

# Creating a Healthier Eating Environment on Campus: Feed Your Need To Succeed

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A thesis submitted to Auckland University of Technology in  
fulfilment of the requirements for the degree of Doctor of  
Philosophy (PhD)

2011

School of Health and Environmental Sciences

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### **Attestation of Authorship**

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

## **Acknowledgements**

“Nā tō rourou, nā taku rourou ka ora ai te iwi ”

With your food basket and my food basket the people will thrive.

This PhD journey has been enriched by the contributions of many people collaborating, cooperating, and working together to make ideas become reality. I would like to acknowledge everyone that has been involved in the process.

Firstly, Professor Elaine Rush, my primary supervisor, thank you for your efforts and enthusiasm for the healthy eating cause and this thesis. Dr Geoff Dickson, my second supervisor, thank you for the clarity of ideas and writing you helped me achieve.

Secondly, I would like to thank the other major contributors to this PhD journey, the AUT University foodservice team. Ian Robertshaw and Bruce Sai Louie, the managers, thank you for your support and generously giving me your time. James Telepo, Rudi Soleiman and the other members of the foodservice management team and the foodservice staff, thank you for sharing your ideas and welcoming me into your kitchens.

Thank you also to my participants and the members of the advisory group, your insight helped me create a programme that worked for you.

I would also like to acknowledge Healthy Living Limited and the Tertiary Education Commission for funding my postgraduate scholarship.

Thank you to Victor Oblonkin who assisted me with the statistical analysis and Wendy Dodunski and Lauren Scott who commented on the initial draft of ‘Guiding framework for foodservice change’. Thank you also to Jack Mabopan and William Yu for pulling together the sales reports.

Finally thank you to my friends and family. To my families, for encouraging my passion for food from an early age, and later, giving me the confidence I needed to leap into the academic world. To my friends, especially Jo, Eva, Kevin, Andriel, Sheilpa and Aaron for always being there when I needed you. Finally, thank you to Hamish, for helping me walk my PhD journey as you have walked yours, your love, support and advice have made it possible.

## **Abstract**

Creating a healthier eating environment, through increasing the availability and accessibility of healthier food and beverage choices, may shift eating behaviour in a favourable direction and improve the nutritional status of consumers. However, evidence about *how* to change eating environments, without compromising foodservice financial and operational objectives, is lacking.

A programme, called Feed Your Need to Succeed (FNS), which created a healthier eating environment in four university-managed food outlets over a two year period, was trialled. Measurable and specific goals of the programme were to proportionally increase the sales of healthier choices, to not compromise the profitability or operational load of the foodservice, and to document the process of change to provide guidelines for others. FNS was developed and implemented within a supportive environment, including consultation, collaboration and partnership with the university foodservice operation, their suppliers and consumers: staff and students.

Three stages: needs assessment, development and implementation, and evaluation were undertaken through iterative stages of action research. Data were collected by both quantitative and qualitative research methods, validated by triangulation, and used to inform the FNS programme and change management process. Research methods used were: focus group and online discussion forum, interviews and collaborative reflective practice, an observational environmental audit and three years of detailed sales reports from the four food outlets.

Staff and students identified that cost saving, convenience, and communication strategies would encourage them to choose healthier choices. The baseline observational

environmental audit identified that the eating environment on campus had very little promotion of healthier or less healthy eating patterns.

The fifteen FNS actions, clustered into four overarching strategies (cost, convenience, communication and foodservice support), were in place from April 2010, and the evaluation was in October 2010. Examples of FNS actions were: competitively priced fruit and muesli bars, healthier choices in vending machines and reformulated heated savouries. FNS actions continued to be maintained in the food outlets after the evaluation. Three critical success factors for development and implementation of FNS were: developing effective and trusting relationships with the foodservice team, adopting a robust and transparent nutrient profiling tool to identify healthier choices, and realistic, negotiated, win-win solutions for the foodservice operation and consumers.

The proportion of healthier choices purchased, increased from 25.8% in 2008, to 30.3% in 2009 and 31.1% in 2010, with no apparent affect on profitability or change in the number of healthier product lines available. Competitively priced healthier snacks (fruit) in particular, were identified by staff and students as an effective and appropriate action and this was supported by an 84% increase in fruit sales. A ‘Guiding framework for foodservice change’ was developed from the research findings, to assist other foodservice operations to transition to a healthier eating environment.

This translational action research provides evidence that creating a healthier eating environment can favourably shift purchasing patterns. However, the evidence provided about *how* foodservice operations can make changes, without compromising financial or operational objectives, is essential for encouraging foodservice operations to create healthier eating environments.

## Glossary

**Action research** – A methodology outlining a research process using cycles of enquiry, action and critical reflection then revision, called learning cycles, to create individualised solutions to problems within a setting (Zuber-Skerritt, 2001)

**Accessibility** – For this research the accessibility refers to how easy it is to identify and purchase particular food and beverage choices

**Availability** – For this research the availability refers to how many product lines there are present in the food outlets or vending machines

**Critical theory** – The research paradigm used in this research. Critical theory is explicitly concerned with creating social change and ensuring equality

**Eating environment** – the physical facilities, promotion and information for customers in the food outlets and vending machines. The physical facilities incorporate the range of food and beverage choices and portion size. The promotion and information for customers encapsulates pricing, packaging and placement of foods and beverages, special deals, posters/advertising and any nutrition information.

**Feed Your Need to Succeed** – Programme created for this research that aims to create a healthier eating environment

**Foodservice** – any business where food is prepared and/or sold for immediate consumption

**Foodservice management team** – Includes the foodservice manager, executive chefs, head chefs, team leaders

**Foodservice operation** – refers to the foodservice business arm of AUT University and includes management as well as the food outlets

**Food outlets** – the physical environment where food is prepared, sold and eaten

**Labelling** – any signage on or near food and beverage products. Includes front-of-pack labelling, logos, shelf tags or motivational messages about that food or beverage

**Nutrient profiling tool** – A system to categorise and rank foods and beverages according to the content of particular beneficial and /or detrimental nutrients (Scarborough, Rayner, & Stockley, 2007)

**Obesogenic environment** – an environment that promotes obesity in individuals or populations (Swinburn, Egger, & Raza, 1999)



## **Abbreviations**

FNS – Feed Your Need to Succeed

FNS FBCS – Feed Your Need to Succeed Food and Beverage Classification System

NEMS-R – Nutrition Environment Measures Study – Restaurants

PBP – Prepared bread products

## **Chapter One: Introduction**

Creating a healthier eating environment, by increasing the availability and accessibility of healthier choices may shift purchasing behaviour of consumers towards making healthier food and beverage choices. Increasing the purchase of healthier food and beverage items is likely to help redress the balance between energy intake and energy expenditure, and thus reduce the prevalence of noncommunicable disease. However, there is little evidence explaining how foodservice operations can create healthier eating environments without compromising operational or financial objectives.

This chapter outlines the background to this research, defining and establishing the need to create healthier eating environments. Then the research questions are presented followed by a description of the characteristics of New Zealand eating environments and more specifically the eating environment and the foodservice operation at AUT University. A short discussion about naming the Feed Your Need to Succeed (FNS) programme, precedes the chapter conclusion with an overview of the thesis' structure.

### **1.1 Prevalence and Causes of Noncommunicable Disease**

Noncommunicable diseases are the leading causes of death globally, accounting for approximately two-thirds of deaths in 2008 (World Health Organisation, 2011a). However, these diseases are largely preventable and improvements in dietary patterns can delay the onset of noncommunicable diseases (Stefanogiannis et al., 2005). The World Health Organisation (WHO) acknowledges that prevention, rather than treatment of these diseases is more effective at minimising their impact (World Health Organisation, 2011a).

In New Zealand, noncommunicable diseases accounted for 91% of all deaths in 2008 (World Health Organisation, 2011b). A modelling exercise by Stefanogiannis et al

(2005) indicated that four nutrition and physical activity related risk factors (high total cholesterol, high blood pressure, high body mass index (BMI) and inadequate fruit and vegetable intake) contributed to 40% (11000) of all New Zealand deaths in 1997. Further, it was calculated that mortality from these four risk factors would be reduced by approximately 1300 in 2011 if small improvements were made to each risk factor distribution.

Morbidity and mortality from NCD's in New Zealand disproportionately affects Māori and Pacific ethnic groups and those living in areas of deprivation. Māori and Pacific people have increased prevalence of high blood pressure, high cholesterol, ischaemic heart disease, diabetes (New Zealand Ministry of Health, 2008b). People living in areas of high deprivation had increased prevalence of ischaemic heart disease, diabetes (New Zealand Ministry of Health, 2008b).

In 2007, one in three adult New Zealanders were overweight (defined as a BMI over 25 kg.m<sup>2</sup>), and a further one in four were obese (defined as a BMI over 30 kg.m<sup>2</sup>) (New Zealand Ministry of Health, 2008b). Swinburn et al (1997) estimated that in 1991 obesity, with a prevalence of 14%, contributed to approximately NZ\$135 million of medical costs. The 1991 estimated obesity prevalence is approximately half of the reported 2008 prevalence. Therefore, obesity, as a noncommunicable disease constitutes a significant financial and health burden for New Zealanders.

An underlying cause of the global increase in noncommunicable diseases is an imbalance between energy intake and energy expenditure. In the past 50 years, dietary patterns have changed from predominantly plant based to predominantly animal based which is higher in energy and fat (World Health Organisation, 2003). In addition, energy expenditure from physical activity has decreased as a shift towards sedentary patterns has occurred. It has been proposed that factors such as easy access to high fat and energy dense

foods are major environmental contributors to this change in dietary patterns (Butland et al., 2007). Therefore, creating healthier eating environments, and adjusting purchasing behaviour, may reduce the incidence of noncommunicable diseases (World Health Organisation, 2003).

The foodservice industry is becoming an increasingly important consideration in changing dietary patterns because of the increasing consumption of away-from-home meals (Lachat et al., 2011; Nestle & Jacobson, 2000; Swinburn & Egger, 2002). Away-from-home meals are typically higher in fat, sugar and salt and have larger portion sizes (Burns, Jackson, Gibbons, & Stoney, 2002; Kant & Graubard, 2004; O'Dwyer, Gibney, Burke, & McCarthy, 2005). Some foodservice operators believe that creating healthier eating environments is not a sound business decision because healthier choices require more labour, are more expensive to produce and customers will not buy them (Dwyer, Macaskill, Uetrecht, & Dombrow, 2004; Lachat et al., 2011). However, as noncommunicable diseases become more prevalent and more of a financial burden, foodservice operations are experiencing more pressure to provide healthier eating environments (Lachat et al., 2011; Williams, 2009).

Creating supportive environments, to encourage healthier lifestyles, was first recommended by the Ottawa Charter (World Health Organisation, Health and Welfare Canada, & Canadian Public Health Association, 1986) and recommended by the WHO in their report on 'Diet, Nutrition and the Prevention of Chronic Disease' (2003).

Recommendations to create healthier eating environments are supported because the traditional approach of individual level interventions has not been completely successful in changing dietary patterns (Glanz, Sallis, Saelens, & Frank, 2005; Swinburn et al., 1999).

The Foresight Obesity Systems Map (Butland et al., 2007) is the most comprehensive examination of the determinants of dietary patterns and their consequent

impact on energy intake. Two out of the seven clusters identified on the map are related to the foodservice industry: Food production and food consumption. The foodservice industry has been implicated in the increasing ease with which people access energy dense food and beverages (Swinburn et al., 2011). Reports such as the Foresight Map, highlight the need to change the foodservice industry to create healthier eating environments (World Health Organisation, 2011a).

How healthier eating environments can be created without compromising foodservice financial and operational objectives has not been well researched. However, government policies exist in many countries about the provision of healthier choices in foodservice operations (Lachat, Roberfroid, Huybregts, Van Camp, & Kolsteren, 2009). Research is needed to investigate the process and impact of creating healthier eating environments whilst maintaining foodservice financial and operational objectives.

## **1.2 Healthier Eating Environments**

The term eating environment has not been explicitly defined in the literature (Kolasa, Dial, Gaskins, & Currie, 2010), although papers call for the creation of healthier eating environments (Kristal, Glanz, Tilley, & Li, 2000; Story, Kaphingst, Robinson-O'Brien, & Glanz, 2008). Throughout this thesis, the eating environment is defined as the physical facilities, promotion and information for customers in the food outlets and vending machines. The physical facilities incorporate the range of food and beverage choices and portion size. The promotion and information for customers encapsulates pricing, packaging and placement of foods and beverages, special deals, posters/advertising and any nutrition information.

The definition of eating environment in this thesis has some similarities with the 'Consumer Nutrition Environment' (Glanz et al., 2005), which incorporates: available

healthy options, price, promotion, placement and nutrition information. However, the definition of eating environment in this thesis incorporates advertising and other information for customers, which Glanz et al (2005) include in the 'Information Environment'.

Creating a healthier eating environment on campus was defined as increasing the availability (i.e. the product range) and the accessibility (i.e. promotions, placement, pricing, information) of healthier choices in the food outlets and vending machines.

### **1.3 Research Questions**

This research aimed to develop, implement and evaluate a programme to create a healthier eating environment, whilst meeting foodservice financial and operational objectives. The specific research questions were:

#### **1.3.1 Outcome questions**

1. What effect did the combined changes to create a healthier eating environment have on the availability and accessibility of healthier food and beverage choices on campus?
2. How do changes to the eating environment affect the purchase of healthier food and beverage choices on campus?

#### **1.3.2 Process questions**

3. How can a healthier eating environment be created without compromising the financial and operational objectives of the foodservice operation?
4. How does consultation and collaboration with staff and students influence the appropriateness of the changes made to create a healthier eating environment?

5. Which aspects of this research process can be incorporated into a framework for other foodservice operations to guide them through a transition to a healthier eating environment?

#### **1.4 Eating Environments in New Zealand**

Having established the focus of this research, this chapter now sets the scene by describing characteristics of New Zealand eating environments. Similar to other countries, expenditure in New Zealand on away-from-home foods is increasing. Expenditure on restaurant and ready-to-eat foods increased by 12.7% between 2006/2007 and 2009/2010 (Statistics New Zealand, 2010b). Further, evidence suggests that people who have low food security are more likely to use food outlets such as school canteens (Smith, Parnell, & Brown, 2010; Utter, Schaaf, Ni Mhurchu, & Scragg, 2007), and rates of low food security in New Zealand are increasing (New Zealand Ministry of Health & University of Otago, 2011)

The cost of healthier diets is also increasing in New Zealand. The weekly cost for a 'basic' diet that meets the New Zealand Food and Nutrition Guidelines (New Zealand Ministry of Health, 2003), has increased by 30% between 2004 and 2011 (University of Otago, 2011). A similar increase has been shown for healthier choices in Illawarra, Australia (Williams, 2010). However, in Illawarra, the affordability of healthier choices has remained constant at approximately 30% of average household income from 2000 - 2009.

New Zealand school environments are the only place an attempt was made to create healthier eating environments (Utter, Scragg, Percival, & Beaglehole, 2009). In June 2008, under the National Administrative Guidelines (5), schools were required to provide healthier food and beverage options. In February 2009, this guideline was removed by the new government. Research indicates that New Zealand schools do not necessarily promote

healthier choices (Carter & Swinburn, 2004; Utter et al., 2007; Walton, Waiti, Signal, & Thomson, 2010). Research highlighting the high proportion of packaged food in packed lunches (Walton et al., 2010), suggests that there are other barriers to making healthier choices in New Zealand apart from the school eating environment. However, the foodservice industry remains an important area to research further to identify how creating a healthier environment impacts purchasing patterns of customers.

The increasing contribution of away-from-home food outlets to New Zealanders' dietary intake highlights the importance of identifying *how* foodservice outlets can create and maintain healthier eating environments and whether purchasing patterns of customers are impacted by the change. New Zealand university foodservice operations are typically large operations catering for thousands of people every day, therefore, constitute an important setting for creating healthier eating environments.

## **1.5 AUT University as a Setting for this Research**

### **1.5.1 AUT University**

This body of work reports the process of development, implementation and evaluation of a programme to create a healthier eating environment at AUT University. The University supports a pastoral approach to the health and wellbeing of its staff and students. The AUT University charter (2004, p. 3) states within two goals the explicit responsibility to provide a nurturing and supportive environment for learning and working. Creating a healthier eating environment encourages staff and students to eat a more optimal diet, providing the body with the diverse nutrients required to function both mentally and physically to “foster excellence” (Council of the Auckland University of Technology, 2004, p. 1) amongst staff and students on campus.



### **1.5.2 AUT-managed food outlets**

The AUT University foodservice operation (henceforth referred to as the foodservice operation) operates on a not-for-profit basis and manages five food outlets between three campuses and coordinates catering for functions. Changes were made to all five AUT-managed food outlets, however, one outlet only opened at the beginning of 2010, so this outlet was not included in the analysis because longitudinal data were not available.

From 2008 – 2010, there were ten other food outlets on campus at AUT University which were not directly managed by the AUT University foodservice operation. Throughout this thesis these outlets have been referred to as ‘contracted outlets’. The AUT University foodservice management team (henceforth referred to as the foodservice management team) have been directed to, but also have expressed high levels of interest in creating a healthier environment. The foodservice management team indicated their willingness to work with the researcher to create a healthier eating environment on campus, provided that the impact on financial and operational objectives was monitored to ensure no negative effects. The financial objectives of the foodservice operation were the maintenance or increase of revenue and gross profit. The operational objective was that staff workloads were not significantly increased by creating a healthier eating environment

This research involved all stakeholders who influenced, or were influenced by, the creation of a healthier eating environment. University students and staff, foodservice staff, foodservice suppliers and vending machine suppliers were incorporated into the development, implementation and evaluation stages of this research.

### **1.5.2 Previous work with AUT-managed food outlets**

Before the researcher arrived, the research supervisor had worked with the AUT University food operation in an advisory manner. Products, including vending machine

items were ranked to identify how ‘healthy’ they were and substitutes suggested and she also encouraged the foodservice to offer fruit at a competitive price. Some of the changes initiated by the researcher supervisor were then integrated into this research

Part of the research supervisor’s strategy was the creation of a specific Enterprise PhD scholarship, funded by the Tertiary Education Commission and Healthy Living Limited. This scholarship was for research with the foodservice operation to investigate ways of creating a healthier eating environment on campus. The aim outlined in the scholarship terms of reference was to improve the food choices available on campus and integrate a marketing strategy to encourage healthier choices. This aim was the basis of the development of the Feed Your Need to Succeed (FNS) programme which was developed, implemented and evaluated during this body of work.

## **1.6 Timeline and Key Milestones.**

Figure 1.1 outlines the main timeline and key milestones of the development, implementation and evaluation process to create a healthier eating environment in the AUT-managed food outlets and vending machines.

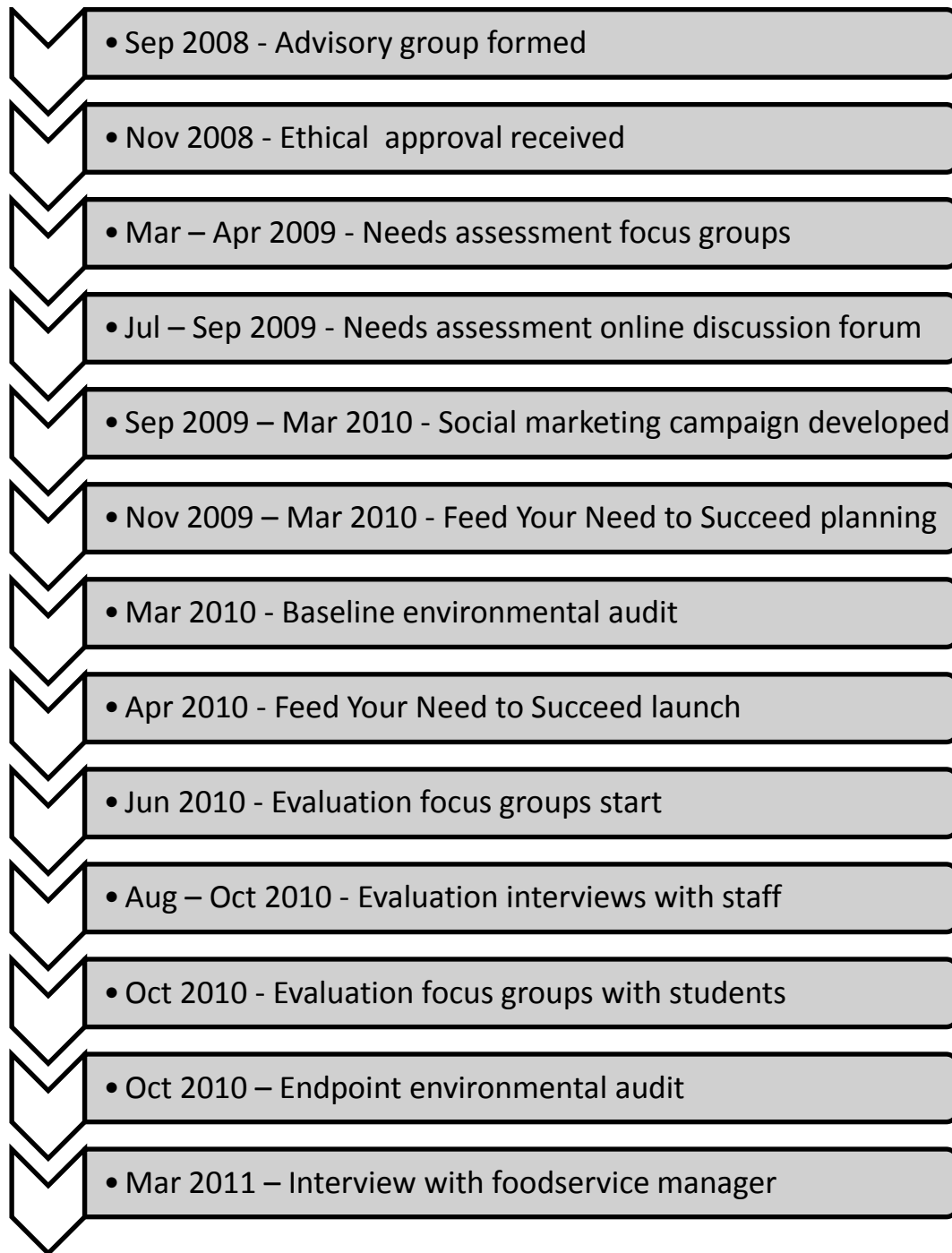


Figure 1.1 Timeline of the research and FNS programme showing key milestones

### 1.7 Naming the Programme

The programme to create a healthier eating environment on campus was called Feed Your Need to Succeed (FNS). The name was chosen primarily because it reflects the relationship between the basic human need to eat and the desire to meet personal goals at

university and in life. The name was developed by the researcher and then participants were consulted and provided approval of the name. Choosing to create a name for the programme that did not mention health explicitly was underpinned by the role of the University to provide a learning environment and affirmed in the needs assessment. The thematic analysis identified that promotion and marketing should relate to focus on food and other factors participants could relate to rather than health.

Previous research in universities demonstrates that only some customers are motivated by health and disease messages when making food purchases (Aaron, Evans, & Mela, 1995; Hoefkens, Lachat, Kolsteren, Van Camp, & Verbeke, 2011). Customers who are not motivated by nutrition and health are more likely to be motivated by other food characteristics such as taste, price and convenience (Blanck et al., 2009; Buscher, Martin, & Crocker, 2001). Given that framing key FNS messages around health was unlikely to influence the majority of people, FNS was framed within the context of food, wellbeing and success. It is likely that many students enrol at a university because it is a step towards achievement and success in life. Therefore, focussing FNS messages on success and wellbeing was considered a positive way of encouraging healthier food and beverage choices for both students and staff.

## **1.8 Overview of the Thesis**

The overall aim of this body of work was to develop, implement and evaluate a programme within a university campus to create a healthier eating environment without compromising foodservice financial or operational objectives. The approach taken during this journey of change was collaborative and consultative, using iterative learning cycles of action research. Initially, a needs assessment enabled the researcher to consult with staff and students on campus to identify priority areas for change. These findings informed the

next action research step of development and implementation of the programme. Finally, key findings from the development and implementation stage were built into the evaluation stage. The structure of this thesis follows this iterative action research approach. Results and findings from each stage are presented and discussed before moving onto the next stage.

Figure 1.2 presents the structure of the nine chapters in this thesis (this is chapter one). Chapter two provides a literature review, summarising common themes and outcomes of creating healthier eating environments in food outlets. Chapter three presents critical theory as the research paradigm and action research as the research methodology. Chapter four describes the methods for data collection and analysis. Chapter five presents the findings and discussion from the needs assessment stage. Chapter six outlines the development and implementation stages of FNS. Chapter seven presents the findings from the evaluation of FNS. Chapter eight discusses research findings in light of other literature and findings from the needs assessment and development and implementation stages. Chapter eight also outlines the implications, contributions, strengths and limitations of this body of work and suggestions for future research before presenting the final conclusion.

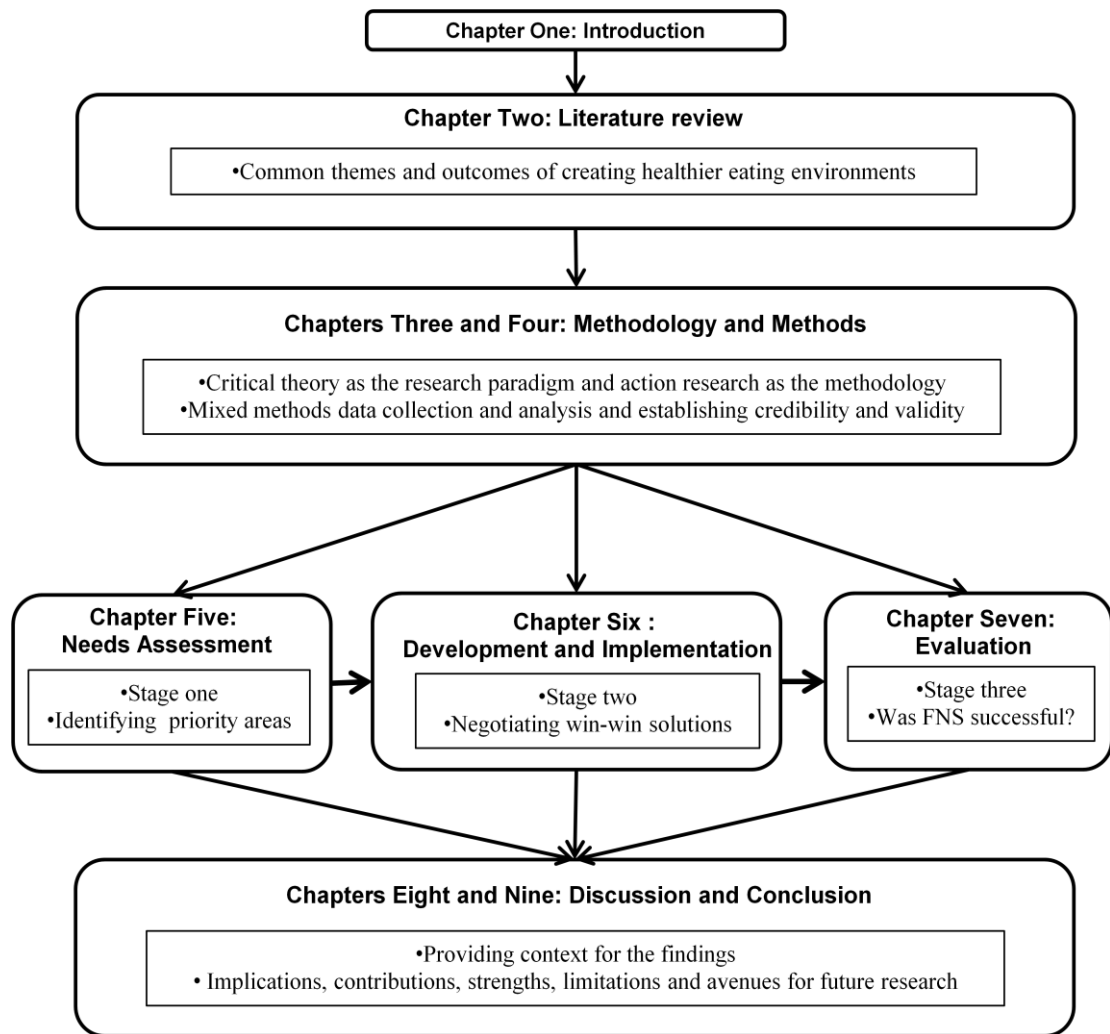


Figure 1.2 Structure of the thesis

## **Chapter Two: Literature review**

This literature review critically assesses reports of the impact of changing the eating environment on the purchase of healthier choices. This section starts by linking obesogenic environments with the increasing prevalence of noncommunicable diseases. Then, there is a brief discussion about how ‘healthier’ choices can be defined, followed by results from key studies using changes in the eating environment to promote healthier choices. This chapter concludes with a summary of the literature and justifies the research methodology and methods used to answer the research questions.

### **2.1 Linking Obesogenic Environments and Noncommunicable Disease**

Obesogenic environments are considered to be one of the main drivers of increasing body weights worldwide (Kumanyika, Jeffery, Morabia, Ritenbaugh, & Antipatis, 2002; Swinburn et al., 2011). The obesogenicity of an environment relates to how much it promotes the development of obesity (Swinburn et al., 1999). Obesity in turn, is classified as one of the noncommunicable diseases that have reached epidemic proportions (World Health Organisation, 2003).

The aetiology of obesity is complex and multifaceted, with many contributing factors. Multiple models outline and describe the interrelationships between the determinants of dietary patterns and their link to energy and nutrient intake (Booth et al., 2001; Butland et al., 2007; Glanz et al., 2005; Kumanyika et al., 2002; Swinburn et al., 2011). All models agree that determining factors work on multiple levels of influence (i.e. individual, organisation, government and global).

The most comprehensive model to date is the Foresight Obesity System Map (Butland et al., 2007), which was developed for the government of the United Kingdom. This qualitative, causal loop model, examines the complexity, relative importance and

interrelationships of factors contributing to energy intake and energy expenditure. Thematic clusters and leverage points are identified and may be used to determine effective interventions in the context of policy, economic, social and cultural contexts. Food production and food consumption are highlighted as two areas that provide opportunity for engagement of stakeholders, a societal approach and systemic change.

Food production and consumption have contributed to excess energy intake by increasing the supply of cheap, convenient energy dense foods, and increasing levels of promotion and marketing of less healthy choices (Cohen, 2008; Swinburn et al., 2011). Other determinants identified in the Foresight Obesity Systems Map are: physiology, individual physical activity, physical activity environment, social psychology and individual psychology. Reducing the prevalence of obesity and improving nutritional status is reliant on finding long-term, sustainable and economic interventions with a systems focus. There is global consensus that prevention is more cost-effective than treatment for obesity and other noncommunicable diseases (World Health Organisation, 2011a).

The WHO proposed a series of ‘best buys’, describing cost effective strategies for the prevention of noncommunicable diseases. The majority of these ‘best buys’ related to tobacco use, however, reducing salt and replacing trans-fat with polyunsaturated fat in food were also considered ‘best buys’. Gortmaker et al (2011) modelled the cost effectiveness of different strategies and identified several that would result in a net cost saving per disability adjusted life year. Some examples of strategies were: taxation and reduction of advertising for less healthy choices, and school and family based nutrition and physical activity programmes. However, not all of these strategies have a strong evidence base.

The complexity of sustainable solutions to the energy intake/energy expenditure imbalance indicates the need for strategies to be implemented in a range of hierarchical levels. Creating change within the upstream determinants of dietary patterns will require



government action as well as private industry and individual action. The foodservice industry is implicated in food consumption; however, the food industry also has a role to play in reformulation of foods. Butland et al (2007) and Gortmaker et al (2011) advocate for translational research to identify appropriate sustainable strategies such as creating healthier eating environments to influence environmental determinants of energy intake and energy expenditure.

## **2.2 Identifying ‘Healthier Choices’**

To effectively create healthier eating environments, a foodservice operator must be able to understand which foods and beverages are ‘healthier’. The most common way healthier choices are identified is through a nutrient profiling tool, which categorises foods “according to their nutritional composition” (Scarborough et al., 2007, p. 330). Most nutrient profiling tools (Dötsch-Klerk & Jansen, 2008; New Zealand Ministry of Health, 2008a) assess levels of negative nutrients such as saturated fat, sugar and salt. Although some (Arambepola, Scarborough, & Rayner, 2008; Food Standards Australia New Zealand, 2008) also consider positive nutrients such as fibre and protein or nutrient rich foods such as fruit and vegetables. Some nutrient profiling tools (Scarborough, Arambepola, Kaur, Bhatnagar, & Rayner, 2010) use different cut-offs for different categories of foods, because different types of food have different acceptable levels of negative and positive nutrients.

Nutrient profiling tools assessing specific nutrients require a nutrition information panel or an analysis by a food composition database. Many foodservice operations do not have access to food composition databases and many items sold in foodservice outlets do not have nutrient information panels. Therefore, using traditional nutrient profiling tools in foodservice operations could be problematic. An alternative type of nutrient profiling tool is the Healthy Meal Index (HMI) (Lassen, Biltoft-Jensen, Hansen, Hels, & Tetens, 2010),

which was designed specifically for use in foodservice operations where nutritional software is unavailable. The HMI was developed collaboratively with foodservice and nutrition professionals to ensure its' utility and was validated against weighed and chemically analysed food. The HMI assigns scores according to thresholds defined by the weights of fruit and vegetables, wholegrain and potatoes and fat containing foods on a plate. The fat containing foods are grouped into low fat, medium fat and high fat, very high fat and solid fat foods based on fat content and quality. The overall meal is given a score from 0-6 indicating how 'healthy' a meal is. (Lassen et al., 2010).

To effectively create healthier eating environments, understanding which food and beverages are healthier facilitates decisions about where to focus changes in the foodservice operation. Some nutrient profiling tools would not be easily utilised in foodservice operations because of limited resources and knowledge. Therefore, the utility of a tool needs to be considered before adoption or adaptation.

### **2.3 The Impact of Changing Eating Environments to Encourage Healthier Choices**

Environmental change strategies that create a healthier eating environment can be defined as those that change “the physical surroundings and social, economic or organisational systems in order to promote individual behaviour change” (Matson-Koffman, Brownstein, Neiner, & Greaney, 2005, p. 168). Other definitions include strategies that help to reduce barriers or increase opportunities for healthier eating (Glanz & Mullis, 1988) and strategies that involve everyone within a setting (Glanz, Sorensen, & Farmer, 1996). All these definitions stress changing the eating environment to make it easier for people to make healthier choices. Some more commonly reported strategies to create healthier eating environments are: labelling foods or menus with basic nutrition

information, educational posters and displays at point-of-purchase, increasing variety and attractiveness of healthier choices and discounting healthier options.

This section compares and contrasts the evidence for environmental change relating to foodservice operations in four different settings: workplaces, educational institutions, restaurants and vending machines. There were three basic categories of environmental changes 1) increasing availability of healthier choices, 2) discounting healthier choices and 3) communicating with customers about healthier choices through labelling, social marketing campaigns or promotional activities.

Literature was identified from the following databases: Scopus, SAGE, Medline, and EBSCO using the key search terms: foodservice and food service intervention, foodservice and food service change, healthy eating programme and school food programme. Inclusion criteria were that changes were made to the foodservice operation that increased the availability and accessibility of healthier choices. Furthermore, studies were only included if they measured change in the availability and accessibility of healthier choice or used sales of food and beverages as an endpoint measure. There are some studies (Aaron et al., 1995; Beresford et al., 2001; Economos et al., 2009; Nicklas, Johnson, Myers, Farris, & Cunningham, 1998) included in this literature review that do not meet all the inclusion criteria. These studies have been included because they have a particularly robust study design or they have findings that are relevant to the FNS programme. All studies discussed in this literature review are presented at the beginning of the relevant section on that setting.

