farmer and buyer	[redacted]	Cell C
79.	[redacted]		FARMER	[redacted]	Vodacom
80.	[redacted]			[redacted]	
81.	[redacted]			[redacted]	
82.	[redacted]			[redacted]	
83.	[redacted]			[redacted]	
84.	[redacted]			[redacted]	
85.	[redacted]			[redacted]	
86.	[redacted]			[redacted]	
87.	[redacted]			[redacted]	
88.	[redacted]			[redacted]	
89.	[redacted]			[redacted]	
90.	[redacted]			[redacted]	
91.	[redacted]			[redacted]	
92.	[redacted]			[redacted]	
93.	[redacted]			[redacted]	
94.	[redacted]			[redacted]	
95.	[redacted]			[redacted]	
96.	[redacted]			[redacted]	
97.	[redacted]			[redacted]	
98.					
99.					
100.					

Appendix I: Food for Us #MatchMaking Event Programme

Food For Us Match Making Event Programme

Where : TRC Hall, Alice
When : Wednesday 25th April 2018 , **10:00 am -03: 00** pm

Attending: Buyers and Sellers of produce in the Raymond Mhlaba area

10: 00 – 10: 30	Tea and Registration
10:30 – 10:40	Introduction and Welcome
10:40 – 10: 50	Opening and introductory **#MatchMaking** exercise
10:50 – 10:55	Objectives of this **#Matchmaking** event and Program
12: 10 – 12:20	Introduction to the Food for Us App
10:55 – 11:20	Brief introduction round the room
11:20 – 11:50	Group Discussion on market related challenges
11:50 – 12:10	Group Presentation and discussion
12:10 – 12:20	Unmet demand from the market
12: 20 – 12:30	Testimonies from current Food for Us buyer/ seller-
12:30 – 1:15	Lunch and Networking session **#MatchMaking** Opportunity
1:15 – 2: 00	Solution competition – What are the solutions can we find to the challenges that farmers and buyers face? **#MatchMaking** Exercise
2:00 – 2:25	Presentation **#MatchMaking** solution competition
2: 25 – 2: 30	Brief Break
2: 30 – 2: 40	Way forward
2: 40 – 2 : 45	Award the prize for the best **#MatchMaking** solution
2: 45 – 2: 50	Group Photograph
2:50- 3:00	Closing Remark

Appendix J: Example of the Food for Us WhatsApp Data

WhatsApp Chat in the Food For Us support group that was developed for the Raymond Mhlaba Area

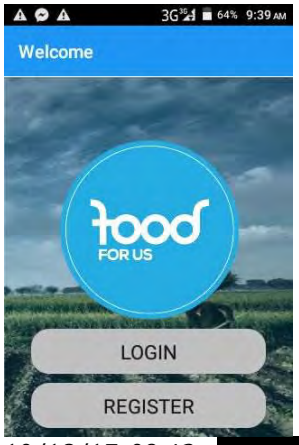
Date from - 17 October 2017
Till Date Captured – 17th August 2018

1. 10/17/17, 11:16 - Messages to this group are now secured with end-to-end encryption. Tap for more info.
2. 10/17/17, 11:16 - You created group "Food For Us - RM trial 🌱🌱"
3. 10/17/17, 11:17 - You added [redacted]
4. 10/17/17, 11:17 - You added [redacted]
5. 10/17/17, 11:18 - You added [redacted]
6. 10/17/17, 11:18 - You added [redacted]
7. 10/17/17, 11:20 - You added [redacted]
8. 10/17/17, 11:20 - Sarah Durr: Good Morning All, I have developed this Whatsapp group to create a support network to help those people who have agreed to be part of the Food For Us mobile application trial. We hope that you have been able to download the application and are slowly starting to be able to use it in your daily activities. Please let me know if there is anyone else you would like to add to this group who is interested in being part of this exciting project.
9. 10/17/17, 11:20 - [redacted]: Thanks Sarah this is very useful.
10. 10/17/17, 11:20 - [redacted] This picture is amazing! Can't wait to visit this market
11. 10/17/17, 11:22 - [redacted] Okay thanks
12. 10/17/17, 11:22 - [redacted]

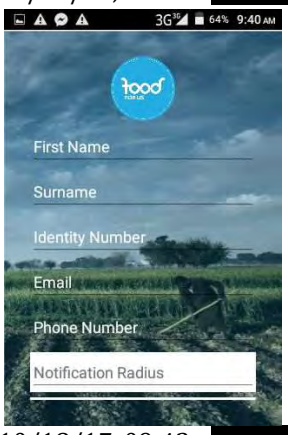
13. 10/17/17, 11:22 - Sarah Durr: If you experience any difficulties regarding the application please email me - Sarahjanedurr@gmail.com
14. 10/17/17, 11:23 - You added [redacted]
15. 10/17/17, 11:39 - [redacted] Thanks Sarah.....this is great
16. 10/17/17, 11:39 - [redacted]: Great Saraj thank you
17. 10/17/17, 11:39 - [redacted]: Sarah rather
18. 10/17/17, 11:53 - [redacted]: Thank you Sarah
19. 10/17/17, 19:17 - [redacted]: Thanx Sarah
20. 10/18/17, 09:05 - [redacted]: Good morning, the app keeps crashing when I try to load it
21. 10/18/17, 09:12 - [redacted]: Good morning [redacted]. Yhoo. At which point in the loading is the App crashing this time so that the developers can be informed by Sarah?
22. 10/18/17, 09:14 - Sarah Durr: [redacted], were you able to redownload the app? It has had some major updates since we last spoke at the Market day.
23. 10/18/17, 09:17 - [redacted]: I'm trying to re download the app ryt nw
24. 10/18/17, 09:25 - Sarah Durr: 🙂👍👍👍Fantastic [redacted]

25. 10/18/17, 09:34 - [redacted]: I've downloaded it now, but ist crashing when I'm registering
26. 10/18/17, 09:35 - [redacted] It's saying application has stopped
27. 10/18/17, 09:39 - Sarah Durr: Okay [redacted] send me a screenshot and will talk to [redacted] (app developer) now 👍 and sort this out for you
28. 10/18/17, 09:43 - [redacted]

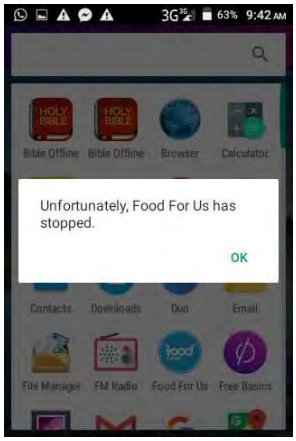
29. 10/18/17, 09:43 - [redacted]



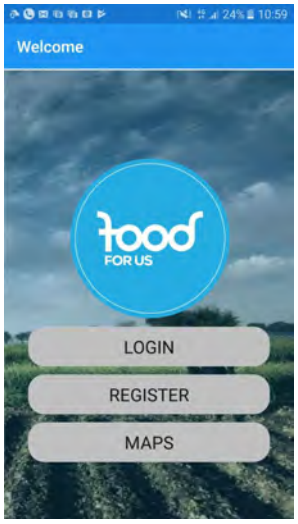
30. 10/18/17, 09:43 - [redacted]



31. 10/18/17, 09:43 - [redacted]

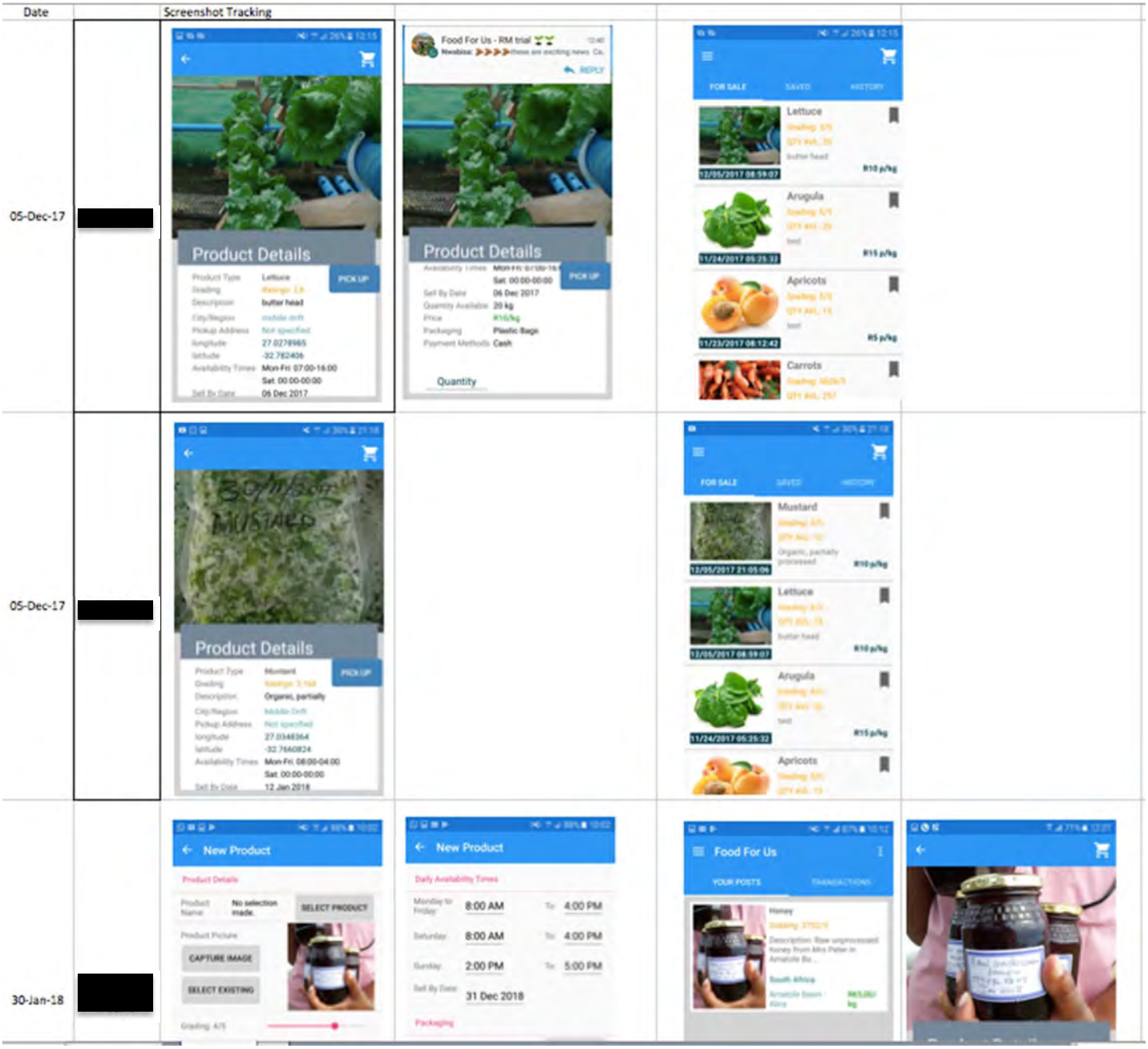


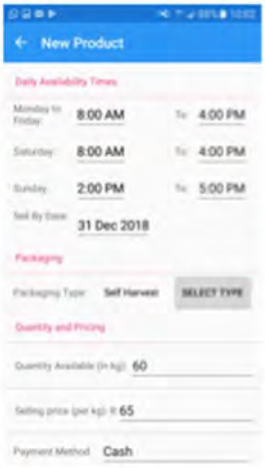
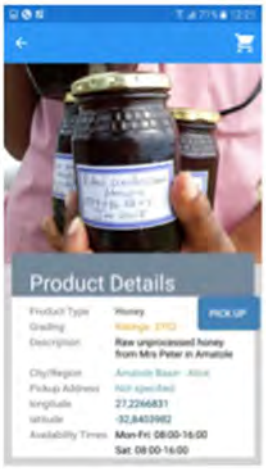
32. 10/18/17, 09:49 - Sarah Durr: Message from [redacted] (manger of app development) - I have taken that up with them the fix will be out in an hour-
33. 10/18/17, 09:50 - Sarah Durr: Sorry for your inconvience [redacted]
34. 10/18/17, 09:50 - Sarah Durr: I mean [redacted]
35. 10/18/17, 09:50 - [redacted]: 👍Thank you Sarah.
36. 10/18/17, 09:51 - [redacted]: Thanks Sarah and [redacted] for the update
37. 10/18/17, 09:53 - [redacted]: Thanks [redacted] and Sarah i was experiencing the same problem yesterday
38. 10/18/17, 09:54 - [redacted]: Thanks family
39. 10/18/17, 09:57 - Sarah Durr: Thanks [redacted] for the feedback🙂👍! I will let you know once the issue has been resolved. Thanks for your patience all!
40. 10/18/17, 09:58 - [redacted]: To me it is saying my username or password is incorrect although I'm using the password which I was given to login
41. 10/18/17, 10:01 - You added [redacted]
42. 10/18/17, 10:02 - Sarah Durr: Hi All, I have added [redacted] to the group so he can deal directly with us to fix the problems as quickly as possible. We can use tho group as a support structure so that we can try and work together to get the app working for all of us.
43. 10/18/17, 10:02 - Sarah Durr: [redacted] [redacted] has just raised the follow issue: To me it is saying my username or password is incorrect although I'm using the password which I was given to login
44. 10/18/17, 10:08 - [redacted]: [redacted] my email address is [redacted],can you please help me?
45. 10/18/17, 10:09 - [redacted]: Thanks Sarah, I will check the administrator page now
46. 10/18/17, 10:12 - [redacted]: Hi [redacted], try doing a reset of your password, I see you on the registered and active users
47. 10/18/17, 10:14 - [redacted] If you would like I can also try to do a password reset here and then email you the new one
48. 10/18/17, 10:15 - [redacted]: Thanx I got the new password and it has worked
49. 10/18/17, 10:16 - [redacted] Great, there is also an update to the app coming up later today that will fix a few problems presently being experienced by users
50. 10/18/17, 11:51 - [redacted] Thanks [redacted]
51. 10/18/17, 13:52 - [redacted] Hi all there is a new version that has been uploaded to the Google store if you are having problems please update and give feedback
52. 10/25/17, 10:59 - Sarah Durr:



53. 10/25/17, 11:00 - Sarah Durr: Good Day all, there is an updated version of the application that works very well. Try and start to use the application as you wish.
54. 10/25/17, 11:04 - Sarah Durr: If there are any people that you know who purchase your produce (shops, resturants, churches and soup kitchens) please let me know as I shall approach them to include them on the application.
55. 10/25/17, 11:05 - [redacted]: Thanks Sarah
56. 10/25/17, 11:49 - [redacted]: Ok
57. 10/25/17, 13:53 - [redacted]: We will let you know Sarah...thank you
58. 10/27/17, 16:34 - [redacted]: <Media omitted>*Image of error codes
59. 10/27/17, 16:34 - [redacted]: <Media omitted>*Image of error code
60. 10/27/17, 16:34 - [redacted]: <Media omitted> *Images of error codes about being able to take photographs to include in application sposts.
61. 10/27/17, 16:36 - [redacted]: With the cannot take picture, is your camera working?
62. 10/27/17, 16:37 - [redacted]: And is your phone connected to the internet?
63. 10/27/17, 16:40 - [redacted]: Also try take a normal picture out of the app and the choose upload from gallery once you are in the app. This may be a quick work around
64. 10/27/17, 16:56 - Sarah Durr: Hi [redacted] we did alot of trialling this afternoon. [redacted] was connected to my hotspot. His phone was able to upload photographs from his phone but couldn't take it's own picture.
65. 10/27/17, 16:58 - [redacted]: OK sent that through for trouble shooting now, I have been able to replicate the problem with some settings on my phone will get back to you shortly
66. 10/27/17, 16:58 - Sarah Durr: My phone wasn't able to take a photograph or to upload a photograph. I have sent you the issues by email.
67. 10/27/17, 16:59 - Sarah Durr: [redacted] and his team have been brilliant and patient with helping us work through the application.

Appendix K: Example Food for Us Screenshot Data



30-Jan-18	[redacted]				
09-Feb-18	[redacted]				
09-Feb-18	[redacted]				

Appendix L: Example of Filled in Back to office Field reflection



FOOD FOR US FIELD REPORT BACK

Attendees:

4th July 2017

[redacted]

Sarah Durr

We departed for Alice at 7:30 am from the Environmental Learning Research Center. The agenda of the days visit to the Alice, Middledrift area was to meet with a number of different parties who may be interested in becoming part of the food for us project through either being trial partners, application users or stakeholders. We hoped to get a number of people's details to whom we can circulate more information about the Food for Us project and upcoming workshop, at a later stage. We hoped to personally invite and hand out hardcopies of workshop flyers to a number of stakeholders to attend the workshop in Grahamstown on the 3rd of August 2017.

RMDA

We first met with [redacted] and [redacted] from the RMDA (Raymond Mhlaba Development Agency) in Alice. RMDA has been working on developing their own digital platform to connect Farmers with new markets for their produce and therefore where very interested in what the Food for Us application could offer. The RMDA agreed to partner with the food for us project to develop a Food for us hub within the Raymond Mhlaba municipality.

Farmers associations, social development agencies, church groups, retailers and other businesses will be invited by RMDA to join a Food For Us meeting in Alice on the 20th July 2017 to discuss what different stakeholders will be needing from a mobile application as well as to discuss the possible challenges that potential users may face.

A number of potential challenges and suggestions where discussed these being;

- Will the application will be able to effectively verify the quality and quantity of produce for consumers?
- What kind of grading system will be available for the produce on the application?
- The concern regarding the cost of data for application users? There was a suggestion in this regard to get mobile companies on board to sponsor the data for the project.
- Not many small-scale farmers and small-scale NGO's and organizations have access to smart phones.

There was a suggestion by RMDA that the T-Vet college of Lovedale be incorporated into the project and Lovedale students be used at interns for the project. These Intern will each have the application on their phones and visit different stakeholders to check quality and put products onto the Food for us platform on behalf of farmers. This idea will alleviate the need for all users to have their own smart phone to utilize the application, but will need the application to be designed in a way each phone can log into a number of different producer and consumer profiles.

RMDA hopes to play a mobilization role in ensuring that the food for us pilot project in Raymond Mhlaba is successfully implemented in the area.

Alice Spar

After our lengthily discussions with RMDA we met very briefly with [redacted] from the Alice Spar to introduce the Food for us project and the role that he could play in being part of the project. We left [redacted] with a workshop flyer and a formal workshop invite.

Agri-Park

Mid-morning, we met with [redacted] from Agri-Park, University of Fort Hare. [redacted] was very enthusiastic about getting involved in the project and saw potential for the application to be applied to Agri- Park through the utilisation of the producer and consumer services. [redacted] highlighted that there is a need to find local producers that can provide the Agri-Park with fresh produce on a regular basis as the large producers are far away. [redacted] also noted that the application would be a good platform to seek markets for the surplus produce that their vegetable gardens produce as well as the surplus produce that they produce in the food-processing plant. [redacted] would like to partner with Food for Us and should great interest in attending the workshop on the 3rd of August in Grahamstown.

World Vision

World Vision is a Christian based NGO based in Middeldrift, Eastern Cape which aims to improve the wellbeing of children. We spoke to [redacted] and [redacted] at the World Vision office in Middeldrift to introduce the project and discuss the possible role that the NGO could plan in facilitating the use of the Food for Us application. World Vision does work with a couple of community members to help them to develop small vegetable gardens hoping to increase the abundance of healthy produce for children's consumption. They expressed keen interest in partnering with the Food for Us project as they believe there is a need to connect the small-scale subsistence farmers to markets in case they have any surplus to sell. We briefly discussed the possibility of World Vision acting as a Food for us application facilitator who is available for producers and consumers to visit if they would like to use the application but don't have access to a smart phone or mobile data.

Department of Rural Development and Agrarian Reform: Extension officers

We briefly described the Food for Us project to the Extension officers who were available to meet with us at

DRDAR, Middeldrift. They expressed some interest in the project and in attending the Raymond Mhlaba meeting later on in the month. The Extension officers reported back that they did believe that there may be a need for a system that connects farmers with alternative markets but warned that not many of the poverty- stricken farmers have access to smart phone devices. This issue needs to be addressed in the design of the application. It was suggested that a similar whatsapp profile be created.

Fort cox College

The last meeting was with [redacted] an Agriculture engineering lecturer from Fort Cox College. [redacted] showed great interest in partnering with the Food for Us project. He hoped that the application could possibly be used as a project subject for student in the Agricultural business course. Depending on when the application will be available for trial participants to use, [redacted] hopes that students will be able to use the application as a market linking tool and at the end of the trial give a project report on using the application as a tool. If the application is not available to application users before mid-August, [redacted] believed that the students would be waiting too long without an application to test.

[redacted] also brought up the issue of many farmers not having access to a smart phone and suggested that possibly tablet be bought by the project and given to specific community leaders who would co-ordinate the use of the application within a smaller community. Both of these issues and queries need to be looked into with the application

developers and the project managers.

In conclusion, it was a very productive field visit with the project being well received from all who we approached and met with. Unfortunately, we were not able to meet with all of the stakeholders (Citrus packaging plant, Local Farmer Association leader ect.) but we hope to meet with these people when we next come to Alice and Fort Beaufort on the 20th July 2017.

Appendix M: Example of the first 10 data fragment entries of the Affordance Memo for the Food for Us application

Emergent Themes	**Realized affordances**	Emergent themes	Enabling Factors	Emergent Themes	Suggested affordances	Emergent Themes	Inhibiting factors
Easy App use :	- 596- "Participant 1: Its very fast n easy to use, (the app). " - FFUWD	**Mobile Data to acess the App**	: 653- "Project Manager: As being part of the project, we would like to give our participants data to ensure there are not factors inhibitng their use of the app."- FFUWD	**Password:**	Suggested that one should be able to make their own password- 175- "Yeah I think you should make your own passwords you see, or have some kind of thing that enables a person to change their password into your own because you cant keep those numbers." – VCIS5	**Registration requires too much info**	**:** 111- Unnecessary to have to ask the users for their ID number – this becomes a longer process – " and also I don't see personally, Im not saying its right, but I don't see the reason why we should have an ID number being captured there. Its not really necessary. " – (VCII2)
	FFSC9- " The application is otherwise incredibly user friendly and easy to use."		The application uses very little data to navigate and upload produce - TOT		FFSC9 - The contact details of the people that are advertising the produce to be bought. One shouldn't need to keep loggining into the application, if you log in once, you need to be able to remain logged in.		Misunderstandings of what fields meant during the registration - FFSA 11- " Once again the issue was knowing what was meant. "
	FFSC12- "the application itself is fine, I will let you know if there are any further suggestions on the application "	**Support of TOT catering**	A way to get people to use the application was to encourage farmers to upload their produce to the application and then it would be bought for catering for the following TOT. - TOTW2O	**Notification system**	Suggested that the application must have a notification system –	**Delay in Registration process:**	There was a lag between the time that some one received their confirmation of registration email and password email and the time that they could get into the application after the administration had approved them. - VCIAD1
	" It was difficult [uploading of produce] especially the first version, after the secomd version of the application it was much easier as the application improved dramatically and it became slightly easier" - IFSA2	**Avail Wifi**	" Allow the participants onto the gymnasium wifi to download the Food for Us application" - TOTW2O		56- "So much easier because I mean it is very easy to just go through your day without even going and looking at the application. So if something pops up and them I am interested I look at it and I quickly access it" – **VCIB4**		(93) " You cant log in straight. Someone needs to approve you on the backend. So the admin will go and check and get a notification first and see, oh a new user has been registered at Food for Us" - VCIAD1
	" Once you have downloaded it, it is easy but can be complicated for those who are not familiar with using technology." - BSFA1	**Access to appropriate Techno**	65% of the participants of the Amanzi for Food TOT had an internet enabled mobile phone. - TOTW1O		50-"So like notification that this order has been seen" **– VCIS6**	**Password Barrier:**	Often the users were not able to get into the application due to the password providing a barrier due to lost passwords or forgotten passwords- -173-"The password, you got the password and then

		logy amongst farming group:					they say you need to put on the password…. Then its says wrong password. So that was a big challenge." – (VCIS5)
Registration:	Easy to register (171- VCIS5)	**Automation of the Mobile Functions:**	The Application automaticall draws the GPS logitude and latitude readings from the phone- TOTW1O		Suggestion to get a notification function on the application- 81- "but when the message beeps, whatsapp I quickly check it, okay its fine. And so cant we have the app doing the same? So it makes a beep like whatsapp? Alert the person that something is ready." - MMWR1		The users are not able to log into the application because they have lost their password - 130 - 131 " App developer- Ok but I am looking at the backend now and can seen you are registered as a seller on the 19th October. Why are you trying to reregister? Participant- I'm sorry I cant find my password." - FFUWD
	" All you have to do is to focus on answering the questions that are asked. There are not too many questions whish is good" - IFSA4	**Technical Support**	**:** During the one training event and the 3 Tot's and Match Making event the participants where taken through a training process.		-4- "Coming to the use of the app, we only need the notificaion. I am going to start with that one. It is very important that we get notifications whenever someone is selling and someone is putting an advert on the app, there must be notifications ." - MMWR4		Password challenges- 374- " Participant 1: The app itself is not working at all, I'm trying different phones from different people" 378 - " Participant 1: I tried 5 times and it keeps on giving me the same password". - FFUWD
	[the registration process] " This process was easy"- BSFA1				" It will be good to have a notification system like whatsapp." - BFSC1		111- " and you must be able to create your own password and one you have got your own password you must be able to interact with the interface of the app without having to refer to the guy to approve" – VCII2
Login feature	allows the user to login into the application –				" I would improve the application by ensuring that there is a notification system " - BFSC4		979- " Participant : The downloading is fine but to log in is a challenge." - FFUWD
	58- "For me, very easy. But by the time it was explained at the launch, it was like it was going to be something difficult to enter. But when it came, it was just like … [easy]. " – **VCIS6**				Notification system that notifies people when there is produce that they want uploaded on the application - TOTW2O		FFSA 7 - Some of the users found it difficult to log into the application due to passwords amongst other challenegs - " It was easy to download and register, but it was difficult to log in. "

Appendix N: Example of the first 10 data fragment entries of Affordance Memo for the networked social learning support systems.