### 2.3.1 Changing workplace eating environments

*Table 2.1 Description and outcomes of studies implementing environmental foodservice change in the workplace*

Location and reference	Baseline measures	Length of intervention	Actions			Outcomes	
			Pricing	Availability	Communication	Proportion of healthier choices available and number purchased	Revenue / profit
'Seattle 5-a-day trial' (28 randomised workplaces) (Beresford et al., 2001)	Pre-intervention FFQ	Two years	Nil	Nil	Compared exposure to national 5-a-day campaign with tailored promotion and social marketing activities to increase fruit and vegetable intake	Self reporting increase in fruit and vegetables of 0.3 serves per day ( $p<0.05$ ) in intervention group supported by 24 hour recall, unobtrusive place observation and usual day checklist.	Not measured
'Danish 6-a-day' programme (5 workplace cafeterias) (Lassen, Thorsen, Trolle, Elsig, & Ovesen, 2003)	3 weeks	10 months	Nil	Tailored strategies to increase availability of fruit and vegetables in cafeterias	Training for foodservice staff about ways to increase fruit and vegetable availability	↑ 39g – 103g fruit and vegetable usage in foodservice per customer	Not measured
Workplace cafeterias (17 between 4 study groups) (Steenhuis, van Assema, van Breukelen, et al., 2004)	3 weeks	6 months with first 3 weeks of sales used as measure	Nil	Study group 2: ↑HC available in 6 target categories (details unspecified)	Study group 1: Awareness raising about healthy eating Study group 3: HC labelled with encouraging signage	↔ 5 out of 6 target categories ↑20% HC desserts on average between group 3 and group 1 ( $p<0.01$ )	Not measured
Workplace cafeterias ( 12 control, 12 intervention) (Vyth et al., 2011)	3 weeks	3 weeks intervention 3 weeks post-intervention	Cost of HC same as non HC	Nil	HC labelled with logo with an integrated awareness raising campaign	↑ 1 piece of fruit per 50 employees in intervention groups maintained throughout post-intervention period ↔ other target food items	Not measured

Key: HC – healthier choices, FFQ - food frequency questionnaire

Workplaces have been identified as a target area where programmes can create and model healthier eating environments (Glanz et al., 2005) by providing healthier options and changing culture and behaviour so that healthier eating is expected (Swinburn, 2002). The joint WHO and World Economic Forum report (2008) supports the workplace as an effective setting for creating healthier eating environments.

The largest workplace programme, the 'Seattle 5-a-day' trial (Beresford, Shannon, McLerran, & Thompson, 2000; Beresford et al., 2001), demonstrates that tailoring strategies and engaging with employees in onsite activities increases the effectiveness of healthier eating environments. This two year, randomised controlled trial involved 28 workplaces comparing a minimal intervention control group consisting of exposure to the national '5-a-day' campaign with a more intensive environmental programme (Beresford et al., 2001). Environmental strategies were designed to gradually encourage people to increase their consumption of fruit and vegetables. Examples of strategies implemented were: contests, taste tests, labelling at point of purchase, educational social marketing materials, incentives for buying fruit and vegetables, newsletters and self help brochures. Intervention groups had employee advisory boards set up to adapt generic strategies recommended by the researcher to their particular workplace. Therefore, strategies were partially tailored to suit the needs of employees. This method of involving employees in the decision making process was designed to provide more ownership from the employees and therefore more acceptance about the strategies implemented.

Beresford et al (2001) identified an increase in self-reported fruit and vegetable intake of 0.3 serves per day ( $p < 0.05$ ) between the intervention and control groups at follow up. Beresford et al (2001) randomised the food frequency questionnaire over the whole workplace population and had a 71% response rate indicating that it was likely to be a true

reflection of the population rather than response bias. Furthermore, increases in fruit and vegetable consumption were supported by the other measures used in the analysis (24 hour recall, unobtrusive plate observation and usual day checklist).

A process evaluation of 'Seattle 5-a-day' (Beresford et al., 2000), determined that the number of activities implemented at a workplace was not linked to the level of behaviour change. However, the number of activities each employee participated in was linked to their behaviour change. This was a consistent relationship in both the intervention and the minimal control group. Within the intervention group, a significant increase in fruit and vegetable consumption of 0.5 serves per day ( $p=0.05$ ) was linked to using four or more pieces of informational material.

Vyth et al (2011) identified in another trial that an increase of one piece of fruit sold per 50 employees ( $p<0.01$ ) was the only significant change in their nine week, randomised controlled trial assessing the effectiveness of labelling for encouraging purchase of healthier choices. Signs indicating healthier choices were placed near sandwiches, soup and fruit in 12 intervention workplace food outlets and compared to a control group. The short length of this research, and a relatively modest intervention (signs only) are possible explanations for the minimal change in purchasing behaviour. Other reports, demonstrating a change in purchasing behaviour in workplaces were at least six months long (Beresford et al., 2001; Lassen et al., 2003) or had more intensive changes.

Steenhuis, van Assema, van Breukelen, Glanz, Kok and deVries (2004), in a seven month, randomised controlled trial in 17 workplaces, compared labelling, increased availability or a combination of these, to identify the most effective strategy to increase fruit and vegetable consumption and decrease dietary fat. Similar to Vyth et al (2011), Steenhuis, van Assema, van Breukelen et al (2004) found no overall change within the diet of employees, however, the purchase of low fat dessert increased by 20% ( $p<0.01$ ) in the

labelling group. However, purchase of healthier choices was only measured in the first three weeks of the intervention perhaps not allowing time for a greater change to occur.

Another possible reason for the limited success of this trial could be explained by the demographics of the employees. Employees were within a healthy weight range (BMI <25 kg.m<sup>2</sup>), did not consider their diets to be high in fat or low in fruit and vegetables and thought the changes were not personally relevant. On closer analysis, when employees were categorised according to their perception of their fat intake, a significant reduction was seen in dietary fat for those who had perceived their diet as high in fat. This reduction only occurred in the labelling arm of the intervention.

Process evaluation (Steenhuis, van Assema, Reubsaet, & Kok, 2004) provided evidence that some foodservice operations were unable to provide an adequate amount of healthier snack choices in the increased availability arm. This may have contributed to the lack of change in diet. In addition, managers thought labels needed to be more obvious and educational materials promoted more intensively.

The limited success of this trial by Steenhuis van Assema, van Breukelen et al (2004) demonstrates that an intervention must have the ability to adapt to the particular needs and context of the environment to which it is applied. It is possible that a longer measurement period, more intense changes or greater consultation with employees may have been able to make the strategies more acceptable to the employees and thus more effective.

Creating strategies acceptable to foodservice employees was central to the development and implementation of the 'Danish 6-a-day' programme in five workplaces (Lassen et al., 2003). Lassen et al (2003) supported the foodservice staff in the food outlets to increase their self efficacy to provide attractive and appetising food, incorporating more

fruit and vegetables. Foodservice staff members were encouraged to think of different ways to meet their customers' needs rather than having strategies defined by the researchers.

Endpoint and follow-up results, at six and ten months post baseline, demonstrated all foodservices significantly increased and maintained their usage of fruit and vegetables between 39g – 103g per customer (Lassen et al., 2003). Three workplaces showed no additional significant change (positive or negative) between endpoint and follow-up, and two companies significantly increased their usage between endpoint and follow-up. The final average increase of fruit and vegetable usage was 95g per customer between baseline and follow-up, which is approximately one whole serve of fruit or vegetables.

Lassen et al (2003) demonstrated a much higher increase in usage per person than other workplace studies. However, the sample size was small and the companies were motivated to increase the amount of fruit and vegetables, which may have influenced the results. Another limitation of this study is that whilst kitchen waste was accounted for, customer waste was not recorded, so it is difficult to know whether customers ate all the vegetables they were served. The types of companies involved in the 'Danish 6-a-day' study were varied (for example a military base, a bank and a waste handling facility), which adds to the impression that it was a representative result rather than bias. In addition, a customer satisfaction analysis discovered that customers were satisfied with the increase in fruit and vegetables and customer numbers did not change throughout programme implementation.

In summary, fruit and vegetable intake in particular seems to increase when healthier eating environments are created. Key messages from these studies are that the more successful programmes (Beresford et al., 2001; Lassen et al., 2003) were tailored to the needs of the organisation and the foodservice operation. Limitations of these workplace studies are that only two of them report on the number of healthier choices purchased



(Steenhuis, van Assema, van Breukelen, et al., 2004; Vyth et al., 2011) and none report on changes in revenue or gross profit of the foodservice operation.

### **2.3.2 Changing educational institutions' eating environments**

Eating environments in educational institutions, particularly schools, have been characterised in recent years by increasing levels of regulation. Regulation of nutritional composition of school meals was gradually introduced in England from 2007 to 2009 (Evans & Harper, 2009). There is emerging evidence that changes in school meals in England have influenced dietary intake of students both in school and out of school (A. Adamson, Personal communication, March 18, 2011). In America, regulation is being debated specifying a set of nutritional criteria to align the National School Lunch Programme with the American Dietary Guidelines (Food and Nutrition Service, 2011).

*Table 2.2 Description and outcomes of studies implementing environmental foodservice change in educational institutions*

Location and reference	Baseline measures	Length of intervention	Actions			Outcomes	
			Pricing	Availability	Communication	Proportion of healthier choices available and number purchased	Revenue / profit
University student cafeteria (n=1) (Aaron et al., 1995)	One week	One week	Nil	Nil	Bar and pie chart showing fat and calorie content	↓HC evidenced by: ↑g fat (41.4 vs 35.6g, p=0.05) ↑energy from fat (39.4% vs 36.6%)	Not measured
Primary and secondary schools 'Healthy Heart Award' programme (232) (Carter & Swinburn, 1999)	N/A cross-sectional study	N/A	N/A	↑ range of HC	Develop school nutrition policy	↑ sales of sandwiches and filled rolls, milk and fruit in 76.6%, 59.6% and 43.3% of schools respectively. ↓ sales of pies and sausage rolls, doughnuts and cream buns and sweets and crisps in 46.3%, 28.4%, 26.8% and 24.7% of schools respectively	Not measured
Primary and secondary schools (132) compliance with state policy (De Silva-Sanigorski et al., 2011)	N/A cross-sectional study	N/A	N/A	Remove least healthy choices from schools	Symbols on menu to identify healthier choices	37% of school menus included banned items	Not measured
Secondary school cafeteria (10 control, 10 intervention) (French, Story, Fulkerson, & Hannan, 2004)	Nil – case control study	Two years	Nil	↑ a la carte lower fat choices	School-wide, student based promotions of lower-fat options	↑51% HC available (intervention) ↓5% HC available (control) Year 1: ↑ mean percentage of sales of HC (27.5% intervention, 19.6% control, p=0.096) Year 2: ↑ mean percentage of sales of HC (33.6% intervention, 22.1% control, p=0.042)	↔ revenue in year one or two

Location and reference	Baseline measures	Length of intervention	Actions			Outcomes	
			Pricing	Availability	Communication	Proportion of healthier choices available and number purchased	Revenue / profit
Secondary school (2) (French, Story, et al., 1997)	Three weeks	Three weeks	50% discount on fruit, baby carrots and salad	Introduced baby carrots	Minimal signage at point of choices	Average weekly purchases ↑ fruit (14.4 baseline, 63.3 discount period, 62.1 follow-up) ↑ carrots (35.6 baseline, 77.6 discount period, 42.0 follow-up) ↔ salad (14.6 baseline, 16.0 discount period, 16.0 follow-up)	Not measured
Primary school foodservice (all schools in community) (Goldberg et al., 2009)	One year	Two years	Nil	↑ HC through foodservice staff training and new equipment	Classroom education, marketing and promotion of HC	↑ HC cereals (low sugar and porridge) ↑ salad (additional day per week) ↑ from 2 to 5 days fruit available at breakfast	Still able to meet budget
University staff cafeteria (1) (Jeffery, French, Raether, & Baxter, 1994)	3 weeks	3 weeks intervention 3 weeks follow up	50% decrease in cost for fruit and salad	Doubled fruit and salad options	Nil	↑ 300% fruit and salad purchases during intervention ↑ mean salad purchases at follow up (8 → 12 pounds purchased per day) ↔ fruit purchases between baseline and follow up	Not measured
University hall of residence dining hall (1) (Buscher et al., 2001)	2 weeks baseline and 1 week follow up	4 weeks with one food category labelled each week	Nil	Nil	HC labelled with sensory and convenience attributes	↔ overall sales ↑ yoghurt (2.62% of transactions at baseline, 3.76% at follow up) ↑ pretzels ↑ whole fruit (1.91% of transactions at baseline 3.26% at follow up)	Not measured
University campus convenience store (1) (Freedman & Connors, 2010)	6 weeks	5 weeks	Cost of labelled items same as unlabelled	Nil	HC marked with 'Fuel your life' shelf tag	↔ quantity of any one food items sold Trend emerging: ↑ overall sales of tagged items as a percentage of total sales in targeted category	Not measured

Location and reference	Baseline measures	Length of intervention	Actions			Outcomes	
			Pricing	Availability	Communication	Proportion of healthier choices available and number purchased	Revenue / profit
Secondary school programme to increase fruit and vegetable intake (12 intervention 12 control) (Nicklas et al., 1998)	Pre intervention consumption	Three years	Nil	↑Availability through tailored actions identified with the foodservice	Social marketing campaign, classroom sessions, workshops	↑0.37 serves consumption of fruit and vegetables compared to control schools after two years, ↔between control and intervention school at three years	Not measured

Key: HC – healthier choices

There is currently no regulation of school food in New Zealand. Schools can choose to join the Heart Foundation's 'Healthy Heart Award' programme, established in 1989, which encourages schools to provide healthier choices. Research indicated that this programme resulted in significant increases in the purchase of healthier choices such as sandwiches and filled rolls and a corresponding decrease in less healthier options such as meat pies, doughnuts, sweets and crisps ( $p < 0.01$  for all) (Carter & Swinburn, 1999). Results from Carter and Swinburn's (1999) analysis need to be interpreted with caution, because they are mainly self reported sales patterns from foodservice operators.

In contrast, more recent research highlighted that school policies, with an accompanying 'traffic light' profiling system, initiated by the Victorian Government in Australia has not been effective at increasing the availability of healthier choices (De Silva-Sanigorski et al., 2011). This research identified that 36.8% of schools were not compliant with the policy. Further, only one school (out of 132) complied with the 'traffic light' profiling system to remove all least healthy choices from the school. This study was cross-sectional so it cannot determine if the food available in schools has improved over time. Schools were only required to be fully compliant with the policy at the start of the year of data collection; therefore, changes may have still been occurring.

There are two large trials investigating the effects of promoting and increasing availability of healthier choices in American high schools (French et al., 2004; Nicklas et al., 1998). French et al (2004) focused on low fat choices and Nicklas et al (1998) focused on fruit and vegetables. In these studies, the main environmental changes were working with the foodservice staff to increase the availability and attractiveness of healthier choices and some promotion of healthier choices. Schools also coordinated a school wide media

campaign with taste tests and contests to encourage pupil participation. One of these studies (Nicklas et al., 1998) had a minor classroom educational component.

Both studies reported favourable change. The ‘Gimme 5 (Louisiana)’ study (Nicklas et al., 1998) demonstrated a significant increase of 0.37 serves in consumption of fruit and vegetables after two years compared to control schools. Unfortunately, this difference was not maintained at three years because the control group increased their intake to match the intervention group. The increase in the control group was possibly due to an area wide programme that was implemented to improve school eating environments.

French et al (2004) reported an increased number of low fat choices (51% more than baseline) and increased purchase of low fat choices after two years (33.6% of purchases in intervention compared to 22.1% in control). However, student self-reported intake at school did not change. Possible reasons for the lack of self-reported change were that the survey used was not sensitive enough, that it did not capture students who used the foodservice or that only a small proportion of students purchased healthier choices rather than all students.

Two studies have investigated the impact of offering a 50% discount on fruit and vegetables for three weeks in a high school (French, Story, et al., 1997) and a university (Jeffery et al., 1994). Both studies demonstrated a significant increase in purchase of the discounted items while the pricing strategy was in place. The purchase of healthier choices decreased after prices had returned to normal. In the high school, during the discount period, fruit sales increased fourfold, baby carrots increased twofold but sales of salad were not affected (French, Story, et al., 1997). The trial in the university setting (Jeffery et al., 1994) demonstrated a threefold increase in fruit and salad purchases while the discount was offered, but only salad sales remained higher than baseline after prices returned to normal.

The half-price discount offered in these short trials (French, Story, et al., 1997; Jeffery et al., 1994) has implications for the utility of this research. French, Story et al (1997) indicated that revenue was maintained while the discount was offered, however Jeffery et al (1994) did not examine the impact of the discount on revenue or gross profit. It is possible that the substantial increase in number of purchases balanced out the money lost through the discount. However, the impact of discounts on revenue and gross profit of a foodservice operation is an area that needs to be explored more thoroughly.

Three studies have investigated the impact of labelling on purchases of healthier choices in university food outlets with varying results (Aaron et al., 1995; Buscher et al., 2001; Freedman & Connors, 2010). Early research showed a negative association with the provision of energy and fat content and purchase of healthier choices (Aaron et al., 1995). In contrast, later research (Buscher et al., 2001; Freedman & Connors, 2010), where healthier choices were identified by a logo, demonstrated a neutral or positive relationship between the provision of labels and the purchase of healthier choices. Buscher et al (2001) demonstrated an increase in purchase of healthier snacks (yoghurt, pretzels, whole fruit) during the labelling period. The largest increase was seen in fruit, which increased from 1.9% of purchases to 3.3% at follow up five weeks later. The impact of labelling in Freedman and Connors' (2010) research was largely neutral, with only an emerging trend for a 3.6% increase in the proportion of labelled items out of overall sales rather than an increase in individual labelled items. This may have been related to the short time period; however, other short term labelling strategies (Buscher et al., 2001) have shown positive change within three weeks.

Research in educational institutions was more likely than workplaces to support the foodservice staff to create tailored solutions to create healthier eating environments. Two studies (Goldberg et al., 2009; Nicklas et al., 1998) reported provision of training and

ongoing support to the foodservice operation. However, neither of these studies provided evidence about the impact of the training and support on purchase of healthier choices, revenue or gross profit. There was more focus on support in educational institutions because foodservice staff working in schools are particularly likely to be low skilled and untrained (Goldberg et al., 2009).

In summary, only two studies have been found that report on how revenue was impacted by creating a healthier eating environment (French et al., 2004; French, Story, et al., 1997). Furthermore, no studies have reported the impact on gross profit. All studies in education institutions focused on one main type of strategy, with some having additional communication strategies. There were no studies that combined a variety of strategy types (for example pricing, promotion and availability). It is possible that combining strategies to create healthier eating environments may result in greater change in purchasing behaviour because customers respond to different stimuli when making decisions in a food outlet (Blanck et al., 2009; Glanz, Basil, Maibach, Goldberg, & Snyder, 1998).

### **2.3.3 Changing restaurant eating environments**

Only three studies were identified by this review which investigates the impact of creating healthier eating environments in restaurants. Two studies identified the impact of a large scale community initiative to provide restaurants with an ‘award’ indicating they offered healthier choices (Economos et al., 2009; Macaskill, Dwyer, Uetrecht, & Dombrow, 2003). The final study investigated the impact of price decreases and health messages on the purchase of healthier choices (Horgen & Brownell, 2002).



*Table 2.3 Description and outcomes of studies implementing environmental foodservice change in restaurants*

Location and reference	Baseline measures	Length of intervention	Actions			Outcomes	
			Pricing	Availability	Communication	Proportion of healthier choices available and number purchased	Revenue / profit
Restaurant (21) 'Shape Up Sommerville' Award (Economos et al., 2009)	Nil	6 month and 9 month follow up	Nil	↑ fruit and vegetables, smaller portions, low fat dairy	Show award Highlight healthier choices	At six months 10 of 21 restaurants fully complied with award criteria. At 9 months half of the non-compliant restaurants were complaint	Not measured
Restaurant (1) (Horgen & Brownell, 2002)	3 weeks 2 weeks interim baseline	43 days	↓20-30% HC for 3 weeks, then 2 weeks combined with health messages	Nil	Brief health messages about targeted HC	↔ overall sales Pricing results (mean daily sales): ↑ HC sandwich (1.81 → 12.9) ↑ HC salad (2.7→6.24) ↑ soup cup (6.71 → 15.24) ↑ soup bowl (3.24 → 8.33) Health message and combination results: No significant differences from preceding period but some significantly different from initial and interim baseline	Not measured
Restaurant (434) 'Eat Smart Ontario' Award (Macaskill et al., 2003)	Nil	One year	Nil	↑ HC on menu	Promote HC at point of purchase	27 – 40% restaurants used different promotional materials Restaurant changes: 51% added low fat dessert 30% added lower fat vegetables/fruit 28% added low fat wholegrain products 22% added fruit juice/milk to kids meals 20% added low fat entree	Not measured

Key: HC – healthier choices

Both large scale community initiatives gave restaurants an ‘award’ for the provision of healthier choices. The Eat Smart! award included other health promoting practices such as smokefree areas (Macaskill et al., 2003), whereas the Shape Up Somerville (SUS) award only included menu criteria (Economos et al., 2009). Neither of these articles reported on the impact of the award on purchase of healthier choices in the restaurants. Instead, the articles report on the effect of the award on the eating environment and perspectives of the restaurant managers.

A survey of restaurants participating in the ‘Eat Smart!’ award (Macaskill et al., 2003), highlighted that only 22% (n=69) of restaurants had to change their menu to provide healthier choices. The other 88% of restaurants’ already met the criteria. Within six months of signing up to the SUS award (Economos et al., 2009), all of the restaurants met criteria relating to healthier meal provision. However, 11 out of the 21 restaurants were not visibly promoting healthier menu choices, another SUS award requirement.

Macaskill et al (2003) and Economos et al (2009) highlight the challenges of developing appropriate and implementable changes in foodservice operations. The criteria for the SUS and Eat Smart! award were developed collaboratively (Economos et al., 2009; Macaskill et al., 2000). This might explain the high compliance with the award criteria, however, a criticism of this consultative process is that the agreed upon criteria may not be robust. Economos et al (2009) managed this criticism by agreeing upon four overarching objectives for the final nutrition criteria. These objectives allowed the researchers to maintain robustness and transparency during the criteria development process.

The fact that foodservice operations engaged with researchers in the development of both these programmes, indicates that they may have been motivated to create healthier eating environments. Both Macaskill et al (2003) and Economos et al (2009) identified that additional publicity for having the award was a key motivating factor. Therefore, creating a

healthier eating environment per se, may not have been a major motivating factor for foodservice operations, yet they willingly made changes to create a healthier eating environment.

Horgen and Brownell (2002) investigated the impact of price discounts and promotional messages on healthier menu choices in one restaurant. The three phases of the study period were: 20-30% price discount, health messages about healthier choices and combination discount and health messages. Across all two or three week phases, there was a trend for increase in daily average purchase of the four targeted items (range 130% -616% increase  $p < 0.001$  for all). The discount phase demonstrated the highest increase in average daily purchase of the healthier choices. Adding health messages did not increase the purchases further. In the final stage, with no discounts or promotional messages average daily purchase had returned to baseline levels for all targeted items except for the soup cup ( $p < 0.05$ ).

In summary, it is difficult to draw conclusions about the impact of creating healthier eating environments in restaurants. Horgen and Brownell (2002) offer an analysis of purchasing behaviour, but they do not report on revenue or gross profit. This is particularly pertinent because pricing discounts were involved. In addition, each phase of the research was so short that it is problematic to analyse the impact in the absence of other studies to compare it with. The other two studies investigating pricing discounts (French, Story, et al., 1997; Jeffery et al., 1994) offered such a significant discount (50%) that their results are not easily comparable with Horgen and Brownell (2002).

The two community restaurant programmes (Economos et al., 2009; Macaskill et al., 2003), offer excellent examples of researchers working collaboratively with foodservice operations to create healthier eating environments that align with operational objectives. What is missing from these studies is an investigation into the impact of the awards on

purchasing behaviour, revenue and profits. These studies highlight the challenges that face researchers wanting to implement environmental change strategies in restaurants. These challenges exist for participating (Economos et al., 2009; Macaskill et al., 2003), and non participating restaurants (Dwyer et al., 2004), and are predominantly foodservice manager concerns about reduction in profit or increased labour costs.

#### **2.3.4 Changing vending machines**

Research into creating healthier eating environments through changing vending machines investigates the impact of increasing availability, reducing cost and displaying promotional posters about healthier choices. Vending machines are important to target when creating healthier eating environments because they typically stock high sugar, salt and fat food and beverages (Lawrence, Boyle, Craypo, & Samuels, 2009).

When prices were reduced and healthier choices were advertised in vending machines, there was a similar effect in a university campus (French, Jeffery, Story, Hannan, & Snyder, 1997), high schools and workplaces (French, Jeffery, et al., 2001) and primary schools (Brown & Tamminen, 2009).

*Table 2.4 Description and outcomes of studies implementing environmental change in vending machines*

Location and reference	Baseline measures	Length of intervention	Actions			Outcomes	
			Pricing	Availability	Communication	Proportion of healthier choices available and number purchased	Revenue/profit
VM in university (8) randomised to intervention or one of two intervention groups (Bergen & Yeh, 2006)	2 weeks	5 weeks	Nil	Nil	Energy content labels OR energy content labels and motivational posters	Labels and posters resulted in slower rate of ↑ for sales of sugar sweetened beverages	↑ Total revenue for all beverages 70.5% of ↑ revenue was from non-energy-containing beverages
Beverage VM in schools (18 schools) (Brown & Tamminen, 2009)	Nil	Two years	↓10 – 25% on HC (carried by site)	↓ sugar sweetened beverages to 50% of products	Advertising on machines was only for HC	Variable depending on site. No clear trends	Average ↑ 63.9% profit in 10 out of 15 schools
VM in school staff rooms (10 divided into 3 experiment groups) (Fiske & Cullen, 2004)	2 weeks	4 weeks	Nil	↑ 5 →8 low fat items per intervention machine HC in prime position	2 experiment groups: Labels on HC and Labels on HC plus motivational signs	Non significant ↑ low fat items in labels and signs group	↔ machine turnover Non significant ↑ in sales with ↑ promotion
VM in university (9 VM in 4 locations) (French, Jeffery, et al., 1997)	4 week	3 week	↓ 50% low fat choices	Nil	Sticker highlighting HC	↔ total number of snacks purchased ↑ sales of low fat choices (25.7% baseline, 45.8% intervention, 22.8% post intervention)	Not measured
VM in schools (12) and workplaces (12). 55 VM (French, Jeffery, et	Nil	12 months – continually changing pricing and promotion	4 conditions: Equal, ↓10%, ↓25%, ↓50%	Nil	3 conditions: None, low fat label, low fat label and sign	↑ overall sales volume in the 50% pricing condition (1557) compared with equal price condition (1325) Price ↓ of 50%, 25% and 10% were	↔ profit between machines/ conditions

Location and reference	Baseline measures	Length of intervention	Actions			Outcomes	
			Pricing	Availability	Communication	Proportion of healthier choices available and number purchased	Revenue/profit
al., 2001)		levels				associated with ↑ sales of 93%, 39% and 9% respectively. 10% ↓ price ↔ equal pricing Only label-plus-sign differed from no label condition ( $p < 0.5$ ) ↑ 0.5 packets (3.5 → 4) per FTE	
VM in hospital (2 sites, 14 VM) (Gorton, Carter, Cvjetan, & Ni Mhurchu, 2010)	3 months	3 months	Nil	All products in VM were HC	Nil		↓ average price per item (\$1.66-\$1.40) ↑ overall sales value ↓ 0.17c per FTE

Key: HC – healthier choices, FTE – full time employee, VM – vending machine

In French and Jeffery et al's two studies (French, Jeffery, et al., 2001; French, Jeffery, et al., 1997), pricing reductions of 50%, 25% and 10% caused increases in the purchase of healthier choices, with the 50% discount causing the most increase. In contrast, different levels of promotion for healthier choices did not lead to significant differences in purchases. The profits from the machines were maintained throughout the discount and promotion phases.

It is unclear from this analysis whether customers were substituting regular vending choices for low fat choices. This appears to be the case in the 10% reduction phase, because the percentage of low fat choices purchased increased but the total number of purchases did not change. It is possible that in the greater discount phase customers were buying two low fat choices instead of a regular choice, which would not necessarily have a beneficial effect on their energy intake. These studies were only three to four weeks long, so it is problematic to assess whether these changes in sales would have been maintained. However, even considering these limitations, these studies provide an overall positive picture that a small reduction in price influences customers to purchase healthier choices preferentially.

Brown and Tamminemi (2009), limited the availability of sugar sweetened soft drinks to 50% of products in schools over two years. Sugar sweetened soft drinks were replaced with water, juice and sports drinks (sports drinks had half the caloric value of sugar sweetened soft drinks). Schools were allowed to set their own discount (between 10% - 25%) for healthier choices and prices predominantly stayed the same between year one and year two. Profit from the vending machines, which was the primary outcome, increased on average by 63.9% in 10 of 15 schools. One of the schools more than doubled the profit from vending machines, although they had eliminated sugar sweetened soft drinks entirely. This study tracked sales for two full school years, therefore, it provides strong evidence that

healthier beverages can be provided at a discounted rate from vending machines without compromising profit.

The effect of different levels of promotional materials on purchases of healthier beverages (Bergen & Yeh, 2006) and snacks (Fiske & Cullen, 2004) were investigated in two short term studies. Bergen and Yeh (2006) provided energy content labels and energy content labels alongside motivational posters compared with a control group. Fiske and Cullen (2004) located the healthier snacks in prime position, and provided logos identifying healthier choices and combined logos alongside motivational posters. Neither of these studies produced meaningful positive outcomes. But both studies identified that providing labels on the products as well as motivational posters had more impact on purchase of healthier choices.

Bergen and Yeh (2006) identified increases in revenue from vending machines, of which 70.5% was accounted for by the healthier beverages, whereas Fiske and Cullen (2004) identified no change in revenue. These two studies combined demonstrate that healthier choices may need to have identifying labels as well as motivating posters to encourage greater purchase. However, changes can be made and maintained without negatively impacting revenue in the short term.

In the only New Zealand study, a new product range, of all healthier choices, were put in vending machines in two workplaces (Gorton et al., 2010). This study found a 0.5 increase in the number of packets purchased per full time equivalent (FTE) staff member. The increase in number of items purchased corresponded with an increase in overall revenue; however, there was a \$0.17 decrease in revenue per FTE, because FTE numbers had increased. The average price per product was \$0.26 lower with the introduction of the new range of products because the pack size was often smaller; therefore, more people were buying cheaper products.



Studies investigating the promotion of healthier choices in vending machines were the only studies consistently measuring revenue and sometimes gross profit. These studies indicate that pricing and availability changes rather than promotional materials are more effective at promoting the purchase of healthier products in vending machines. It is also clear that a small discount of approximately 10% - 25% can have a beneficial impact on the purchase of healthier choices. Studies with a discount higher than 25% (French, Jeffery, et al., 2001; French, Jeffery, et al., 1997), indicate that customers were buying more healthier choices on one purchasing occasion, which may not have been nutritionally beneficial in the long term. Two studies to date (Brown & Tammineni, 2009; Gorton et al., 2010), have demonstrated the long term financial viability of increasing the proportion of healthier choices in vending machines. Further, one of these long term studies, showed increasing profit despite discounts being offered on healthier choices (Brown & Tammineni, 2009).

### **2.3.5 Social marketing as a tool to influence food and beverage purchasing behaviour**

This literature review has identified that social marketing can be a component of programmes that have successfully changed the eating environment to make healthy choices easier. Social marketing is not a theory per se, rather it is a framework used to understand people's behaviour and how to influence it to encourage positive change (Stead, Gordon, Angus, & McDermott, 2006). Social marketing can refer to a spectrum of processes and actions to encourage healthier food and beverage choices (McDermott, Stead, & Hastings, 2005). Social marketing has been used holistically, informing the whole process of change from identification of the target market and the needs assessment through to implementation of the promotional strategies (Piggin & Lee, 2011). Alternatively, social marketing can be limited to the communication and promotional tools that works alongside

the environmental changes (Macaskill et al., 2000). Although these appear to be two ends of a spectrum, they have the common the identification of strategies and actions that support and encourage people to make positive lifestyle changes (Jackson, 2009).

The most effective social marketing interventions for public health interventions are those that are aligned with strategies on multiple levels of influence (individual, sectoral and environmental) and communicate with stakeholders in multiple ways (Cairns & Stead, 2009). A review of nutrition focused social marketing campaigns (Gordon, McDermott, Stead, & Angus, 2006) provided strong evidence that social marketing positively influenced fruit and vegetable intake, fat intake, nutrition knowledge and psychosocial variables. Furthermore, studies discussed in this literature review (Beresford et al., 2001; French et al., 2004; Macaskill et al., 2003; Nicklas et al., 1998) identified that communication and promotional interventions, such as posters and labels, as part of a multi-component programme, encouraged purchase of healthier food and beverage choices.

## **2.4 Summary of the Literature**

The increasing prevalence of noncommunicable disease is a complex and multi-factorial issue. The Foresight Obesity Systems Map (Butland et al., 2007) demonstrates the complexity of the interrelationships between the determinants of energy intake and expenditure. There is strong evidence that the ease with which people access cheap, energy dense food is one of the major drivers of the increasing prevalence of obesity (Kumanyika et al., 2002; Swinburn et al., 2011; World Health Organisation, 2003). The food and the foodservice industry are both implicated in the increasing access to cheap, energy dense foods in eating environments.

Research investigating how creating healthier eating environments impacts purchase and eating behaviours shows positive outcomes for this approach, particularly in workplace

and school settings (Beresford et al., 2001; French et al., 2004; Lassen et al., 2003; Nicklas & O'Neil, 2000). Increasing availability and discounting healthier choices appears to be more effective than promotional strategies at encouraging purchase of healthier choices. However, only three studies (Beresford et al., 2001; French et al., 2004; Nicklas et al., 1998) investigate long term, multifaceted programmes to create healthier eating environments. Evidence supporting multifaceted, long terms programmes, reflecting the complex, multi-factorial nature of eating behaviour, are needed to inform the creation of healthier eating environments.

Further research is needed to identify the influence of implementing multiple and varied strategies in foodservice operations for an extended period of time. Longer term programmes have generally been more successful (Beresford et al., 2001; French et al., 2004; Nicklas et al., 1998). However, no studies combine increasing availability with promotion and pricing strategies to create healthier eating environments. There is acknowledgement that foodservice managers are reluctant to create healthier eating environments because they believe it will impact their operational or financial objectives (Dwyer et al., 2004; Lachat et al., 2011). This belief of foodservice managers highlights a significant gap in knowledge. There is research demonstrating that researchers and foodservice managers can work collaboratively to develop and implement changes that meet operational objectives (Economos et al., 2009; Lassen et al., 2003; Macaskill et al., 2000). However, these studies do not report on the impact of changing the environment on purchasing behaviour, revenue or gross profit.

There are calls for governments to start regulating eating environments to ensure healthier choices are available and promoted (French & Wechsler, 2004; Gortmaker et al., 2011; Swinburn et al., 2011). However, given the reluctance of governments to regulate the food and foodservice industry to date, foodservice operations need to be encouraged to

engage in a change process voluntarily. A consortium of foodservice organisations has been created in Europe to undertake an analysis to identify how foodservice operations can engage in developing strategies to promote healthier choices (Lachat et al., 2011). A weakness identified by Lachat et al (2011) was the lack of evidence demonstrating that healthier eating environments can be created whilst meeting financial and operational objectives. This is why long term, applied research is needed to identify the impact of creating a healthier eating environment on purchasing behaviour, operational objectives, revenue and gross profit. This is the gap in the research that this body of work aims to fill through using a collaborative, consultative, action research process within the critical theory paradigm.

## **Chapter Three: Theoretical approach**

This section discusses the research paradigm and provides an overarching framework for the theories that guide the research process (methodology) and the research methods (Grant & Giddings, 2002). Critical theory was the research paradigm with action research as the methodology. The following sections describe critical theory and action research and demonstrate how they are implicitly linked to translational change research and addressing inequalities.

### **3.1 Overarching Research Paradigm**

In this first section, the assumptions of critical theory research and critical theory's relationship to organisational change research are discussed.

Using critical theory to frame this study acknowledges the aim of this research; to create a healthier eating environment on campus so healthier choices are easier for staff and students. The aim of this research is to not only describe the eating environment, but to change it. Critical theory is explicit in its desire for social change and focuses on working collaboratively within an organisation (for example, a foodservice operation) to initiate change.

The term 'critical theory' was first used in 1930 by Max Horkheimer, the director of the Frankfurt Institute for Social Research. Critical theory is based in the social sciences, with the original ideology coming from the writings of Marx and the labour movement. After 1930, critical theory began to incorporate a much broader focus including critiques of philosophy, psychology and aesthetics (Bronner, 2002). Today it is used within other fields of inquiry including feminism, neo-Marxism and critical poststructuralism (Alvesson & Ashcraft, 2009).

### **3.1.1 Assumptions of critical research**

Critical theory research is similar to interpretivist research. Researchers using both paradigms believe in multiple realities that are subjectively interpreted by each individual depending on their circumstances (Grant & Giddings, 2002). In contrast to positivist researchers, critical theory researchers believe in multiple truths. Critical theorists make the assumption that there is no 'one truth' waiting to be discovered. Critical theory researchers recognise that research and knowledge are not independent of people's daily lives, because truth and reality are steeped in the culture of each particular environment (Dant, 2003). Wanting to identify knowledge through interpretation of people's experiences within their lived reality, leads critical theory researchers to use more collaborative forms of inquiry. Within critical theory research, power inequalities are examined, acknowledged and ideally reduced. The net effect is more equal relationships between researchers and participants.

Participants in critical theory research are often considered co-researchers rather than subjects. Therefore, two-way interaction between the researcher and participants is used to develop research findings (Alvesson & Ashcraft, 2009). However, there can be tension in the researcher-participant relationship because critical theorists believe that how we live and act is in part determined by power inequalities and societal norms (Dant, 2003; Grant & Giddings, 2002). Critical theory researchers believe that societal norms and power inequalities are implicit within all societies and that societal expectations are often historical and not necessarily fair and justified (Dant, 2003). Critical theorists seek to reduce these inequalities by empowering individuals and communities (Grant & Giddings, 2002), whereas participants may not necessarily see societal norms and expectations as problematic. The researcher must then operate with full recognition and awareness of this

paradox and find the balance between encouraging changes that participants appreciate, as well as working towards the end goal that the researcher has within their sight.

The societal norms challenged in this research revolved around food choice and the eating environment. New Zealand eating environments, similar to other Western countries are characterised by aggressively marketed convenience products that are high in fat, sugar and salt (Cairns & Stead, 2009; Nestle & Jacobson, 2000; Swinburn et al., 2011). Many would argue that food choice is a matter of individual choice and free will. However, in the current system, consumers are manipulated by sophisticated marketing practices and often by indirect means such as product placement on shelves (Cohen, 2008; Schmitt, Wagner, & Kirch, 2007). Indirect marketing in particular, has been designed to subtly encourage consumers to choose high fat, sugar and salt products in the eating environment (Cohen, 2008; Mamalis, 2009). One result of the social norms created through aggressive marketing of less healthy choices, is that healthier choices are perceived as less desirable and not as socially acceptable (Stead, McDermott, MacKintosh, & Adamson, 2011). If healthier choices are less desirable, then they are likely to become less available and more expensive.

There is strong evidence demonstrating that this inequality in the eating environment exists to the detriment of consumer health (Butland et al., 2007; Haapala, Hodge, McNeill, Tseng, & Yngve, 2011; World Health Organisation, 2003). In contrast, there are many consumers who believe that less healthy choices are tasty, enjoyable and therefore worth buying, regardless of their health impacts (Stead et al., 2011). Consumers who eat and enjoy less healthy choices, are unlikely to be concerned about the New Zealand eating environment. Differing views between the researcher and consumers about societal norms and expectations around appropriate food choices may cause tension in this research.

Critical theorists believe knowledge is generated through combining action with critical reflection with the aim to raise consciousness and empower members of society to critique their current actions and make improvements (Grant & Giddings, 2002). The process of linking knowledge to experience and practice is called praxis (Dant, 2003) and is a defining characteristic of critical theory research. Critical theory researchers apply existing theories within a setting to change reality, rather than describing or creating abstract theories that have not been applied to the real world. To this end, many critical theory researchers use cycles of “collaborative planning, acting and critical reflection” (Grant & Giddings, 2002, p. 19) to move through a process of empowerment and social transformation involving participants. Participants are often involved from the identification of the problem through to the analysis and reporting of findings.

### **3.1.2 Critical theory in organisational research**

Critical theory is becoming more popular within research in organisations, particularly when the research aims to create change. Within this research, the organisation has been defined as the AUT University foodservice operation. When applied to research about change in organisations, Alvesson and Ashcraft (2009) believe critical theory research should be less Utopian and consider the “conditions and constraints that mark management and organisational structures” (p. 64). This pragmatic approach can assist with negotiating the tension between the researcher and the employees about the differing awareness of societal norms and expectations. It is important to note, that this pragmatic approach is not permission to focus exclusively on the needs of those in a high power position and ignore the needs of those in low power positions. Critical theory research requires that the needs of those in lower power positions are taken into consideration (Bronner, 2002).



One way critical theory research considers the needs of those in less powerful positions is to use a collaborative approach and focus on working with participants from all hierarchy levels (Alvesson & Ashcraft, 2009). In practice, this means that critical theory research has a more systems oriented focus, rather than an individual, fault-finding focus (Dant, 2003). Thus, it is ideally suited to situations where the status quo needs to be challenged to discover how to resolve problems.

Using critical theory as the research paradigm makes explicit a positive, transformative/reconstructive approach with a systems focus. In more traditional organisational research, lack of involvement, communication and understanding can cause organisational change research to be met with resistance from employees and stakeholders'. Using a critical research approach helps to combat these factors. Critical research provides a focal point for empowerment and promotes employees to work together through ongoing cycles of development and reflexivity to gradually improve work practices (Alvesson & Ashcraft, 2009).

### **3.2 Action Research as a Methodology**

Ongoing cycles of development and reflexivity are also characteristics of action research methodology (Wicks, Reason, & Bradbury, 2008). This section describes action research, presenting an action research typology which is discussed in relation to this research, followed by a discussion about how action research aligns with critical theory.

#### **3.2.1 Action research approach and justification**

Action research uses cycles of research, action and critical reflection, called learning cycles, to create individualised solutions to problems within a setting (Zuber-Skerritt, 2001). An action research project will progress through multiple learning cycles, each one improving on the last and informing the development of the next. Action research

was chosen because the reflexive learning cycles reinforce the collaborative and practical nature of this research. In addition, action research aligns well with the continuous quality improvement approach evident within many foodservice operations (Duncan & Jensen, 2010).

Action research, as a distinct research methodology, was first used in the social sciences in the 1940's by Kurt Lewin. Lewin researched real-life situations (i.e. within a workplace), rather than focusing on laboratory-based research (Hart & Bond, 1995). Action research can be defined by its participatory and democratic change process (Winter & Munn-Giddings, 2001) and its focus on change and praxis (i.e. linking knowledge with practice) (Meyer, 2000). Participatory and democratic change processes encourage participants to believe in, and consider themselves an equal in the change process (Meyer, 2000).

A schematic of the stages of an action research process is outlined in Figure 3.1. The three larger circles, each with four steps, represent the learning cycles used in action research. The arrows represent the movement from one cycle to the next. . These four steps in a learning cycle lead researchers and participants through a period of planning, action, observation and then reflection, before moving onto the next cycle which starts with a revised plan.

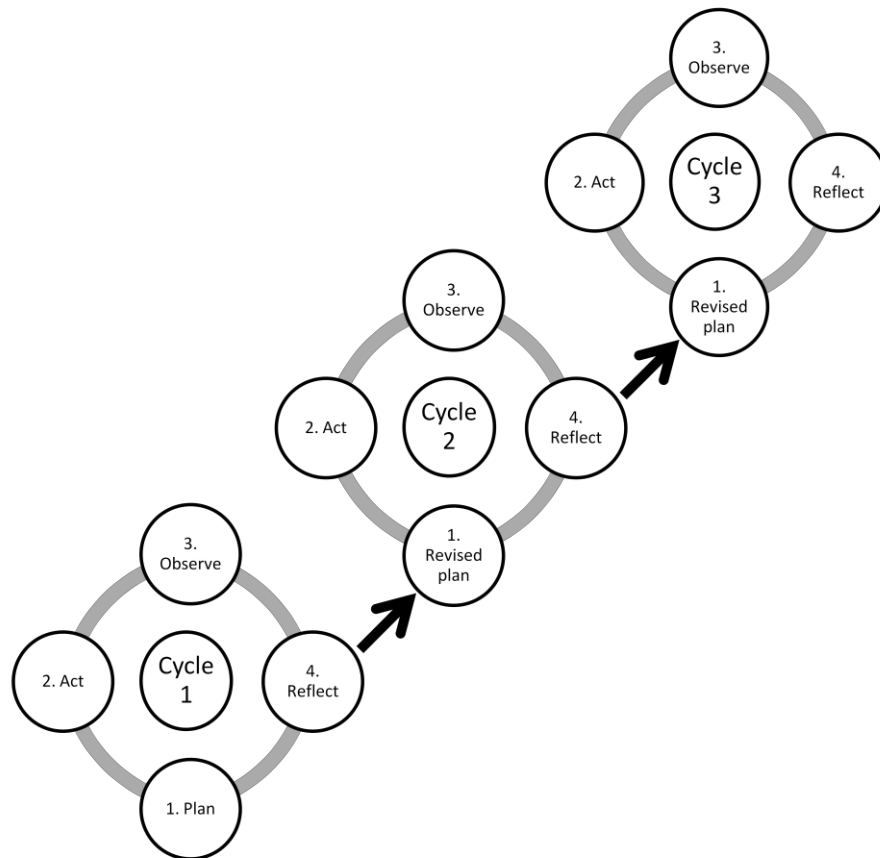


Figure 3 1 Action research process  
Adapted from (Zuber-Skerritt, 2001, p. 20)

Learning cycles can be formal or informal and can be used by an individual to reflect and improve their practices, or by a group wishing to resolve a larger issue. Within this research, learning cycles ranged in scope from researcher self-reflection, to group discussion with the foodservice management team about goals for creating a healthier eating environment. In all learning cycles, critical reflection is crucial, and findings from previous learning cycles inform new learning cycles.

Action research methodology was appropriate for this research because of the desire to create solutions specific to the AUT University foodservice operation. The focus on consultation in action research, encouraged the continuing involvement of many key stakeholders, which is crucial for change within a large organisation (Ruuska & Vartiainen,

2003). Progressing through cycles of learning and improvement created a positive transformative approach allowing for greater flexibility because actions could be adapted once they were in place.

### **3.2.2 Action research typology**

As with most research methodologies, action research is used many different ways within social sciences and has been adapted for use in different research areas. Hart and Bond (1995) define four typologies of action research: experimental, organisational, professionalising, and empowering. The typology used in a project is determined by its characteristics within seven criteria as depicted in Table 3.1:

*Table 3.1 Action research typology and characteristics*

Experimental	Organisational	Professionalising	Empowering
<u>Educative base</u>			
<ul style="list-style-type: none"> <li>• Re-education</li> <li>• Enhancing social science or administrative control and social change towards consensus</li> <li>• Inferring relationship between behaviour and output; identifying causal factors in group dynamics</li> <li>• Social scientific bias/researcher focussed</li> </ul>	<ul style="list-style-type: none"> <li>• Re-education/training</li> <li>• Enhancing managerial control and organisational change towards consensus</li> <li>• Overcoming resistance to change/restructuring balance of power between managers and workers</li> <li>• Managerial bias/client focussed</li> </ul>	<ul style="list-style-type: none"> <li>• Reflective practice</li> <li>• Enhancing professional control and individual's ability to control work situation</li> <li>• Empowering professional groups; advocacy on behalf of patients/clients</li> <li>• Practitioner focussed</li> </ul>	<ul style="list-style-type: none"> <li>• Consciousness raising</li> <li>• Enhancing user-control and shifting balance of power; structural change towards pluralism</li> <li>• Empowering oppressed groups</li> <li>• User practitioner focussed</li> </ul>
<u>How individuals are dealt with as part of a social group</u>			
<ul style="list-style-type: none"> <li>• Closed group, controlled selection made by researcher for purposes of measurement relationship between cause and effect</li> <li>• Fixed membership</li> </ul>	<ul style="list-style-type: none"> <li>• Work groups and/or mixed groups of managers and workers</li> <li>• Selected membership</li> </ul>	<ul style="list-style-type: none"> <li>• Professional(s) and/or (interdisciplinary) professional group/negotiated team boundaries</li> <li>• Shifting membership</li> </ul>	<ul style="list-style-type: none"> <li>• Fluid groupings, self selecting or natural boundary or open/closed by negotiation</li> <li>• Fluid membership</li> </ul>
<u>The problem focus and how context specific and future orientated it is</u>			
<ul style="list-style-type: none"> <li>• Problem emerges from the interaction of social science theory and social problems</li> <li>• Problem relevant for social science/management interests</li> <li>• Success defined in terms of social science</li> </ul>	<ul style="list-style-type: none"> <li>• Problem defined by most powerful group; some negotiation with workers</li> <li>• Problem relevant for management/social interests</li> <li>• Success defined by sponsors</li> </ul>	<ul style="list-style-type: none"> <li>• Problem defined by professional group; some negotiation with users</li> <li>• Problem emerges from professional practice/experience</li> <li>• Contested, professionally determined definitions of success</li> </ul>	<ul style="list-style-type: none"> <li>• Emerging and negotiated definition of problem by less powerful group(s)</li> <li>• Problem emerges from members' practice/experience</li> <li>• Competing definitions of success accepted and expected</li> </ul>
<u>The type of change intervention</u>			
<ul style="list-style-type: none"> <li>• Social science, experimental intervention to test theory and/or generate theory</li> <li>• Problem to be solved in terms of research aims</li> </ul>	<ul style="list-style-type: none"> <li>• Top-down, directed change towards predetermined aims</li> <li>• Problem to be solved in terms of management aims</li> </ul>	<ul style="list-style-type: none"> <li>• Professionally led, predefined, process-led</li> <li>• Problem to be resolved in the interests of research-based practice and professionalization</li> </ul>	<ul style="list-style-type: none"> <li>• Bottom-up, undetermined, process led</li> <li>• Problem to be explored as part of process of change, developing an understanding of meanings of issues in terms of problem and solution</li> </ul>
<u>The aims of improvement and involvement</u>			
<ul style="list-style-type: none"> <li>• Towards controlled outcome and consensual definition of improvement</li> </ul>	<ul style="list-style-type: none"> <li>• Towards tangible outcome and consensual definition of improvement</li> </ul>	<ul style="list-style-type: none"> <li>• Towards improvement in practice defined by professionals and on behalf of users</li> </ul>	<ul style="list-style-type: none"> <li>• Towards negotiated outcomes and pluralist definitions of improvement: account taken of vested interests</li> </ul>
<u>The cyclic processes and the balance between action and research</u>			
<ul style="list-style-type: none"> <li>• Research components dominant</li> <li>• Identifies causal processes that can be generalised</li> <li>• Time limited, task focussed</li> </ul>	<ul style="list-style-type: none"> <li>• Action and research components in tension; action dominated</li> <li>• Identifies causal processes that are specific to the problem context and/or can be generalised</li> <li>• Discrete cycle, rationalist, sequential</li> </ul>	<ul style="list-style-type: none"> <li>• Research and action components in tension; research dominated</li> <li>• Identifies causal processes that are specific to problem and/or can be generalised</li> <li>• Spiral of cycles, opportunistic, dynamic</li> </ul>	<ul style="list-style-type: none"> <li>• Action components dominant</li> <li>• Change course of events; recognition of multiple influences upon change</li> <li>• Open-ended, process driven</li> </ul>
<u>The research relationship, and the degree of collaboration</u>			
<ul style="list-style-type: none"> <li>• Experimenter/respondents</li> <li>• Outside researcher as expert/research funding</li> <li>• Differentiated roles</li> </ul>	<ul style="list-style-type: none"> <li>• Consultant/researcher, respondent/participants</li> <li>• Client pays an outside consultant – 'they who pay the piper call the tune'</li> <li>• Differentiated roles</li> </ul>	<ul style="list-style-type: none"> <li>• Practitioner or researcher/collaborators</li> <li>• Outside resources and/or internally generated</li> <li>• Merged roles</li> </ul>	<ul style="list-style-type: none"> <li>• Practitioner researcher/co-researchers/co-change agents</li> <li>• Outside resources and/or internally generated</li> <li>• Shared roles</li> </ul>

Adapted from Hart and Bond (1995, p. 55)

This research has elements of all four typologies. However, the organisational typology aligns best with this research. The educative base of this research focused on re-education and training of the foodservice staff to develop new ways of providing healthier choices. The change process was managed by both the foodservice management team and the researcher, thus there was a bias towards the needs of these ‘high power’ stakeholders.

Individuals were dealt with as part of a mixed group within the wider social setting of the university. Participants came from a variety of hierarchical levels within AUT University and the foodservice operation, and were selected by the foodservice manager and the researcher, so membership was selected rather than fluid.

The problem focus of this research was determined by the researcher and the foodservice management team, the most powerful group. The problem focused on the goals of the foodservice operation and AUT University. Success was defined jointly by the researcher and the foodservice management team as the research coordinators.

The type of change intervention included both a top down and a bottom up approach to decide on the content and the implementation of FNS. The problem was solved in terms of management aims to create a healthier eating environment. The problem was also based on participants’ desires and their ideas about how best to create a healthier eating environment.

The aims of improvement and involvement in the foodservice operation were to change the eating environment to make healthier choices easier. Thus, outcomes for this research were tangible. For example, the outcome of increasing the proportion of healthier choices purchased was defined by both the researcher and the foodservice management team.

The cyclic processes were sequential and somewhat formalised. The balance between action and research was dominated by action rather than research.

Finally, in terms of the research relationship, there was a high degree of collaboration involved in this research. Resources were, for the most part, generated internally. Roles were differentiated between the researcher and the foodservice management team but roles were coordinated by the researcher.

### **3.2.3 Alignment of action research and critical theory**

The assumptions and philosophies underpinning action research have much in common with critical theory. Bronner (2002) believes critical theory research forms a new basis for praxis, which is also a key factor of action research. Lefebvre (as cited by Dant, 2003) believes critical theorists are focused on the application of theories, ideas and knowledge to real life situations, which is also a focus of action research. Similar to critical theory research, action research uses cyclical processes of research, action and reflection to bring about long term, sustainable changes within an organisation (Denis & Lehoux, 2009).

Like critical theory, action research is useful for organisational change research (Denis & Lehoux, 2009) because of the positive transformative and systems based focus they both have. Action research creates results relevant to a particular setting and the collaborative nature of action research encourages participation by end users within an organisation (Kemmis, 2008). Involving end users throughout the change process creates relevant and appropriate solutions to problems, which is a key characteristic of successful organisational change (Burke, 2008).

## **3.3 The Role of the Researcher**

The collaborative relationship between an action researcher and their participants throughout the change process dictates a researcher's role in the research. Within this research, the researcher had a dual role as a) the change agent for creating a healthier eating environment and b) the researcher evaluating the success of the changes. This dual role

determined the level of involvement within the research and the foodservice operation. Denis and Lehoux (2009) identifies immersion as one role of the researcher within action research. Immersion occurs when the researcher becomes closely involved with an organisation on a long term basis. Thus, the researcher is integral to the data generation because they are “actors whose actions have immediate effects on their research settings” (Denis & Lehoux, 2009, p. 368) The role taken by the researcher within this research was immersion because of the close involvement she had with the foodservice operation.

The researchers’ dual role created a possible source of tension because the researcher was influencing the foodservice operation concurrent with her efforts to examine and understand it. This tension made it imperative that the researcher remain critically reflexive about her own approach and the FNS programme throughout the research. Reflexivity assisted the researcher to consider how power relations impacted on her interpretation and communication with participants during the research (Reid & Frisby, 2008). Further, reflexivity helped provide a greater level of understanding about the impact of the researchers’ actions and background on the foodservice operation and participants.

The researchers’ role determined the relationship between the researcher and the other stakeholders (research participants) and end users (food outlet customers). By using immersion as her role, the researcher committed to working collaboratively and co-operatively with stakeholders and end users of the programme. As discussed earlier, both critical theory and action research include stakeholders and end users as co-researchers, who help to discover and implement solutions to the proposed problem (Alvesson & Ashcraft, 2009; Grant & Giddings, 2002; Hart & Bond, 1995).

The researchers’ role and her approach to this research was influenced by her past experiences as a New Zealand registered dietitian with experience in foodservice management roles. Therefore, she brought her experience and understanding about



healthier dietary patterns and organisational change from her training and previous jobs. As a change agent, the researcher was the catalyst for change within the foodservice operation and had a responsibility to create a healthier eating environment while meeting the foodservice operations financial and operational objectives. However, the researcher was also responsible for evaluating the success of the change process.

These responsibilities were managed in two ways. First, the researcher developed an open and honest relationship with the foodservice manager that promoted the ready exchange of ideas and discussions about whether proposed changes were worth trying. In these conversations with the foodservice manager, the researcher used local knowledge, as well as her knowledge from previous experiences, to present ideas for future action. These ideas were always grounded within the overarching guiding principles of this research, but were also applicable to this setting.

The second way the researcher negotiated her dual responsibilities was by encouraging involvement from a range of participants and end users, both from the population on campus and the foodservice. Including multiple perspectives in the development and implementation of the FNS programme mitigated the researchers influence somewhat, because incorporating other opinions diluted hers.

### **3.4 Summary of Theoretical Approach**

This chapter discussed critical theory as the research paradigm and action research as the methodology. Both critical theory and action research are implicit in their desire for change and reducing inequalities, focusing on collaborative translational research in real life settings. The research methods discussed in the next chapter align with the assumptions of critical theory and action research.

## **Chapter Four: Research Methods**

This chapter describes the specific data collection and analysis methods used in this research. This section explains the overall study design, the mixed methods triangulation design used and then outlines the stages of the research and the specific methods used to collect and analyse data in each stage of the research.

### **4.1 Study Design**

This research used a longitudinal design, comparing pre and post implementation data to answer the research questions. In this research, where change is tracked over a long period of time (three years), a case-control study design to identify whether changes were due to confounding factors was considered. A key principle in case-control studies is identifying comparable controls that are similar to the case group but that will not be exposed to the programme to ensure limited contamination of data (Salazar, Crosby, & DiClemente, 2006). Early on in the research process, investigation identified that there was no comparable food outlet at AUT University or within New Zealand that could be a control. There were two possible sources of a control; a similar set of food outlets on campus, or another university foodservice operation within New Zealand.

An internal control was not possible because even though AUT managed food outlets were present on both campuses, each campus serviced different students and the AUT-managed food outlets had a different percentage of the market share. One campus was primarily health students, whereas the other campus was primarily business and arts focused. Health students may be more concerned with their lifestyle choices, whereas business and arts students may be less concerned. Another difference was that one campus was in the central business district, so had multiple food outlets within a short walking distance, whereas the other campus had no surrounding food outlets. Finally, the market

share of the AUT managed food outlets was different between the two campuses. On one campus, three out of eight food outlets were AUT-managed food outlets, whereas on the other campus one out of five food outlets were AUT-managed.

Finding a comparable control at another New Zealand university was also problematic. One other New Zealand university manages all of the food outlets on campus in house, whereas others contract out the food outlets. Food outlets managed in-house are more likely to prioritise the service they offer rather than profit. This difference can impact the approach the foodservice operation takes to programmes such as FNS and how they market their products. The university that managed the foodservice in house had multiple niche outlets, which contrasts with the larger and more diverse food outlets at AUT Univeristy.

The lack of control group could be interpreted as a limitation of this research. However, the action research approach taken in this research, with the focus on change within the AUT-managed food outlets, demands that the study design be longitudinal and measures change over time within the natural setting where the change agent is operating. Furthermore, it became clear to the researcher that the complex interactions that determine food and beverage purchasing behaviour such as the food outlets nearby and customer group make each setting unique and therefore not truly comparable. Therefore, a longitudinal study design, informed by both qualitative and quantitative data was the most appropriate for this research.

## **4.2 Mixed Methods**

A mixed methods research design is more effective when investigating a research problem with multiple levels of interactions (Creswell, 2003). Combining qualitative and quantitative data helps to provide greater depth of meaning and balances out the inherent

strengths and weaknesses within each type of data (Creswell, Plano Clark, Gutmann, & Hanson, 2003).

Creswell and Plano Clark (2007) identify four mixed methods research designs that combine qualitative and quantitative data in different ways to reach conclusions about the research questions. Triangulation, the most well known type of mixed methods, combines qualitative and quantitative results about the same topic at the end of the research process to interpret findings. Embedded research designs, use either qualitative or quantitative data as the main data set, with the other being secondary and used to support or validate findings from the main data set. Similar to the triangulation design, interpretation of findings happens at the end of the research process. The third design, explanatory, contrasts with triangulation and embedded designs because it has two distinct and separate stages; one for each type of data set. In explanatory design, there is an initial quantitative data collection and analysis stage and then qualitative data is collected and analysed separately to support and validate quantitative findings. The final design, exploratory, is similar to explanatory in that there are two distinct stages of data collection and analysis; one qualitative, one quantitative. The difference with exploratory design is that the emphasis is on the qualitative data set and the quantitative data set supports and validates qualitative findings.

According to Creswell and Plano Clark (2007), there are three research characteristics that determine which mixed methods design is used. These characteristics are whether 1) the timing of the different types of data collection and analysis is sequential or concurrent; 2) the quantitative or qualitative data is emphasised at the expense of the other or whether they are considered equally, and 3) the data sets are merged or whether one set of data informs the other.

The structure of the research methods used in this thesis are consistent with Creswell and Plano Clark's (2007) triangulation design. The timing of the different types of

data collection was concurrent rather than sequential. The emphasis during interpretation was on both qualitative and quantitative data with both types of data equally contributing to findings. Data were merged at the interpretation stage because each set of data contributed different elements to answer the research questions.

The mixed method design used in this research is represented in Figure 4.1. This figure outlines the three stages of the research process: needs assessment, development and implementation, and evaluation. Findings from the needs assessment and development and implementation stages contributed to the evaluation stage. In addition, Figure 4.1 links the methods of data collection used within each stage.

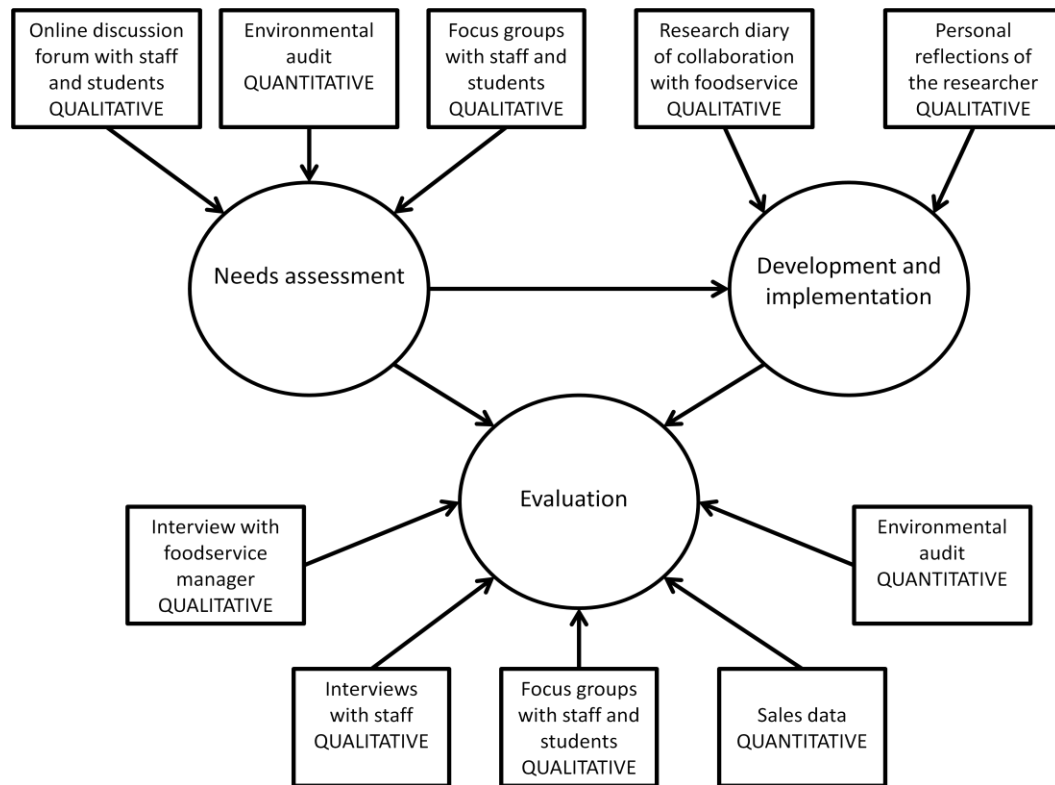


Figure 4.1 Triangulation design

### 4.3 Description of Research Stages

There were three stages in this research: 1) needs assessment; 2) programme development and implementation; and 3) evaluation. For an overview of key milestones and dates in the research process see Figure 1.1 (Chapter 1, section 1.6). The different data collection and analysis tools used in each stage of the research are shown in Table 4.1.

Figure 4.2 outlines the interactions between the stages diagrammatically, and includes a fourth stage (future planning), that was not explicitly included in the research findings chapters, but is an important part of the action research process. The cyclic process of planning, implementation, evaluation and future planning depicted in figure 4.2 represents the learning cycles within the action research process. The fourth stage of future planning feeds directly in to a new planning stage and a new learning cycle and is discussed explicitly in Chapter eight, section 8.8

*Table 4.1: Outline of activities and sources of data for each stage of the research*

Activities	Sources of data
<u>Stage 1: Needs assessment</u>	
a) Created advisory group	Qualitative analysis of focus groups and online discussion forum
b) Completed focus groups	Quantitative data from environmental audit
c) Completed online discussion forum	
d) Completed baseline environmental audit	
<u>Stage 2: Development and implementation</u>	
a) Consulted with key stakeholders	Qualitative analysis of research diary detailing collaboration with foodservice staff
b) Social marketing campaign developed	Qualitative analysis of personal reflections of the researcher
c) Developed actions to implement in the AUT-managed food outlets that met the needs outlined in the needs assessment	
d) Completed activities to ensure food outlets were able to implement actions	
e) Implemented Feed Your Need to Succeed	
f) Implemented social marketing campaign	
g) Continued involvement to ensure actions were being implemented appropriately	
<u>Stage 3: Programme evaluation</u>	
a) Completed focus groups with AUT staff and students	Qualitative analysis of focus groups and interviews with AUT University staff and students
b) Completed interviews with AUT staff and foodservice manager	Qualitative analysis of interview with the foodservice manager
c) Collected and analysed electronic sales reports	Quantitative data from environmental audit
d) Completed endpoint environmental audit	Quantitative analysis of sales reports

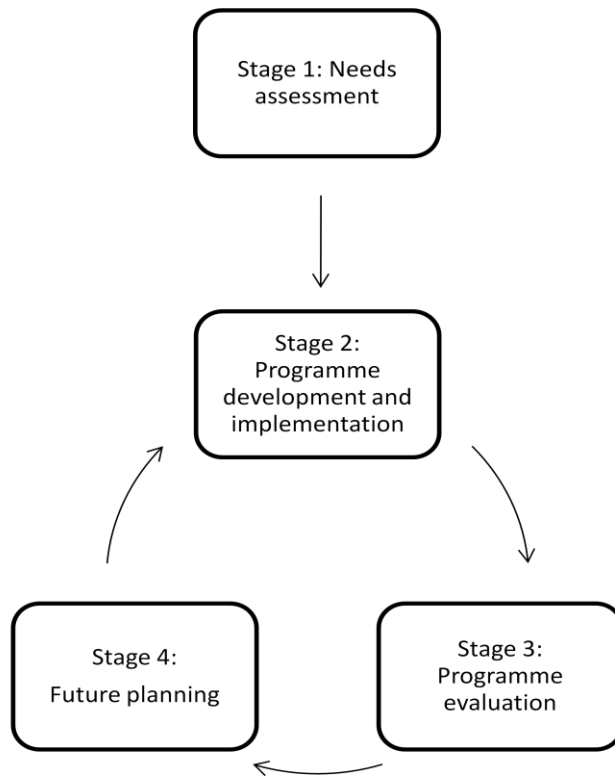


Figure 4.2 Stages in this research

#### **4.4 Data Collection and Analysis**

This section presents the data collection and analysis methods used in each stage of this research. For each section, there will be a description of the data collection method followed by a justification for its use. Next, the analysis method is explained and supported by examples from this research.

##### **4.4.1 Ethical approval**

Ethical approval to consult with staff and students for this research was obtained (AUTECH 08/279 – see Appendix A). Permission to work with the foodservice operation and staff was obtained from the manager of Commercial Services, the Foodservice Manager and the General Manager Finance.



#### **4.4.2 Needs assessment stage**

The needs assessment stage detailed staff and students perceptions of the eating environment and the extent to which the baseline environment promoted healthier choices. The results from the needs assessment informed the development and implementation of Feed Your Need to Succeed (FNS) actions.

##### ***4.4.2.1 Focus groups***

Focus groups allowed people to contribute their thoughts and ideas about the eating environment on campus and priority areas for change, in a non-threatening environment. In focus groups, multiple ideas can be put forward because there is no need to reach a consensus (Krueger, 1994). In the focus groups the researcher followed up on any ideas that seemed particularly relevant or insightful. Through focus groups the researcher began to identify and understand perceptions about the eating environment on campus for staff and students.

The thoughts and ideas discussed in the focus groups informed the development of FNS to ensure the needs of staff and students were considered.

##### ***4.4.2.1.1 Recruitment and participation***

Participants in the focus groups were a purposively selected convenience sample of AUT staff that represented a community or group on campus, such as student support organisations and student union representatives. The only inclusion criterion was that ideally participants represented a group of people however, people who were not part of a larger group were also encouraged to participate. The four staff groups represented were: AUT Council, Health and Safety committee, Asian Staff Network, Liason librarians. The five student groups represented were: Student Union, Student Mentors, Health, Counselling

and Wellbeing service, International Student Support Network and the Asian Student Support Network. Each group was represented by a single participant.

Invitations to participate in focus groups were emailed to people recommended by the FNS advisory group (see chapter five, section 5.1 for more detail about the FNS advisory group). Additional advertisements were placed on AUT electronic noticeboards that go to all staff and students and in the food outlets on campus.

Three focus groups were completed between April 22<sup>nd</sup> and May 5<sup>th</sup> 2009. One focus group was at Campus 1 and the other two were at Campus 2. Each focus group had three participants, making a total of nine participants. There were three male and six female participants. Two participants were Asian, two participants were South Asian and the other six participants were New Zealand European. Ideally, Māori and Pacific participants would have been included in the focus groups because these two groups represent 21% of students on campus (AUT University, 2010). The researcher attempted to recruit Māori and Pacific participants, but both participants could not attend the scheduled focus group due to unexpected work commitments. Attempts were made to meet again with these participants, but again, these meetings were cancelled because of unexpected work commitments.

#### *4.4.2.1.2 Discussion areas*

Topics of discussion in the focus groups revolved around barriers and motivators of healthier food and beverage choices on campus, priority action areas and useful resources. Each focus group started with a short presentation from the researcher about the research aims and focus group processes.

Table 4.2 outlines the five key discussion areas and that prompts that were used to initiate discussion.

*Table 4.2 Discussion areas and prompts in the needs assessment focus groups*

Discussion area	Prompts
Current situation	What are your thoughts on the current supply of food on campus? What is working well at present that you would like to see continue?
Barriers to making healthier choices	What barriers do you think stops people from making healthier choices?
Motivators for making healthier choices	What do you think would motivate people to choose healthier options? If this was your project what would you like to see changed on campus?
Ways of communicating about and promoting healthier choices	What methods of communication might be effective at encouraging people to make healthier choices? What might be effective ways to promote healthier choices at a) point of purchase and b) around campus?
Beneficial information and resources	What information and resources about healthier choices might be useful for staff and students?