Example of the first 20 entries in the affordance analytic memo created for the affordances enabled by the networked social learning processes.

Emergent Themes	Realized affordances	Enabling Factors	Potential affordances	Inhibiting factors / Challenge
Notice local supply chain	**More aware of circular Economy practices :** Opening eyes of users to sustainable practices: Notice and recognise 'circular economy' actions –16- "And then I have also noticed that now there used to be those big trucks that used to come in to deliver things to like twins and fruit and veg and also now I see the local farmers are also now, like this morening there is that guy that delivers cabbages to him…. They are also getting it locally" – **VCIB4**	Existing strong Imvotho Bubomi Network that supported and attended the Amanzi for Food Training of Trainers courses. - TOTW10	The marketing affordance of the whatsapp group was not realised due to the farmers not having what the buyer needs- 76- "mmm look my way is that I look what is there or I would see what is there. You see most of the time they don't have what I need."**- VCIB4**	The marketing affordance of the whatsapp group was not realised due to the farmers not having what the buyer needs- 76- "mmm look my way is that I look what is there or I would see what is there. You see most of the time they don't have what I need."**- VCIB4**
	99- The issue of food waste and lack of circular economy recognised as a issue that needs to be adressed- " I think my understanding, the Food for Us program, my understandning is trying to deal with the issue of waste. That is one, but the bigger thing which I think it is trying to address is the issue of how do you link the producer and the consumer and the buyer. …. So I think is trying to expand the market share for the participants and also at the same time bring in some aspects of competition." – **VCII2**	The Tot provided ample opportunity for the research and other members of the team to discuss with participants if they were struggling or if they need assistance with their mobile phones. - TOTW10	Don't have the (lack of) **resoures** to extend the project from a trial to an extensive project. **(112- VCIS5)**	Don't have the (lack of) **resoures** to extend the project from a trial to an extensive project. **(112- VCIS5)**
	815- 824 Through the WhatsApp group the users were able to show (in pictures) the process of produce being sucessfully sold. A member of the RMDA displayed the entire value chain process of the cabbage being grown in the fields, harvested, packed onto a bakkie, transported to the retailer, and then the cabbage being put in buyers trolleys to be purchased. - FFUWD	" Excitement around the use of technology to adress farmer challenges" - TOTW10	To start using the application and be introduced to the application according to User S6 the information about the application is not readily available- **(78-VCIS6)**	To start using the application and be introduced to the application according to User S6 the information about the application is not readily available- **(78-VCIS6)**
	" There were more farmers that I expected which was good to see. I was also not aware that there were so	use of the gymnasium wifi in the second Training of	There isnt much information or details about how the application	There isnt much information or details about how the application works on the Whatsapp group – **(82-VCIS6)**

	many co-operatives around Raymond Mhlaba and therefore this was good to see." - BFSB4	Trainers course - TOTW2O	works on the Whatsapp group – **(82-VCIS6)**	
Build Vision for local supply chain	The users started to forcast what a future Raymond Mhlaba might look like- 92-"I think with time we are going to have more people. We are going to have more supply. Where we eally don't have to go outside of Raymond Mhlaba to try and get things"-**VCIB4**	Confidence in the application was built up thanks to the buyers that had been named as potential partners in the Food for Us project. - TOTW2O	**115-** "I see on whatsapp that people sending messages to Wayne, saying Wayne I want to do this and then they say okay you are now active or think that that … it just doesn't work. " – **(VCII2)** – This is with reference to having to wait for Wayne to approve new profiles who would like to register.	**115-** "I see on whatsapp that people sending messages to Wayne, saying Wayne I want to do this and then they say okay you are now active or think that that … it just doesn't work. " – **(VCII2)** – This is with refernce to having to wait for Wayne to approve new profiles who would like to register.
	The importance of people interacting and being part of the project was discussed as an important need for effective project development. - 2- " So what is key is how do we get local people to participate? " - MMWR1	Including the participants in the creation of a Food for Us product advertsement- TOTW2O	334- "App developers: I hope it works, if not send another message. Unfortunately it is difficult troubleshooting from a distance." - FFUWD	334- "App developers: I hope it works, if not send another message. Unfortunately it is difficult troubleshooting from a distance." - FFUWD
Network Building	The project has enabled people to build networks and connect with one another – 18-"I think this whole thing that is developing with the farmers in getting in contact with them has kind of opened that up now. Because people are now able to go and say you know I have got like however many hectares of spinach of spinach or cabbage, can I bring you some." – **VCIB4**	The app developers were able to add aditional functions that thought would be useful on the application. An example of a fnction that was included was the development of the interest notification system. - VCIAD1	Not everyone has been participating in the project due to produce not being ready to sell and be harvested- 908- " It has been great using the new version, we have been introducing it to a lot of farmers this side, and most will be using it when their produce is ready." - FFUWD	Not everyone has been participating in the project due to produce not being ready to sell and be harvested- 908- " It has been great using the new version, we have been introducing it to a lot of farmers this side, and most will be using it when their produce is ready." - FFUWD
	Being part of the project has been a positive expierence for a lot of people as it has enabled farmers to meet new people- (153-**VCIS5**)	" You know the fact that we are working with the ELRC and Heila, sha has strong orientation around the marginalised groups. So you know she will, shae carried inot the project, discussions and quite a strong focus on marginalised rural small scale farmers. "- (10) - VCIPM1	974 - "Project manager/ Researcher : I have been discussing with a lot of people the successes and challenges of the project thus far. We are realizing that the major stumbling block is our lack of buyers of produce. We need to work together to grow our network to include buyers!!! If everyone could encourage two of the customers that regularly buy from them to download and start buying through the application we can start to build our buyer base. Put those buyers numbers on the group if they	974 - "Project manager/ Researcher : I have been discussing with a lot of people the sucesses and challenges of the project thus far. We are realizing that the major stumbling block is our lack of buyers of produce. We need to work together to grow our network to include buyers!!! If everyone could encourage two of the customers that regularly buy from them to download and start buying through the application we can start to build our buyer base. Put those buyers numbers on the group if they agree to be part of the

			agree to be part of the network and either myself or [redacted] shall add them! " - FFUW	network and either myself or Xolisa shall add them! " - FFUW
	-94-"They are all in contact ya." (**VCIB4**)	" I suppose the Amanzi for Food also took us in that direction because Tich had already built so much of those relationships." - (10) - VCIPM1	FFSC5- "We seem to be stuck in a place at the moment with just farmers posting and not new buyers coming onto the application and using the application." "It has been frustrating that it has not been working because of buyers and this needs to be worked on."	FFSC5- "We seem to be stuck in a place at the moment with just farmers posting and not new buyers coming onto the application and using the application." "It has been frustrating that it has not been working because of buyers and this needs to be worked on."
	-155- " Yes, yes we met New people and then a few doors opened for us. It was really nice. " – **VCIS5**	"I think a specific factor is the orientation that those people working in the project, carry into the project" - (34) - VCIPM1	When users are not able to communicate challenges if they are not able to screenshot - 1046- FFUWD	When users are not able to communicate challenges if they are not able to screenshot - 1046- FFUWD

Appendix O: Example of part of the Value Creation Analytic Memo for the use of the Food for Us application

	Immediate Value	Potential Value	**Applied Value**	**Realized Value**	**Reframing Value**	**Circular Economy Value**
Food for Us Application users in Raymond Mhlaba	Excitement " The application did well for the first phase of the project. It created significant awareness but there is need for improvement and there is opportunity to improve. Excitement and awareness has been made amongst several people but more people need to respond, the bigger the audeince the better." - BFSB1 This is a good application and a good idea, there just needs to be more action and work happening through the application. - FFSB12- " This is a good app, I just need to wait for people to start using it a lot." Exposure to new ideas 56- "So it was kind of, sort of difficult untill I saw it in practice." – VCIS6	Improve mobile use skills – Human Capital & Learning Capital - 596- "Participant 1: Its very fast n easy to use, (the app). " - FFUWD FFSC9- " The application is otherwise incredibly user friendly and easy to use." " It was difficult [uploading of produce] especially the first version, after the secomd version of the application it was much easier as the application improved dramatically and it became slightly easier" - IFSA2 " Once you have downloaded it, it is easy but can be complicated for those who are not familiar with using technology." - BSFA1 " All you have to do is to focus on answering the questions that are asked. There are not too many questions whish is good" - IFSA4 58- "For me, very easy. But by the time it was explained at the launch, it was like it was going to be something difficult to enter. But when it came, it was just like … [easy]. " – VCIS6 54- "At first I thought it was all, technology, difficult things, I didn't buy it actually but as times goes on. I immediately managed	43 users downloaded and registered onto the *Food for Us* application (section 4.2.4) Advertised produce on the application (section 4.2.4) Total of 31 posts made on application during the duration of the project. FFUAS 106 - "I mean my brother put those chickens on there and then someone got in contact with him… He has got people who want to buy more from him" – VCIB4 98 – " I'm using the app, Im using the app to upload my products" – VCIS6 FFSB10 - " I uploaded onto the application and the Whatsapp group more than 5 times. I advertised the chicken, the Maize and the fresh Vegetables.	Increased confidence with the *Food for Us* mobile application **125 –** " I think people, generally I think people are technologically more confident after the use of the app that is one. " **– VCII2** " As the application improved the registration got easier and more manageable." - IFSA3 Exposed to what local farmers are producing and prices thereof 106- "She has got a lot. And we now know that she is there and she is getting the word out there, she is getting know" (talking about another seller) – VCIB4 " I have become aware of people who are close by. I have been made aware of the people that are selling if I am looking for large quantities of produce" - BFSB4	Technology can be used as an important tool for small-scale farmers to increase their markets and build their business as well as effectively contribute to developing a local supply chain. 135 – " and I think it is going to break this fear around use of technology by small holder farmers and by subsitence farmers" – VCII2 " I have learned that if we use technology to market and improve and especially if we use technology to market things and market our produce. I have started to use WhatsApp and other technologies like this app and Facebook. People start to enquire about what they see online and they start to enquire if they don't have WhatsApp about how to be part of the new technology" – FFSB1	• Exposure to local produce • Tool to connect local members of the local supply chain • Find alternate markets for produce that is not able to be sold to the consumer market • Shift in mind-set around the importance of produce being traded and consumed locally.

	121- " I think the application in itself is something new, the app in itself is something. Of course people have been using facebook and and ya it is fine. This one it gives you direct contact with the buyer for example if you are a producer." – VCII2	to log in or download the application and see." – VCIS6 (V2) 920 - "Participant : I like the fact that one does not have to key in the password when logging in. I also love the Public Wall. Thanks Wayne for the recipe." - FFUWD Technological Trading platform – Tangible capital " Um well I think it allows producers list in a public space the produce that they have." (16) VCIPM1 6- "It will be captured by the farmer so that the farmer might also have records on his farm and the officer will have records and its alos going to assist us in terms of tracking the sites" – VCII3 68- " You know, we'll be having records even not asking him the questions but to pick it up in the system." – VCII3 Develop relationships – social capital **90**-"we met farmer in farmers meetings, but there was not much more, no relationships of interest. So what exactly you are doing or how you are doing it . Or who you doing it with. But now there is that interest. You see. [interest in each others work and farming techniques] – **VCIS6** **98-"** I'm using the Oh Im just introducing a few people" - VCIS6	Search for Demanded produce Interest is being shown in the produce from buyers due to produce price fluctuations- (**80-VCIB4**) **88-** " But I've seen other produce that was there for example the honey from Mam Peter which is very fantastic and the quality of the picture is very very good"- **VCII3** " I uploaded chicken onto the application " - IFSB2 " I was able to check what produce was avialble by looking at the application." - BFSB1	" There were more farmers that I expected which was good to see. I was also not aware that there were so many co-operatives around Raymond Mhlaba and therefore this was good to see." - BFSB4 Successfully was made aware of produce on the application - however did not transact on the application. - BFSB4 Record particulars of produce. 72" So the app will sort of assisting us to keep track and to try and do that ya to keep track." VCII3 Increased interactions in the local supply chain due to the shared interest around the *Food for Us* project.		