Beyond these specific prompts, the researcher guided discussions to determine how an idea might be tailored to meet the needs of AUT staff and students. For example, one participant said:

*P: I think you need to look at snack options, I think as well, because quite often I'll be hungry and just want a snack, but you go to get something and it's just biscuits or chocolate bars. You need like a small morning or afternoon snack*

*R: What sort of things would you be interested in?*

*(P= participant, R= researcher)*

#### *4.4.2.1.3 Data analysis*

Focus groups were transcribed verbatim, and thematically categorised and analysed to elucidate themes and discussion points. Miles and Huberman (2009) outline three processes in data analysis: data reduction, data display and conclusion drawing. In this research, data reduction was performed by assigning codes identifying participants' perspectives about the eating environment on campus as the transcripts were read. Relevant sentences were circled on the page and a code was assigned representing what those sentences described. By the end of the first read of the transcripts, 20 codes were identified. Transcripts were then reread to ensure all relevant information had been identified.

In the data display process, data were transferred to a Microsoft Word 2007™ file to allow for the comparison and clarification of main ideas to facilitate a more in-depth analysis (Jackson, 2009). Table 4.3 presents an example of the data display process.

*Table 4.3 Example of data display with memos*

Quote	Page & Line	Memo
<u>FG1</u> nothing is ever available during weekends and students are really frustrated at times. So all the way they have to go to [name of outlet off campus] or to [name of outlet off campus] to get some food if they are studying late at night. And even during like, their examination time we're open until 11pm but the cafe will be closed I agree with your point in terms of availability... we need to look at having food available for a much longer period and on weekends cos there's a lot of short courses particularly during semester break there's no choice	P2 L20-23  P3 L6-8  P4 L31	These comments all relate to availability after hours – clearly it is an issue as it also comes up in other focus groups, though not on the online discussion forum interestingly enough.

To assist with the comparison and clarification of the main ideas, the researcher added memos in the data display stage to make explicit the interpretation of the transcripts (see Table 4.3). The process of memoing helped to clarify the researcher's thinking and

allowed reflexivity about emerging themes and ideas (Hesse-Biber, 2010). The primary research supervisor was given a copy of the coded files and the transcripts to review while the researcher began the next stage of data analysis; conclusion drawing.

Conclusion drawing requires the researcher to take a step back to identify patterns and relationships between different codes and reconstruct the data into themes (Jackson, 2009). An example from this research was the integration of the ‘Unawareness of what’s available’ code into the ‘Knowledge and information’ theme. In the conclusion drawing phase the definition of the ‘Knowledge and information’ theme was changed to integrate comments from the ‘Unawareness of what’s available’ code (see example Table 4.4). This integration allowed the researcher to gain a better understanding of the current information available and how it might be improved.

*Table 4.4 Example of redefining themes in the conclusion drawing phase*

Code full length	Code abbreviation	Definition of code
<u>Original code definition</u>		
Unawareness of what’s available	UA	Comments about whether people know what food options are available on campus and whether healthier choices are easy to determine
Knowledge and information	KI	Comments about what people want to know or think people want to know about the service on campus and healthier choices
<u>New theme definition</u>		
Knowledge and information	KI	What information is currently available and what information people would like in the future about the programme and healthier choices

#### ***4.4.2.2 Online discussion forum***

The online discussion forum on the FNS AUT Online page enabled participants to contribute anonymous thoughts and ideas about the eating environment on campus and

priority areas for change. AUT Online is the online teaching environment used at AUT University, where students access information and resources about their classes. The FNS AUT Online page was available to all staff and students; however the discussion forum was predominantly targeted towards students. On the discussion forum, participants could respond to previous posts to create interactive discussions and the researcher could probe for further detail as required. The ‘conversations’ were asynchronous; therefore responses to probing questions by the researcher were not as immediate as the focus groups. However, the main strength of the online discussion forum was that it provided an opportunity to comment that was less time consuming and more anonymous than the focus groups. This gave participants, uncomfortable or unable to participate in focus groups, the opportunity to contribute in a different way.

#### *4.4.2.2.1 Recruitment*

Staff and students were invited to contribute to the online discussion forum by announcements on the university physical and electronic noticeboards. In addition, emails were sent out to the FNS advisory group to forward on to their contacts and, if they were lecturers, to pass on to their class groups. Finally, the researcher spoke at several lectures to introduce the research and encourage people to contribute.

The online discussion forum was available from July - September 2009 and logged 141 hits and 43 comments. The difference between hits and comments might be because people agreed with what had already been said or did not have strong opinions about answers to the questions. There were some comments indicating that participants thought they repeated salient points. For example, in the question about barriers to healthier choices, the first person said cost was the biggest barrier and another six people (half of the remaining contributors) agreed.

No demographic information was recorded for online discussion forum contributions. It is therefore difficult to evaluate whether a representative sample was obtained. However, the following statements suggest that the online discussion forum received contributions from both staff and students from both campuses.

Comment from staff member:

*“It needs to be well marketed to staff and students (AUT online notice OR AUT noticeboard that pops up every time you start your computer (staff) OR when communicated to staff, those staff who may be interested/passionate about health could either add an announcement to their course on AUT Online – or mention it in class”*

Comment from student:

*“I don’t even bother to line up for sausage sizzle as I don’t like sausages – not such a healthy option. Friends have had this same discussion. We are all health students and bypass the free sausages”*

Comment from Campus 1

*“Choice of outlets is good although need to have a better geographic spread – no food outlet close to [building on Campus 1]”*

Comment from Campus 2

*“Most people in my classes all go to [food outlet on Campus 2] with the same comment... it’s cheaper than downstairs”*

#### *4.4.2.2.2 Discussion areas*

Topics of discussion on the online discussion forum were similar to the focus groups. These topics were incorporating barriers and motivators to making healthier choices on campus, priority actions and useful resources.

There were six threads available on the online discussion forum. At the top of each thread, an open-ended prompt invited comments. The first thread explored what services participants appreciated and their views of the current situation on campus by asking, ‘What do you think is being done well at the moment?’ The second thread invited participants to talk about barriers to making healthier choices on campus with the prompt, ‘What are the barriers to healthier food choices on campus?’ The next thread encouraged comments about ways to promote healthier choices with the prompt, ‘What are ideas for ways to promote healthier food choices? The fourth thread prompted discussion about priority areas for change by asking, ‘What would you change first? The fifth thread identified the information people wanted about healthier choices on campus with the prompt, ‘What useful information can we provide you with? The sixth thread simply asked, ‘Any other comments or ideas?’

#### *4.4.2.2.3 Data analysis*

Data analysis started with the researcher transferring all comments, in the order they were entered into one Microsoft Word 2007™ document. This was then read by the researcher and the process of data reduction used to analyse the focus groups was repeated (see section 4.4.2.1.3). Contributions from the online discussion forum were added to the end of the appropriate codes from the focus group analysis in the data display step. No new codes were identified from the online discussion forum because the codes identified by the focus group analysis were appropriate for the online discussion forum analysis. The



researcher then continued through the process of memoing and drawing conclusions to create themes as explained in section 4.4.2.1.3.

#### ***4.4.2.3 Observational environmental audit***

An audit tool, called Nutrition Environment Measures Study in Restaurants (NEMS-R), measured the healthiness of the eating environment on campus (see Appendix B). The NEMS-R measures the extent to which an eating environment promotes healthier food and beverage choices through their menu and promotions. NEMS-R was used to assess the eating environment at baseline before FNS launched and at the end point of this research (Chapter seven, section 7.1). This audit tool was developed by researchers at the Rollins School of Public Health, Emory University (Saelens, Glanz, Sallis, & Frank, 2007). The researcher completed an online training course, provided by the creators of the NEMS-R tools, about how to use and adapt the NEMS-R tool.

The NEMS-R audit gathers information about whether signage and promotions encourage healthier eating practices. For example, “Do signs/table tents highlight **healthy menu options?**” It also records what proportion of food and beverage choices are identified as healthier choices and whether healthier choices, such as plain water or fruit, are available. Finally the NEMS-R looks at barriers, such as whether outlets encourage larger portion sizes and whether pricing encourages buying more food or beverages.

##### ***4.4.2.3.1 Adaptation of the audit tool***

After completing the training, the researcher adapted the audit tool to better suit the New Zealand university eating environment (Appendix C). This was done with permission from the developers of the audit tool. Questions were removed, adapted and some questions were added to provide information relevant to the needs of this research. Table 4.5 outlines the changes and justification for each change.

*Table 4.5 Changes made to Nutrition Environment Measures Study - Restaurant audit and justification*

Change	Justification
<u>Questions removed</u>	
Where information was sourced from e.g site visit, website visit	All information would be sourced from a site visit therefore it was not necessary to establish what information came from what source.
Drive through service and parking	These questions were not necessary for an audit of on campus food outlets.
Whether main dish salads were available.	The food outlets on campus were not likely to have main dish salads available because there was no a la carte menu. Therefore this question was removed.
Availability of chips and baked chips.	This question was removed because in the adapted audit information about chips and other snacks was investigated in other questions.
Section about children's menu.	This was not necessary for an audit of university food outlets.
Whether there was a low carbohydrate promotion available.	In the original audit, this question was included because low carbohydrate menu promotions are often misleading. Low carbohydrate promotions are not usual in New Zealand therefore this question was removed.
Whether there is a charge for sharing a meal.	None of the food outlets on campus offer a table service therefore it is unlikely that a food outlet would charge extra for sharing a meal.
<u>Questions adapted or moved</u>	
Adjusted hours of operation question to reflect the university schedule. Added separate information for semester time and semester break.	Restaurants are generally open more hours than the food outlets on campus. One of the discussion points in the focus groups and online discussion forum was about opening hours in semester time and weekend so it was important to gain information about the difference in opening hours in the audit.
Adapted question about the availability of wholemeal and wholegrain bread.	In the university food outlets bread is only offered in the form of sandwiches or rolls rather than as an entree or a side as happens in some restaurants. The question was changed to

Change	Justification
	reflect this by asking whether wholemeal sandwiches were available and how many. This question was moved so it was part of the review about how many main dishes there were and whether healthier choices were identified.
Moved question about low fat salad dressings to this section as part of the question about whether salads options were available.	In the original audit, the question about low fat dressing was with the question about whether main dish salads were available. As discussed above, the question about the availability of a salad bar was considered the most appropriate question for the type of service the university food outlets offered. Therefore, the question about low fat dressing was moved so it was just after the question about the salad bar.
Adapted question “Menu notations that encourage healthier choices” to ask “Point of choice labelling encouraging healthy requests is prominent”.	No food outlets offered a paper menu so asking a question about menu notations was not appropriate. Therefore the question was changed because food outlets might have had point of choice labelling encouraging healthy requests.
<u>Questions that were added</u> Added specific questions about type of menu, foods and beverages were available	This change allowed for a more specific comparison and discussion about what range of food and beverages were available in the food outlets.
Added in questions about how many types of snacks were available and whether any were identified as healthier choices.	Snacks make up a large majority of the items available in the food outlets on campus. Snacks are often a source of energy dense and nutrient poor options therefore it was important to identify what was available and the quality of what was available in the food outlets.
Added question about placement of healthier choices to identify whether they were easily accessible to self serve customers.	Many of the food outlets on campus have self service, therefore, it was important to identify whether healthier choices were easy for customers to access themselves.

#### *4.4.2.3.2 Pre-testing of the audit tool*

After adapting the audit tool, the researcher wrote an audit protocol clarifying how to answer audit questions and giving examples of appropriate promotions to include in the audit responses (see Appendix D for audit protocol). This protocol was based on the original NEMS-R protocol (Glanz, Clawson, Young, & Carvalho, 2006). Where audit questions had not changed the protocol instructions were copied exactly.

After the protocol was written, the researcher performed a pre-test audit in two food outlets offering different types of food and beverages to ensure that questions were relevant and appropriate for the setting. The pre-test purpose was to identify additional types of promotions, barriers or facilitators that needed to be itemised on the audit. Other aspects assessed in the pre-test audit were whether any formatting needing changing to aid clarity and the appropriateness of the protocol.

The only changes that occurred after the pre-test were minor formatting changes, such as spelling mistakes and lining up questions with their respective answer circles. The questions were clear and specific; any questions that were not self-explanatory were clarified by the audit protocol. All questions were relevant and appropriate and allowed for the inclusion of all the main ways that the eating environments promoted or discouraged healthier food and beverage choices.

#### *4.4.2.3.3 Data collection*

Audits were conducted in all food outlets on campus by the researcher in March 2010, prior to the FNS launch. The audits were completed on two consecutive days, one day for each campus, between 10am and midday. This time was chosen because food outlets would have their full range on offer and there was minimal chance that items would already have been sold out.

#### *4.4.2.3.4 Data analysis*

Data from each food outlet were entered into a Microsoft Excel 2007™ worksheet immediately after each audit took place. Descriptive statistics from the audit (i.e. percentages, median, mean and ranges) identified characteristics of the eating environment at baseline. Results were divided by the type of food outlet: AUT-managed food outlet or contracted food outlet.

### **4.4.3 Development and implementation stages**

The development and implementation stage of this research was action dominated; therefore the data were primarily documentation of the change process. The sources of data collected and analysed were the research activity diary outlining the collaboration between the researcher and the foodservice staff and personal reflections of the researcher.

#### *4.4.3.1 Research activity diary*

The research activity diary was the main source of data collection and analysis in the development and implementation stage and documented collaboration with the foodservice staff, foodservice management team, and foodservice suppliers. A research activity diary allows for transparent reasoning and provides an accurate and detailed account of the activities and experiences as they happen (Silverman, 2005). Every month, emails, conversations and activities were entered and cross referenced to any relevant documents such as meeting minutes, reports or reflections by the researcher. The research diary provided detailed information about the process of change experienced by the foodservice operation and the researcher.

#### *4.4.3.1.1 Data analysis*

Soon after FNS implementation, the researcher and the foodservice manager met to discuss and identify critical success factors for the development and implementation stage. Before this meeting, the researcher identified factors thought critical to the success of the implementation based on the research activity diary. While reading through the activity diaries to analyse them, the researcher posed herself the following questions: 1) What were significant amounts of time spent on? 2) What directly influenced the development and implementation of the actions? 3) What were the predominant characteristics of the collaboration between the researcher and the foodservice management team, staff and suppliers? The researcher asked the foodservice manager to ask himself these questions as well to provide another perspective. When deciding on critical success factors, the researcher and the foodservice manager discussed similarities and differences between their answers to the questions. These discussions resulted in the mutual identification of three critical success factors.

Additional information extracted from the research diary included the frequency and medium of communication between the researcher and the foodservice management team.

#### *4.4.3.2 Personal reflections of the researcher*

Within an action research process, the researcher's records are themselves a source of data because the interactions they have with the organisation effects what happens within the research (Burke, 2008). Similarly, as the change agent, the researcher had an integral part in the development and implementation of FNS.

Personal reflections were made by using 'emails to self', an approach recommended by Sankaran (1997). These reflections contributed to the development and implementation of FNS actions by making transparent the critique of possible actions and how to develop

and implement these actions to maximise chance of success. Furthermore, the ‘emails to self’ documented the researcher’s perspective on the change process and what elements might be applicable to other foodservice operations.

#### *4.4.3.2.1 Data analysis*

The ‘emails to self’ were used as informal short learning cycles in the action research process. The emails were analysed as they were written (Pelias, 2011), with the results reflected in the actions and identification of the critical success factors. The researcher moved through cycles of posing critically reflexive questions and possible answers to develop further understanding of the complexity inherent in the development and implementation process. The emerging analysis was used to inform the next learning cycle. The answers discovered in the ‘emails to self’ provided a transparent record of the researchers’ actions as a change agent. The transparent thinking process outlined in the ‘emails to self’, helped identify the value of the collaboration with the foodservice team as actions were critiqued, adapted and then implemented.

#### **4.4.4 Evaluation stage**

In the evaluation stage, sales reports and the observational environmental audit were used to determine the effectiveness of FNS. Focus group discussions and semi-structured interviews were employed to provide information about the appropriateness of FNS.

#### *4.4.4.1 Sales reports*

Descriptive statistics, sourced from three years (2008, 2009 and 2010) of sales reports from the AUT-managed food outlets, provided longitudinal data about availability of healthier choices and how creating a healthier eating environment impacted purchasing patterns. Sales reports from 2008 were used as pre-implementation / baseline information

because no changes had been made to the foodservice in 2008. Reports from 2009 and 2010 were used to measure change as FNS actions were implemented. Longitudinal comparisons between years allowed for usual demand fluctuations (for example, semester break and seasonal purchasing). Two years of vending machine sales reports (2009 and 2010) were used to identify changes in the availability of healthier choices from the vending machines.

In the evaluation stage of this research, sales data were combined with the information from the thematic analysis of the focus groups and semi-structured interviews. This provided a greater understanding of the programme impact and possible reasons for this level of impact.

#### *4.4.4.1.1 Data collection*

Every sale in the AUT-managed food outlets is recorded by individual barcodes using a point of sale software system (Quest Point of Sale Systems – Advance Equipment Supplies, NZ). Records detailing quantity purchased, revenue and food cost, can be accessed retrospectively according to product line, category (for example cold beverages) or food outlet.

Reports from three of the four AUT-managed food outlets, detailing the quantity purchased of every product line from January 1 – December 31, for each year of analysis, were provided to the researcher at the beginning of 2011. The reports were separated by food outlet and listed each product by unique code, how many of each product were sold, and the food cost and profit for that product for the calendar year. The fourth AUT-managed food outlet closed at the end of 2010 before the reports could be generated (see Chapter seven section 7.2.5 for a discussion about reasons for closure). The cash register from the closed food outlet was shifted to another location and the retrospective sales information was lost. Complete reports for the 2009 and 2010 calendar year from this food



outlet were located. However, complete data were not available for 2008. The foodservice manager and the researcher identified any sales reports they had saved or emailed pertaining to sales in the closed food outlet in 2008. When all the information was collated, there was only 2.7% of the sales data missing from the closed food outlet from one particular category of food (i.e. prepared bread products).

A full calendar year was used as the analysis period because actions were not all implemented at once. For example, healthier heated savouries were introduced in June 2009, and the social marketing campaign (i.e. posters and everyday and sometimes labels) was implemented in April 2010. The staged implementation was due to the action research approach whereby the foodservice operation started to change as soon as the researcher became involved (beginning 2009). Although the social marketing campaign was only launched in April 2010, the researchers' work with the foodservice staff developing the nutritional criteria before the launch may have influenced what foods were made and how they were promoted. Furthermore, even though the qualitative evaluation was undertaken in October 2010, FNS actions were still active after this time.

The computerised sales reports from the vending machines were provided in December 2010 and August 2011 by the vending company holding the contract for food and beverage vending on campus.

#### *4.4.4.1.2 Data analysis*

The analysis identified any changes in the availability or purchase of healthier choices and the impact these changes had on revenue and gross profit. Change is expressed in terms of absolute change rather than adjusted change because the data set collected represents all possible data points rather than a sub set of the data.

For each product line, the reports detailed the ‘price look-up’ code, description, quantity sold, food cost and revenue. The food cost is the cost the food outlets pay to buy the raw ingredients or prepared products. In Microsoft Excel 2007™, every product line was given a category identifying the food or beverage grouping (i.e. beverages, snacks, prepared bread products, heated savouries and other) and a classification code describing its’ level of healthiness (i.e. ‘everyday’, ‘sometimes’, ‘rarely’ and ‘undefined’). The classification codes were defined by the FNS Food and Beverage Classification System (Chapter six, section 6.1.1). These codes and categories provided the basic level of analysis used. In each section of the analysis, overall totals and/or percentages were presented first, followed by more in depth analysis of changes using the codes and categories. All sets of analyses investigated change between 2008 and 2009, 2009 and 2010 and 2008 and 2010.

Results from the analysis were presented for all food outlets combined rather than individual food outlets to maintain commercial sensitivity. Similarly, the revenue and gross profit analysis was presented using percentages rather than raw data. For this analysis healthier choices were defined as ‘everyday’ and ‘sometimes’ choices.

The availability and the quantity of healthier choices purchased were analysed by identifying the percentage and number of product lines within each classification code. Results for all food outlets were added together to provide an overall total for each healthiness code per year. This information was further divided according to beverages and the four food categories (i.e. snacks, heated savouries, prepared bread products, other).

The analysis detailing the impact of creating a healthier eating environment on revenue and profit was completed in a similar way. Gross profit was calculated by subtracting the total food cost from the total revenue. Change in the overall revenue and gross profit for the combined AUT-managed food outlets was expressed as a percentage change between 2008 and 2009, and 2009 and 2010. Then, as with the other analyses in this

section, the percentage of revenue and gross profit from each category per year and each classification code per year was presented.

To identify gross profit margins according to category and classification code, a mixed-effect linear model was fitted to estimate the effect of the category and classification code on the yearly profit for this product. The model was adjusted for repeated measures. The profit margin for each product was calculated by subtracting the yearly cost of the product from total sales of this product. The data were log transformed to reach normal distribution of the residuals. Analysis was performed with lme4 package R 2.19 (cran.r-project.org). The final results were back transformed and interpreted in multiplicative terms. Confidence intervals were adjusted for multiple comparison by Tukey adjustment.

#### ***4.4.4.2 Observational environmental audit***

As explained in section 4.4.2.3, an audit tool called Nutrition Environment Measures Study in Restaurants (NEMS-R) measured the extent to which a food outlet promoted healthier choices through their menu and promotions. Results from the audits were used in the evaluation stage of this research to identify whether a healthier eating environment was created.

##### ***4.4.4.2.1 Data collection***

The end point audits were completed on two consecutive days between 10am and midday in the last week of the academic year before students went on study leave. The audit tool and audit protocol used in the end point of this research project were the same as that used in the needs assessment stage (section 4.4.2.3).

#### *4.4.4.2.2 Data analysis*

The results of the end-point observational audit were analysed in the same way as the results from the needs assessment audit (section 4.4.2.3.4). Descriptive statistics from the evaluation audit were compared to the needs assessment audit to identify whether change had occurred in the food outlets on campus.

#### *4.4.4.3 Focus groups*

In the evaluation stage, two sets of focus groups, for staff and for students, were used to discover the appropriateness of FNS and to establish future directions of FNS at AUT University. An online discussion forum was created and advertised in the evaluation stage, but there were only two comments posted. Therefore, another source of student participation was required. It was not clear why there was limited contribution to the online discussion forum in the evaluation stage. One possibility was inappropriate timing because the evaluation online discussion forum was advertised close to end of year exams and students were busy studying. Instead of an online discussion forum, focus groups were arranged with students to discover their attitudes towards FNS.

##### *4.4.4.3.1 Recruitment*

Staff member focus groups were held with the same participants consulted in the needs assessment. If people left their jobs within the course of this research, people capable of representing the relevant community were recruited. A list of who participants represented is in Table 4.6.

Some focus group participants were unable to attend scheduled focus groups because of sickness or unexpected work commitments. These individuals were followed up

and asked if they would be happy to participate in a semi structured interview instead (see section 4.4.2.3.4).

*Table 4.6 Groups on campus represented by participants in focus groups and semi structured interviews*

Group	Number of participants in focus groups and semi-structured interviews
<u>Staff representation groups</u>	
AUT Council	1
Health and Safety committee members	2
<u>Student representation groups</u>	
Student union	3
Student mentors	1
Student health counselling and wellbeing service	1
International students support network	1
Asian student support network	2

The second set of focus groups were with students on campus. Students were approached in all campus food outlets by the researcher and asked if they wished to participate in a short focus group to discuss the food on campus. The researcher approached students over a two hour period on two consecutive days.

#### *4.4.4.3.2 Discussion areas*

The first and second focus groups, with staff and students respectively, had the same discussion areas to identify the appropriateness of the FNS actions. Appropriateness was defined as the extent to which FNS actions met the needs expressed in the needs assessment and New Zealand public health nutrition documents. The only difference was that staff participants were sent a summary of the discussion from the needs assessment consultation to remind participants of what had been said previously and to introduce any new participants to what had been said before.

Prior to both sets of focus groups, a short presentation showing the different FNS actions was provided to the participants. Focus group discussions covered whether FNS actions were appropriate and how they could be adapted to make them more successful in the future. The specific prompts were: 1) Which actions have you noticed? 2) Which actions do you think are more effective at encouraging and motivating healthier choices? 3) Do you think this programme meets the needs of people on campus? Why or why not? 4) How can I improve communication on campus? and 5) What areas do I need to focus on in the future?

#### *4.4.4.3.3 Data analysis*

Recorded transcripts from the focus groups were transcribed verbatim and then analysed using the same method used in the needs assessment. See section 4.4.2.1.3.

#### *4.4.4.4 Semi structured interviews*

In semi-structured interviews, participants are encouraged to explore their thoughts and discuss ideas more than they would in a structured interview. The interviewer uses prompts to guide the conversation rather than a set list of questions. In a semi-structured interview, the interviewer asks additional questions for clarification and explanation as new ideas or different angles are presented by the participant (Hesse-Biber & Leavy, 2006). Semi-structured interviews were chosen because they allow for the exploration of ideas and information that the researcher may not have thought of. This exploration of ideas creates a more in-depth analysis of the effectiveness and appropriateness of FNS.

Two series of semi-structured interviews were carried out in the evaluation stage of this research; one with participants unable to attend the evaluation focus groups and the other was with the foodservice manager. The purpose of these interviews was to evaluate the appropriateness of FNS and the change process that occurred in the food outlets.

Appropriateness was evaluated from two perspectives: staff and students on campus and the foodservice operation. Appropriateness from the foodservice operation's perspective, was defined as the implementation of a programme that met operational and financial objectives.

#### *4.4.4.4.1 Recruitment*

Participants who were unable to attend evaluation focus groups were contacted by email and asked if they would be available for a one on one interview. Participants were sent the summary of the needs assessment findings and a summary of the discussion in the evaluation focus groups split into three categories: 'Positives about FNS so far', 'Remaining issues' and 'Future endeavours'.

A semi-structured interview with the foodservice manager provided a greater understanding of his perspective throughout the change process. The interview occurred after the evaluation focus groups were transcribed and analysed to allow for the inclusion of participant views and comments. Ideally more than one member of the foodservice management team would have been interviewed. However, only the foodservice manager was available for interview. One of the members of the management team resigned before the interviews were scheduled and was unable to be contacted for personal reasons. Another key member of the management team declined to be interviewed for reasons they did not state. This was a limitation of this section of the evaluation.

#### *4.4.4.4.2 Discussion topics*

The staff semi-structured interviews also started with a short presentation outlining FNS actions. Then, participants were shown the summary from the evaluation focus groups and asked to talk about what they agreed/disagreed with and whether they would like to add anything. After this discussion, the same prompts were asked that had been asked in the

evaluation focus groups namely: 1) Which actions have you noticed? 2) Which actions do you think are more effective at encouraging and motivating healthier choices? 3) Do you think this programme meets the needs of people on campus? Why or why not? 4) How can I improve communication on campus? and 5) What areas do I need to focus on in the future?

The interview with the foodservice manager contained nine prompts in total. Three prompts were based around strengths, weaknesses, future directions and lessons learnt throughout the process. The prompts were: 1) Which actions do you think are more effective at encouraging and motivating healthier choices? 2) Do you think this programme meets the needs of people on campus? Why or why not? and 3) What areas do I need to focus on in the future?

Three additional prompts explored the foodservice manager's perspective about the change process and the implementation of FNS. Specific prompts were: 1) How would you do things differently next time? 2) To what extent do you think the actions were implemented in the different food outlets? and 3) How appropriate do you think the changes made were for your customers?

Finally, three prompts asked about the change process the foodservice experienced, namely; 1) To what extent do you think the researchers' consultation with customers contributed to the programme? 2) How effectively do you think the researcher communicated with you throughout the change process? 3) What contributions do you think the researcher made to the project as a change agent?

#### *4.4.4.4.3 Data analysis*

Recorded transcripts from the interviews were transcribed verbatim and then analysed using the same method as that used for the focus groups. See section 4.4.2.1.3.



#### **4.5 Establishing Credibility and Validity of Research Methods**

The methods to establish credibility and validity of the data collection and analysis methods outlined in the previous section are aligned with the action research methodology used in this research. Action researchers, Greenwood and Levin (1998) define credibility as “the arguments and the processes necessary for having someone trust research results” (p. 80). Similarly, Hesse-Biber (2010) refers to validity in mixed methods research, as how well the research links the research questions with the findings and whether appropriate methods were used.

In most stages of this research, qualitative and quantitative data were triangulated to create an in depth analysis of the process and outcomes of creating a healthier eating environment. When doing mixed methods research, it is problematic to use a strictly quantitative definition of validity when qualitative data have the same or greater emphasis as quantitative. (Hesse-Biber, 2010). Therefore, explicit criteria must be found to establish quality and validity for both the qualitative and quantitative components of this research (Giddings & Grant, 2009).

Within action research, findings about the process are as important as findings about the outcomes. Therefore, the credibility and validity of an action research project relate to both the internal validity (i.e. whether actions are accepted by the local community) and the external validity (i.e. whether outsiders who were not involved accept the results). Herr and Anderson (2005) identify five Quality/Validity criteria (Table 4.7) that are implicitly related to the goals of action research and consider both internal and external validity.

*Table 4.7 Herr and Anderson's Goals of Action Research and Validity Criteria*

Goals of Action Research	Quality/Validity Criteria
The generation of new knowledge	Dialogic and process validity
The achievement of action-oriented outcomes	Outcome validity
The education of both the researcher and participants	Catalytic validity
Results that are relevant to the local setting	Democratic validity
A sound and appropriate research methodology	Process validity

Adapted from Herr and Anderson (2005)

#### **4.5.1 Dialogic validity**

Dialogic validity is the extent to which the researcher entered into constructive and critical dialogue with their peers (Herr & Anderson, 2005). This criterion is a measure of external validity and reflects whether those separate from the research believe it was done logically and thoroughly. During this research, weekly meetings were held with the research supervisor and a group of colleagues to discuss progress, challenges and future plans. This forum was used as a sounding board for the researcher and provided the opportunity to talk through results from transcript analysis, suggestions from participants and how they were to be included within FNS.

#### **4.5.2 Process validity**

Process validity relates to how appropriate the research process has been; namely whether learning cycles were used appropriately and whether findings were based on sound research methods (Herr & Anderson, 2005). Process validity asks whether learning cycles allowed for ongoing learning and reflection by the individual or the organisation. The continual process of informal learning cycles in this research was particularly evident in the development and implementation stage. In this stage, the researcher went through informal learning cycles by herself and with the foodservice manager to create and adapt actions before implementation

The other question asked when establishing process validity is whether findings were based on sound research methods. Validity for both the qualitative and the quantitative data need to be established as part of the process validity (Giddings & Grant, 2009). Both the qualitative and quantitative data methods were validated by triangulation at each stage whereby contributions from each set of data were compared and contrasted to give greater depth to the understanding of the results (Creswell, 2003).

The qualitative data were validated in two ways. First, the process of memoing in the qualitative data analysis and the researcher's 'emails to self' allowed for transparent acknowledgement of the researchers thinking (section 4.4.3). This allows for the accurate explication of themes from the data and allows for greater dialogic validity. Second, 'member checking' was performed, whereby summaries of discussions with participants were sent back to them so they could confirm that they were a true and accurate analysis of the discussion.

There were two sets of quantitative data that need to be established as valid. The reliability of the audit tool used had been previously established (Saelens et al., 2007). However, the tool was adapted for use in the university eating environment in New Zealand (see section 4.4.2.3). After the adaptations had been made, the audit tool was pre-tested and a detailed protocol was written. Finally, the same person completed the audits, at a similar time of day at baseline and end point.

The sales reports provided a computerised record of every sale occurring in the AUT-managed food outlets. Sales reports were sourced from the point of sale software, so every transaction in the food outlets was recorded and thus included in the analysis. Further, each item sold in the food outlets has an individual barcode and many are scanned by a barcode scanner thus reducing human error. For some items such as fruit, the cashier does not have a barcode to scan; rather, they go through a series of menus to choose the

type of fruit purchased (banana, apple, orange etc). It is possible that cashiers did not pick the correct type of fruit, however, because fruit were all the same price and were not analysed as separate types of fruit this is unlikely to effect the analysis. Finally, as outlined in section 4.4.4.1.1, some of the data were missing for one food category in one food outlet for one year comprising 2.7% of the sales data for that year. All of the analysis from 2009 and 2010 was correct and all the analysis except for prepared bread products was correct for 2008. Where incomplete data were used in the analysis this is acknowledged in the thesis.

#### **4.5.3 Outcome validity**

Outcome validity in action research relates to the actions and change that occurred how well the ‘problems identified’ were resolved (Herr & Anderson, 2005). The challenge with action research is that often in the course of the research the problem gets redefined and further questions are created. In this research the findings from the evaluation stage, particularly the interviews with the foodservice manager, were used to judge outcome validity. These results are discussed in chapter seven. Another challenge to determining outcome validity is that there may be different versions of what a ‘resolved’ problem looks like. For this reason outcome validity is also linked to democratic validity which is described next.

#### **4.5.4 Democratic validity**

Democratic validity is the extent to which the project was democratic and involved stakeholders (Herr & Anderson, 2005). Having high democratic validity means that the project was carried out collaboratively and multiple perspectives were taken into account. The consultation process carried out in this research was extensive and involved an advisory group, university staff members, students, foodservice team and foodservice

suppliers. The quality of the interaction with participants and the foodservice management team was assessed to evaluate the process of change and consultation that occurred. These findings are presented in chapters six and seven.

#### **4.5.5 Catalytic validity**

Catalytic validity relates to how participants and the researcher come to reassess their view of reality and begin to look at things in a different way. It has high crossover with process and democratic validity, because consultation and sound research methods are key to creating an environment where participants and researchers are able to reassess and develop new ways of operating (Herr & Anderson, 2005). The ‘emails to self’ in this research and the activity research diary demonstrated catalytic validity because the researcher demonstrated a change in their understanding and the changes that happened in the food outlets.

#### **4.6 Summary of Research Methods**

This research used mixed methods to provide an in-depth analysis of the process and outcomes of creating a healthier eating environment. There were three distinct stages to this research: needs assessment, development and implementation, and evaluation. Within each stage, results from several research methods were triangulated to provide key findings that would inform the next step of the action research cycle. The research methods used were: 1) focus groups; 2) online discussion forum; 3) observational environmental audit; 4) research activity diary; 5) personal reflections of the researcher; 6) semi-structured interviews; and 7) sales reports. The findings are presented in the following three chapters: Needs assessment (Chapter five), Development and implementation (Chapter six), and Evaluation (Chapter seven).

## **Chapter Five: Needs Assessment**

This chapter presents findings from the first stage of this research, the needs assessment, which explored staff and student perceptions of the AUT University eating environment and informed the development of the Feed Your Need to Succeed programme. The first section of this chapter discusses each of the eight themes that emerged from the qualitative analysis of focus groups and an online discussion forum with staff and students. Each theme is compared and contrasted to relevant literature. The second section of this chapter discusses barriers and motivators to making healthier choices, identified through the quantitative analysis of the observational environmental audit. The barriers and motivators are discussed in relation to other literature. Finally, this chapter presents the implications of the needs assessment findings for the development and implementation of FNS.

### **5.1 Creation of the FNS Advisory Group**

The first step in the needs assessment stage was creating a FNS Advisory Group to guide the needs assessment and subsequent stages of creating a healthier eating environment. The FNS Advisory Group included university staff members that were interested in, and willing to support the creation of a healthier eating environment. Membership was fluid throughout this research as staff members moved on and others expressed interest in being involved in the development of FNS.

The advisory group had representatives from: staff and student unions, staff and student support services, lecturers and heads of departments, members of the AUT University foodservices management team and the general manager of finances.

Newsletters from the researcher providing a progress report were sent to the FNS advisory group every six months and they were consulted at the end of each research stage

about key findings and the next steps. In the needs assessment stage specifically, the advisory group were involved in recruitment of participants, consulted about the prompts used and the key findings.

## **5.2 Focus Group and Online Discussion Forum Findings**

The two aims of the needs assessment consultation were to establish participant concerns about the eating environment and to identify how these concerns could be addressed when creating a healthier eating environment. Each theme discussed in this section outlines staff and student perceptions of the eating environment, healthier eating, and how a healthier eating environment should be created on campus. At the end of each theme, the implication of these findings for the development and implementation of FNS is written in a shaded box.

### **5.2.1 Theme one: Satisfaction with current food outlets**

The *satisfaction with current food outlets* theme incorporates aspects of the eating environment participants were satisfied with. There were few positive comments (15 out of 258 comments) about the food outlets suggesting that participants were not necessarily satisfied with the food outlets at baseline. One source of satisfaction was the variety of ethnic meals offered by the contracted food outlets.

*“Sushi and Indian food outlets a good idea” (Source: ODF)*

*“I wandered through the other day and I was amazed to see kebabs and sushi you know, so many different types of food in there” (Source: FG participant 8)*

Another source of satisfaction for participants was the cost effective options available on campus such as those described below:

*“Each week you get a large plate of delicious and healthy food for only \$5...  
...The servings are huge and I often share with a friend so it’s only \$2.50  
each really. I’m not a vegetarian, but I know a good, nutritious food deal  
when I see one.” (Source: ODF)*

*“It’s a huge meal and I usually have half for lunch and half for dinner. It’s  
\$10 but I’m happy for what I get” (Source: ODF)*

*“I’m glad the fruit is only 60c a piece at [name of food outlet on campus].  
Thanks for the work done to ensure it remains that price” (Source:ODF)*

The repeated expression of satisfaction regarding cost effective options is consistent with previous research suggesting that food choice is strongly related to cost (Blanck et al., 2009; French, Story, & Jeffery, 2001; Glanz et al., 1998; Ni Mhurchu et al., 2011)

#### Implication for Feed Your Need to Succeed:

Factors associated with satisfaction should be incorporated into the development and implementation of FNS. Therefore, it was important to provide and promote a variety of food types on campus and ensure that pricing promotions provided value for money.

### **5.2.2 Theme two: Dissatisfaction with current food outlets**

The theme *dissatisfaction with current food outlets* encapsulates comments about how food outlets on campus were not meeting perceived needs of participants. There were substantially more comments about dissatisfaction with the food outlets (n=55) than satisfaction with the food outlets (n=14). This disparity indicated that the current food outlets on campus were not meeting participants’ needs. Participants highlighted sources of dissatisfaction when discussing barriers to making healthier choices, suggesting that participants were dissatisfied that healthier choices were not more easily available.



However, participants' may have adjusted their responses because they were aware that the focus of the needs assessment was on healthier choices. Predominant sources of dissatisfaction were price, availability and variety. Other sources of dissatisfaction were: food quality and the limited choices for participants with special dietary needs.

Participants' thought healthier choices were more expensive and discussed how cost was a significant barrier to them making healthier choices

*"Healthy food options on campus cost (significantly) more and are harder to find. After a while, it becomes easier to grab junk or bring something from home" (Source: ODF)*

*"[The price of healthy food] doesn't encourage people to eat healthy, does it, when it's so expensive... as the unhealthy choices are the cheapest ones that's what people will keep buying. That's why people will drink coke instead of milk and stuff like that because essentially it's cheaper"(Source: FG participant 2)*

Dissatisfaction with availability was related to both the physical location of the food outlets in relation to offices, and the availability of food after 4pm and on weekends. There were more comments about location and distance to food outlets from participants on Campus 1, which is more decentralised than Campus 2. Whilst Campus 1 has a reasonably well defined campus precinct, some staff work in buildings that are not within this precinct. Staff in these 'satellite offices' indicated that they were unlikely to walk to campus to buy food when there were other closer food outlets.

*"One of the difficulties about this institution is its outlying areas... none of us generally has access to any of the food, we're very rarely up on the campus... options are not available to everyone, it depends on where they are situated"(Source: FG participant 8)*

*“For instance, if I was working at [a satellite office], I would not make a conscious effort to walk to The Hub [on-campus outlet] to buy my lunch if I’m going to pass 100 food outlets on the way there” (Source: FG participant 7)*

Participants also commented about the lack of food options on campus outside of university hours.

*“Nothing is ever available during weekends and students are really frustrated at times” (Source: FG participant 3)*

*“If you’re starving and it’s night, there’s nothing around” (Source: FG participant 6)*

Participants expressed dissatisfaction with the in-store variety of food and beverage choices.

*“It always looks the same you know, you walk into one of the cafes and there could be everything that was there from two months ago, and nothing seems to change in terms of appearance, so it could be the same old scones or the same old sandwiches” (Source: FG participant 6)*

*“...variety of enjoyable healthy food is lacking” (Source:ODF)*

The final two factors participants were dissatisfied with were food quality and the lack of options for people with special dietary needs. Participants believed that healthier choices on campus were not appetising or presented in a way that made them appealing.

*“I go there and look at the food cabinets and there’s nothing inspiring about what’s laid out in there at all” (Source: FG participant 2)*

For those participants with special dietary needs, the lack of choice and ingredient labelling was a source of dissatisfaction.

*“I can’t eat anything from the AUT cafes as I have no idea if the items are going to send me to hospital or not” (Source: ODF)*

*“healthy options for vegetarian and vegan people are highly limited. After a few months on campus I exhausted all suitable options and started going off-campus for food. I have not used an on-campus outlet since” (Source: ODF)*

In summary, the major factors contributing to participants’ dissatisfaction were pricing, variety and availability. Further subthemes of these major factors were the quality of the food on offer (related to variety) and the lack of consideration for people with special dietary needs (related to availability).

#### Implication for Feed Your Need to Succeed:

If staff and students were dissatisfied with the service offered on campus they might look off campus for other alternatives. People who eat off campus may not be exposed to the majority of FNS actions. Therefore, solutions to sources of dissatisfaction (i.e. availability, variety and value for money) were incorporated into FNS to encourage people to eat on campus.

### **5.2.3 Theme three: Desired healthier choices**

The theme *desired healthier choices* incorporates participant requests for healthier choices they want available on campus. Some requests were very specific, whereas others were more general. Specific requests were for salad, sandwich and noodle bars where customers could choose components of their meal. Another specific request, echoed by several participants, was more water fountains on campus so water bottles can be refilled for free. Some general requests were healthier snack options and to incorporate more vegetables into meals and main choices.

Several participants commented on the appropriateness of the free sausage sizzles (i.e. barbeque cooked sausage served in white bread) that the student union provide for students once a week. Participants requested that the student union provide healthier choices, and that some effort is made to cater for vegetarians.

In summary, participants requested a wide variety of healthier choices. The most common requests were for options that enabled greater customer choice for example salad and sandwich bar. There were also requests for healthier snacks because participants believed there were few healthier options available. Participants were also supportive of smaller changes to modify existing food options.

#### Implications for Feed Your Need to Succeed:

These findings gave an indication of the sorts of foods that participants wished to have on campus that were not currently available. Participant suggestions were important to consider, and provide if possible, to increase chance of success and customer satisfaction.

#### **5.2.4 Theme four: Reasons for choosing food outlets**

The theme *reasons for choosing food outlets* describes participants' views about where people buy their food and why. This was not an explicit prompt, but focus group participants devoted a large amount of time exchanging ideas about their favourite food outlets and why they liked them. Due to the level of discussion in this area, this theme was created to collect and contrast opinions about the reasons for the popularity of some food outlets on and off campus.

Predominant reasons for choosing food outlets were taste, value for money and convenience. These three factors have been identified in a range of literature for adults and

adolescents within New Zealand and internationally (Blanck et al., 2009; French, Story, et al., 2001; Glanz et al., 1998; Ni Mhurchu et al., 2011).

Taste was related to a participant's belief that the food at a specific outlet was fresh and good quality.

*"It's really really fresh and different and there's always something that you're going to enjoy. And it's so fresh, that's the thing that I love about it"*

*(Source: FG participant 8)*

Participants believed value for money was represented by two characteristics: an appropriate price for the meal and adding value through coupons and loyalty cards. Many comments (20) in the focus groups and the online discussion forum demonstrated that cost significantly influenced food selection and was a significant barrier for participants buying healthier choices.

*"They run specials as well so you know you can get a good deal when you go in"* *(Source: FG participant 8)*

*"This is the first experience a huge majority of students have of being in control of their own diet/finances. It is very easy to look at cost and not think about nutritional value"* *(Source: ODF)*

*"Again, to reiterate, COST is the most important factor, the vast majority of food on campus is more expensive and less nutritionally valuable"*

*(emphasis original) (Source: ODF)*

Convenience was related to the location of the food outlet, as well as how convenient the food was to buy, for example, queuing times, and how easy foods were to eat when moving between meetings or classes. Participants in the 'satellite offices' felt their time was limited at lunch, so they frequented food outlets close to their offices where there were no queues and the food was easy to eat quickly.

*“With limited time for lunch breaks people don’t have the time to walk around campus searching for healthy options” (Source: ODF)*

*“If you’re in a rush and in a hurry, you’re gonna go and grab something that’s easy, that you don’t need to do anything with, that you don’t have to wait for someone to prepare” (Source: FG participant 7)*

The final aspect discussed in conversations about buying preferences, was whether participants ate by habit or made a conscious decision to eat somewhere in particular. There were mixed perspectives about this: some participants made a particular effort to go to certain places they enjoyed, whereas others decided on the spur of the moment.

*“You don’t make a decision about whether it’s healthy or unhealthy, you make a decision about whether you’re hungry and whether you can buy quickly and get out” (Source: FG participant 9)*

*“I don’t usually carefully look at the varieties and all the sorts, I, you know look at the ones I like” (Source: FG participant 2)*

Although there were contrasting opinions about this topic, most participants agreed that prompts such as promotional emails or an attractive display of food could influence the decision about which food outlet to eat at.

Participants’ reasons for eating at certain off campus food outlets strongly paralleled the reasons for participants’ dissatisfaction with the on campus food outlets (see theme: *dissatisfaction with current service*). Lack of taste, convenience and value for money were all stated as sources of dissatisfaction, and these three factors were all expressed as reasons for eating at alternative off campus outlets. The strong congruence between the themes of *‘dissatisfaction with current service’* and *‘reasons for choosing food outlets’* provided direction about what actions to focus on in FNS.

#### Implications for Feed Your Need to Succeed:

This theme highlighted reasons behind purchasing decisions on and off campus. The implication of these findings was that taste, value for money and convenience were incorporated into FNS actions.

#### **5.2.5 Theme five: Knowledge and information**

The ‘*knowledge and information theme*’ included what information was available on campus and what participants wanted to know about healthier eating and healthier lifestyle.

Participants agreed there was minimal information on campus at baseline, noting that healthier choices were not effectively marketed at point of choice or around campus

*“If you’re asking me am I seeing healthier options, they don’t sort of; they’re not in the forefront.” (Source: FG participant 7)*

*“You’re not really aware of what’s available unless you get around or walk around” (Source: FG participant 8)*

Participants requested information about what and where healthier choices were available, and which choices offer the best value for money. They suggested that information could be presented at point of purchase in the food outlets, or available through other means, for example emails and the university intranet.

Short, relevant information and healthier living tips were suggested as effective tools to increase awareness about the importance of healthier eating.

*“Short, quick tips regarding healthy eating could be posted around campus. Healthy eating is not top of my priority list so I tend to ignore anything with too much information” (Source: ODF)*

*“Provide nutrition information that targets where we are at as students”*

*(Source: ODF)*

Participant requests for labelling of healthier choices were followed up by the researcher asking for specific details about what information participants want on the label and how they want it presented. Both a logo type label highlighting healthier choices and nutrient information panels were discussed. Participants suggested that calorie information, fat, sugar and salt content be included in a nutrition information panel. However, a logo type label was more strongly supported by participants because it required less interpretation and knowledge than a nutrition information panel. Ingredient lists were also requested, particularly for those with special dietary needs such as allergies.

*“I think something with a healthy choice [logo] would be fine and then maybe just the ingredients, I’m not really worried about all the numbers and everything” Source: FG participant 4)*

The requests for labelling of healthier choices reflect developments in the food and foodservice industries. Nutrition labelling in restaurants is becoming more common, particularly in America, with some states making nutrition labelling mandatory in restaurants (California Conference of Directors of Environmental Health, 2009). In England, some catering companies are reported to be voluntarily putting nutrition information on their menus after a recommendation from the Food Standards Agency (Benelam, 2009). Surveys undertaken in the United Kingdom indicated that consumers would appreciate and utilise nutrition information on restaurant menus (Mackison, Wrieden, & Anderson, 2009).

Research in supermarkets (Grunert, Fernández-Celemín, Wills, Storcksdieck genannt Bonsmann, & Nureeva, 2009) indicates that people say they purchase according to food labels but observational data did not support the self reported label use. Similarly,



Roberto, Agnew and Brownell (2009) identified that customers in fast food chain restaurants do not look at nutrition information before ordering. In contrast, research in food outlets (Bassett et al., 2008; Chu, Frongillo, Jones, & Kaye, 2009; Driskell, Schake, & Detter, 2008; Pulos & Leng, 2010) demonstrate a decrease in calories ordered and eaten when nutrition information is provided.

**Implication for Feed Your Need to Succeed:**

The apparent lack of knowledge about healthier choices on campus demonstrated that communication needed to be a component in FNS. The repeated request for food labelling indicated that labelling should be a FNS action.

### **5.2.6 Theme six: Promotion and marketing of healthier choices**

The *promotion and marketing of healthier choices* theme related to recommendations from participants about how to promote healthier choices. More specifically, this theme incorporated suggestions for in-store and campus-wide promotional activities, to encourage customers to buy healthier choices. Participants highlighted that they want communication and promotional activities to be constant and visible.

Most participants supported electronic communication, staff participants in particular supported regular emails about what food was available and what the best choices on offer were.

*“If you’re staff and stuck on your computer all day long, it’s [an email] so quick and easy to see and it’s like a prompt and it makes you think about the food, so that you think Ooo I might go there” (Source: FG participant 7)*

Making healthier choices cheaper or adding value to them were suggested as ways of marketing healthier choices at point of purchase. Specific ideas were: loyalty cards,

discount coupons, combo meals of healthier choices, and information about the best value for money options each week.

Prime shelf placement, visibility and better presentation were also suggested as ways of marketing healthier choices.

*“It’s a no brainer – make healthy options literally more visible! Where can you get fruit, soup, salad etc on campus? It’s all hidden away in the corners while curry, chips etc are visible at every counter. People don’t have time to seek out better options – they need to be able to see them when they walk in the door!” (Source: ODF)*

Participants also recommended a marketing approach that was not explicitly about health outcomes, and asked that marketing and promotion should focus on food and other factors that students could relate to.

*“when you tell the students you have to choose the healthy option because it’s good for you, straightway you’ve turned away half the students. But if you make it something exciting, like for one day, every Thursday or every Friday, it’s going to be fabulous fresh exciting food then they won’t notice that there’s no fried chips “ (Source: FG participant 7)*

*“In the lead up to the end of semester and exam time – promotions on snacks to help with studying” (Source: ODF)*

#### Implications for Feed Your Need to Succeed:

Suggestions from people to add value to healthier choices and make them cheaper were included in FNS actions because cost of healthier choices was mentioned in other themes. Campus-wide communication techniques were established and implemented linking eating well and success.

Specific topics were what and where healthier choices were available, and which healthier choices represented the best value for money.

### **5.2.7 Theme seven: Attitude towards healthier choices**

The theme ‘*attitude towards healthier choices*’ discussed the attitude of staff and students towards healthier choices and how attitudes might change after the implementation of FNS. Participants believed some people on campus wanted to make healthier choices and would respond well to FNS. However, participants also acknowledged that there would be people on campus who do not prioritise healthier eating.

*“Some people will want to eat that way [healthier choices] and others won’t. I don’t think that because it’s suddenly put there and it’s made obvious, that some people are going to go from being a nonhealthy eater to being a healthy eater. But those people who want to eat healthy, that at the moment feel limited, will go, be, you know eat healthy” (Source: FG participant 4)*

There were comments by focus group participants about the challenge of trying to influence students, aged predominantly between 18 and 21 years, to make healthier choices. Participants believed some students considered themselves “*bullet-proof*” and that the vast majority think “*hey I’m young, I can eat whatever I like; it makes no difference*”.

Online discussion forum comments conveyed a sense of ambivalence and apathy towards healthier choices because they were difficult. Whilst participants recognised they should be making healthier choices, they knowingly sacrificed them in favour of the cheaper or easier option.

*“more often than not I find myself settling for the quick and easy fix and health is the first thing that is sacrificed” (Source: ODF)*

*“We all know what’s bad for us, but it’s hard to come up with healthy alternatives and variety that excite us” (Source: ODF)*

Implicit in this last comment was the attitude that healthier choices were boring and unexciting and that less healthy choices were more desirable and satisfying. This attitude has been identified in both American (Kubik, Lytle, & Fulkerson, 2005) and English (Stead et al., 2011) secondary school pupils and American male university students (Aaron et al., 1995).

#### Implications for Feed Your Need to Succeed:

These findings highlighted that differing attitudes towards healthier choices could limit the effectiveness of FNS actions. Therefore, actions needed to appeal to a variety of motivators such as cost and taste rather than health.

### **5.2.8 Theme eight: Recommended characteristics of the programme**

The theme *‘recommended characteristics of the programme’* combines comments about the general characteristics participants’ suggested for the change process to create a healthier eating environment. Conflict existed between the approaches that focus group and online discussion forum participants recommended. Focus group participants preferred a positive focus, making healthier choices more available and more attractive. In contrast, online discussion forum participants supported a more restrictive approach. This disparity is highlighted in the comments below:

*“the worst thing would be to suddenly remove every unhealthy option from sight and then you’ll have a huge uprising and people would be very unhappy” (Source: FG participant 6)*

*“I’d get rid of the fried, trans-fat laden food, including processed stuff and crap from the vending machines” (Source: ODF)*

A possible reason for this disparity between the focus groups and the online discussion forum is the attitude and motivation of commenting participants. Whilst every effort was made to ensure a wide audience participated in the online discussion forum, it is possible that highly motivated people, who have strong opinions about healthy eating, were over-represented. People with strong didactic opinions about healthier eating could be more likely to encourage a restrictive approach.

Focus groups participants supported some restrictive changes, but in contrast to the online discussion forum participants, focus group participants recommended a more gradual and measured change.

*“So not giving them lots of different types of chocolate or chips you know, reducing the flavours, rather than fizzy drinks galore you’re actually reducing that kind of option down and expanding the other options”*  
(Source: FG participant 6)

This positive approach also appears to be preferred by foodservice operations. Several community based restaurant programmes successfully created healthier eating environment by focussing on promoting and making healthier choices more available (Economos et al., 2009; Lachat et al., 2011; Macaskill et al., 2003).

#### Implications for Feed Your Need to Succeed:

These findings highlighted the importance of the overall FNS approach.

Focus groups participants highlighted that focusing on the positive and providing alternatives may be more appropriate and appealing to staff and students.

### **5.3 Observational Environmental Audit: Baseline Findings**

Complementary to the needs assessment consultation with staff and students, was the observational environmental audit, which provided a baseline measure about how much the AUT University eating environment promoted healthier choices. The Nutrition Environment Measures Study – Restaurants (NEMS-R) audits were completed in all campus food outlets in March 2010, before FNS was implemented. The NEMS-R audit highlights eating environment characteristics such as the availability of cheap, energy dense food and aggressive marketing, which are linked to poor dietary patterns (Glanz et al., 2005; Swinburn et al., 1999). This section explores findings from the NEMS-R audit detailing the provision and promotion of healthier and less healthy choices in the food outlets on campus at baseline.

#### **5.3.1 Descriptive information about food outlets**

At baseline, there were 14 food outlets at AUT University, four AUT-managed outlets and ten contracted outlets. The contracted outlets were split equally between the two campuses, whereas three out of four AUT-managed food outlets were on one campus. All ten contracted outlets were co-located within a food court, whereas the AUT-managed outlets had their own seating, ranging from 3 to 32 seats.

Table 5.1 outlines information about the type of menu, types of food and beverages offered and opening hours for all food outlets on campus.

*Table 5.1 Descriptive information about all food outlets at AUT University*

Audit measure	Contracted outlets (n=10)	AUT-managed outlets (n=4)	All outlets (n=14)
<u>Type of menu</u>			
Noticeboard	8	1	9 (64%)
Labels by food	6	4	10 (71%)
<u>Food items available</u>			
Hot meals	9	4	13 (93%)
Cold meals	3	4	7 (50%)
Hot snacks	5	2	7 (50%)
Cold snacks	3	4	7 (50%)
<u>Beverage items available</u>			
Hot drinks	3	4	7 (50%)
Cold drinks	10	4	14 (100%)
<u>Opening hours</u>			
Monday to Friday only	9	4	13 (93%)
Open semester breaks	5 always open, 3 open some breaks	1 always open, 1 open some breaks	6 always open, 4 open some breaks
Open before 1000	2	4	6 (43%)
Open between 1000 – 1500	10	4	14 (100%)
Open 1500 – 1700	8	2	10 (71%)
After 1700	1	0	1 (7%)

( ) bracketed number represents percentage of all 14 outlets

Most food outlets used a noticeboard menu and/or labels by the foods in a display cabinet. All outlets offered hot and/or cold meals (13 and seven outlets respectively) but only half of the outlets offered snack options (cold or hot). All outlets offered cold beverages, whereas only half offered hot beverages (tea and coffee).

Ethnic cuisine was offered in 50% of all outlets on campus which contrasts with the pattern shown in the rest of New Zealand. Nation-wide research demonstrated that in 2008, only 13.8% of foodservice operations were categorised as fish and chips, ethnic food, hamburger and chicken takeaway (Restaurant Association of New Zealand, 2008). The portion that was ethnic food was not specified. In New Zealand, restaurants, cafes, coffee houses and caterers comprise 75.9% of the market share (Restaurant Association of New Zealand, 2008), whereas, at AUT University, only 29% of food outlets offered a café style operation.

Six outlets were open before 10am, however only one outlet was open after 5pm, all outlets were open between 10am and 3pm. Only one outlet was open on weekends and approximately half of the outlets were closed during semester breaks. These limited opening hours demonstrate the limited food availability after 5pm and on weekends, because the only on campus options are vending machines and one food outlet. This finding is supported by the focus group and online discussion forum findings, where a key source of dissatisfaction was food availability after hours.

#### Implications for Feed Your Need to Succeed:

The main implication of these findings was the need for after-hours access to healthier choices. Further, creating healthier eating environments in the AUT managed food outlets promoted healthier choices in only 29% of the food outlets on campus; although they were the largest. Involving the contracted outlets in FNS was outside the scope of this research; however, a long term strategy for creating healthier eating environments in the contracted outlets was required.

### **5.3.2 Food and beverage review**

The type of food and beverages available in a food outlet has a direct influence on the purchasing behaviour of customers. Therefore, ensuring that healthier food and beverage choices are available in food outlets is an important part of encouraging healthier eating patterns (Swinburn et al., 1999; World Health Organisation & World Economic Forum, 2008). Table 5.2 outlines the types of food and beverage choices available on campus.



*Table 5.2 Food/beverage review of all food outlets at AUT University*

Audit measure	Contracted outlets (n=10)	AUT-managed outlets (n=4)	All outlets (n=14)
<u>Main dishes</u>			
Number of main dishes			
Median	17	34	23
Range	2 - 34	26 - 48	2 - 48
Main dishes identified as healthier choices	1 (24%) <sup>a</sup>	0 (0%)	1 (24%) <sup>a</sup>
Wholemeal/wholegrain options available	1 outlet (7.1%)	4 (28.6%)	5 (35.7%)
<u>Snacks</u>			
Number of snacks available			
Range	0 - 12	28 - 42	0 - 42
Average	4.8	37.3	14.1
Median	3	39	7
Snacks identified as healthier choices	1 (20%) <sup>a</sup>	0 (0%)	1 (20%) <sup>a</sup>
<u>Healthier choices available</u>			
Salad options available	2 (14.2%)	3 (21.4%)	5 (35.7%)
Low fat dressings available	1 (7.1%)	0 (0%)	1 (7.1%)
Non fried vegetables without sauce available	1 (7.1%)	1 (7.1%)	2 (14.2%)
Fruit without sugar available	2 (14.2%)	4 (28.6%)	6 (42.9%)
Diet soft drink available	9 (64.3%)	4 (28.6%)	13 (92.9%)
Other healthier beverages available	10 (71.4%)	4 (28.6%)	14 (100%)
Low fat milk available	3 (21.4%)	4 (28.6%)	7 (50%)

( ) bracketed number represents percentage of all 14 outlets except for those marked with <sup>a</sup>

<sup>a</sup> The percentage represents the proportion of the food in that outlet identified as healthier choices.

The AUT-managed food outlets provided the greatest quantity and range of main meal choices and snacks at baseline. The AUT-managed food outlets provided between 26 and 48 meals choices and between 28 and 42 snack choices, whereas, the contracted food outlets offered between two and 34 meal choices and zero and 12 snack choices. At baseline, only one outlet used a promotional logo or nutritional information to identify healthier choices on the menu. In this contracted outlet, 24% of the main meal choices and 20% of the snack choices were identified as healthier.

The product mix on campus was different to that demonstrated in 167 randomly selected New Zealand primary schools. Carter and Swinburn (2004) highlighted that meat pies were the most commonly available item (available in 79% of schools), followed by filled rolls (available in 47% of schools) and sandwiches (available in 30% of schools). Utter et al (2007) identified that primary school pupils regularly buying their lunch at school were significantly more likely to consume sugar sweetened soft drinks, meat pies and sausage rolls ( $p < 0.001$ ), indicating that these products were most easily available. In comparison, at AUT University, there were more outlets offering hot meals (ethnic cuisine) rather than sandwiches, filled rolls and pies. However, it is important to note that the larger outlets were the ones offering pies, filled rolls and sandwiches.

At baseline, only one outlet used a promotional logo or nutritional information to identify healthier choices on their menu. In this contracted outlet, 1:4.2 of the available main choices and 1:5 of the snack choices were identified as healthier choices. Carter and Swinburn (2004) identified the ratio of healthier to less healthy food choices in primary schools as 1:5.6 for main choices and 1:9.3 for snack choices. French, Story, Fulkerson and Gerlach (2003) identified that 1:2.9 of the à la carte items in 20 Minnesota schools met a lower fat criteria of  $< 5\text{g}/100\text{g}$ . This total included snack choices such as chips and lollies, therefore this can only be used as a rudimentary comparison to AUT University food outlets.

Important differences between the NEMS-R and the literature limit the relevance of these comparisons. Both Carter and Swinburn (2004) and French et al (2003) analysed and categorised all foods available, whereas NEMS-R only counted healthier choices if they were identified on the menu. Therefore, the percentage of healthier choices at AUT University may be falsely low, because not all foods were included in the analysis, only the ones identified as healthier choices.

A range of healthier choices was available on campus (identified by the researcher), but were not identified as healthier choices, therefore they were not counted in the NEMSR totals. As examples, all but one outlet offering sandwiches had wholemeal sandwiches available and fruit was available in all four AUT-managed outlets and two contracted outlets. In Carter and Swinburn's (2004) analysis of the school eating environment, only 17% of schools offered fruit in comparison to 43% at AUT University. Salads were available in five outlets, two contracted outlets and three AUT-managed outlets. Considering that five food outlets on campus already offered salad at baseline, it is interesting that needs assessment participants requested salad. Participants' seemed to want a self-serve salad bar where they could choose their own salad. Only three food outlets offered salads that customers could choose how much they wanted, in the other two food outlets the salads were pre-packaged.

Four of the outlets providing salads served them with dressing already on them, low fat dressing was only available in the one outlet where dressing was added after a salad selection had been made. Only two outlets had non deep fried vegetables without sauce available. Thirteen outlets offered artificially sweetened soft drinks and other low calorie beverages such as water. One AUT-managed outlet provided a free water fountain for customer use. All outlets selling hot drinks had low fat milk available, but the availability of low fat milk was not sign posted.

#### Implications for Feed Your Need to Succeed:

These findings demonstrated the range of food and beverage choices on campus. All but one outlet had healthier beverages for sale; therefore actions were focused on healthier food choices. Healthier food choices appeared to be available, but were not signposted, so customers may not

have realised they were there. Therefore, ensuring visibility and prominence of healthier choices was important.

### 5.3.3 Promotion in food outlets

In-store promotions can be in the form of table tents, posters, special pricing or presentation and placement. They can promote specific menu items, for example “Try our grilled fish” or “Choose fruit as your snack”. Promotions can encourage healthier or less healthy eating patterns, for example, advertising combo meals that encourage ordering extra, or posters with pictures of high sugar and/or high fat foods. In-store promotions affect customer choice by encouraging impulse purchasing and the purchase of the promoted product (McDermott, O'Sullivan, Stead, & Hastings, 2006; Sigurdsson, Saevarsson, & Foxall, 2009).

*Table 5.3 Promotions in all food outlets at AUT University*

Audit measure	Contracted outlets (n=10)	AUT-managed outlets (n=4)	All outlets (n=14)
Healthier menu options promoted	1 (7.1%)	0 (0%)	1 (7.1%)
Healthier eating promoted	0 (0%)	0 (0%)	0 (0%)
Unhealthy eating promoted	0 (0%)	0 (0%)	0 (0%)
Promotion encouraging overeating	3 (21.4%)	0 (0%)	3 (21.4%)
Healthier foods have preferential placement	2 (14.3%)	3 (21.4%)	5 (35.7%)
Healthier beverages have preferential placement	0 (0%)	4 (28.6%)	4 (28.6%)

( ) bracketed number represents percentage of all 14 outlets

Table 5.3 outlines the different types of promotions present on campus at baseline. At baseline, there was limited promotion of healthier or less healthy choices in the food outlets at AUT University. No outlet explicitly promoted healthier or less healthy eating patterns. However, three contracted outlets promoted combo meals incorporating energy

dense beverages and side dishes. Combo meals, encouraging customers to buy more food or beverages can encourage overeating (French, Story, et al., 2001). One outlet offered a combo meal to purchase two meals for cheaper than it would be to buy them separately. This was promoted as a combo meal to share with a friend; however, if customers did not share their two meals, they would be buying a significant amount of food.

One outlet had motivational posters about choosing healthier menu choices, which is a practice somewhat supported by the literature, however, only short term (three to five week) studies have been reported. One university based study, concluded that signage on healthier choices focussing on taste, convenience, cost and energy increased sales of the promoted healthier choices (Buscher et al., 2001). Two studies (Fiske & Cullen, 2004; French, Jeffery, et al., 2001), demonstrated that promotion of low fat items through posters and labels caused a small but significant increase in the purchase of low fat items from vending machines in schools. Bergen and Yeh (2003) also concluded that point of choice labelling on beverage vending machines increased the percentage of low-energy drinks sold in relation to all beverages purchased.

Promotions potentially encouraging overeating in on campus food outlets were typically combo meals in contracted outlets which encouraged the purchase of additional energy dense side dishes such as hot chips or sugar sweetened soft drinks. Combo meals, providing more food at a cheaper cost per gram or millilitre, are perceived as better value and therefore are more likely to be purchased (French, Story, et al., 2001). Increasing the perceived value for money of a meal can influence buying patterns because of the high correlation between food choice and cost (Blanck et al., 2009; Glanz et al., 1998; Ni Mhurchu et al., 2011).

The final type of promotion investigated in the NEMS-R audit was placement of healthier choices so they were more accessible than less healthy choices. Accessible

locations were defined as those in mid-range (between eye and waist level) and in full view of customers. All AUT-managed food outlets and one contracted outlet gave preferential placement to healthier food choices and all AUT-managed food outlets gave preferential placement for healthier beverage choices. In the AUT-managed food outlets, healthier beverage choices were placed closest to the door opening in the drinks fridges.

Improving accessibility of healthier choices is a successful component of many programmes to create a healthier eating environment (Glanz & Hoelscher, 2004) because the amount of food or beverage consumed appears to be related to its' accessibility (Engell, Kramer, Salomon, Leshner, & Malafi, 1996; Wansink, 2004). Engell et al (1996) observed that greater quantities of water were consumed when a water jug was on the table ( $444\pm259\text{g}$ ), compared to fixed water filters in the dining room ( $197\pm100.2\text{g}$ ), or in an adjacent room ( $186.7\pm115.2\text{g}$ ). The same pattern of increased consumption with increased accessibility appears to exist for food as well. Painter, Wansink and Hieggelke (2002) identified that office workers with candies on their desk consumed 2.9 more candies daily than those with the container in their desk and 5.6 more than those who had to walk two meters.

In summary, there were few in-store promotions on campus at baseline. The most apparent promotions were placement of healthier products to encourage healthier choices in the AUT-managed outlets and the promotion of combo meals in the contracted outlets which potentially encouraged overeating.

#### Implications for Feed Your Need to Succeed:

The low levels of promotion on campus meant that FNS promotions would not be in direct competition with promotions for less healthy choices. Furthermore, low levels of promotions for less healthy choices

allowed FNS to start positively by adding promotions for healthier choices rather than restricting promotions for less healthy choices.

### 5.3.4 Motivators and barriers to healthier choices

Table 5.4 presents the motivators for and barriers to making healthier choices in the eating environment. Examples of motivators include offering reduced portion sizes or identifying healthier choices. Examples of barriers are charging for healthier requests such as sharing a meal or low-fat milk, more expensive healthier choices, or an ‘all-you-can-eat’ option.

*Table 5.4 Motivators and barriers to making healthier choices in all food outlets at AUT*

#### University

Audit measure	Contracted outlets (n=10)	AUT-managed outlets (n=4)	All outlets (n=14)
<u>Facilitators</u>			
Nutrition information available	1 (7.1%)	0 (0%)	1 (7.1%)
Healthier options identified	1 (7.1%)	0 (0%)	1 (7.1%)
Reduced-sized portions available	7 (50%) <sup>a</sup>	1 (7.1%) <sup>a</sup>	8 (57.1%) <sup>a</sup>
Point of choice signage encouraging healthier requests	0 (0%)	0 (0%)	0 (0%)
<u>Barriers</u>			
Larger portion sizes encouraged	1 (7.1%)	0 (0%)	1 (7.1%)
Signage discouraging healthier requests	0 (0%)	0 (0%)	0 (0%)
All you can eat option	0 (0%)	0 (0%)	0 (0%)
<u>Pricing barriers</u>			
Individual meal items more expensive than a combo	6 (42.9%)	0 (0%)	6 (42.9%)
Healthier choices same price as regular choices	1	0 (0%)	1
Smaller portion cheaper than regular portion	7 (50%) <sup>b</sup>	1 (7.1%) <sup>b</sup>	8(57.1%) <sup>b</sup>

( ) bracketed number represents percentage of all 14 outlets

<sup>a</sup> food outlets offer multiple sizes for their meals (small, medium and large)

<sup>b</sup> smaller portion sizes were cheaper but not proportionally cheaper

At baseline, few facilitators of healthier choices were apparent. Only one outlet identified healthier choices and had their nutrition information available on a website. No food outlets had signage at point-of-choice encouraging healthier requests, such as a half serve or low fat milk. Several outlets offered two or three different portion sizes as a standard feature, allowing customers to choose smaller serves.

The food outlets did not have a high number of barriers at baseline, but contracted outlets did demonstrate some barriers to making healthier choices. No contracted outlets discouraged healthier requests or had an all-you-can-eat option and only one contracted outlet encouraged larger portion sizes. Ironically, the outlet promoting larger portion sizes was also the only outlet that identified healthier choices on the menu. Six contracted outlets offered combo meals and for all of these combo meals, buying the items individually would be more expensive than buying the combo meal. Finally, smaller portions were cheaper in all outlets that offered different portion sizes, but these prices were not proportional, meaning that a half size portion was more than half the price of the largest portion size.