Appendix P: Example of the Value Creation Analytic Memo for the Food for Us networked social learning support systems

Immediate Value	Potential Value	Applied Value	Realized Value	Reframing Value
Build Contacts 155- " Yes, yes we met New people and then a few doors opened for us. It was really nice. " – **VCIS5** **72-** Got connections from the participants at the Match Making event **– VCIS6** 53- " I am very happy that we now have people that are selling maize whereby we will be providing support and buying from local producers. So thank you very much." - MMWR1 " I connected with about 3 people at the Match making event alone" - IFSB3 " I met with a lot of other people which I had not met before and can do bussiness with. There was nothing else but I think that as we grow the application and there are more people the expectations will be more fully met. " - IFSB3 "I have personal connected with more than 10 people through the match Making event through the whatsapp group and through many other avenues" - IFSB4 Pride and Enthusiasm -284- "I am proud, since the beginning of this year." – (VCIS5) -100-"Everybody was enthusiastic and they got involved and they got very excited about"-**VCIB4** Being able to see all the produce that was uploaded on the application (not only be able to see your own uploads as a seller) increased the confidence of the users- 450 - " Okay it look much	Network & Relationship Building– social Capital 18 - "I think this whole thing that is developing with the farmers in getting in contact with them has kind of opened that up now. Because people are now able to go and say you know I have got like however many hectares of spinach of spinach or cabbage, can I bring you some." – VCIB4 **92 –** " Zeekhona has got chickens. So we have got that interest, now we know that Zeekhona is producing chickens, so mama Nxosi approaches her and asks where did she get her chicks? **– VCIS6** **106- "**So partnership is very key."- **VCII3** **FFSB 5** - "The application has made me make connections but has not been able to yet as the application has not directly enabled me to find local buyers immediately. I did make contact with buyers who I might do bussiness with in the future. Norman and Passmore are the two people that I have connected with through the application and through the whatsapp group. People have been recommending me to other people to buy spinach and butternut. " FFSB5 "It also taught me how to speak to different kinds of people and understand how different people work. I understood how important it is to be a people person. I learned that I need to speak to different people in different ways, I learned that one needs to have different marketting skills"	Communication - FFSB12-"The application and the whatsapp group mean that things are communicated quickly, everybody has whatsapp and they are all able to communicate quickly about what they have and what they can sell. " "WhatsApp was useful to communicate about the produce and talk about the logisitcs of the transaction. You were also able to share challenges and discuss the needed improvements on the Whatsapp group." - BFSB1 85- " I sucessfully registered and got my Pin thanks very much". - FFUWD - 904- " participant 1: Hi guys. I have just downloaded the latest version. The people that are struggling to download just need to keep on trying, maybe it's a network problem." - FFUWD (32, 49) "Great, there is also an update to the app coming up later today that will fix a few problems presently being expierenced by users." – 49 – FFUWD	Transacting of local produce Purchasing platform **80-** Easier to use the Whatsapp group because the is familliarity with the platfrom and perceived as more convient- 84- "Its easier on the Whatsapp group, because I can just go on. If anyone has tomatoes then I see"- **(VCIB4)** 70 – sold produce in advance to buyers in another area – " So its getting to feeding maize for baby chicks, even now there is someone for Queenstown that I met at the Match Making event and he wants to buy all my maize when its dry, totally dry, he is going to take all of it". – VCIS6 **106 –** "So far, the highlight for me is the one that Im saying that my products are being sold, they are still in the field." **– VCIS6** **110**- People from the whatsapp group are approaching this users to buy her maize independently from the application- " But they came to me so they pulled me aside and came to me from the group and came to buy." VCIS6 – 133- " The guys from Fort Cox managed to sell the lettuce through to [redacted], we facilitated that transaction."	Using technology to further the agricultural business of small farming enterprises. 135 – "it is going to break this fear around use of technology by small holder farmers and by subsitence farmers" – VCII2 " I have learned that if we use technology to market and improve and especially if we use technology to market things and market our produce. I have started to use WhatsApp and other technologies like this app and Facebook. People start to enquire about what they see online and they start to enquire if they don't have WhatsApp about how to be part of the new technology" – FFSB1 **106 – "**That is what is enabling is the bridging through the app. Agency"- **VCII3** Definition of Waste in Rural areas- " I have also learned that it is important to avoid wastage – I have learned this through the application – when you see that produce is getting old and beginning to rot, it is important to try and sell the produce. The application showed the importance of needing to improve marketing so it isn't wasted," (FFSB5) " It has changed, I used to take bukkie through to town to sell my Maize, my green maize , and then I would come back with wasted as green maize would be ruined and I would have only sold a small amount . So now I have learned that if people order and contact me then I only take that which was ordered to town so as not to ruin the rest. I only take that which is order and leave the rest behind. " FFSB6 "We can address food waste through market access and therefore they are directly related" – FFSB12

better now from a buyers point of view." - FFUWD

The Match making event created a sence of excitement and a sence of enthusiasm around the project and the potential that lies within the project and the potential for collaboration and growth- 31- " Anyway great things start by small goals set. So don't underestimate your participantion in this process." - MMWR4

-31- " So let's think big, let us not think small, let's think big, once you think big you create bigger things, big employment, big income, bigger everything." - MMWR4

Positive air of working together- 40- " It is not everyday that you meet people that are very encouraging who are willing to participate, who are very determined, you know the perseverance. " - MMWR4

222- So we actualy met him through the app sessions.(VCIS5)

The Match-making event was very sucessful in connecting people. I am not so sure about the Whatsapp group and the application - IFSB2

230- "Then we started to connect and then they invited us there, they invited us because we are working."**(VCIS5)**

Sense of community- Social Capital

The Whatsapp group provided a place where users could encourage one another and expression gratitude, and a sense of working together- 67- [redacted] and his team have been brilliant and patient with helping us work through the application. "

68- "[redacted]: Thanks all for the patience and finding bugs that we couldn't find here, it is a great help to making this application perfect." – FFUWD

The group provided a place where farmers were encouraged with positive comments from one another - 103- " Ok good looking crop" 189 " Participant: Well done Wayne, Particpant: Wow good work" 198- " Participant: That's the spirit Wayne. Well done!" - FFUWD

" Looking good all, the app has been updated today and the camera function is working again" **- 74- FFUWD**

The application developer can get a better idea of what was going on when the application crashed to troubleshoot the problem - " What were you doing when it crashed? " **- 76 - FFUWD**

Group provided a place where what happens on the application could be shared. 110- " First upload on the Food for Us application" - FFUWD

The whatsapp group allowed the project implementors to be in constant communication with the users to reminder about insentives and activities - 201 [reminder about the opportunity to produce for the TOT catering]. - FFUWD

Learn about technological reasons for the application possibly not working 332- " App developer: Ok on the playstore. Check to see that you have space on you phone for the app, it may require you to make space by deleting a few photos/videos" -

FFUWD & 332 - "Then also check your internet connection as it may be timing out due to slow speed." - FFUWD

404- " App developer: Okay I see on the backend that you have been able to log into the app, happy uploading and selling of products. " - FFUWD

VC!!2- The Group provides a place where someone is able to express interets in a product that was discussed in the group or in the application. - 244- FFUWD

The Whatsapp group also provides an opportunity for the users to transact over the group - 257 -261 " Participant 1: Wow, beautiful cocks, can I buy one to add to my family chicks, pls Participant 2: Yes please Participant 2: The price is R250 colleagues" The rest of the transaction was discussed in private message- FFUWD

The Match Making event provided a place where users sucesses involving the project thus far can be expressed - 16- " Okay [redacted] actually told me he has actually already sold some chickens on the app". - MMWR1

FFSA 5 - " Not so sure on the way that the transactions were made because all transactions where made through other channels and not on the application.

Transactions were made outside of the application- FFS6 - "I made a purchase but this was not through the application, tis was outside the application. I also made a 'transaction' through the application but there was no response. I knew the person so it was much easier to give the person a call and then speak through the call rather than through the application. If I did not know the person maybe I would have then gone through

Bring youth into the local supply chain

There were a number of youth farmers that attened the Match Making event, 6 of the 12 farmers where between the age of 25 and 35. - MMWR1

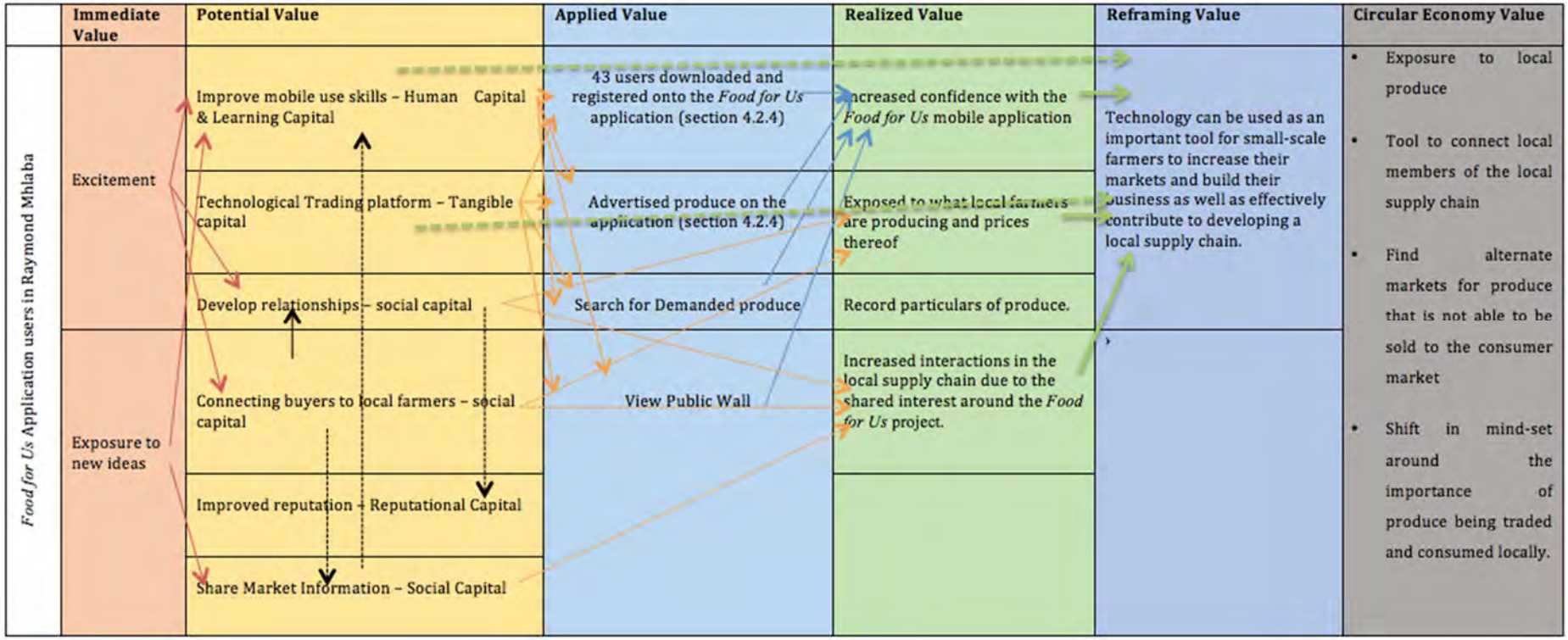
FFSC5- Mobilize the youth and create excitement - "Youth farmers are very intersted in getting involved and approached us when they heard about the application. It deffinitely sparked interest in the you th of the community. "

" Some of the people, older people need help with marketing so I have been assisting them with the marketing problem. This is near Fort Cox." - IFSA4