Identifying healthier choices and/or providing nutrition information at point of purchase in restaurants is a policy that has support in the literature as a tool to encourage healthier choices (Driskell et al., 2008; Finkelstein, French, Variyam, & Haines, 2004; Harnack & French, 2008; Roberto, Larsen, Agnew, Baik, & Brownell, 2010). Earlier studies found neutral or even negative effects of labelling (Aaron et al., 1995), yet more recent studies have shown positive changes in sales due to labelling (Driskell et al., 2008; Roberto et al., 2010). There is evidence that university students in particular respond well to provision of nutrition information and identifying healthier items at point of choice (Buscher et al., 2001; Freedman & Connors, 2010). At AUT University, only one outlet identified healthier choices at baseline, therefore, it is unlikely that labelling was markedly able to affect customer choices on campus.



Price is one of the key determinants of food choices (often second to taste) (Blanck et al., 2009; Glanz et al., 1998; Ni Mhurchu et al., 2011). Therefore, more expensive healthier choices can be a barrier for customers. Cost based actions have been effective at increasing the amount of healthier choices sold in schools and worksites (French, 2005). In New Zealand primary schools (Carter & Swinburn, 2004), the cheapest choice was hot chips, the most expensive were filled rolls, the cost of pies and sandwiches were similar, approximately halfway between hot chips and filled rolls. At AUT University, healthier choices were not identified at baseline; therefore it is difficult to compare these results with other research. Healthier choices, in the outlet that did identify them, were roughly the same price as other menu items with all choices costing between \$4.90 and \$6.50, regardless of whether they were identified as being healthier.

Large portion size, another barrier to healthier eating, has become more common, particularly in America. Larger portion sizes are considered a significant barrier to eating a healthier diet because they encourage people to eat larger amounts of food (French, Story, et al., 2001; L. R. Young & Nestle, 2002). Several studies have demonstrated that larger portion sizes encourage over consumption of food, which is not compensated for later in the day (Kral & Rolls, 2004; Wansink, 2004). French, Story et al (2001) suggest that large portion sizes promote overeating because people have lost the ability to recognise an appropriate portion size because large portions are so common. Another mechanism posited by Wansink (2004), is that people eat according to environmental cues such as packaging, and believe the meal is finished when the packet or plate is empty. If larger crockery and packaging is used, portions tend to be larger and consequently more is eaten.

At AUT University, different portion sizes were offered at 57% of outlets as a standard menu feature, particularly in contracted outlets. Where a self service or a served buffet was available, small and medium size containers were offered. Unfortunately, the

price of smaller portions was not directly proportional to the portion size. Larger portions of food were cheaper per gram, therefore they represented better value for money and thus were more attractive to cost-conscious students (French, Story, et al., 2001). Similarly, combo meals items were cheaper when purchased together than when the items were purchased individually. This also is perceived as better value for money and thus may promote overeating.

#### Implications for Feed Your Need to Succeed:

Similar to the previous section, the small number of barriers enabled FNS to have a positive approach, increasing motivators rather than restricting barriers. Motivators and barriers mentioned in the focus groups and online discussion forum (namely, price and convenience) were similar to those discussed in this section. Therefore actions facilitating the purchase of healthier choices needed to be implemented through FNS.

### **5.3.5 Summary of eating environment at baseline**

Overall, the majority of food outlets at AUT University did not promote eating healthier choices. However, they also did not actively promote less healthy choices. There were a variety of menu options available, with a greater emphasis and range in the snack category. Healthier choices were not highlighted at point of purchase; however, they were placed in prominent positions in one third of the outlets. There were few outlets offering vegetables without sauce and just under half of the outlets offered fruit without sugar, and thirteen outlets offered healthier, low calories beverages. There were no facilitators for healthier choices such as preferential pricing or point-of-choice promotion encouraging healthier choices. In contrast, there were promotions for larger serves and combo meals which might encourage over eating.

Both the AUT-managed food outlets and the contracted food outlets promoted healthier choices in some ways; however contracted outlets were more likely to also promote less healthy choices giving confused messages to customers.

There are some limitations that need to be considered. These audits were carried out on one day for each campus, thus, there is the possibility that food and beverage items available on that day were not representative of the usual offerings because variety and amount of food available may change according to the day of the week. This could particularly be an issue when counting up the main and snack options available. To minimise the impact of time of day on what food and beverages were on offer, all outlets were audited within two hours before lunch (10am – midday).

#### **5.4 Vending Machines on Campus at Baseline**

Food outlets were not the only options for accessing food and beverages on campus. At baseline, there were 30 food and beverage vending machines spread between two campuses (19 beverage, 11 food). The product mix was predominantly less healthy with 81% of food choices and 79% beverage choices representing less healthy choices (as defined by Waitemata DHB Better Vending Guidelines (Waitemata District Health Board, 2008), see Chapter six, section 6.1 for more details). This product mix is similar to that discovered by Lawrence et al (2009), who identified that 81% of foods and 75% of beverages were less healthy choices.

#### **5.5 Implications of the Needs Assessment Findings on Programme Development and Implementation**

Findings from the NEMS-R audit and the focus groups and online discussion forum were integrated to create a set of implications (table 5.5) from the needs assessment that

informed the development and implementation of FNS. How these implications were translated into actions is described in the next chapter.

*Table 5.5. Summary of findings from the needs assessment and implications for the development of Feed Your Need to Succeed programme*

Evidence from needs assessment	Implications for the development of the FNS programme
FG/ODF – Theme 1, 2 and 4	Provide and promote a variety of food types on campus
NEMS – Food and beverage review	
NEMS - Food and beverage review	Focus on providing healthier food choices because all but one outlet currently provide healthier beverages
FG/ODF – Theme 5	Incorporate a way of identifying healthier choices in the food outlets
NEMS – Motivators and barriers	
FG/ODF – Theme 1, 2 and 4	Include pricing promotions to give customers value for money
FG/ODF - Theme 2 and 4	Ensure healthier choices are easily available, particularly in the evenings and weekends
NEMS – Descriptive information	
FG/ODF – Theme 7	Incorporate actions encouraging customers who are interested, and customers who are not interested in making healthier choices
FG/ODF - Theme 3	Incorporate suggestions for healthier choices from participants where possible
FG/ODF – Theme 5 and 6	Incorporate communication focussing on what healthier choices are available, where they are available and which represent the best value for money
NEMS – Promotion in food outlets	
FG/ODF –Theme 8	Use a positive approach, focussing on providing more options rather than removing options
NEMS – Descriptive information	Have a long term strategy for including all on-campus outlets into the FNS programme rather than just the AUT-managed outlets

NEMS = Nutrition Environment Measures Survey

FG / ODF = Focus group / Online discussion forum

\* Theme 1 = satisfaction with current service, Theme 2 = dissatisfaction with current service, Theme 3 = desired healthier choices, Theme 4 = reasons for choosing food outlets, Theme 5 = Knowledge and information, Theme 6 = Promotion and marketing of healthier choices, Theme 7 = Attitude towards healthier choices, Theme 8 = Recommended characteristics of the programme

## **5.6 Summary of the Needs Assessment Stage**

The majority of the implications from the needs assessment can be summarised into four broad strategies for the FNS programme. These broad strategies were: cost, convenience, communication about healthier choices and foodservice support. Using an iterative action research process, whereby participant needs are incorporated into the development and implementation of FNS, was likely to increase the effectiveness and appropriateness of FNS.

The cost strategy was defined by the need for healthier choices to be good value for money and having perceived benefit for customers. FNS should provide and promote healthier choices that provide value for money. The convenience strategy referred to food being available and accessible for as many customers as possible in a manner that is appropriate (for example short waiting times). FNS actions should focus on making healthier choices available and convenient. The communication strategy refers to staff and students having access to information about healthier choices on campus and guidance about which choices are healthier. Campus wide communication and promotion was integrated throughout FNS. Finally, the foodservice support strategy refers to the support offered by the researcher to encourage and guide the foodservice through a process of pragmatic and realistic change.

The NEMS-R audit indicated that the baseline eating environment was relatively neutral because it did not overtly promote less healthy eating, but neither did it overtly promote healthier eating. The implication for the development of FNS was that no major underlying barriers to healthier eating (for example, all-you-can-eat buffet) would need to be resolved. The lack of significant barriers in the eating environment allows for a more

positive approach, because FNS can focus on promoting healthier choices rather than removing promotions of less healthy choices.

The needs assessment stage highlighted that participants found it challenging to find healthier choices on campus and this was corroborated by findings from the NEMS-R audit. Making healthier choices more accessible and available are key components of encouraging behaviour change and a shift towards healthier dietary patterns (Butland et al., 2007; Kumanyika et al., 2002; World Health Organisation, 2003). Therefore, increasing availability and accessibility of healthier choices underpins all the actions that were developed and implemented through FNS.

At the end of the needs assessment stage, a report was written and submitted to focus group participants, the advisory group and the foodservice management team. In this report, the main findings of the NEMS-R audits and the needs assessment consultation were summarised to ensure the researcher and the foodservice management team had a shared set of goals and objectives. This report was used as the guiding document to develop actions in the AUT-managed food outlets under four overarching strategies: cost, convenience, communication and foodservice support.

## **Chapter Six: Development and implementation**

This chapter outlines how needs assessment findings (Chapter five, table 5.5) were translated into the development and implementation of Feed Your Need to Succeed, with a focus on the consultative and collaborative approach taken. This description of the process is followed by an explanation of the FNS actions, which are then compared with the literature. Finally, three critical success factors for the development and implementation stage are discussed, with reference to particular actions and development processes.

### **6.1 Process to Develop Feed Your Need to Succeed Actions**

The process to develop fifteen actions (figure 6.1), within four overarching strategies (cost, convenience, communication and foodservice support), is presented in this next section. However, critical to the description of the process are the actions which were implemented. Figure 6.1 shows the actions in diagrammatic form which will be elaborated on in section 6.2.



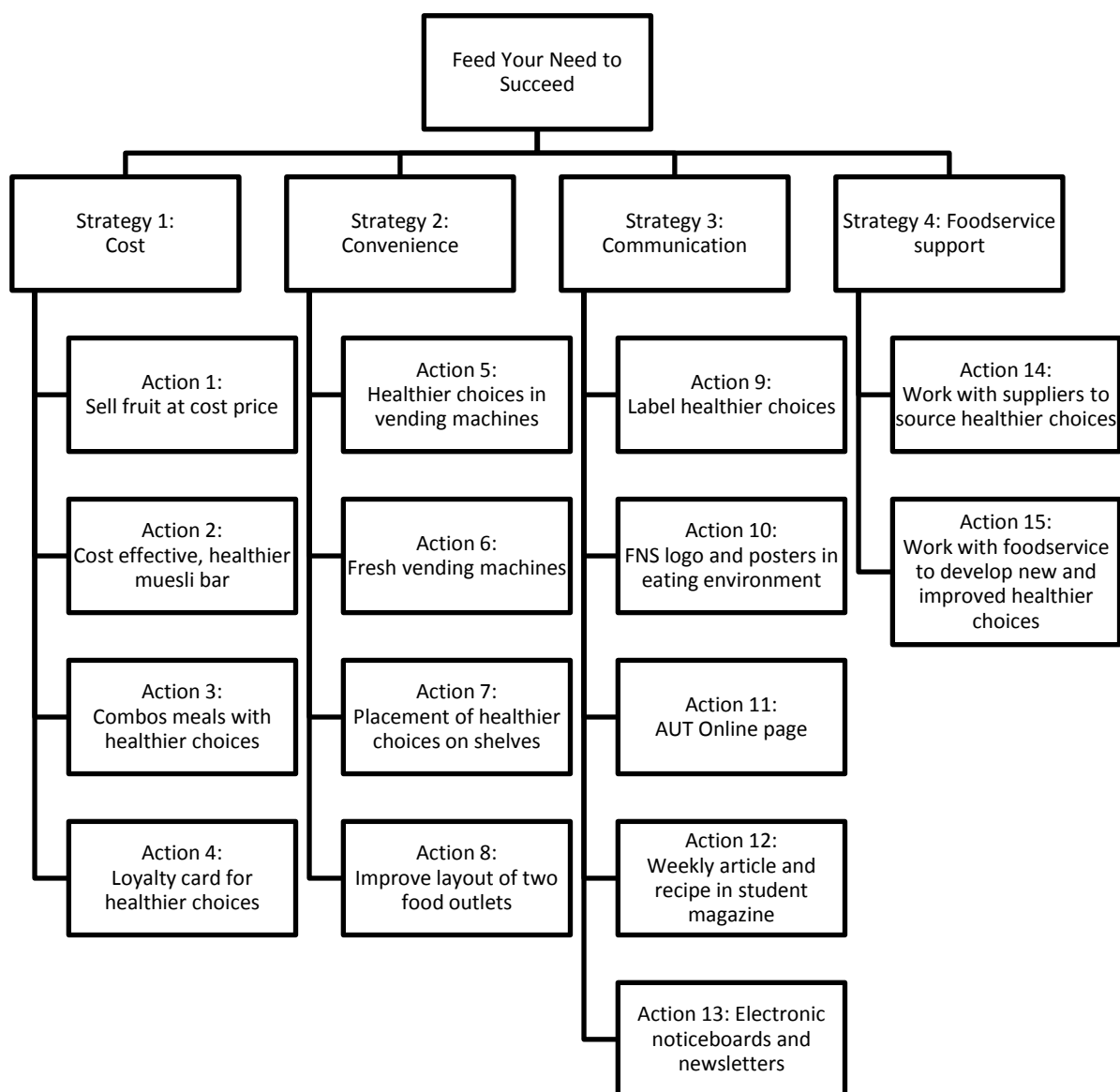


Figure 6.1 Feed Your Need to Succeed programme strategies and actions

### 6.1.1 Adoption of a nutrient profiling tool

The first step in the development process was to adopt a nutrient profiling tool to identify healthier choices. This tool identified which food and beverages to target in FNS and facilitated the development and implementation of multiple actions. Characteristics of an appropriate nutrient profiling tool were identified from theoretical (Lobstein & Davies, 2009; Scarborough et al., 2010; Scarborough et al., 2007) and applied literature (Dwyer et

al., 2004; Economos et al., 2009; Lachat et al., 2011). Appendix E provides a detailed description of the characteristics identified as necessary for the FNS nutrient profiling tool.

After consideration of the identified characteristics, and investigation of available nutrient profiling tools (see chapter two, section 2.2), an adapted version of the Food and Beverage Classification System (New Zealand Ministry of Health, 2008a) was adopted. The original Food and Beverage Classification System (FBCS) was developed for use in early childhood centres and schools (see Appendix F for the original FBCS). The FBCS divides food and beverages into seven broad categories, each divided into specific foods such as sandwiches, soup, milk drinks, cheese and breakfast cereals.

Sacks et al (2011) believe the most versatile nutrient profiling tools are those using broad categories of foods and beverages where a few key nutrients are considered within each category. The FBCS classifies foods and beverages into one of three levels of healthiness called ‘everyday’, ‘sometimes’, and ‘occasional’ choices. These levels are based on upper limits for energy, saturated fat and sodium. Some foods, such as meat pies and soup also have a requirement for fibre content.

The FBCS was chosen because it contains common New Zealand foods and beverages; it is simple to use because the three nutrients assessed are on nutrition information panels; and a single three-tier system is most easily understood (Gorton, Ni Mhurchu, Chen, & Dixon, 2009).

#### ***6.1.1.1 Adaptations to the Food and Beverage Classification System to create a specific tool for Feed Your Need to Succeed***

Seven adaptations were made to the FBCS to tailor it for university food outlets, four of these to the nutritional criteria. The FBCS coordinator (Senior Advisor at the New Zealand Ministry of Health) informed the researcher that permission was not needed to

adapt and adopt the FBCS (M. Grant, personal communication, November 10, 2009) because it is publicly available. The researcher discussed possible adaptations with the FBCS coordinator and the research supervisor. The adapted version of the FBCS described below is referred to as the FNS FBCS.

In the first adaptations, only three of the original FBCS seven broad categories of food and beverages were used in FNS FBCS: beverages, mixed meal dishes and snack items. These three categories represented all the types of food available on campus.

A further adaptation created an additional level of healthiness called ‘undefined’ for those products that could not be classified. ‘Undefined’ choices were those where daily variation in ingredients was too high or they had no nutritional information panels, for example, items made without a recipe. In a third adaptation, the name ‘occasional’ was too long to easily integrate into the social marketing campaign. ‘Rarely’ was used instead.

There were four adaptations to the original FBCS nutritional criteria to take into account the adult population at the university. First, energy per serve was added to the mixed meal items (2000kJ and 2500kJ per serve for ‘everyday’ and ‘sometimes’ foods respectively) to encourage moderation in portion size. The original FBCS used energy per 100g requirements because the age of school pupils was thought to be a limiting factor for how much was eaten (M. Grant, personal communication, November 10, 2009). The energy per serve requirements of the FNS FBCS align with the Nutrient Reference Values for Australia and New Zealand (Australian NHMRC & New Zealand Ministry of Health, 2005).

The second nutritional criteria adaptation increased the energy per serve for prepared bread items from 1500kJ per serve to 2000kJ per serve. The energy per serve was set slightly lower for prepared bread products than mixed meals to allow for the inclusion of another snack such as yoghurt, fruit or muesli bar to create a full meal.

The next adaptation removed the energy per 100g requirement for all snack foods because it was considered unnecessary to have a per 100g upper limit as well as a per serve upper limit. In addition, the snacks were altered to align the FNS FBCS with the requirements agreed for snacks in the vending machine contract, which were based on the ‘Better vending for health guidelines’ (Waitemata District Health Board, 2008). See Appendix G for the original ‘Better vending for health guidelines’.

Finally, the FNS FBCS requirements for beverages were also based on the ‘Better vending for health guidelines’ (Waitemata District Health Board, 2008), although the package sizes were slightly increased in some categories (namely sports beverages, fruit drinks and fruit juices) to reflect the products that were available through the foodservice suppliers. In addition, artificially sweetened carbonated soft drinks were placed in the ‘everyday’ classification, because they have similar energy density to water, the only ‘everyday’ beverage in the original FBCS.

The final FNS FBCS criteria are presented in Table 6.1 (food items) and Table 6.2 (beverage items).

*Table 6.1 Feed Your Need to Succeed Food and Beverage Classification System (Food)*

	Everyday foods	Sometimes foods	Rarely foods
<u>Mixed meal dishes</u>			
Mixed meal items	Energy ≤ 2000kJ/serve Saturated fat ≤ 5g/100g Sodium ≤ 450mg/100g	Energy 2000-2500kJ/serve Saturated fat ≤ 5g/100g Sodium ≤ 450mg/100g	Energy > 2500kJ/serve Saturated fat > 5g/100g Sodium > 450mg/100g
Soup	Saturated fat ≤ 1.5g/100ml Sodium ≤ 450mg/100ml Fibre ≥ 1g/100ml	Energy ≤ 1000/100ml Saturated fat ≤ 1.5g/100ml Sodium ≤ 450mg/100ml	Energy > 1000/100ml Saturated fat > 1.5g/100ml Sodium > 450mg/100ml
Prepared bread products	Energy ≤ 2000kJ/serve Saturated fat ≤ 5g/serve Sodium ≤ 600mg/100g	Energy ≤ 2000kJ/serve Saturated fat ≤ 7.5g/serve Sodium ≤ 750mg/100g	Energy > 2000kJ/serve Saturated fat > 7.5g/serve Sodium > 750mg/100g
Pastry products	Not applicable	Energy ≤ 1500kJ per serve Saturated fat ≤ 5g/100g Sodium ≤ 350mg/100g	Energy > 1500kJ per serve Saturated fat > 5g/100g Sodium > 350mg/100g
<u>Snack foods</u>			
Packaged sweet snacks	Energy ≤ 800kJ per packet Saturated fat ≤ 1.5g/100g Sodium ≤ 450mg/100g	Energy ≤ 800kJ per packet	Energy > 800kJ per packet
Packaged savoury snacks	Energy ≤ 800kJ per packet Saturated fat ≤ 1.5g/100g Sodium ≤ 450mg/100g	Energy ≤ 800kJ per packet	Energy > 800kJ per packet
Baked snacks	Not applicable	Energy ≤ 900kJ per serve Saturated fat ≤ 3g/serve Fibre ≥ 1.5g/serve	Energy > 900kJ per serve Saturated fat > 3g/serve Fibre > 1.5g/serve
Dried fruit, nut and seed mixtures	Energy ≤ 800kJ per packet Saturated fat ≤ 1.5g/100g Sodium ≤ 450mg/100g	Energy ≤ 800kJ per packet	Energy > 800kJ per packet
Ice creams, ice blocks, frozen yoghurts and jellies	Not applicable	Energy ≤ 600kJ/serve Saturated fat ≤ 3g/serve	Energy > 600kJ/serve Saturated fat > 3g/serve

Adapted from 'Food and beverage classification system nutrient for schools' (New Zealand Ministry of Health, 2008a)

*Table 6.2 Feed Your Need to Succeed Food and Beverage Classification System (Beverages)*

Everyday beverages	Sometimes beverages	Rarely beverages
Water	Fruit juices - $\leq 375\text{ml}$ bottle	Fruit juices $> 375\text{ml}$ bottle
Plain, reduced-fat milk and calcium enriched soy beverages	Reduced-fat, flavoured milk, calcium enriches soy beverages and drinking yoghurts - $\leq 350\text{ml}$ bottle	Reduced-fat, flavoured milk, calcium enriches soy beverages and drinking yoghurts - $> 350\text{ml}$ bottle
Artificially sweetened carbonated soft drinks	Sports beverages, sports waters and flavoured waters with $\leq 50\text{kJ}$ per 100mls <b>and</b> $\leq 800\text{ml}$ bottle	Sports beverages, sports waters and flavoured waters with $> 50\text{kJ}$ per 100mls <b>or</b> $> 800\text{ml}$ bottle
	Fruit drinks with $\leq 90\text{kJ}$ per 100mls <b>and</b> $\leq 500\text{ml}$ bottle	Fruit drinks with $> 90\text{kJ}$ per 100mls <b>or</b> $> 500\text{ml}$ bottle
		Carbonated beverages containing sugar
		All other beverages not covered in the everyday or sometimes categories

Adapted from 'Better vending for health guidelines' (Waitemata District Health Board, 2008)

### ***6.1.1.2 Process of analysing current product range***

The next step towards adoption of the FNS FBCS was to analyse the food currently available in the AUT-managed food outlets. There were two ways the researcher analysed the food prepared in-house to identify which level of the FNS FBCS they met. The first was analysing recipes through FoodWorks™ (version 2004, Xyris Software, FoodWorks Professional Edition, Queensland, Australia) dietary analysis computer software which converts foods to nutrients using the New Zealand Food Composition Database (Crop and Food Research New Zealand Limited, 2007). Limitations for this method included inaccurate documentation of recipes, day to day variability in formulation, and errors in the nutrient analysis, both by data entry and in the food composition tables. Limitations may be caused by human error or by the natural variation in food and preparation practices (Williamson, 2006), but all could impact the accuracy of the final classification.

To minimise the impact of inaccurate documentation of recipes, the researcher and the chefs met six times over the course of three months to clarify questions about ingredients and recipes. The researcher spent two days in each kitchen weighing ingredients on digital scales for regularly made items such as sandwiches and quiches to ensure reported recipes matched usual practice. To ensure that the researcher entered the recipes correctly into FoodWorks™, recipes were printed and double checked against the original hard copy. For ingredients, such as plain tortilla wraps, that were not in the database, nutritional information of these products was manually added to the database for use when analysing recipes.

Variability within chef practices, such as using different amounts of oil for sautéing, was accounted for by allowing a 10% variation for one of the three upper limits in the FNS FBCS. For example, if a sandwich met the energy per serve and

saturated fat per 100g requirements for an ‘everyday’ product, and was within 10% of the sodium per 100g requirement, then it was classified as an ‘everyday’ product.

The other method developed to assess the healthiness of choices was a set of guidelines for making salads (Appendix H) which was developed collaboratively by the researcher and the chef. Ingredients in salads varied depending on seasonal produce and excess food stock. To find a pragmatic solution to this variability the researcher identified upper limits of high fat and sodium ingredients per serve of salad through modelling in FoodWorks™. The guidelines listed high fat and sodium salad ingredients and indicated upper limits per bowl of salad. This is not as robust or transparent as using a food composition database; however it was a pragmatic solution in this specific situation. The FNS salad guideline shares similarities with the Healthy Meal Index (Lassen et al., 2010), which was designed as a tool to assess the nutritional quality of a meal for food outlets (see Chapter two, section 2.2 for more details). The FNS FBCS was utilised throughout the development process as a benchmarking tool in conversations between the researcher, the foodservice staff, and suppliers about which foods and beverages to target and how to improve the current range of healthier choices.

### **6.1.2 Developing actions to create a healthier eating environment**

With the FNS FBCS in place, the next step was to collaborate with stakeholders (foodservice management team and staff, suppliers, FNS Advisory group) to review the findings from the needs assessments, decide on which suggestions were realistic and to plan for change. A collaborative approach, with ongoing consultation, was used throughout the development step to contribute to the relevance of FNS actions. Stakeholders were given the opportunity to comment on summary findings from the needs assessment and then formal planning meetings were held with the foodservice operation. During the formal planning meetings, it was agreed that some needs assessment suggestions were outside the remit of the foodservice operation (for



example, farmers market on campus). The suggestions that were not related to the AUT-managed food outlets, were forwarded to more appropriate departments, for example, campus events and the Student Union. In addition, suggestions involving significant capital expenditure were unable to be implemented as part of FNS in the short term. The remaining suggestions from the needs assessment were assigned variously to the researcher, the foodservice manager, chefs or team leaders to investigate, develop and implement (table 6.3).

*Table 6.3 Allocation of responsibility for investigating, developing and implementing Feed Your Need to Succeed actions*

Action <sup>a</sup>	Develop				Implement			
	FM	R	TL	C	FM	R	TL	C
Introduce healthier, cost effective muesli bar		•			•			
Combo meals incorporating healthier choices	•	•	•	•	•		•	
Loyalty cards offering 10 <sup>th</sup> healthier choices for free	•	•			•		•	
Place healthier choices in the food outlets so they are visible and easiest to access		•			•		•	
Review and alter two café layouts to improve flow and reduce congestion	•	•			•			
Introduce labels highlighting healthier choices		•				•	•	
Introduce logo to eating environment		•				•		
Introduce posters in food outlets to raise awareness of FNS and the importance of healthier choices		•				•		
Continue adding to AUT Online page		•				•		
Weekly article and recipe in Debate magazine (student magazine)		•				•		
Use electronic noticeboards and newsletters to promote FNS and healthier choices		•				•		
Working with suppliers to ensure healthier choices are available	•	•	•	•	•	•	•	•
Working with chefs and team leaders in food outlets to ensure healthier choices are available		•	•	•		•	•	•

Key: FM=foodservice manager, R=researcher, TL=team leaders, C=chefs

<sup>a</sup> Some actions are not included because they were fully implemented before the remaining actions were developed (see section 6.1.2.1).

An aim of the development and implementation stage of FNS was that all interested members of the foodservice would participate in the process of change. Effective and open communication with employees is recommended in any organisational change process (Elving, 2005) because it assists with engaging employees and helps to reduce any uncertainties they may experience (Marques, 2008). During the four month development stage, formal and informal consultation occurred with the foodservice staff who were most impacted by FNS actions, to ensure their views were integrated into the final programme. The researcher attended 35 meetings with different stakeholders and suppliers to develop FNS in ways compatible with maintaining operational and financial objectives during implementation.

As described in Chapter four, section 4.3.3.2, the researcher's 'emails to self' were used to critically reflect on the potential impact of FNS on foodservice objectives, to question the appropriateness of the actions for the foodservice, and to ensure FNS actions stayed 'true' to the needs assessment findings. For example, the following excerpt is taken from an 'email to self' written to try and understand how a salad bar could operate successfully.

*"A salad bar is something customers said they want, but will it actually be utilised? Do participants want a salad bar because it is perceived as the healthiest choice rather than something they'll actually use? How can we minimise wastage, particularly as we're coming into winter?!?!? An extra challenge is that one chef likes to make his own salads and be creative, whereas in the other food outlets less experienced staff are likely to be making the salads. Hmmm. I think buying in premade salads can be ruled out, too much expense, so the kitchens needs recipes for interesting and healthier salads. But, there also needs to be room for*

*creativity and the ability to use leftovers. Perhaps I could make a folder that has guidelines for what ingredients are high calorie and say no more than x amount per salad, and then have some recipes”*

The critical questions within this ‘email to self’ were whether customers would buy the salads, and how to maximise the chance of successful implementation given the differences between the AUT-managed food outlets. The researcher acknowledged that the salad bar was a high risk action, because of the wastage. Therefore, the researcher and foodservice management team put extra thought into development of this particular action. The explicit acknowledgement of risks facilitated thorough, in-depth development of the action.

A continuing area of reflection during the development and implementation stage was whether actions met foodservice operational and financial objectives. Actions had to be suitable for the AUT-managed food outlets, whilst meeting participants’ requests. The researcher’s critical reflection in the development and implementation stage helped identify possible solutions and legitimise the implemented actions to ensure they met the needs of the foodservice operation and customers.

#### ***6.1.2.1 Actions developed before the needs assessment stage***

Whilst the majority of FNS actions were informed by needs assessment findings, other collaborative actions were taken before the completion of the needs assessment. These situations typically occurred when a multi-year supplier contract was up for renewal. If a multi-year contract was negotiated in 2008/09, it would impact the range of choices available in 2010/11. Therefore, the researcher became involved in these decisions, even though the needs assessment had not been completed. When a contract was being negotiated, meetings between the researcher, the foodservice management team and potential suppliers reviewed the potential product range in the AUT-managed food outlets. The researcher participated in the supplier decision process by assessing

the nutritional adequacy of the supplier's range and whether they had an acceptable range of healthier choices. If appropriate, the feasibility of tailored options for healthier choices was explored with potential suppliers. The researcher was involved in supplier agreements for: vending (food and beverages), heated savouries (including meat pies) and bread and pre-prepared bread products (in one food outlet only).

### **6.1.3 Development of Feed Your Need to Succeed communication actions**

The development of the FNS communication actions, namely, the social marketing campaign and the university-wide communication plan are outlined in this section. FNS communication actions were designed to inform customers of what healthier choices were available on campus and to raise awareness about the importance of healthier choices and the FNS programme.

#### ***6.1.3.1 Development of the social marketing campaign***

The social marketing campaign developed and implemented for FNS incorporated the use of logos and posters in the eating environment, and identification of healthier choices with labels. The development of the FNS brand has increased the social capital of the foodservice. In this research the term social marketing campaign refers to the sequence of media and communication strategies that were implemented alongside the environmental changes. The social marketing approach used in FNS recognised that something of value must be offered to both parties (i.e. foodservice operation and customers) to ensure productive and resilient relationships (Cairns & Stead, 2009). The brand also provided customers with the assurance that they were making food and beverage choices to assist them in their journey to success.

To increase its relevance and acceptability, the social marketing campaign was designed by an AUT university design student as a follow on from an assignment the researcher helped facilitate. The researcher participated in the assignment with

permission from the Head of the Graphic Design Department, who was a member of the FNS advisory group. The researcher, the research supervisor, the lecturer and the foodservice manager collectively chose an assignment to be developed into the FNS social marketing campaign.

The five components of the campaign agreed by the researcher and the design student were: 1) possible places where a logo could be used to raise awareness of FNS; 2) food labels to identify healthier choices; 3) staff uniforms to raise awareness of the involvement of the AUT-managed food outlets in FNS 4) floor and cabinetry decals (posters and plastic transparent stickers) to bring the food labels and FNS to the attention of customers; and 5) awareness raising or informative printed media to assist with the advertisement of FNS throughout campus and in the food outlets.

There were two face-to-face meetings and 17 email threads (46 emails) between the researcher and the design student. The majority of these emails discussed mock ups of campaign components, ideas and clarification about aspects of the campaign. In addition, there were regular meetings with the foodservice manager to discuss progress. The final social marketing campaign included food labels identifying healthier choices, posters in the food outlets, staff t-shirts, table numbers, advertisements in the student magazine and on display screens in one food outlet.

Not all drafted components of the social marketing campaign were implemented because they were not cost effective or changes in the foodservice made them superfluous. For example large floor stickers and branded serviettes were not implemented because they were not cost effective and coffee cup sleeves were superfluous because the foodservice changed their takeaway coffee cups to ones that did not need sleeves.

### ***6.1.3.2 Development of a university-wide communication plan***

The aims of the university-wide communication plan complemented those for the social marketing campaign but had slightly more focus on raising awareness of FNS. The university-wide communication plan was informed by needs assessment findings and comments from advisory group members. The plan was created in collaboration with key people within AUT University, such as the internal communications manager (two meetings) and the editor of the student magazine (two meetings).

The development process for university-wide communication was more streamlined than other FNS development processes because the researcher was utilising existing communication tools and networks. The university wide communication plan incorporated a weekly article and recipe in the student magazine and the use of university wide electronic noticeboards and newsletters.

### **6.1.4 Ongoing monitoring of Feed Your Need to Succeed actions**

In the six months after launch, there were 116 email threads (400 emails) between the researcher and the foodservice manager demonstrating ongoing high levels of communication. These emails concerned new products, feedback from food outlets about actions and sales reports to review performance. This ongoing communication allowed FNS to be constantly adapted and refined, as appropriate, to ensure the foodservice operational and financial objectives were maintained.

### **6.1.5 Summary of development of Feed Your Need to Succeed actions**

The development of FNS was characterised by collaboration and consultation with multiple stakeholders. During the development and implementation stage, the researcher and the foodservice management team translated the needs assessment findings into fifteen pragmatic and implementable actions that did not compromise foodservice operational or financial objectives.

## **6.2 Feed Your Need to Succeed Strategies and Actions**

This thesis now turns to a description of each specific action that was implemented. A multifaceted, systems-based approach, where each action supports the others, is necessary to create a healthier eating environment (Butland et al., 2007). The fifteen FNS actions, within four overarching strategies (figure 6.1) implemented in the AUT-managed food outlets and vending machines improved availability (proportion available) and accessibility (easily identified and purchased) of healthier choices.

Each action, and the evidence for its inclusion, is presented, starting with table 6.4 which explicitly linking FNS actions with the relevant needs assessment findings. Then, each cluster of actions that make up a strategy is compared with other programmes in universities, workplaces and schools. There are challenges in comparing FNS with other published studies because of the lack of detail available in the literature. Larger, more comprehensive, multi-site studies (Beresford et al., 2001), have insufficient detail to compare with individual actions implemented in FNS. Smaller studies (Buscher et al., 2001; Driskell et al., 2008; Gorton et al., 2010) have the necessary detail to allow comparison, but are limited to one or two types of environmental or educational actions and so do not compare directly with the multifaceted, tailored approach of FNS.



*Table 6.4 Links between FNS actions and findings from the needs assessment*

Action	Evidence to justify inclusion*
<u>Cost strategies</u>	
Action 1: Fruit sold at cost price	Implications 1, 2, 4, 6 and 8
Action 2: Introduce healthier, cost effective muesli bar	Implications 1, 2, 4, 6 and 8
Action 3: Combo meals incorporating healthier choices	Implications 1, 4, 6 and 8
Action 4: Loyalty cards offering 10 <sup>th</sup> healthier choice for free	Implications 1, 4, 6 and 8
<u>Convenience strategies</u>	
Action 5: Introduce fresh refrigerated vending machines with healthier choices	Implications 1, 5, 6, 8 and 9
Action 6: Change range in snack and beverage machines so more healthier options are available	Implications 1, 5, 6, 8 and 9
Action 7: Place healthier choices in the food outlets so they are visible and easiest to access	Implications 1, 5, 6, 8 and 9
Action 8: Review and alter two café layouts to improve flow and reduce congestion	Implications 1, 5, 6, 8 and 9
<u>Communication strategies</u>	
Action 9: Introduce labels highlighting healthier choices	Implications 1, 2, 3, 5, and 8
Action 10: Introduce logo and posters to eating environment to raise awareness of FNS and the importance of healthier choices	Implications 1, and 8
Action 11: Continue adding to AUT Online page	Implications 1, 4, and 8
Action 12: Weekly article and recipe in Debate magazine (student magazine)	Implications 1, 4, and 8
Action 13: Use electronic noticeboards and newsletters to promote FNS and healthier choices	Implications 1, 4, and 8
<u>Foodservice support strategies</u>	
Action 14: Working with suppliers to ensure healthier choices are available	Implications 1, 2, 3, 7 and 9
Action 15: Working with chefs and team leaders in food outlets to ensure healthier choices are available	Implications 1, 2, 3, 7 and 9

\*Implication 1 = Provide and promote a variety of food types on campus, Implication 2 = Focus on providing healthier food rather than beverage choices, Implication 3 = Identify healthier choices, Implication 4 = Provide cost based actions, Implication 5 = Ensure healthier choices are easily available out of hours, Implication 6 = Ensure actions that could encourage customers who are and are not interested in healthier choices, Implication 7 = incorporate participant suggestions, Implication 8 = Focus communication on what and where healthier choices are available and which represent best value for money, Implication 9 = Positive approach.

### **6.2.1 Strategy 1: Cost based actions**

Four cost based actions (Actions 1-4) were implemented in the AUT-managed food outlets. Actions one and two were providing competitively priced fruit and healthier muesli bars because snacks were identified as an area where there were few

competitively priced healthier choices. Fruit was offered at a fixed retail price, which only covered the cost the foodservice paid to buy the fruit. A healthier muesli bar, as identified by the FNS FBCS, was offered for two-thirds the price of a regular chocolate bar.

Actions three and four made healthier choices better value for money because participants' reported purchasing better value for money products. Action three introduced fourteen combo meals incorporating healthier choices, including sides and/or beverages. Traditionally, combo meals are considered a barrier to making healthier choices (French, Story, et al., 2001; L. R. Young & Nestle, 2002) because they typically incorporate less healthy food and beverages and encourage larger portion sizes. This was not the case with the FNS combo meals because they met the FNS FBCS nutritional criteria. One example of a combo was a healthier sandwich, piece of fruit and a bottle of water. To maximise sales, each food outlet was encouraged to promote the combo meals they thought would appeal to their customers. Action four was the introduction of a loyalty card which encouraged repeat purchase of healthier choices through providing an incentive in the form of one free healthier choice after the purchase of ten healthier choices.

Price is one of the most significant factors in decisions about which food to buy, both in New Zealand and internationally (Glanz et al., 1998; Ni Mhurchu et al., 2011). FNS combined multiple cost based actions to ensure healthier choices were competitively priced or were value for money. No other studies have combined discounting healthier choices alongside actions to make healthier choices better value for money.

The EatSmart! Award implemented in workplace cafeterias (Dawson, Dwyer, Evers, & Sheeshka, 2006) added healthier side dishes to combo meals making healthier choices better value for money but no other cost based actions were offered. The TrEAT

Yourself Well programme in restaurants (Acharya, Patterson, Hill, Schmitz, & Bohm, 2006) made healthier choices better value for money by offering coupons and loyalty cards, however, once again this was the only cost based action offered.

Several programmes have investigated the effectiveness of offering discounted healthier choices in foodservice operations (French, Jeffery, et al., 2001; Horgen & Brownell, 2002; Jeffery et al., 1994) but the only action is a discount. In contrast, FNS introduced competitively priced muesli bars and fruit that were cheaper than other, less healthy snacks as well as offering combo meals and loyalty cards.

Cost based actions are often the most challenging to implement in foodservice operations because businesses are concerned about programmes having a negative impact on profits (Dwyer et al., 2004; Horgen & Brownell, 2002). The AUT University foodservice management team were willing to implement cost based actions as part of FNS as long as the financial impact was monitored throughout. In addition, the cost based actions did not offer aggressive discounts. The retail price of the muesli bar still allowed for a 50% profit margin, although it was cheaper than all other bars available in the food outlets. Secondly, the combo meals offered only a 10% discount on the total price; this is a very modest discount. Finally, the most expensive product available with the loyalty card cost \$4.50, whereas most customers would have spent at most, on average \$21.12 for their previous ten purchases. This equates to a 21% discount which is once again, a feasible discount for a large operation.

### **6.2.2 Strategy 2: Convenience based actions**

Four actions (Actions 5-8) were implemented to make healthier choices more available and accessible in the AUT-managed food outlets and the vending machines. Action five was changing the range in both food and beverage vending machines to ensure healthier choices were available. Negotiations for the vending contract in 2009

required that 60% of food and beverage products must meet the FNS FBCS ‘everyday’ and ‘sometimes’ criteria.

Action six introduced refrigerated, fresh vending machines on each campus to provide access to healthier choices after 5pm and on weekends. These machines would only stock a range of healthier snacks and meal options.

Action seven strategically placed refrigerated, shelf stable healthier choices in the most prominent position (between eye and waist level) in both the food outlets and the vending machines. An example of the altered layout was that healthier beverages were placed between eye and waist height and were closest to the opening of the doors.

Action eight redesigned the customer self-service area within two food outlets to reduce congestion and to allow space for customers to make choices. Needs assessment findings identified that queuing time and congestion were sources of dissatisfaction and reasons for why participants’ did not use the AUT-managed food outlets. Two changes were made to the layout of the food outlets. First, movable cabinets were shifted to ensure customers were able to easily navigate between the self-service points, and to ensure that payment for food could be made quickly and easily. Second, the food outlets were repainted from dark grey to off-white. This was to provide a brighter, more inviting atmosphere thus encouraging new customers. Whilst this action was not strictly about making healthier choices easier, reducing congestion encouraged customers to shop in the AUT-managed food outlets rather than other outlets where healthier choices may not be available.

Positive effects are reported in both publications that changed the product range in food (Gorton et al., 2010) and beverage (Brown & Tammineni, 2009) vending machines. Gorton et al (2010) substantially reduced the total energy, fat, saturated fat and sugars per 100g of product sold in vending machines in a New Zealand hospital through changing the product range. Sales volume increased by 0.5 packets per full time

employee during the three months of measurement. Brown and Tamminen (2009) reported that increasing the availability of healthier beverages to at least 50% of the range and offering 10%-25% discounts in school vending machines increased profit on average by 63.9% in ten out of fifteen schools over two years.

The convenience action unique to FNS was the focus on product placement in both vending machines and food outlets. In the AUT-managed food outlets, healthier food and beverages were placed in the most accessible points for self service, between eye and waist level on shelves. Much of the research into the effect of shelf placement on consumer purchasing has been conducted in retail stores for their own purposes rather than peer-reviewed publications. Sigurdsson, Saevarsson and Foxall (2009) completed one of the few empirical studies measuring the impact of product placement on purchasing behaviour. These authors assessed the impact of placing different brands of potato chips on high, middle or low shelves and adding an extra display at the entrance to the supermarket. This study identified that sales of the target brand of potato chips was highest when placed on the middle shelf (7.5% of sales) compared with the low (4%) and high (3.3%) shelves. In addition, sales of the target brand were even higher (12.6%) when there was an extra display at the front of the store. The FNS action to place healthier choices at mid range on shelves and in the most visible locations in self service areas ensured that healthier choices were visible and encouraged customers to purchase them.

### **6.2.3 Strategy 3: Communication based actions**

Five actions (Actions 9-13) were integrated into a social marketing campaign (Actions 9 - 10) and a university-wide communication plan (Actions 11 – 13) to raise awareness of FNS and encourage healthier choices. All communication activities were positive, action oriented and relevant to the life stage of staff and students as recommended by the needs assessment findings. Action nine was two different logo

type label to identify healthier choices (figure 6.2) with the word ‘everyday’ (green label) and ‘sometimes’ (orange label) to align with the FNS FNCS. ‘Rarely’ labels were not used because highlighting less healthy choices conflicts with the positive approach of FNS. Action ten was posters and staff uniforms incorporating the FNS logo in the AUT-managed food outlets to help customers recognise FNS actions. Actions eleven – thirteen were the utilisation of university wide communication opportunities, namely, weekly articles and recipes in the student magazine, advertising on electronic noticeboards and providing a FNS page on AUT Online (the online teaching environment).



Figure 6.2 Feed Your Need to Succeed labels highlighting healthier choices

Programmes in school (French et al., 2004; Nicklas et al., 1998) and workplaces (Beresford et al., 2001) have used posters and promotions such as taste tests and self-help quizzes to promote healthier choices and raise awareness of the programme. Similar to FNS, these programmes have typically increased the availability of healthier choices and used this increase as a platform to communicate with customers in several different ways.

Labelling initiatives are probably the most widely researched single strategy. There are several different approaches including nutrition information panels (Aaron et al., 1995; Driskell et al., 2008; Hoefkens et al., 2011), logos identifying healthier choices (Freedman & Connors, 2010; Vyth et al., 2011), health messages (Horgen &

Brownell, 2002; Steenhuis, van Assema, van Breukelen, et al., 2004) and emphasising attributes such as taste, convenience and cost (Buscher et al., 2001).

New Zealand research (Gorton et al., 2009), demonstrates that 84% of surveyed customers self-reported the use of labels in supermarkets, although this did vary by age and ethnicity. Approximately two-thirds of participants understood the nutrition information panel. However, when asked to interpret formats other than the nutrition information panel, a single traffic light label was most often interpreted correctly with (83% correctly interpreted). Therefore, local literature supports the use of a single traffic light type label in FNS.

International research (Grunert et al., 2009) has demonstrated incongruence between label understanding and label use. Over 50% of supermarket shoppers in the United Kingdom, Sweden and Germany understand 'guideline daily amount' labels but only 16.8% of shoppers were observed using the labels when choosing products (Grunert et al., 2009). Research in university cafeterias (Aaron et al., 1995; Driskell et al., 2008) indicated that people who are more concerned about what they eat are more likely to use food labels when choosing their purchases.

#### **6.2.4 Strategy 4: Foodservice support actions**

The final two FNS actions (Action 14-15) supported AUT foodservice staff to improve and extend the range of healthier choices available in the AUT-managed food outlets. In action 14, the researcher directly communicated with foodservice suppliers to investigate new and existing ranges of healthier choices. In some instances, suppliers created new healthier products for the AUT-managed food outlets that met the FNS FBCS criteria. For example, the heated savoury supplier reformulated their chicken pie to meet FNS FBCS and quality criteria.

In action 15, the researcher collaborated with the chefs and team leaders of the AUT-managed food outlets to identify ways to increase the availability of new healthier

choices and make existing choices healthier. The researcher spent two days in each kitchen observing practices and talking with staff and team leaders about possible improvements, such as sourcing lower fat salad dressings and bacon. These visits occurred once the researcher had established a good working relationship and had acquired trust with the team leaders and some of the foodservice staff. Establishing trust and a constructive positive relationship with foodservice staff was crucial with these actions, where capacity building is implicit (Patton, 2011).

The support offered to the AUT foodservice team during the process of change was intensive, tailored, one-on-one support with nine key staff members including chefs, team leaders and kitchen assistants. The researcher identified suppliers who stocked healthier products, assisted with decisions about suppliers, created guidelines for use in the kitchen and developed positive working relationships with foodservice staff. All these support actions helped to contribute to the successful implementation and ongoing development of FNS.

Aspects of the FNS foodservice support were similar to what has been used in other programmes. However, when the range of the FNS actions is considered, the intensive and tailored approach used is without precedent. A limitation of this intensive approach is sustainability because it is reliant on one key change agent and on staff buy-in. If staff believe in the programme and what it is trying to achieve, they are more likely to continue to support and promote the implemented actions (Patton, 2011). Support and promotion from engaged staff members allows the programme to continue once the change agent is no longer in place. If staff do not support the programme, high staff turnover or the change agent leaving can be a limiting factor for future change.

There are two studies offering foodservice support strategies similar to FNS: the '6 a day' worksite canteen study (Lassen et al., 2003) and 'Shape Up Sommerville (SUS)' school foodservice programme (Goldberg et al., 2009). In these studies,



foodservice staff were offered intensive training, support and encouragement to identify and implement ways of providing healthier choices. SUS and '6-a-day' researchers worked with each foodservice to reduce barriers to the implementation of a programme by cooperatively creating tailored solutions for each food outlet. However, working with ten (SUS) or five ('6-a-day') foodservice operations may have limited the level of understanding and tailoring that the researcher was able to achieve.

In FNS, the level of understanding the researcher had about the food outlets and her level of involvement with the foodservice operation was likely to have been more comprehensive than other studies. On personal reflection, the researcher identified three characteristics of her relationship with the foodservice that determined this high level of involvement. First, the researcher had worked as a foodservice manager both in New Zealand and internationally. Therefore, she had an excellent working knowledge of kitchen and large foodservice operations from the very beginning of the project. This knowledge contributed to the high level of practical support the foodservice staff were given.

Second, the researcher built up a relationship with the foodservice management team for over a year before initiating conversations about FNS changes. Previous to the needs assessment analysis, some actions had already been implemented (for example vending machine contract), but the researcher had been invited to be involved rather than initiating the changes herself. This additional time before initiating change allowed for an effective and trusting relationship to form between the researcher and the foodservice team, in part because they had the opportunity to see how she worked on their terms (Patton, 2011; Thomas, Rowe, & Harris, 2010). The effective relationships between the researcher and the foodservice management team were identified as one of the critical success factors of the FNS development and implementation stage (see section 6.3.1).

The third characteristic determining the researchers' high level of involvement with the foodservice was that she was an end user of the programme, because she was also a student at AUT University. Being able to understand and relate to the actions implemented through FNS, as an ex foodservice manager, the change agent and a student at the university, facilitated the high levels of involvement and pragmatic support for the foodservice operations (Burke, 2008). The ability to look at possible actions from these diverse viewpoints led to a much more tailored and comprehensive set of FNS actions.

#### **6.2.5 Summary of Feed Your Need to Succeed strategies and actions**

In summary, the combination of tailored and intensive actions designed to create an integrated, comprehensive and multifaceted programme with a high reliance on environmental actions makes FNS unique. The environmental actions were based on increasing availability and accessibility of healthier choices. The communication actions were based around printed media, with posters and weekly articles and recipes. Whilst some of these actions have been investigated in the literature, no other studies involving the combination of all the actions implemented over a long period of time have been published. Another unique aspect of FNS is the collaborative nature of the programme development and implementation. Throughout the actions, the voices of the participants from the needs assessment are clear, as well as the collaboration and cooperation between the researcher and the foodservice team. Identifying characteristics that supported the development and implementation of FNS contributes to understanding about how foodservice operations can create healthier eating environments without compromising financial or operational objectives.

## **6.3 Critical Success Factors for the Development and Implementation of Feed Your Need to Succeed**

This section identifies the characteristics or critical success factors that contributed to the development and implementation stage of creating a healthier eating environment. Critical success factors are those activities, elements and things that are said and done that impact on or catalyse the eventual success of a project (Freund, 1988).

This section identifies and discusses the three overarching critical success factors identified retrospectively by the researcher and the foodservice manager as having been particularly important in supporting the development and implementation of FNS. The first critical success factor was developing effective working relationships between the researcher and stakeholders on and off campus. The second critical success factor was the adoption of an appropriate nutrient profiling tool to identify healthier choices. The third critical success factor was the focus on negotiated, positive, and flexible actions.

### **6.3.1 Developing effective working relationships with stakeholders**

That effective working relationships are critical success factors within organisations experiencing change is well documented (Dexter, 2010; Ruuska & Vartiainen, 2003; Thomas et al., 2010). Effective working relationships are particularly important in larger organisations when communication must be with a whole network of people rather than one or two key stakeholders (Ruuska & Vartiainen, 2003). From the very early stages of FNS development, the researcher spent time focussing on creating networks and establishing relationships on campus (figure 6.3).

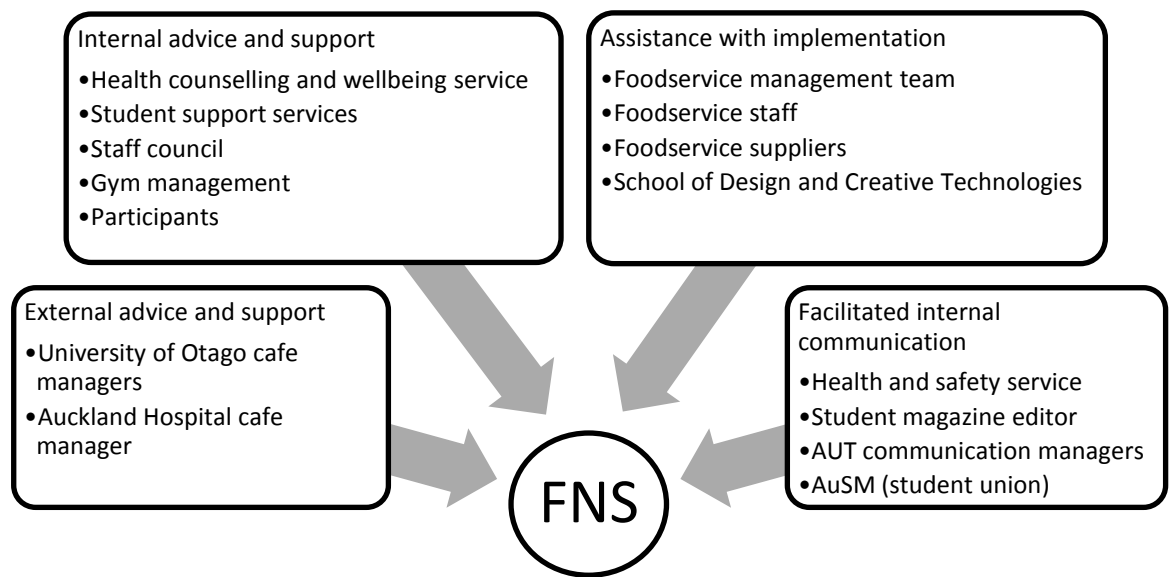


Figure 6.3 Relationships created for the development and implementation of Feed Your Need to Succeed

Effective, high quality and valuable relationships were a critical success factor because these relationships were the base from which contributions to the development and implementation of FNS were made. The development of FNS was facilitated by relationships between the researcher and internal and external networks to identify priority areas and possible solutions. Had effective, high quality and valuable relationships not been in place FNS may have been much more limited in scope.

The implementation of FNS was assisted by two groups of people, those who helped with communication on campus and those who were directly involved with the service provision in the food outlets. Some internal groups such as the Health Counselling and Wellbeing Service involved the researcher in other health promotion activities on campus which increased the researcher's profile on campus and led to the creation of additional networks.

It is well established in the literature that involving members of the community in the decision making process assists ownership and sustainability of an initiative.

(Nicklas & O'Neil, 2000; Thomas et al., 2010). Patton (2011), talks about community ownership and involvement of people who want the programme to succeed as the 'personal factor'. Patton (2011) opines that if these people are included in the development of the programme and it is useful for them, then ownership is increased and changes are more likely to be implemented because these people are already motivated.

The personal factor was clearly present within key people in the foodservice management team. The foodservice manager, right from the start of the project was keen to implement changes, saying that he believed that the foodservice was responsible for offering a service that provided healthier choices. One of the chefs was also highly motivated as evidenced by his immediate adoption of suggestions from the researcher (such as ordering a lower fat bacon) to make his food healthier.

The relationship needing to be cultivated to increase participation and sustainability of FNS was the relationship between the researcher and the foodservice staff (Goldberg et al., 2009). This relationship was crucial because the foodservice staff were responsible for ensuring compliance with actions such as labelling and product placement in the food outlets. Thomas et al (2010) discovered that focusing on effective relationships, as characterised by communication, familiarity and helpfulness, was one of the critical success factors in creating and sustaining health promoting schools.

Thomas's (2010) characteristics were present in the relationship between the researcher and the foodservice management team, however, effective relationships were not created with all foodservice staff predominantly because of high staff turnover. Familiarity was established through communication and involvement of the researcher with the foodservice management team from her first day on campus. Communication was mostly face-to-face early on, particularly with foodservice staff, who might be less used to email interaction. Conversations and input from the researcher were not

necessarily limited to matters pertaining to FNS. For example, the researchers' knowledge as a dietitian and a ex-foodservice manager was utilised by the chefs when discussing practical ways of meeting special dietary needs such as veganism and gluten free. Wherever possible, the researcher aimed to be helpful to the foodservice staff, particularly while rapport was being established.

Challenges to developing effective relationships were high staff turnover and competing priorities such lack of time amongst some staff members. Both these challenges have been outlined in the literature as impacting on the implementation of changes to eating environments (Dwyer et al., 2004; Lachat et al., 2011).

### **6.3.2 Adopting a robust and transparent nutrient profiling tool to identify healthier choices**

The second critical success factor that was identified was the adoption of a robust and transparent nutrient profiling tool to identify healthier choices. Two studies (Economos et al., 2009; Scarborough et al., 2007) have identified that choosing an appropriate nutrient profiling tool was a critical step in changing the eating environment to encourage healthier choices. In this research, the FNS FBCS was used to identify healthier choices with labels, communicate with suppliers, develop combo meals, create new recipes items and develop components of the social marketing campaign.

Having a nutrient profiling tool in place was particularly important when working with suppliers to find new, healthier, cost effective products. The menu is the most important component of a foodservice operation (Duncan & Jensen, 2010). Therefore, finding appropriate products to sell in the AUT-managed food outlets was essential. The FNS FBCS allowed the foodservice team to specify to suppliers which products were preferred. This was exemplified when the researcher was working with the vending machine supplier to find suitable products. The researcher provided the

supplier with the criteria for the different classification codes to ensure they identified appropriate products.

Ensuring the foodservice staff understood and engaged with the FNS FBCS was also an important part of this critical success factor. Foodservice staff were involved in the process to create accurate recipes and during this process several foodservice staff members expressed interest about why certain products were in the ‘sometimes’ or ‘rarely’ classification. This provided the researcher with an opportunity to talk about healthier choices and what ingredients contributed to a product being considered less healthy. These conversations were an excellent example of the way the researcher worked as a change agent openly encouraging development and change from the bottom up as well as the top down (Patton, 2011).

To ensure foodservice staff were aware of which choices were healthier, signs were made for each food outlet identifying which products were ‘everyday’ or ‘sometimes’ choices. Signs were provided in A4 and A3, the A3 copies were laminated so they could be displayed on the wall for easy reference. The laminated copies were intended to last longer because they could be cleaned when dirty.

The FNS implementation was aided greatly by the adoption of a nutrient profiling tool. The adoption and adaptation of the FNS FBCS was a complex process with many potential limitations that needed to be resolved with pragmatic solutions. Ensuring the foodservice staff were involved in the development of the FNS FBCS and the creation of accurate recipes helped with buy-in and understanding from the staff. Some foodservice staff were interested in the classification of the foods and how the food they prepared ‘rated’ using the system. This interest suggested that some foodservice staff understood and supported the FNS FBCS.

### **6.3.3 Negotiated, positive and flexible actions**

The final critical success factor for the development and implementation stage of FNS was a flexible, negotiated approach that prioritised positive transformational change. Many action research projects are characterised by high uncertainty about problems and high disagreement about solutions and thus actions may evolve as the project progresses (Patton, 2011). FNS actions were informed by the needs assessment, but needed to be tailored to the particular food outlet and there was no certainty that actions would be effective. Another complex characteristic of FNS, was that actions were implemented as a cluster and therefore any effects of FNS were based on the interactions and relationships between the actions, the foodservice and the customers (Patton, 2011).

To effectively manage the uncertainty associated with the high level of FNS complexity, actions were negotiated between the researcher, foodservice and suppliers to ensure win-win solutions to encourage support from stakeholders. In addition, participants' requests had to be balanced with the operational and financial foodservice objectives. This took much negotiation between the researcher, foodservice and suppliers. One example of this negotiation is that larger portions of energy drinks, which are a top seller, were at the bottom of the fridge and that only smaller serve artificially sweetened energy drinks were used in promotions. A similar arrangement was developed for confectionary in the food outlets. These solutions provided these popular products for customers, however smaller pack sizes were promoted and easier to access in the food outlets.

Another area of negotiation was between customers desires and the New Zealand Healthy Eating Guidelines (New Zealand Ministry of Health, 2003). As already discussed, some students at AUT University were not motivated to eat healthier choices (Chapter five, section 5.2.7) but the food outlets still need to meet their desires or they



may start looking for alternatives. The researcher was responsible for ensuring that FNS actions were consistent with healthy eating guidelines but still provided choice for customers who may perceive healthier choices as undesirable. One way this negotiation was managed was through focussing FNS social marketing on success rather than health.

#### **6.4 Summary of the Development and Implementation Stage**

Translating the needs assessment findings into implementable FNS actions was a complex process but resulted in the creation of an integrated, comprehensive and varied multifaceted programme. The journey of change for the foodservice operation to create a healthier eating environment was coordinated by the researcher and facilitated by three critical success factors. Critical reflection, aligned with formal and informal learning cycles, helped to establish transparent thinking and decision making by the researcher and the foodservice management team. Collaboration and consultation were inherent in every aspect of the development and implementation process and thus effective working relationships were essential. Stakeholder engagement was high and pragmatic actions were negotiated between multiple stakeholders, often with competing priorities.

## **Chapter Seven: Evaluation**

Evaluation is the final stage in this research and in an action research learning cycle, incorporating the observation and reflection steps (Chapter three, figure 3.1). This evaluation aimed to assess the effectiveness and appropriateness of the combined FNS actions and the process of change to create a healthier eating environment. The results of the observational environmental audit and sales reports demonstrate how the eating environment and purchasing behaviour changed on campus. Thematic analysis of focus groups and semi-structured interviews with staff, students and the foodservice manager provided information about the appropriateness of FNS actions and the process of change for the foodservice operation and university staff and students.

### **7.1 Observational Environment Audit: Evaluation Findings**

The observational environment audit was completed in all 14 food outlets on campus. Findings from the baseline observational environmental audit (Nutrition Environment Measures Study – Restaurants) indicated that the eating environment on campus had very little promotion of healthier or less healthy eating patterns (Chapter five, section 5.3). Seven months later, the evaluation NEMS-R audit demonstrated that all AUT-managed food outlets had introduced labelling and printed media promotion of healthier choices and eating patterns such as eating fruit as a snack (table 7.1). In three of the four AUT-managed food outlets, combo meals, comprising ‘everyday’ and ‘sometimes’ foods, were promoted. In contrast, five of the ten contracted outlets had started promoting less healthy eating patterns such as encouraging larger portion sizes, reducing the availability of smaller portion sizes and introducing combo meals adding energy-dense side dishes and beverages (table 7.1). The complete results from both needs assessment and evaluation NEMS-R audits are in Appendix I).

*Table 7.1 Summary of changes in the eating environments identified by the observational environmental audit of all campus food outlets between March and October 2010*

AUT-managed outlets (n=4)	Contracted outlets (n=10)
<u>Descriptive information<sup>a</sup></u>	
No change	No change
<u>Food and beverage review<sup>b</sup></u>	
All four outlets identified healthier main and snack choices.	Slight increase of 4.3 choices in the average variety of main choices available per outlet
Slight increase of 4.9 choices in the average variety of snacks available per outlet	One outlet introduced fresh fruit for sale
One outlet introduced salad. Therefore at endpoint all four outlets offered salad	
<u>Promotion in eating environment<sup>c</sup></u>	
Three out of four outlets promoted healthier choices at endpoint	Three out of ten outlets had started promoting less healthy eating practices such as adding hot chips for a small additional cost, or buying two full sugar carbonated soft drinks for less than twice the price of one
Four outlets promoted healthier eating practices at endpoint	
<u>Facilitators and barriers to making healthier choices<sup>d</sup></u>	
Four outlets identified healthier choices at endpoint	Two fewer outlets offered reduced sized portions at endpoint.
Three outlets were promoting combo meals where it was cheaper to buy the products together. However, the combo meals contained healthier choices that met the 'everyday' or 'sometimes' classification.	One outlet displayed point of choice signage encouraging customers to buy a healthier choice. However, this outlet also had additional costs associated with this healthier request, which could have discouraged customers from choosing this option.
Choices identified as healthier were the same price as less healthy choices.	
<sup>a</sup> opening hours, type of menu and types of service offered	
<sup>b</sup> range of food and beverages offered, identification of healthier choices	
<sup>c</sup> printed media promoting healthier or less healthy foods and/or healthier or less healthy eating practices	
<sup>d</sup> signage, pricing and portion sizes that encourage or discourage healthier choices	

The evaluation NEMS-R audit provided evidence that the AUT-managed food outlets had moved towards promoting healthier choices and eating patterns, while half of the contracted outlets moved towards promoting less healthy choices and eating

patterns. While it is likely that FNS was responsible for the shift in the AUT-managed food outlets, it was unclear why some of the contracted outlets shifted towards promoting less healthy choices because detailed information was not available.

## **7.2 Sales Reports Analysis**

The next type of data collected and analysed in the evaluation stage were the detailed sales reports from the four AUT-managed food outlets, which incorporated over one million items purchased over three years (2008, 2009, and 2010). The reports detailed quantity purchased, revenue and the food cost per item line. Sales reports from 2008 were used as pre-implementation information because changes to the foodservice started from early 2009. Reports from 2008 were compared with 2009 and 2010 reports, which was when FNS actions were implemented. Full calendar years were used as the unit of analysis because significant FNS actions, for example cost effective fruit, were implemented at different times, although most actions were first implemented in April 2010. The lack of a tightly controlled implementation phase is consistent with the iterative action research approach used. However, the staged implementation precludes the use of a tight pre and post implementation analysis timeframe.

Revenue is defined as the money the food outlets received for food and beverage sales without any costs removed. The food cost is the money that the food outlets pay to buy the raw ingredients or the prepared products. Data is reported within year by product line (unique barcodes), grouped by the Feed Your Need to Succeed Food and Beverage Classification System codes ('everyday', 'sometimes', 'rarely' and 'undefined'), and product type category (beverages, snacks, heated savouries, prepared bread products and other).

### 7.2.1 Food and beverage lines available in AUT-managed food outlets

Table 7.2 outlines the number and percentage of product lines available in the four AUT-managed food outlets according to the FNS FBCS.

*Table 7.2 Proportion and number of food and beverage products available from AUT managed food outlets from 2008 to 2010 according to Feed Your Need to Succeed Food and Beverage Classification System codes*

Classification of product	2008 <sup>a</sup> %	n	2009 %	n	2010 %	n
<u>All food and beverages</u>	(n=1361)		(n=1637)		(n=1855)	
Everyday	12.3	167	11.6	189	12.4	230
Sometimes	21.2	289	20.8	341	21.6	400
Rarely	52.8	719	55.4	906	49.8	924
Undefined <sup>b</sup>	13.6	186	12.3	201	16.2	301
<u>All food items</u>	(n=730)		(n=1021)		(n=1218)	
Everyday	12.1	88	10.6	108	11.0	134
Sometimes	18.1	132	20.9	213	21.4	261
Rarely	58.2	425	59.5	607	52.9	644
Undefined <sup>b</sup>	11.6	85	9.1	93	14.7	179
<u>All beverage items</u>	(n=629)		(n=616)		(n=599)	
Everyday	12.6	79	13.2	81	15.4	92
Sometimes	25.0	157	20.8	128	17.5	105
Rarely	46.7	294	48.5	299	47.9	287
Undefined <sup>c</sup>	15.7	99	17.5	108	19.2	115

<sup>a</sup> line by line sales data were not available for all sales in one food outlet in 2008. 2.7% of sales data is missing from the food items. The data for the beverage items are complete.

<sup>b</sup> undefined products are those that are unable to be defined according to the food and beverage classification system. They are unable to be defined because their ingredients change too much from day to day or they have no nutritional information panels for example hot meals that are not made to a recipe.

<sup>c</sup>undefined beverages consist entirely of tea, coffee and hot chocolate

Between 2008 and 2010, the average number of product lines available in each AUT-managed food outlet increased. In 2008, there were on average 340 product lines per food outlet. The average number of product lines increased by 20% in 2009, and increased again by 13% in 2010. The number of food product lines increased by 40% in 2009 and by a further 19% in 2010. In contrast, the number of beverage product lines decreased by 5% between 2008 and 2010.

Between 2008 and 2010, the proportion of healthier ('everyday' and 'sometimes') product lines available in the AUT-managed food outlets remained consistent at 32.3% -34%. 'Rarely' products represented 49.8%-55.3% and 'undefined' products represented 12.3% - 16.2% of all product lines available in the food outlets. The lack of substantial differences between numbers of product lines within each code indicates that newly introduced food items were evenly distributed between the different codes.

### **7.2.2 Food and beverage lines available in vending machines**

The process of deciding upon, and sourcing, healthier foods for the vending machines from the external contractor took approximately two years from initial negotiations to when all machines were fully stocked. In July 2010, the complete new range of snacks was available in the vending machines. Most of the time delay was caused by challenges in sourcing appropriate snack items.

In contrast to the AUT-managed food outlets, the proportion of healthier food product lines in the vending machines increased from 13.9% in August 2009 to 60% in August 2010 once the new range had been introduced. The total number of product lines in the food vending machines increased from 36 to 55 in August 2010. In beverage vending machines, the proportion of healthier beverage product lines increased from 21.2% in August 2009 to 32.3% in August 2010. In contrast to the food, the number of beverage product lines decreased from 33 choices in 2009 to 31 choices in 2010. These changes in proportion of healthier product line need to be interpreted with caution because data were not sourced about how many facings each product had in the vending machine. Therefore, it is possible that whilst the proportion of beverage product lines only increased by 10%, the total number of facings for healthier beverages may have increased, if one product line had multiple facings in the vending machines.

### **7.2.3 Quantity of food and beverages purchased in AUT-managed food outlets**

In contrast to the results for the number of food and beverages lines available, there was a meaningful shift towards purchase of ‘everyday’ food and beverage choices. The largest increase in the proportion of ‘everyday’ choices purchased occurred between 2008 and 2009 (21.8% increase), with a further but smaller 6.4% increase between 2009 and 2010 (table 7.3).

For food products specifically, the proportion of ‘everyday’ items purchased increased by 27.8% between 2008 and 2009 and by 6.2% between 2009 and 2010. Purchase of ‘sometimes’ foods also increased by 22.6% between 2008 and 2010. For beverages specifically, the proportion of ‘everyday’ beverages purchased increased by 9.1% between 2008 and 2010. Purchase of ‘sometimes’ and ‘rarely’ beverages decreased by 10.1% and 9.5% respectively between 2008 and 2010. Finally, the proportion of ‘undefined’ beverages purchased increased by 10.5% between 2009 and 2010. The majority of this change was attributed to an increase in the purchase of coffee, because 75.8% of all ‘undefined’ beverages purchased were coffees.

*Table 7.3 Proportion and number of food and beverage products purchased from AUT-managed food outlets from 2008 to 2010 according to Feed Your Need to Succeed Food and Beverage Classification System codes*

Classification of products	2008 <sup>a</sup>		2009		2010	
	%	n	%	n	%	n
<u>All food and beverage items</u>	(n=289229)		(n=358465)		(n=358965)	
Everyday	13.2	38153	16.1	57573	17.1	61348
Sometimes	12.6	36445	14.2	51034	14.0	50295
Rarely	40.4	116792	40.6	145690	33.9	119151
Undefined <sup>b</sup>	33.8	97909	29.1	104168	35.7	128162
<u>All food items</u>	(n=125389)		(n=172949)		(n=163900)	
Everyday	12.6	15814	16.5	28503	17.1	27971
Sometimes	16.8	21054	19.6	33885	20.6	33793
Rarely	55.3	69356	50.5	87313	46.9	76931
Undefined <sup>b</sup>	15.3	19165	13.4	23248	15.4	25205
<u>All beverage items</u>	(n=163264)		(n=185516)		(N=195056)	
Everyday	13.7	22339	15.7	29070	17.1	33377
Sometimes	9.4	15391	9.2	17149	8.5	16502
Rarely	29.0	47436	31.5	58377	26.2	51158
Undefined <sup>c</sup>	48.0	78458	43.6	80920	48.2	94019

<sup>a</sup> line by line sales data were not available for all sales in one food outlet in 2008. 2.7% of sales data is missing from the food items. The data for the beverage items are complete.

<sup>b</sup> undefined products are those that are unable to be defined according to the food and beverage classification system. They are unable to be defined because their ingredients change too much from day to day or they have no nutritional information panels for example hot meals that are not made to a recipe.