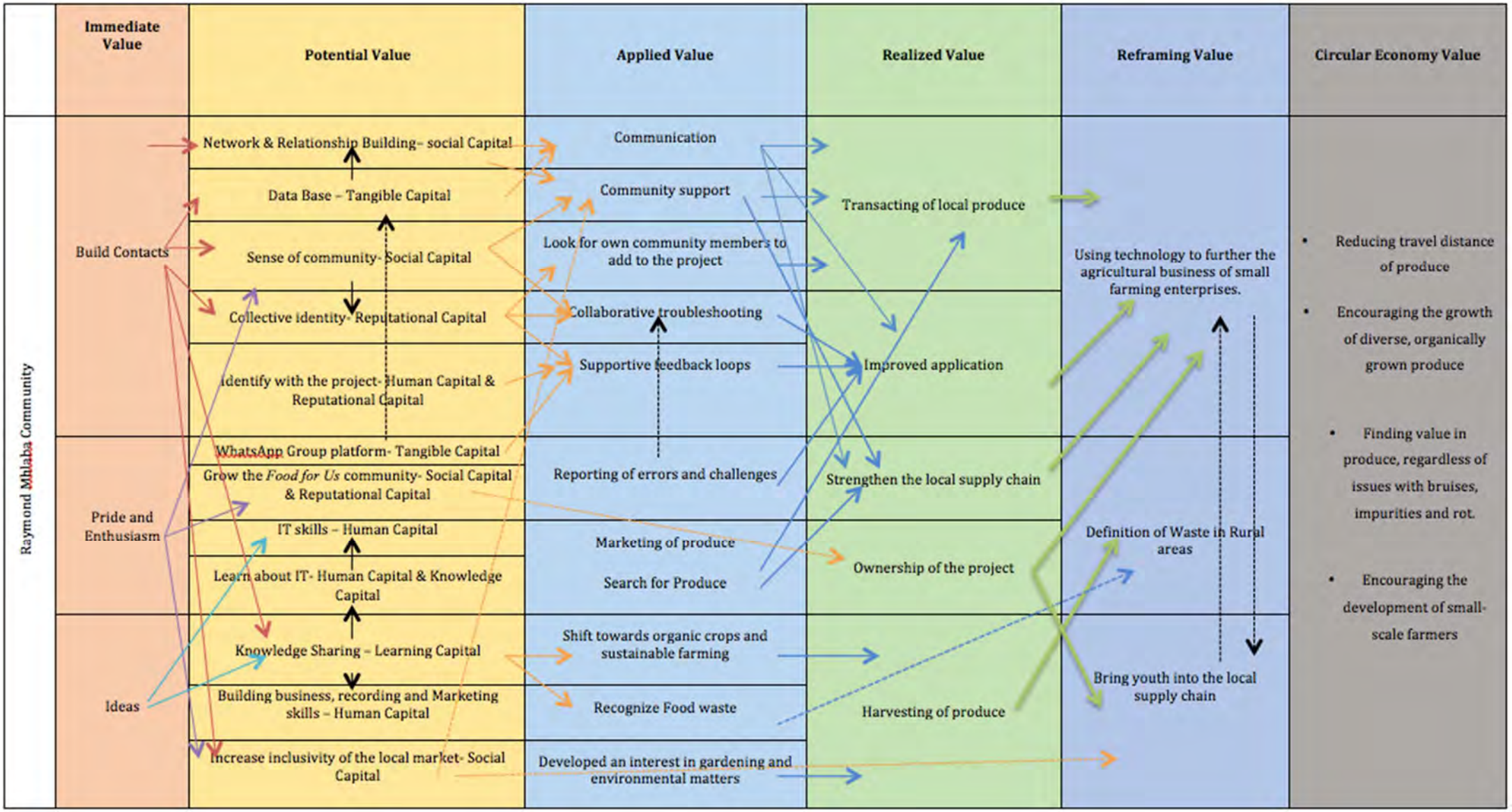
" This is giving young people a platform to perform and do what they enjoy. This showed me an example of work in practice." - BFSB1

" Building relationships in the workshop with different participants helping each othe to download the application [redacted] trying to assist a fellow participant to download the application without the email access. " - TOTW2O

Appendix Q: Value Creation Relationship Analytic – FFU App



Appendix R: Value Creation Relationship Analytic Memo - Networked Social Learning Support systems of the Food for Us project



Appendix S: Timeline of activities and interviews that were conducted throughout the Food for Us project

Date	Activity	Destination
4th Jul '17	Field visit to Raymond Mhlaba Development Agency	
24th Jul '17	Food For US researchers Food Waste Webinaar	Skype
1st Aug '17	Initial Food For Us Introductory Workshop	SI, Stellenbosch
3rd Aug '17	Initial Food For Us Introductory Workshop	Rhodes Education Dep, Grahamstown, EC
8th Aug '17	Food For Us research Team meeting	Skype
30th Aug '17	Food For Us application first went live on Android Google Play store	Google Play store
1st-10thSept '17	Migration of the FFU app to a different more stable secure server	
7th Sept '17	Application Training Workshop	RMDA, Eastern Cape
7th Sept '17	Application Training Workshop	Grahamstown, Eastern Cape
8th Sept '17	Research Food For Us skype meeting	Skype Call
26th -27th Sept '17	Food For Us challenges with Registering and Logging into the application	
3rd Oct '17	Raymond Mhlaba Farmers Market	Alice, Eastern Cape
4th Oct '17	FFU server issues	
17th Oct '17	Sarah Created the FFU support Whatsapp group	
19th Oct '17	Meeting with Lorenzo and Adalfo	Grahasmtown, Eastern Cape
25th Oct '17	Field visit to Worcester	Avian Park, Worcster, Western Cape
27th Oct '17	FFU scalability and progress evaluation	Grahamstown, Eastern Cape
27th Oct '17	Field visit to Raymond Mhlaba Development Agency	Alice, RMDA, Eastern Cape
2nd -3rd Nov '17	Amanzi For Food Tot	Fort Cox, Middeldrift, Eastern Cape
6th Nov '17	FFU application updated	
23rd Nov '17	FFU Researcher meeting	Skype
5th Dec '17	First independent FFU upload and transaction - [redacted]	Food For Us app & IBLN whatsapp group
6th Dec '17	FFU has become approved and will become available on Iphone devices in the next 24 hours	Iphone store, available on ipads as well.
14th Dec '17	FFU meeting in Worcetser with [redacted] from the Worscter ECD centres and then with a Stanford farmer	Worcster - ECD center , Stanford - Laughing Waters (Kirsten Neke's farm)
18th Jan '18	FFU Skype meeting with the Food For Us management and researchers	Skype
30th Jan '18	Imvotho Bubomi annual meeting	Dimbaza Agricultural co-op, Dimbaza, Eastern Cape
5th Feb '18 - 10 h 00	Meeting with [redacted] - Interview, Survey	RMDA board room, Alice, EC
5th Feb '18 - 14 h 00	Introductory Meeting with [redacted] from Kofu Bar	Kofubar, Alice, Eastern Cape
5th Feb '18 - 14 h 30	Introduction meeting with the Spar management	Spar, Alice, Eastern Cape
6th Feb '18 - 10h 00	Survey and Interview with [redacted] and [redacted]	Middeldrfit Agricultural Extension Office, Eastern Cape
6th Feb '18 - 12h00	Survey and interview with [redacted]	RMDA board room, Alice, Eastern Cape
8th -9th Feb '18	Amanzi For Food Tot	Fort Cox colleage, Eastern Cape
8th Feb '18 - 11h00	Meeting with [redacted] and Kofu Bar	Kofu Bar, Alice, Eastern Cape
13th Feb '18	Mid-term Food For Us meeting	Soil for Life, Constantia, Cape Town
19th Feb'18 - 13h00	Discussion on funding opportunities and potential scaling of the project	Zoom
27th Feb '18 - 10h00	Meeting Mak and Mak	Mak and Mak Guesthouse, Alice
27th Feb '18 - 10h45	Meeting with Alice Primary School	Alice Primary School

27th Feb '18 - 12h00	Value Creation Interview with [redacted] - only half completed	Fort Cox colleage
27th Feb '18 - 13h00	Fort Community FM- Discussion on the Farmers slot advertising the Food For Us application	Fort Hare Radio station
1st Mar '18	Discussion with [redacted] from Twins supermarket	
1st Mar '18	Visit the RAYMAF market	
1st Mar '18	Discussions with the local tourism and development municipal office in Fort Beaufort	
9th Mar '18	Meeting with [redacted] from the RU Technology Transfer Manager, Research Office	ELRC, Grahamstown
22nd Mar '18	Value Creation Interview with [redacted]	Durban, Gateway Mug & Bean
23rd Mar '18	Value Creation Interview with [redacted] (App developers)	Durban
6th Apr '18	FFU team - Catch up Meeting	Zoom
23rd Apr '18	Match Making Event	TRC Hall, Alice, Eastern Cape
2nd May '18	Interview with Norman Moy	RMDA, Alice, Eastern Cape
3rd -4th May '18	Amanzi for Food Tot	Fort Cox Colleage, Middeldrift, Eastern Cape
3rd May '18	Baseline survey [redacted]	RMDA, Alice, Eastern Cape
3rd May '18	Baseline survey [redacted]	RMDA, Alice, Eastern Cape
3rd May '18	Value Creation Interview- [redacted]	RMDA, Alice, Eastern Cape
4th May '18	Vale Creation Interview with [redacted]	Kofu Bar, Alice, Eastern Cape
9th May '18	New version of the Food for Us application became available on Google Play store	A of issues regarding the logging in options and the software on the new application.
24th May '18	FFU application version updated	
24th May '18	FFU Bussiness Canvas	ELRC Rhodes University
8th Jun '18	FFU researchers consolidation report meeting.	Zoom meeting
11th -22nd Jun '18	FFU final Surveys	Conducted telephonically
18th Jun '18	Future of FFU meeting	Zoom meeting
25th Jul '18	Final FFU consolidation & closing meeting	SI, Stellenbosch

Appendix T: Completed Consent Form



INFORMED CONSENT FORM

Ethical Approval Reference Number	-
Name of Principal Investigator	Sarah Jane DURR.
Address of Principal Investigator	Grahamstown.
Contact Number	072 024 0672.
Academic Supervisors	Professor Heila Lotz-Sisitka

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the Principal Investigator any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do initially agree to take part.

What is this research study all about?

- This research will be written up as part of Sarah Jane Durr's Environmental Education Master's thesis in the Education Department, Rhodes University.
- This research will also be used in the 10 YFP Sustainable Lifestyles & Education programme reports and publications.
- The aim of the project is to develop and trial a mobile phone application in South Africa which contributes towards the alleviation of food insecurity and aids access to nutritious food in a country where significant food loss occurs on-farm
- You are being asked to participate in semi-structured interviews, focus groups and Food For Us project workshops where you will be asked to share your experience, opinions and feelings about the Food For Us application and the different types of value creation that it enables.
- You will be asked to participate in a number of workshop and project evaluation, and baseline surveys where you will be asked to share same information about your current activities as a consumer or producer, share your opinion on the success of the training workshops and share your overall experience and opinions regarding the Food For Us project.
- This research project is being funded by the 10 YFP Sustainable Lifestyles & Education Programme Trust fund established by the United Nations Environmental Programme. The project is being undertaken by the Environmental Learning Research Centre (ELRC) at Rhodes University, with a wider consortium of specialist project partners.

Why have you been invited to participate?

- You have been carefully selected to participate because you hold valuable knowledge, experience and insights regarding the consumption or production of fresh produce in the Eastern Cape or Western Cape area. We have selected trial participant who are actively involved in the fresh produce supply chain so that the application can be accurately tested and modified to the needs of those who will use the application most.

What will your responsibilities be?

- If you agree to participate, you will be asked to engage in 3 semi-structured interviews that will last between 30 minutes and 1 hour speaking with the Food For Us Investigators, answering questions regarding your experience of application. You are welcome to abstain from answering specific questions or divulging certain details if this makes you uncomfortable or you do not know the answer. You will also be asked to attend any introductory mobile application training and fill out a baseline, training evaluation and field trial 1 and field trial 2 evaluation survey. Lastly you will be asked to please attend a final focus group discussion at the end of the project to debrief on the successes and failures of the 18-month project.

Are there any risks involved in your taking part in this research?

- Some of the questions might make you feel uncomfortable. Please remember that you may choose not to answer any questions and you can withdraw from the study at any time.
- You will not be mentioned by name in the thesis. However, due to the fairly 'small' group of people working on the Food For Us application project, it may be possible for people to guess your identity. To mitigate risks to you, you will be given a copy of parts of the thesis that refer to you and asked to review it before anyone else aside from the Principal Investigator and her research supervisors have seen it. You may request changes to certain parts of the thesis to protect your identity.

Who will have access to your records?

- If you grant permission for your interview/s to be recorded, or photographs and videos to be taken, this media will be kept on a computer that is password protected and only be used for Food For Us project purposes.

Will you be paid to take part in this study and are there any costs involved?

- No, you will not be paid to take part in the study nor will there be any costs to you for taking part.

Is there anything else that you should know or do?

- You can contact the Principal Investigator's research supervisor, Professor Heila Lotz-Sistika, or project manager, Nicola Jenkins, if you have any further queries or encounter any problems.

FOOD FOR US

1. I, [redacted] (name and surname), hereby acknowledge that I have been informed about the Food For Us research project facilitated by Rhodes University on behalf of the UNEP 10YFP Sustainable Lifestyles and Education Programme.

2. I agree to participate in the research with full knowledge of its background and hereby provide consent for the information I provide to be used for this research.

3. This research study will follow a process that will be fully disclosed me in the interview or focus group that I will take part in. The study is looking at the potential social learning that may be facilitated by the Food For Us mobile application's affordances. This research will also be looking at the levels of value that the Food For Us application produces for the research participants.

4. The study is made up of interviews, focus group interviews, discussions, formative intervention workshops and analysis of all data collected by the Food For Us application.

5. I am aware of the potential benefits of this study, such as providing an opportunity for smallholder farmers to link up with alternative markets for their produce, as well as provide a platform for commercial farmers to sell their surplus to an alternative market. This project has the potential to benefit consumers by providing creating an opportunity to link consumers more directly to the source of their food.

6. I am aware that the Food For Us application is a trading platform and any produce traded is done so at the consumer or producer's own risk.

7. I also understand that my participation in this study is entirely voluntary and that I may withdraw from this study at any time should I wish to do so.

8. I authorise the researcher to use any photographs or videos that include me in their research reports, publications or theses providing that such usage is in line with the research ethics procedure at Rhodes University.
YES ☑ NO ☐

9. Please select one: I would like my specific input to

   ☐ Remain anonymous, In which case the researcher will ensure anonymity following research ethics procedures at Rhodes University, or

   ☐ I do not mind if my identity is explicitly revealed in the study as long as it is in line with the research ethics procedures at Rhodes University.

10. The study has been explained to me. I have read and understood the consent form, all my questions have been answered and I agree to participate. I understand that the research process will continuously provide opportunities for research findings to be shared with the Food For Us consumer and producer trial participants in The Eastern Cape and the Western Cape.

FOOD FOR US

11. By agreeing to participate in the research project, I also agree participate in the application training workshops, research interviews and feedback workshop process that will be arranged for the Food For Us consumer and producer trial participants.

12. I am free to ask the Food For Us team any questions about the study or about my participation in the research at any stage in the project via email, mobile phone or office number which I have been given.

Date: 6th February 2018 Place: Middledrift.

Signature of participant: [signature] Signature of Witness: [signature]

Appendix U: Food for Us Dissemination Event Synthesis and Attendance register

food FOR US

Workshop synthesis

25th July 2018

The Sustainability Institute, Stellenbosch

Social media handles:
#foodforus #foodwaste #danieljardim
@GlobalSCP @Rhodes_Uni @Lynedoch_SI

One planet handle with care · Rhodes University · environmental · CSV · FEEDBACK · LEAD Associates · pinpoint sustainability · Sustainability Institute

One planet handle with care · Rhodes University · environmental · CSV · FEEDBACK · LEAD Associates · pinpoint sustainability · Sustainability Institute

Introduction

The UNE's One Planet has pulled together substantial funds to work on issues around sustainable consumption, of which the Food for Us project, is a recipient of such funds – through the Sustainable Lifestyles and Education Trust Fund, and Government of Japan.

"At its core, Food for Us, is about learning, about the processes that took place. While something emerged from it, an app, the focus should not be on the launching of that app or positioning it in a competitive environment as 'the solution', but about starting a conversation and the learning that takes place from those conversations", Dr Scott Drimie, The Southern Africa Sustainable Food Lab and workshop chair.

As such, the intention of the workshop was to share the Food for Us project research findings and learnings, and to build and move the food waste and surplus dialogue within South Africa on – by incorporating and drawing together the contextual framing within which such a project sits. This latter component was guided through a panel and open discussion in response to the presentations and discussions held during the day on how South Africa should approach the food surplus challenge – focusing on early childhood nutrition, and use of technology to aid surplus food distribution through communities of practice and social enterprise business models.

This document provides a synthesis of the discussions and outcomes generated from the workshop.

Setting the context and project findings

To start the day, two presentations setting the food surplus discussion in context were delivered by Solly Molepo – Deputy Director, Agri-processing, Department of Trade & Industry (DTI); and Niki Charalampopoulou – Co-founder, Feedback.

In response to these presentations, it was noted how from the on-set of the day the **language of the discussion had shifted from food waste to food surplus**, which therefore situates the discussion towards solutions in a positive space.

One of discussions arising in response to the presentations was around the use of **food by-products.** Goodwell Dingaan of the Directorate of Industry Development, Western Cape Government suggested this had significant potential. Niki Charalampopoulou agreed, especially in a country such as South Africa which has a large poultry industry. She noted that in the UK about 20% of food waste could be used to feed livestock, and that 65% of productions costs for pig and chicken farmers is feed, so using food by-products could also save them a lot of money.

The **role of consumers** in the food waste debate was also highlighted – how responsible are they for food waste? Niki Charalampopoulou noted consumers in principle are okay to eat food that isn't always perfect. Responding from a Government perspective Solly Molepo noted that the DTI are working closely with the Consumer Goods Council of South Africa (CGCSA) to investigate how to respond to the issue of a mindset change for consumers, and working with retailers and manufacturers to reduce food waste.

Solly Molepo, Department of Trade & Industry

Niki Charalampopoulou, Feedback

Food for Us project findings and learnings

A brief introduction to the Food for Us project was provided by Nicola Jenkin of Pinpoint Sustainability and Food for Us project manager. She acknowledged the financial and lead support offered by the UN's One Planet Sustainable Lifestyles and Education Trust Fund, and Rhodes University's Environmental Learning Research Centre (ELRC) respectively. The aim of the project was to develop and trial a mobile phone application in South Africa to divert on-farm surplus food to those predominantly in need; and using this as a mechanism for socio-technical transformative change through communities of practice. Following the introduction, the Food for Us team presented their research and project findings, which covered:

- **Learnings from the field:** Sarah Durr – a Masters student at Rhodes University, and Passmore Dongi - Raymond Mhlaba Economic Development Agency presented on their fieldwork in the Raymond Mhlaba Municipality in the Eastern Cape; and Stefanie Swanepoel of The Sustainability Institute on her fieldwork in Worcester, Western Cape. The trialling of the app as a socio-technical solution, particularly in areas of poverty and technical illiteracy were noted as significant challenges which required far more on-the-ground time to catalyse uptake than originally anticipated. Three key learnings and benefits were highlighted: 1) the ability of the app to aid access to market for produce; 2) the opportunity the app provides for connecting people within a community, and 3) the significant role intermediaries in the community play in catalysing uptake and use.
- **Food waste savings and potential:** Nici Palmer of Carbon Calculated provided insights into the data generated through app transactions and survey findings, and the challenges associated with data capture, yet potential to capture and calculate environmental and social savings should the potential of the app be realised. Of particular importance, was the generation of food waste nutritional conversions factors for this project, a likely first for South Africa.
- **The application platform:** Grant Trebble and Wayne Stead of LEAD Associates managed the development of the app, and engaged with the app developers. They shared the development process, app functionality and challenges of trialling an app that required functionality adjustments and testing during the trial. Most notably the impact instability had on introducing the app and use.
- **Proposed future business model:** A key element of this project was the future sustainability of Food for Us. Mike Ward of CSV and Thato Thansi – an MBA student at Rhodes University presented a proposed future business model. The key question for the model being "how do we do environmental and social good, yet be financially sustainable?". It was on this basis that the Food for Us future model was developed. The key immediate activities going forward being to build and formalise partnerships, to better understand how data gathered via the app can be best be stored and used correctly, and 3) to seek funding to maintain momentum.

Surplus food lunch

One of the highlights of the workshop was the delegate lunch prepared and presented by chef Daniel Jardim of Honest to Goodness, who explained what a wonderful experience it was cooking the meal. He was amazed at the variety and quantity of surplus food kindly donated by local retailers.

Delegates enjoying the surplus 'cherished' food lunch

The chef, Daniel Jardim
www.honest-to-goodness.co.za

Panel and open discussion

Food for Us recognises that systemic transformations within South Africa's food system will require that individuals and organisations from government, research institutions, civil society and business work together to bring about significant change in the current food system. For this reason, Food for Us always seeks to engage with a wide range of role-players and to share insights from the project as it develops. To this end, a panel representing members of the South African sustainable food system community provided a rich and open discussion in response to the morning's presentations. The panel, chaired by Dr Scott Drimie of the Southern Africa Food Lab, included Niki Charalampopoulou (Feedback); Passmore Dongi (Raymond Mhlaba Economic Development Agency); Prof. Heila Lotz-Sisitka (Environmental Learning Research Centre, Rhodes University); Tristan Görgens (Dept. of Premier, Western Cape Government); Solly Molepo (Dept. of Trade & Industry), Pam Picken (Do More) and Tatjana von Bormann (WWF-South Africa).

Themes covered in the discussion included:

- How can we in South Africa can better understand the potential and opportunities for diverting food waste to animals?
- The importance of the conversations and communities of practice that are enabled around the use of a socio-technical innovation, such as an app. We need to find ways to unlock the creativity in communities not through technical solutions, but through community agency and the creation of spaces of trust.
- The issue of language in the food waste debate – how can the terminology we use encourage inclusivity and collaboration throughout the food value chain?
- The importance of valuing and cherishing food and ensuring that where feasible opportunities are provided to distribute this food to those in need, in particular to mitigate the serious issue of stunting in children under 5 years of age. We need a caring economy – a shift in thinking from the current discourse of a green economy.
- Food waste needs to be part of a wider interdisciplinary dialogue – one that encapsulates nutrition, food security and sustainable food systems. We also need to be brave, and step out of our silos, including government coming to these kind of forums. This should aid in ensuring joined up thinking and acknowledging feedback loops that could happen e.g. the introduction of stringent legislation could increase food waste, as food surplus can no longer be sold in the informal economy.
- The issue of food waste occurs within a multi-level system – from local farmers to ECD centres to provincial and national government. We need to be aware of how big this system is. We need to therefore think about how to leverage points across the food system to catalyse change and mitigate food waste.

Next steps

Food for Us is just beginning its journey. Drawing on the learnings and findings from the UN-funded Phase 1, our intention is to engage with interested stakeholders to work with us to future-proof and adopt an inclusive business model which will see:

- A strengthening and more refined mobile application; and increased uptake.
- Scaling the trial and uptake more broadly across South Africa.
- Further explore the development of a 'franchise-type' model.
- Explore the use of the app as a transformative social learning activity in other sectors for trading other by-products.

Join our community of practice

If you are interested in becoming involved in the future of Food for Us, or wish to follow its developments, please contact:

Thato Thansi, Rhodes University

email t.tantsi@ru.ac.za

List of attendees

Over 50 people attended the workshop, representing international food waste organisations, national and provincial government, academics, national and local community-based organisations and NGOs, and municipal economic development professionals.

Ryan	Fortune	African Climate & Development Initiative, UCT
Daniel	Jardim	Chef – Honest to Goodness
Noel	Johannessen	City of Cape Town
Alison	Davison	City of Cape Town
Leonard	Arendse	Dept. Agriculture, Forestry & Fisheries
Rishal	Sookal	Dept. Environmental Affairs
Katlego	Mabatle	Dept. Environmental Affairs
Goodwell	Dingaan	Directorate of Industry Development, Western Cape Government
Pam	Picken	Do More
Solly	Molepo	Dept. Trade & Industry
Nobesuthu	Mdingi	Dept. Trade & Industry
Niki	Charalampopoulou	Feedback
Liesl	Koen	Feeding in Action
Passmore	Dongi	FfU team/Raymond Mhlaba Economic Development Agency
Heila	Lotz-Sisitka	FfU team/Rhodes University
Stefanie	Swanepoel	FfU team/Sustainability Institute
Nici	Palmer	FfU/Carbon Calculated
Robyn	Ferrar	FfU/Carbon Calculated
Mike	Ward	FfU/CSV
Wayne	Stead	FfU/Lead Associates
Grant	Trebble	FfU/Lead Associates
Sarah	Durr	FfU/Rhodes University
Titch	Pesnayi	FfU/Rhodes University
Thato	Tantsi	FfU/Rhodes University
Blake	Robinson	FfU/Sustainability Institute
Candice	Goldsmith	FfU/Sustainability Institute
Andy	du Plessis	Food Forward SA
Wayne	du Plessis	Food Forward SA
Cathy	Pineo	GreenCape
Kate	Rivett-Carnac	Independent
Millicent	February	Integrated Nutrition Programme, Western Cape Government
Lucinda	Fairhurst	Neighbourhood Farm
Eugenie	Tancred	Neighbourhood Farm
Sheryl	Ozinsky	Oranjezicht City Farm
Karin	du Preez	Oranjezicht City Farm
Amelia	Koeries	Peninsula School Feeding Association
Petrina	Pakoe	Peninsula School Feeding Association
Thomas	Swana	Philippi Economic Development Initiative
Christopher	DÁiuto	Philippi Economic Development Initiative
Nicola	Jenkin	Pinpoint Sustainability
Tristan	Gorgens	Premier's Office, Western Cape Government
Wendy	Van Rensburg	Shoprite Checkers
Scott	Drimie	Southern Africa Food Lab
Carolyn	Cramer	Southern Africa Food Lab
Gareth	Haysom	UCT/African Centre for Cities
Tsele	Nthane	UCT/Environment & Geographical Science
Evodia	Boonzaier	Waste Management, DEADP, WCape Gov.
Belinda	Langenhoven	Waste Management, DEADP, WCape Gov.
Alicia	le Roux	Waste Management, DEADP, WCape Gov.
Robyn	Britten	Waste Management, DEADP, WCape Gov.
Tatjana	Von Bormann	WWF-SA

Thank you for your participation!

Appendix V: Full list of attendees at the Grahamstown Food for Us Introductory workshop

COLLABORATIVE WORKSHOP

Food for Us: A food surplus trading mobile application

Thursday, **3rd** August 2017, Rhodes University, Grahamstown

List of attendees:

Organisation	Participant
Agribusiness/farmer	[redacted]
Agribusiness/farmer	Mazibuko Jara
Agribusiness/farmer	Hlumelo Somnise
Assumption Development Centre -Joza	Luyanda Kota
Assumption Development Centre -Joza	Martin Scholtz
Assumption Development Centre -Joza Representative	
Assumption Development Centre -Joza Representative	
Assumption Nutrition Centre	Sister Michelline
ChildWelfare (Grahamstown)	Kim Wright
Department of Agriculture, Forestry and Fisheries	Phumlani Aloni
Department of Agriculture, Forestry and Fisheries	Khathu Ravere
Department of Agriculture, Forestry and Fisheries	Zukiswa Mnqayi
Department of Rural Development and Agrarian Reform	Mike Ngwane
Department of Rural Development and Agrarian Reform	Siyabulela Jakavula
Department of Rural Development and Agrarian Reform	Sinethemba Mfisi
Department of Rural Development and Agrarian Reform	Chwayita Mda
Department of Rural Development and Agrarian Reform	Dambile Dubasi
Department of Rural Development and Agrarian Reform	Ms. Xotyeni
Department of Rural Development and Agrarian Reform	Thembinkosi Klaas
Department of Trade and Industry	Bhekithemba Dlamini
Department of Trade and Industry	Parmella Makhongwana
Fort Cox College of Agriculture and Forestry	Chamunorwa Matambo
Hope Permaculture, East London	Belinda Hope
Lead Associates	Wayne Stead
Lead Associates	Grant Trebble
Lebone Centre	Amy Webster
Lenge Youth Group	Live Matiwane
Linomtha Food Garden Project in Ext 7	Dambisa Zenani
Mxumbu Youth Agricultural Co-op	Xolisa Dwane
Ntingantabakandoda Solidarity Economy Programme	Phumla Mavakala
Rafael HIV Centre	Mary Humphry
Raymond Mhlaba Agri Forum	Justice Nika
Raymond Mhlaba Agri Forum - Adelaide/Bedford	Siyabonga Gwam
Raymond Mhlaba Agri Forum - Adelaide/Bedford	Busisiwe Mndende

Raymond Mhlaba Agri Forum - Alice	[redacted]
Raymond Mhlaba Agri Forum - Alice	Mandisa Mabandla
Raymond Mhlaba Agri Forum - Fort Beaufort	Adington Ndziba
Raymond Mhlaba Agri Forum - Fort Beaufort	Nosiviwe Msauli
Raymond Mhlaba Agri Forum - Middledrift	M. Venene
Raymond Mhlaba Agri Forum - Middledrift	L. Fihla
Raymond Mhlaba Agri Forum - Middledrift	L. Kobe
Raymond Mhlaba Agri Forum - Seymour/Balfour	Andile Papu
Raymond Mhlaba Agri Forum - Seymour/Balfour	Mr. Doyi
Raymond Mhlaba Agri Forum - Seymour/Balfour	Nokuzola Mange
Raymond Mhlaba Agri Forum - Seymour/Balfour	Sibongiseni Mnqodolo
Raymond Mhlaba Economic Development Agency (RMDA)	Mandisi Mali
Raymond Mhlaba Economic Development Agency (RMDA)	Passmore Dongi
Raymond Mhlaba Economic Development Agency (RMDA)	Farai Makombe
Redbeard Permaculture, Grahamstown	Edward Gaybba
Rhodes Univ Society - COTS Children of the Soil	Dr Nosi Ngqwala
Rhodes University - Community Engagement	Nosipho Nkwinti
Rhodes University - Food Services	Simon Wright
Rhodes University - MobiSam	Caroline Khene
Rhodes University/ JAM partnership	Brett Malila (RU)
Sitrusrand Boerdery, Kirkwood, Alexandria	Attie Jv Rensburg
Siyazama Multi-Purpose Centre	Khaya Baliso
St Mary's Development Centre	Martha Thompson
Ubunye Foundation	Lucy O'Keeffe
Ubunye Foundation	Nompucuko Nodada
Ubunye Foundation	Luleka Kondlo
Umthathi NGO	Monica Canca
University of Fort Hare, Agri- Park	Dr. Mnkeni Astereda
Vegado	Mbame Mhlobo
Food For Us Project Team - Rhodes University, ELRC Team	Prof. Heila Lotz-Sisitka
Food For Us Project Team - Rhodes University, ELRC Team	Mr Mike Ward
Food For Us Project Team - Rhodes University, ELRC Team	Mr Tichaona Pesanayi
Food For Us Project Team - Rhodes University, ELRC Team	Ms Thato Tantsi
Food For Us Project Team - Rhodes University, ELRC Team	Ms Sarah Durr

Appendix W: Food for Us Application Training Guide

APP Trial

The aim of the project is to develop and trial a mobile phone application in South Africa which contributes to the reduction of food waste while at the same time opening innovative business opportunities and reducing the cost of food. More specifically farmers and food buyers in the Greater Cape Town and rural Eastern Cape areas are invited to participate in the development and use of a mobile phone application and the internet based platform that supports it.

This work will simultaneously add to the growing body of research focusing on social learning processes, sustainable food systems and the reduction of food loss and waste in South Africa.

The use and piloting of the app during the project is open and we are inviting 'early adopters', social entrepreneurs, innovators and other forward-thinking producers and buyers of fresh produce to work with us in developing and understanding the potential for mobile technologies and social learning processes to reduce food waste.

HOW to get the APP

Or

Development of the application

The app will be developed and trialled during the project to ensure that it is fit-for-purpose and meets the needs of the users. The main structure of the app has been developed by our project partner LEAD Associates. However, we are very keen to ensure that growers and buyers are involved in defining the functionality of the app, for example what data needs to be included, what information would be useful as a buyer to make a purchase.

Two workshops, in each trial region, are being held in August to engage with potential users to refine the app. Based on the outcomes of the workshop, a first version of the app will be ready to go to trial in October 2017. It will be trialled for 4-5 months. Feedback will be gathered to further refine the app, with adaptations continuing to be trialled until mid-2018.

APP start-up screen

Login screen

Registration screen

Notification of product within radius to buyer

Register a primary role, Buyer/Seller/researcher

Address that is to be used as a pickup point when selling a product

What type of transport is needed to get to the pickup point

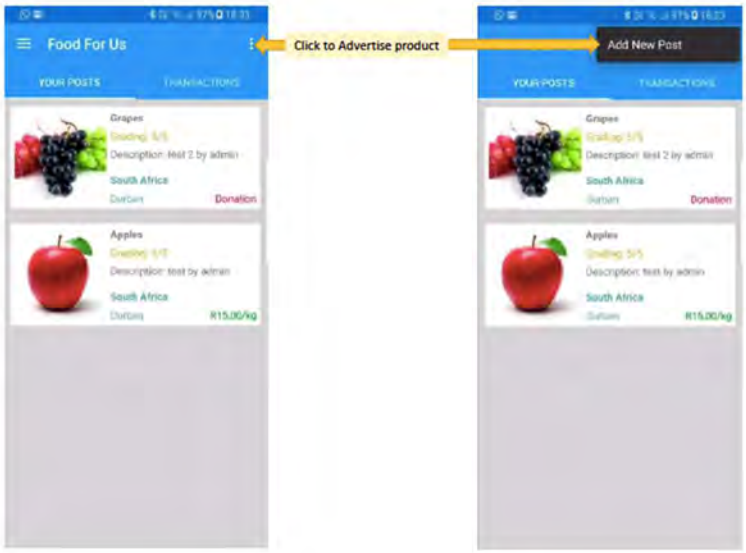
Sends you to the terms, conditions, Privacy Page.

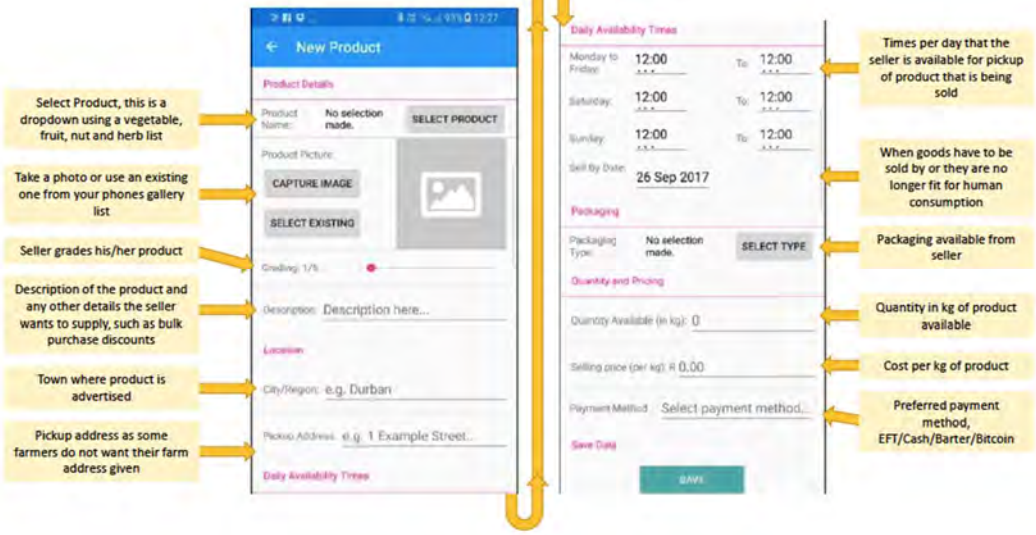
Login with chosen Profile Group

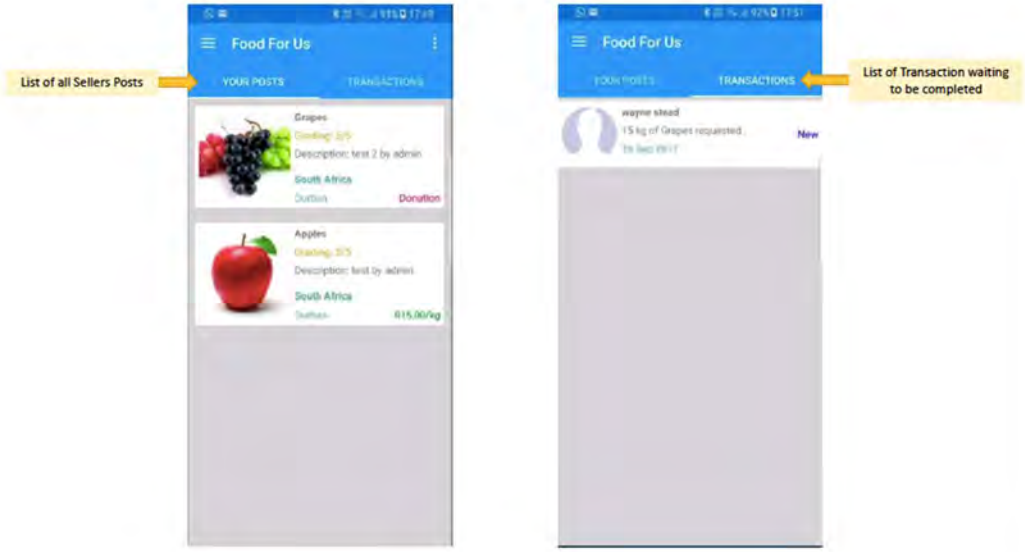
Password Reset

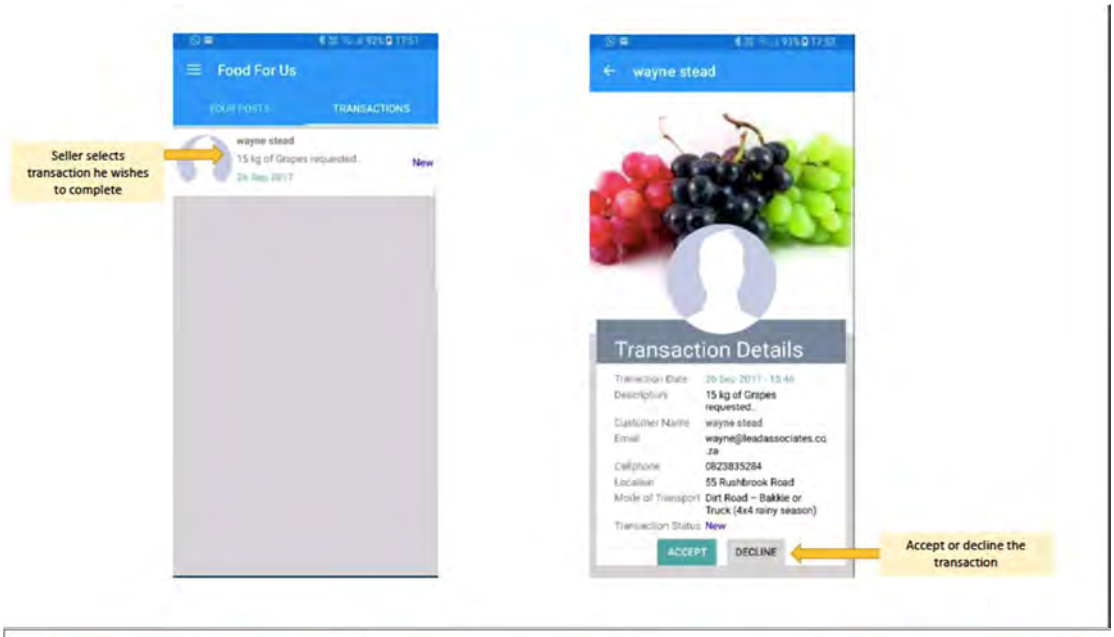
Home Screen when Logging is as:

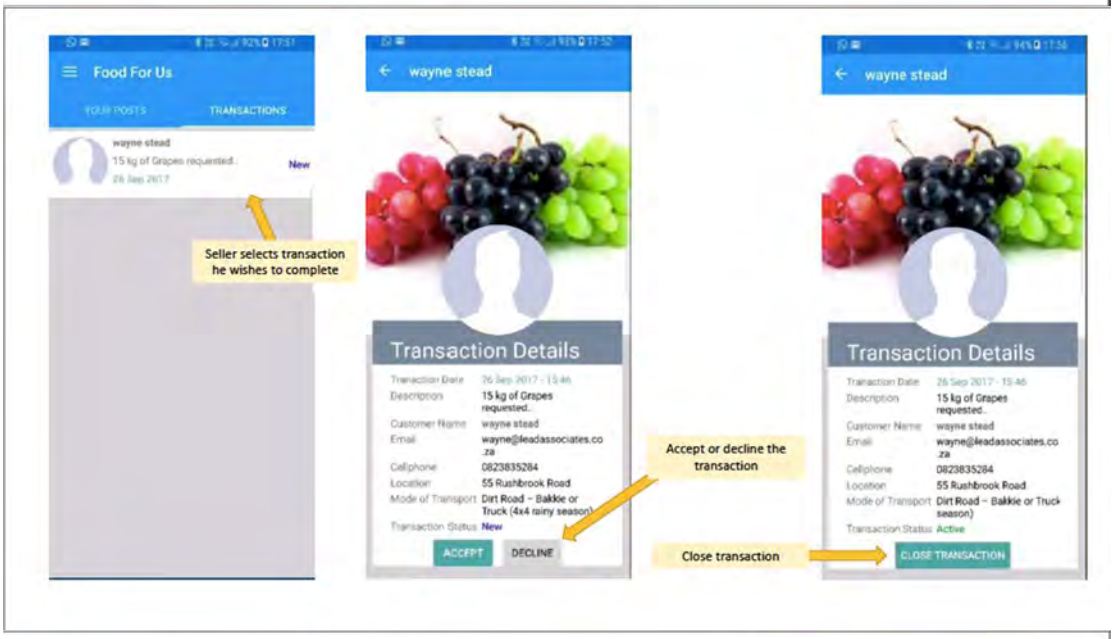
SELLER

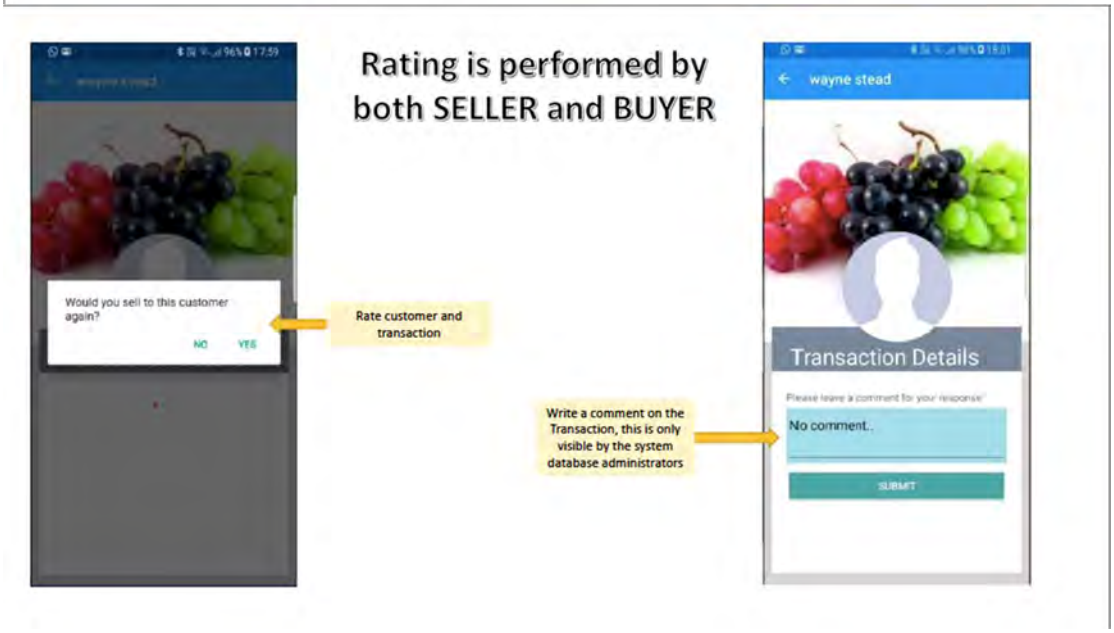


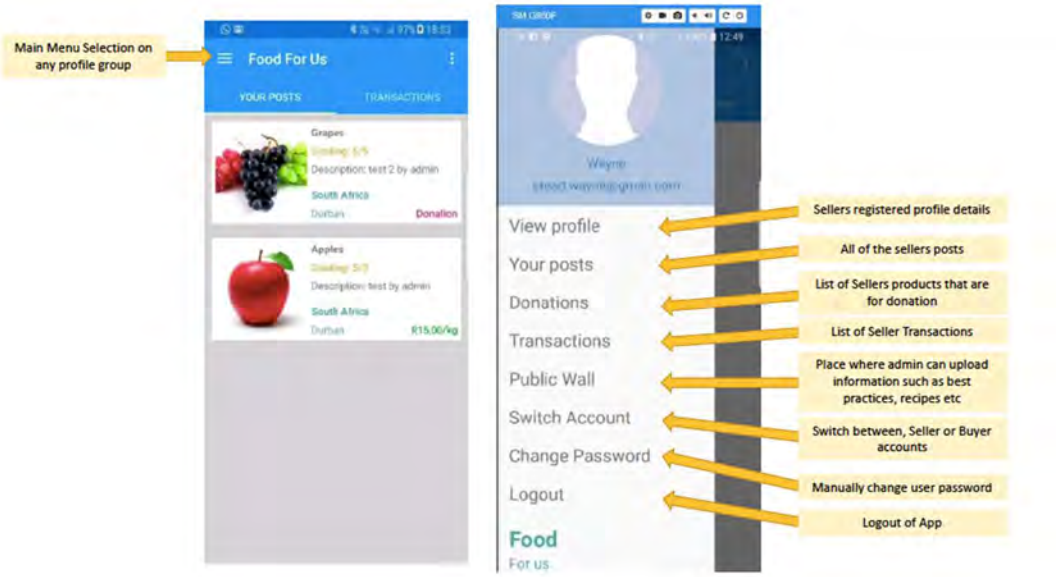





Food For Us
TRANSACTIONS
wayne stead
15 kg of Grapes requested..
New
Seller selects transaction he wishes to complete
wayne stead
Transaction Details
Description
15 kg of Grapes requested..
Customer Name
wayne stead
Email
wayne@leadassociates.co.za
Cellphone
0823835284
Location
55 Rushbrook Road
Mode of Transport
Dirt Road – Bakkie or Truck (4x4 rainy season)
Transaction Status
New
ACCEPT
DECLINE
Accept or decline the transaction

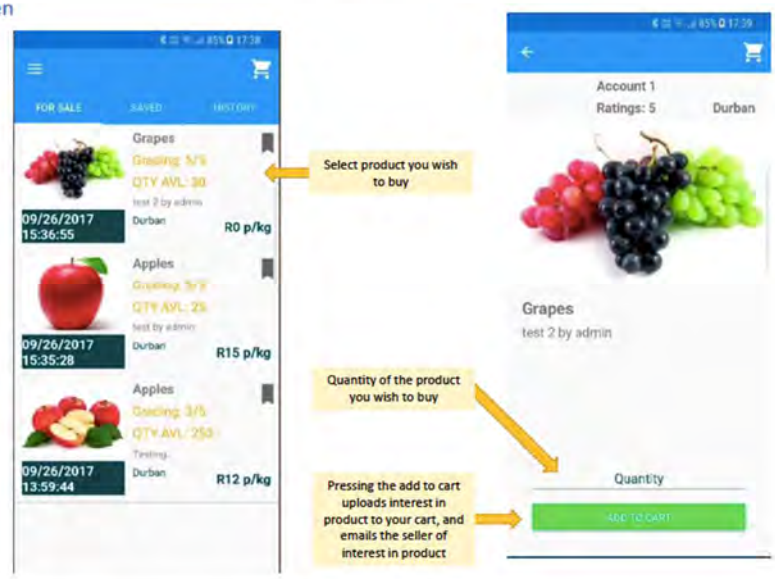

Food For Us
TRANSACTIONS
wayne stead
15 kg of Grapes requested..
New
Seller selects transaction he wishes to complete
wayne stead
Transaction Details
Description
15 kg of Grapes requested..
Customer Name
wayne stead
Email
wayne@leadassociates.co.za
Cellphone
0823835284
Location
55 Rushbrook Road
Mode of Transport
Dirt Road – Bakkie or Truck (4x4 rainy season)
Transaction Status
New
ACCEPT
DECLINE
Accept or decline the transaction
Close transaction
wayne stead
Transaction Details
Description
15 kg of Grapes requested..
Customer Name
wayne stead
Email
wayne@leadassociates.co.za
Cellphone
0823835284
Location
55 Rushbrook Road
Mode of Transport
Dirt Road – Bakkie or Truck season)
Transaction Status
Active
CLOSE TRANSACTION

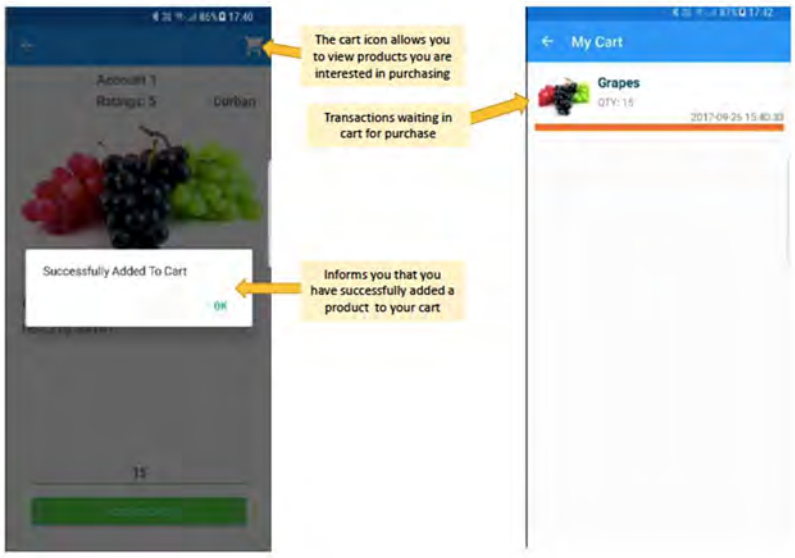

Rating is performed by both SELLER and BUYER
Would you sell to this customer again?
NO
YES
Rate customer and transaction
wayne stead
Transaction Details
Please leave a comment for your response
No comment..
SUBMIT
Write a comment on the Transaction, this is only visible by the system database administrators

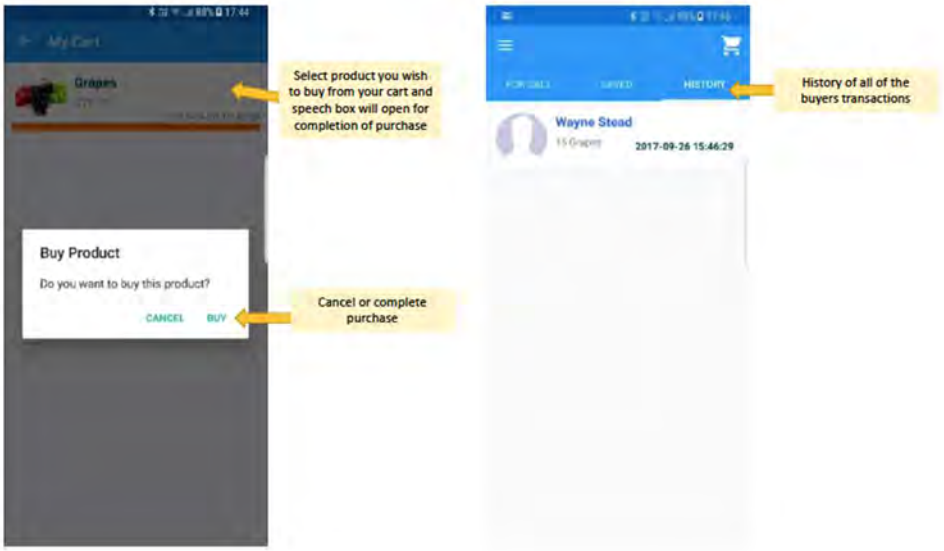


Home Screen when logging in as:

Buyer






Grapes
Buy Product
Do you want to buy this product?
CANCEL
BUY
Select product you wish to buy from your cart and speech box will open for completion of purchase
Cancel or complete purchase
HISTORY
Wayne Stead
2017-09-26 15:46:29
History of all of the buyers transactions