<sup>c</sup> undefined beverages consist entirely of coffee, hot chocolate and tea



*Table 7.4 Proportion and number of food and beverage products purchased from AUT-managed food outlets from 2008 to 2010 according to product type category and Feed Your Need to Succeed Food and Beverage Classification System codes*

Classification of products	2008 %	n	2009 %	n	2010 %	n
<u>Product type category</u>						
<u>Snack items</u>	(n=64027)		(n=89849)		(n=90059)	
Everyday	17.8	11416	22.6	20294	23.2	20870
Sometimes	13.5	8650	15.2	13690	15.6	14048
Rarely	68.7	43961	62.2	55865	61.2	55141
Undefined <sup>a</sup>	0.00	0	0.00	0	0.00	0
<u>Heated savouries</u>	(n=21803)		(n=24431)		(n=18434)	
Everyday	0.00	0	0.00	0	0.00	0
Sometimes	22.1	4819	33.5	8174	58.4	10760
Rarely	77.9	16984	66.5	16257	41.6	7674
Undefined	0.00	0	0.00	0	0.00	0
<u>Prepared bread products (PBP)</u>	(n=14999) <sup>b</sup>		(n=27035)		(n=21641)	
Everyday	23.4	3519	20.8	5620	27.2	5890
Sometimes	31.9	4790	35.2	9518	33.6	7279
Rarely	44.6	6690	44.0	11897	39.2	8472
Undefined <sup>a</sup>	0.00	0	0.00	0	0.00	0
<u>Other</u>	(n=24560)		(n=31634)		(n=33766)	
Everyday	3.6	879	8.2	2589	3.6	1211
Sometimes	11.4	2795	7.9	2503	5.1	1706
Rarely	7.0	1721	10.4	3294	16.7	5644
Undefined <sup>a</sup>	78.0	19165	73.5	23248	74.7	25205

<sup>a</sup> undefined products are those that are unable to be defined according to the food and beverage classification system. They are unable to be defined because their ingredients change too much from day to day or they have no nutritional information panels for example hot meals that are not made to a recipe.

<sup>b</sup> line by line sales data were not available for all sales in one food outlet in 2008. 2.7% of sales data (PBP only) is missing from the food items. The data for other categories are complete.

Division of the food products into product type categories (table 7.4), indicates that within the snack product category, the proportion of ‘everyday’ products sold increased from 17.8% in 2008 to 22.6% in 2009. This is the largest change in the ‘everyday’ code across all the food categories. This increase was associated with the introduction of competitively priced fruit during 2008. When sales from fruit are not included in the analysis, there is a significant decrease in ‘everyday’ and ‘rarely’ snacks sold and an increase in the ‘sometimes’ products sold (data not shown). ‘Everyday’

snacks represent 72.2% of ‘everyday’ food products purchased, suggesting that the increase in fruit sales was largely responsible for the increase in proportion of ‘everyday’ products purchased between 2008 and 2009.

The number of heated savouries purchased meeting the ‘sometimes’ criteria increased when a new supplier, who was able to supply ‘sometimes’ meat pies was introduced in June 2009. In 2008 only 22.1% of heated savouries purchased were classified as ‘sometimes’ products, whereas in 2010, 58.4% of heated savouries purchased met the ‘sometimes’ criteria. The impact of this shift is substantial; reducing saturated fat and salt purchased from pies by 178 kilograms and 17 kilograms respectively in the year after the supplier was changed. See Appendix J for a detailed analysis of the nutritional impact of changing the pie supplier.

The prepared bread products category (PBP) does not have complete data from one food outlet in 2008 so only the 2009 and 2010 sales information is described. There was a significant increase in the proportion of ‘everyday’ choices purchased (20.8% in 2009, 27.2% in 2010), with a concurrent decrease in the proportion of ‘rarely’ choices purchased (44.1% in 2008, 39.2% in 2009). The range of PBP provided did not change, but it is possible that labelling the healthier sandwiches with an ‘everyday’ label impacted the sales mix in two ways. Firstly, customers were preferentially choosing ‘everyday’ sandwiches and/or foodservice staff were preferentially making ‘everyday’ sandwiches.

These results indicate a pattern of preferential purchase of healthier choices by customers, even though the number of healthier product lines on the shelf did not increase. This pattern is shown in Figure 7.1; the proportion of ‘everyday’ choices purchased is higher than the proportion of ‘everyday’ choices available. In contrast, the proportion of ‘rarely’ choices available is much smaller than the proportion of ‘rarely’ choices purchased.

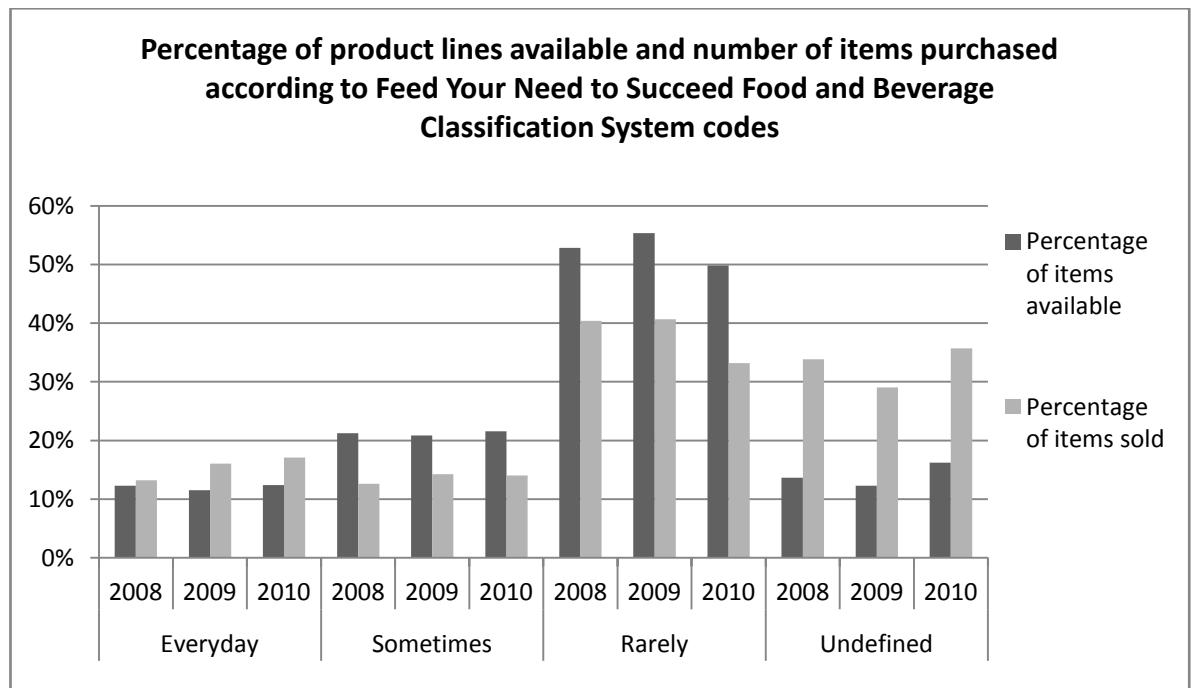


Figure 7.1 Percentage of product lines available and number of items purchased according to Feed Your Need to Succeed Food and Beverage Classification System codes

#### 7.2.4 Quantity of food and beverages sold in vending machines

A brief analysis of the sales reports provided by the vending contractor showed some anomalies, such as chocolate bars costing \$35.00 each when product line revenue was divided by number purchased, suggesting that this data set was not a valid measure of change. Therefore, the vending machine sales reports were not included in this analysis.

#### 7.2.5 Revenue and gross profit from AUT-managed food outlets

An underlying tenant of this research was that the not-for-profit AUT-managed food outlets maintained their revenue and gross profits after implementation of FNS. Together, the revenue from the four AUT-managed food outlets equals approximately \$1,000,000 per annum. This section assesses the impact of FNS on the revenue and gross profit of AUT-managed food outlets and gross profit margins of product lines according to overall revenue, product type category and FNS FBCS code. Gross profit is defined as total revenue less food costs and includes Good and Services Tax (GST),

but does not include food outlet expenses such as overheads and labour costs because these data were not available. The analysis is presented from all AUT-managed food outlets, rather than individual outlets, and using proportions rather than actual dollar values, to maintain confidentiality of commercially sensitive information about the food outlets.

One of the food outlets closed at the end of 2010 after several years of not breaking even. As FNS was being implemented, the foodservice manager was attempting to improve business in this food outlet by widening the product range and installing new display equipment. Feedback from the FNS needs assessment was used to tailor the provision of food to meet the expressed needs of customers from that particular food outlet. The FNS actions created “*some small positive improvements in some specific products*” (B. Sai Louie, personal communication, October 10, 2011), but they were not extensive enough to improve the profitability of this food outlet. The foodservice operation decided to close the food outlet because further development to improve the profitability of the outlet “*would require a large capital investment and additional payroll costs*” (B. Sai Louie, personal communication, October 10, 2011).

Analysis of the sales reports from the food outlet that closed, demonstrated that decreasing beverage sales, particularly hot drinks contributed to 70% of the reduction in gross profit between 2008 and 2010. The reduction in hot drinks contrasts with the other AUT-managed food outlets, where revenue and gross profit from hot drinks increased. FNS did not implement any actions associated with hot drinks; therefore it is unlikely that FNS actions directly impacted the loss of revenue and gross profit in this food outlet.

#### ***7.2.5.1 Analysis of revenue***

Changes in revenue for the food outlets reflected a positive shift in revenue from healthier (‘everyday’) choices and away from less healthy (‘rarely’) choices (Table 7.5).

*Table 7.5 Proportion of revenue from products sold from AUT-managed food outlets from 2008 to 2010 according to product type category and Feed Your Need to Succeed Food and Beverage Classification System codes*

Food groupings	2008 <sup>a</sup> %	2009 %	2010 %
<u>Food category groupings</u>			
Beverages	57.1	54.4	56.0
Heated savouries	6.2	5.5	4.0
Snacks	14.8	17.0	17.1
Prepared bread products	9.0	11.6	10.2
Other	13.0	11.5	12.7
<u>Food and beverage classification codes</u>			
Everyday	10.2	11.7	13.0
Sometimes	11.4	13.0	12.0
Rarely	37.7	40.0	35.1
Hot drinks <sup>b</sup>	27.3	24.1	27.2
Undefined <sup>c</sup>	12.9	11.2	12.7

<sup>a</sup> line by line sales data were not available for all sales in one food outlet in 2008. 2.7% of sales data is missing from prepared bread products. The data for the other categories are complete.

<sup>b</sup> hot drinks have been separated out from the 'undefined' category because they contribute such a significant proportion of revenue and gross profit

<sup>c</sup> undefined products are those that are unable to be defined according to the food and beverage classification system. They are unable to be defined because their ingredients change too much from day to day or they have no nutritional information panels for example hot meals that are not made to a recipe.

Total revenue for the AUT-managed food outlets increased by 20.5% from 2008 to 2009 and then again by 4.1% in 2010. Increases in the proportion of revenue from 'everyday' choices increased from 10.2% in 2008 to 13.0% in 2010. In contrast, the proportion of revenue from 'rarely' choices decreased from 37.7% in 2008 to 35.1% in 2010. The proportion of revenue contributed by 'sometimes' products increased in 2009, but then decreased in 2010. Hot drinks showed the opposite trend with a decrease in 2009 and then an increase in 2010. 'Undefined' food choices stayed relatively stable.

It is not apparent why the increase in revenue between 2009 and 2010 was smaller than the increase between 2008 and 2009. There is the possibility that creating a healthier eating environment did not encourage new customers in 2010. However, it is

also possible that the smaller revenue increase in 2010 was because rising costs and less discretionary income for students left less discretionary money to spend in the food outlets (New Zealand Union of Students' Associations, 2011).

The food categories with a change in proportion of total revenue of more than 2% between 2008 and 2009 were beverages (57.1% in 2008, 54.4% in 2009) and snacks (14.8% in 2008, 17.0% in 2009). Prepared bread products also increased from 9.0% of total revenue in 2008 to 11.6% of total revenue in 2009. However, the data set for prepared bread products in 2008 is incomplete for one of the food outlets, so this increase needs to be interpreted with caution. Between 2009 and 2010, the most movement in the proportion of revenue from a category was an increase from beverages (54.4% in 2009, 56.0% in 2010) and a decrease from heated savouries (5.5% in 2009, 4.0% in 2010).

#### *7.2.5.1.1 Analysis of revenue according to specific Feed Your Need to Succeed actions in AUT-managed food outlets*

Figure 7.2 presents the proportion of total revenue per year from each product category and FNS FBCS code.

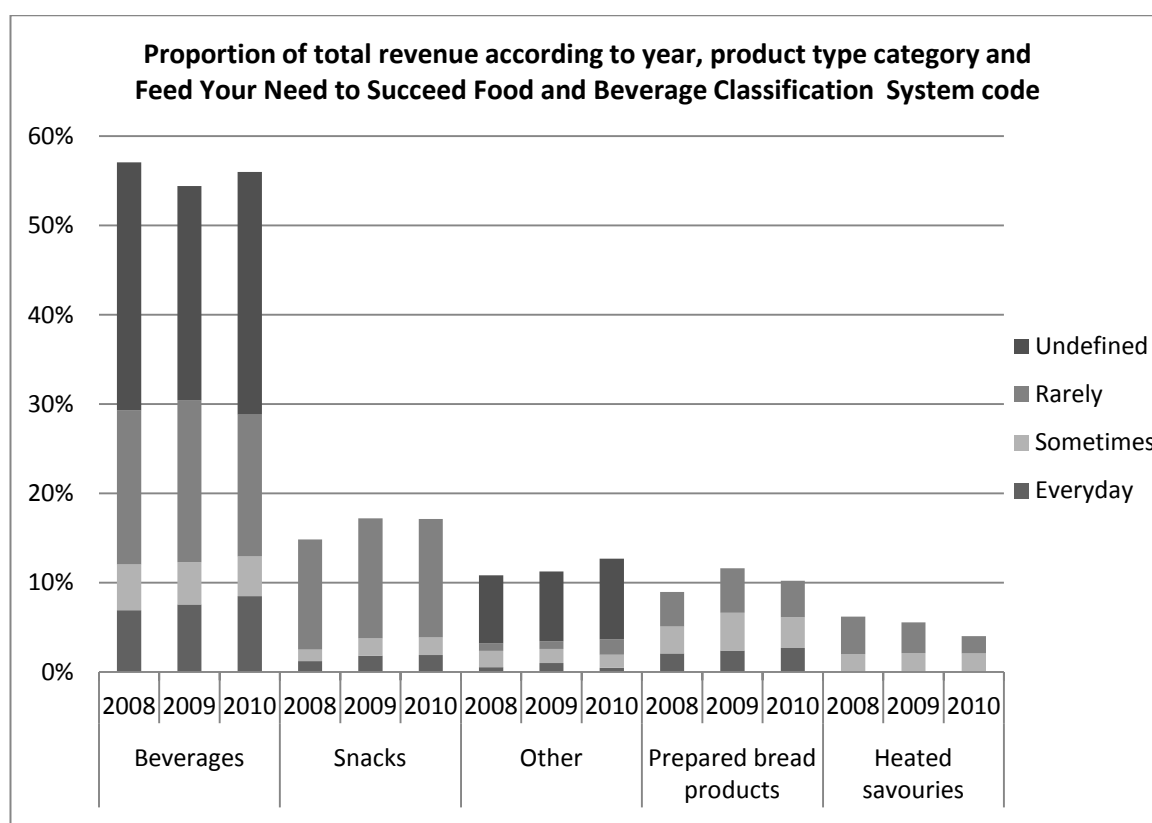


Figure 7.2 Proportion of revenue from food and beverage categories according to Feed Your Need to Succeed Food and Beverage Classification System code

There were two specific FNS actions that may have contributed to the increase in proportion of revenue from snacks (14.8% in 2008, 17.0% in 2009). These actions were the introduction of competitively priced fruit and healthier muesli bars to act as competition for the traditional high fat and sugar snacks.

The proportion of revenue from ‘everyday’ and ‘sometimes’ snacks increased by 47.8% and 50.9% respectively, from 2008 to 2009. In contrast, the proportion of revenue from ‘rarely’ snacks only increased by 9.3% between 2008 and 2009. The increase in ‘everyday’ snacks can be largely attributed to the increase in the quantity of fruit sold (84% increase between 2008 and 2009).

The competitively priced, healthier muesli bar, introduced to the AUT-managed food outlets in 2010, did not appear to substantially impact the revenue because the proportion of revenue from ‘sometimes’ snacks only increased by 2.0% from 2009 to 2010. Muesli bar sales represented 20% of the total bar (chocolate and muesli bar) sales

in the AUT-managed food outlets in 2010. It is important to note that although the introduced muesli bar constituted a significant share of the bar market, it did not negatively impact revenue.

Another FNS action that may have impacted overall revenue was changing the heated savouries supplier to one that provided healthier products. When the supplier changed, the price of a pie went up by 0.50c. As discussed earlier (section 7.2.3), this change had positive effects on the nutritional profile of heated savouries on campus, however, revenue from heated savouries decreased after the supplier changed. In 2008, heated savouries accounted for 6.2% of total revenue, in June 2009 the supplier changed, and by 2010, heated savouries only accounted for 4.0% of total revenue, representing a 35.5% decrease in revenue over two years.

When revenue from heated savouries is divided by FNS FBCS code, it becomes clear that the reduction in revenue comes predominantly from a reduction in the revenue from 'rarely' heated savouries (54.2% reduction between 2008 and 2010). In contrast, the proportion of revenue from 'sometimes' heated savouries increased by 3.5% between 2008 and 2010. The number of 'rarely' heated savouries purchased in 2010 was 52.8% lower than in 2009, yet the quantity of 'sometimes' heated savouries purchased increased between 2008 and 2009 by 31.6%.

The reduction in revenue and number of 'rarely' heated savouries purchased suggests that changing the heated savouries supplier was associated with negative impact on revenue because some customers stopped purchasing heated savouries. The increase in number of 'sometimes' heated savouries purchased suggests that customers were happy to buy healthier heated savouries. Therefore, it is more likely that the reduction in the proportion of revenue from heated savouries was because of the price increase rather than the change to healthier heated savouries. Evidence to support the price sensitivity of heated savouries can be found in the increase in purchase of sausage



rolls, which cost 40% less than pies. The proportion of sausage rolls increased from 12.8% of all heated savouries purchased in 2008 to 27.1% in 2010 (data not shown).

In 2010, healthier prepared bread products (PBP), like many food and beverage choices in the AUT-managed food outlets, were identified with ‘everyday’ or ‘sometimes’ labels to indicate the healthier choices. Between 2009 and 2010, the proportion of total revenue from PBP reduced from 11.6% to 10.2%. This reduction comes from a decrease in the proportion of revenue from ‘sometimes’ (4.2% to 3.5%) and ‘rarely’ (5.0% to 4.1%) PBP. In contrast, the proportion of revenue from ‘everyday’ PBP increased from 2.4% in 2009 to 2.7% in 2010.

The beverages category contributed over 50% of the overall revenue for the AUT-managed food outlets. Within the beverages category, the largest proportion of revenue came from hot drinks (48% on average), which fall into the ‘undefined’ FNS FBCS code. At baseline, there were already healthier beverage choices available, and this was not highlighted as an area of concern in the needs assessment. Therefore, the only FNS action that may have impacted on sales in the beverages category was restocking the drinks fridges at the beginning of 2009 to ensure that healthier choices were the most accessible. It is unclear whether this placement of healthier beverages impacted sales of healthier beverages. The three years of sales reports analysed show surprising variability within the beverages category, suggesting that it is a volatile product category and prone to frequent change.

#### ***7.2.5.2 Analysis of gross profit of the foodservice operation***

The combined gross profit from the four AUT-managed food outlets increased by 25% in 2009 and then was maintained between 2009 and 2010 (0.2% decrease). The performance of individual food outlets has not been compared to ensure commercially sensitive information remains confidential.

*Table 7.6 Proportion of gross profit from food and beverage products purchased from AUT-managed food outlets from 2008 to 2010 according to product type categories and Feed Your Need to Succeed Food and Beverage Classification System codes*

Food groupings	2008 <sup>a</sup> %	2009 %	2010 %
<u>Food category groupings</u>			
Beverages	57.0	55.4	55.9
Heated savouries	6.1	4.8	3.5
Snacks	14.3	14.9	15.4
Prepared bread products	10.1 <sup>a</sup>	13.3	11.8
Other	12.5	11.6	13.5
<u>Food and beverage classification codes</u>			
Everyday	9.8 <sup>a</sup>	10.6	11.1
Sometimes	10.6 <sup>a</sup>	12.6	10.9
Rarely	35.6 <sup>a</sup>	36.5	30.3
Hot drinks <sup>b</sup>	31.4	28.7	34.2
Undefined <sup>c</sup>	12.5 <sup>a</sup>	11.6	13.5

<sup>a</sup> line by line sales data were not available for all sales in one food outlet in 2008. 2.7% of sales data is missing from prepared bread products. The data for the other categories are complete.

<sup>b</sup> hot drinks have been separated out from the 'undefined' category because they contribute such a significant proportion of revenue and gross profit

<sup>c</sup> undefined products are those that are unable to be defined according to the food and beverage classification system. They are unable to be defined because their ingredients change too much from day to day or they have no nutritional information panels for example hot meals that are not made to a recipe.

Table 7.6 demonstrates the proportion of gross profit from food and beverages in the AUT-managed food outlets according to product category and FNS FBCS code. The FNS actions most likely to decrease gross profit of the AUT-managed food outlets were those offering healthier choices at discounted prices. The snacks category, which contributed 15% of total gross profit, had two healthier choices offered at discounted prices: fruit and muesli bars. The proportion of gross profit contributed from 'everyday' snacks increased from 1.0% in 2008 to 1.5% in 2009, and stabilised at 1.5% in 2010. The 2008 to 2009 increase can be related to increased purchases of fruit. Therefore, offering discounted fruit did not negatively impact gross profit of the foodservice operation.

The discounted, healthier muesli bars introduced in 2010, were classified by the FNS FBCS as a 'sometimes' product and accounted for 20% of all bars purchased in 2010. Even though the healthier muesli bars were two-thirds the price of regular chocolate bars, the gross profit margin was still in line with gross profit margins from other snacks within this category. The proportion of gross profit from 'sometimes' snacks increased from 1.5% in 2009 to 1.8% in 2010, indicating that discounting healthier muesli bars did not have a negative impact on the gross profit of the foodservice operation.

The cost based actions, offering discounts on healthier choices resulted in increases in the proportion of gross profit from these items. Therefore, the discounts offered were set at an appropriate level to ensure that increases in the number purchased would offset the discounts to ensure gross profit was not negatively impacted.

#### ***7.2.5.3 Analysis of gross profit margins***

For each distinct product line, differences between years in the gross profit per product line (revenue less the food cost) were determined. The median gross profit per product line was around \$62 in 2008 and 2010. The median gross profit per product line was higher in 2009 (\$94). The higher gross profit margin per product line in 2009 was influenced by three changes. First, the foodservice started contracting with suppliers who offered better discounts. Second, the foodservice combined some key product lines to provide one supplier with a larger business portfolio, thereby allowing for economies of scale. Finally, retail prices of some key foods items increased in 2009 to allow for food and raw ingredient costs increasing throughout New Zealand (B. Sai Louie, personal communication, September 30, 2011).

The decrease reported for gross profit margin per product line in 2010 is likely to be related to the foodservice absorbing the increase in food and raw ingredient costs. Between December 2009 and December 2010, food prices in New Zealand increased by

4.2% (Statistics New Zealand, 2011a). Some of this increase was because of the 2.5% increase in GST in October 2010; however grocery food and fresh fruit and vegetables increased by 4.9% and 4.0% respectively in the same time period (Statistics New Zealand, 2011a). Between 2009 and 2010, there were no significant rises in the retail price of food served in the food outlets, although there was a small increase in retail beverage prices (B. Sai Louie, personal communication, September 30, 2011).

The sales reports data were analysed to identify whether healthier items have a smaller profit margin than less healthy. The post-hoc Tukey comparison according to FNS FBCS code, identified that 'everyday' products had 22.8% (CI 0.0; 40.0,  $p=0.04$ ) higher gross profit margins than 'sometimes' products and 28.8% (CI 10.8; 43.2,  $p<0.001$ ) higher than 'rarely' products. 'Undefined' products had on average 56.4% (CI 16.5; 110.0  $p<0.001$ ) and 69.7% (CI 28.6; 123.9  $p<0.001$ ) higher gross profit margins per product than 'sometimes' and 'rarely' products respectively. There was no statistically significant difference between the gross profit margin of 'everyday' products and 'undefined' products.

The post-hoc Tukey comparison of gross profit margins of products according to product type category indicated that items in the beverage category on average had the highest gross profit margins of all categories. The gross profit margin on beverages was on average 27.7% (CI 9.8; 54.2,  $p<0.001$ ) higher than prepared bread products, 35.7% (CI 9.8; 54.2,  $p<0.01$ ) higher than heated savouries, 57.2% (CI 40.9; 69.0,  $p<0.001$ ) higher than 'other' products, and 59.6% (CI 51.2; 66.7,  $p<0.001$ ) higher than snacks. Prepared bread products had a gross profit margin that on average was 69.0% (CI 14.7; 148.8,  $p<0.001$ ) higher than 'other' products and 42.3% (CI 28.7; 56.4,  $p<0.001$ ) higher than snacks.

The snacks category had a lower average gross profit margin than several other food and beverage categories. Snacks are typically low cost products (0.60c to \$1.80

each); therefore the absolute gross profit margin per product is likely to be small.

However, because snacks on average accounted for 24% of products sold, it was, after beverages, the second largest contributor to revenue and gross profit.

These results demonstrate that healthier products do not necessarily have a lower gross profit margin and dependent on sales volume, may be in fact more profitable for a foodservice operation than other categories of food and beverages.

Labour and foodservice overheads have not been factored into this analysis, because these data were not available. Within some types of food such as hot main meals, healthier choices can require more labour hours because of additional preparation. However, for beverages, snacks, prepared bread products and heated savouries, healthier choices in the AUT-managed food outlets did not require any more labour to prepare and present for sale than less healthy choices.

#### **7.2.6 Revenue from food and beverage vending machines**

No analysis of revenue from the vending machines is available, because as mentioned previously, initial analysis of the sales reports provided by the vending contractor identified that these data were not a valid measure of change.

#### **7.2.7 Summary of the sales reports analysis**

The quantitative analysis of sales provides objective data demonstrating a favourable change in purchasing behaviour while financial objectives of the foodservice were maintained. Some explanation for the changes has been provided, however the following qualitative analysis provides further explanation for the change in purchasing behaviour.

### **7.3 Focus Groups and Interviews Analysis**

The success of FNS for increasing purchase of healthier choices is related to the appropriateness of the FNS actions for the foodservice and the staff and students on

campus. The evaluation of the appropriateness of FNS actions utilised focus groups, and interviews with staff and students and the foodservice manager to identify perceptions about FNS and the process of change that occurred. Thematic analysis of the focus groups and interviews with staff and students are presented, followed by the thematic analysis of the interview with the foodservice manager. Comments were invited about all aspects of the food provision on campus, not just the four AUT-managed food outlets.

### **7.3.1 Thematic analysis of evaluation consultation with staff and students**

Three main themes were identified in the analysis of focus groups and interviews with staff and student participants. Each theme will be discussed in turn.

#### ***7.3.1.1 Theme one: Suitability of actions***

The theme *suitability of actions* refers to participants' views on the FNS actions and the approach used to create a healthier eating environment. Three subthemes related to the suitability of particular actions were mentioned by participants: primacy of cost, vending machines – noticed but not used and labelling – help or hindrance?

Overall, there were positive comments about nearly all FNS actions. The salad bar, competitively priced fruit, vending machines and the 'everyday' and 'sometimes' labels were the most frequently noted.

*"I think that even simple things like; changing layouts and making things that are healthier look better or where they are makes a big difference. I definitely noticed it [FNS] without even particularly knowing it was your project" (Source: FG participant 7)*

However, there were also comments from participants' indicating they had not seen FNS actions, or that they did not believe that students knew about them.

*“I sincerely believe if you took a poll and asked what muesli bars cost at AUT, they [students] would all say “We have muesli bars?”. (Source: Staff FG participant 7)*

Participants’ who had noticed FNS actions, approved of the approach taken by the researcher and the foodservice operation.

*“you’ve made your recipes accessible as well as your information, that’s accessible as well. You’re not preaching, you’re not telling them what to do, it’s just making them aware” (Source: Staff FG participant 8)*

The first subtheme within *suitability of actions* is the primacy of cost, which was also highlighted in the needs assessment stage. Primacy of cost in this evaluation consultation seemed to reflect two main factors. First, participants’ reiterated that for students, money is often an issue and that they will preferentially buy the cheaper choice, even if they know it is not what they should be eating

*“I often find with all the healthy food it’s always a lot more expensive than the cheaper fatty food, like sometimes if we’ve only got \$3. The [name of regular special] is way cheaper than having to get a salad for \$5.50, and you know that they’re higher in fat, but you know sometimes, poor students can’t always afford healthier options” (Source: Student FG)*

The other factor raised by participants was that healthier options available in the food outlets were seen as something that participants could make themselves for less expense.

*“it’s \$5/\$6 for a bun with a little bit of chicken – you can bring an awesome sandwich from home at that price” (Source: Student FG)*

This comment highlights the aspect discussed in the needs assessment (*Attitude towards healthier choices* theme, Chapter five, section 5.2.7) that healthier choices are seen as ordinary, and therefore not worth paying a premium for.

The second subtheme in *suitability of actions* was ‘vending machines - noticed but not used’. The majority of participants (20 out of 29) had noticed changes in the range of foods available in the vending machines

*“I have noticed the vending machines around campus a little bit.*

*Particularly the reduction in chocolate – when you have to stop and*

*think, is that chocolate down there – in that little corner?” (Source: Staff*

*FG participant 6)*

More than half of the participants who had noticed the change in the range of products available in the vending machines then went on to say they do not use them (11 out of 18). Participants were “*sceptical*” about buying food from vending machines because they “*don’t know how fresh it is*”.

The final subtheme in *suitability of actions* was ‘labelling – help or hindrance?’ which incorporates opinions about the ‘everyday’ and ‘sometimes’ labels highlighting healthier choices in the AUT-managed food outlets. Some people thought the labels were the most effective and important FNS action, saying that:

*“I definitely think that those [labels] are the best from my perspective*

*just because it helps you realise what is good and what’s bad and change*

*your view on what you thought was a healthy option” (Source: Staff FG*

*participant 8)*

Other people disagreed, saying that:

*“I think I know what foods are healthy, I don’t need a sticker to tell me”*

*(Source: Student FG)*



Participants who appreciated the labels were typically those interested in what they ate, or those who wanted to make healthier choices, whereas, participants who did not appreciate or use the labels were those who may not have been interested in eating healthier choices. The two contrasting comments below exemplify this difference in participants approach to healthier choices:

*“I do find it pretty good because you do start to think about what you have and you think “Oh hang on, maybe I shouldn’t have that because I had that yesterday and that’s a ‘sometimes” (Source: Staff FG participant 3)*

*“We’re allowed to eat whatever we want during exams, that’s the rules” (Source: Student FG)*

These contrasting comments highlight that there are staff and students who will not be encouraged to eat healthier choices because of a label. However, the labels were useful for those who were interested in making healthier choices. Labelling healthier choices was an FNS action implemented with the understanding that it would be predominantly for customers who are consciously trying to find healthier choices. This assumption was supported with the information collected in the evaluation consultation stage.

A third set of focus group participants had not even noticed the labels

*“I haven’t even seen these [labels] on any of the foods. All I see is the food” (Source: Student FG)*

In one food outlet, the sandwich packs were brightly coloured, whereas in the other food outlets the sandwich packs were brown or white. The participants who reported not seeing the labels typically went to the food outlet that had the brightly coloured sandwich packs. It is possible that the labels did not provide enough contrast with the sandwich packs to be easily seen on the sandwiches in this food outlet.

However, because some participants had not noticed other FNS actions, it is possible that the labels had not been noticed for reasons other than the contrast with the background packaging.

### ***7.3.1.2 Theme two: Continuing unmet demand***

The theme of *continuing unmet demand* describes participants' frustrations and reservations about the current food provision. The main sources of unmet demand on campus were the perceived lack of variety and freshness of the food available. There were also participants who wanted to make healthier choices but found it challenging to do so.

Lack of variety was cited as a reason for participants' not using the AUT-managed food outlets

*"I just never eat here [on campus] cos there's not much variety"*

*(Source: Student FG)*

The lack of variety was evident as a source of dissatisfaction in the findings from the needs assessment stage (*Dissatisfaction with current service* theme, Chapter five, section 5.2.2). The fact that participants still believe there is not enough variety indicates that this was not successfully resolved during the first six months of FNS implementation.

The second area of unmet demand was participants' desires for 'fresh' food. Participants commented on not wanting to buy food from vending machines and from the salad bar because there was a perception that these foods were not fresh.

*"healthy food looks like it's been there for a while, that's like my only concern with buying it"* *(Source: Student FG)*

In addition, participants' were reluctant to buy food that was not pre-packaged into sealed containers.

*“cos it all looks really yum, but because it’s all open and there’s kind of nothing to cover it completely I’m scared of like germs and people coughing and stuff all over it” (Source Student FG)*

This comment was made in relation to the salad bar. In the needs assessment, participants were clear that they wanted to choose their own food rather than having pre-packaged salads so the salad bar was set up as a self-service option. There is clearly a tension between participants wanting to choose their own food, yet also wanting pre-packaged, convenient foods. From a foodservice perspective, this finding highlights the challenge of providing a service that meets the needs of all customers as well as food safety requirements.

The final area of unmet demand on campus was that participants still believed it was difficult to access healthier choices easily and that the majority of places on campus did not provide healthier choices

*“I don’t think there are enough healthy options actually, like I mean there’s two or three places that you can get hot chips from just here” (Source: Student FG)*

*“I know from my own perspective that it’s easier to grab a big chunky chocolate muffin when you’re buying your morning coffee than it is to go and get a healthier option” Source: Staff FG participant 6)*

These two comments highlight the challenge that participants still experienced accessing healthier choices after implementation of FNS. FNS was only implemented in four of the 14 food outlets on the two campuses. Therefore, it is likely that if participants’ did not frequent these food outlets they would have struggled to find healthier choices. The second comment also highlights the challenge of finding healthier choices for certain meal occasions, particularly breakfast options. Healthier breakfast options were not explicitly targeted in FNS, but this could be a target area for the future.

Sources of unmet demand in the evaluation consultation indicated that there were still challenges facing the food outlets on campus. The congruence between comments in the needs assessment and evaluation stage demonstrated that FNS actions were not extensive enough to change participants' perceptions of sources of dissatisfaction. The repetition of the lack of variety and the challenge of finding healthier choices indicates that these are two areas that should be a high priority in the future.

### ***7.3.1.3 Theme three: Future actions and directions***

The final theme *future actions and directions* combined participants' comments about what they think FNS should focus on in the future and offers of help and assistance from key participants such as the student union. As mentioned in the previous theme, participants' specifically mentioned breakfast as a challenging area to find healthier choices and believe that both staff and students come to university without having breakfast.

*"I think definitely breakfast, especially in peak busy times of the year, especially for students when they're studying and stuff, they come in really early and don't necessarily have time to eat before they get here"*  
(Source: Staff FG participant 6)

Breakfast was the only focused recommendation for future action, other recommendations were more generic, but focused on more effective communication on campus. People highlighted the need to use social networking tools to raise the FNS profile as well as other electronic forms of communication. The FNS communication actions were secondary in focus to the environmental changes in the AUT-managed food outlets, but will need to be a constant component of FNS in the future because there is a constant turnover of students on campus.

*“I think in any university situation the two main things that you need to continually focus on are communication and cutting costs... .. you have people graduating every year so you have to keep communicating about what is going on” (Source: Staff FG participant 7)*

There were other comments from participants endorsing consolidation and improvement of current actions before starting new ones:

*“focus on the things that you’ve already done and try and improve them, like the salad bar, make it bigger, more tempting, you know, try and get it as cheap as possible” (Source: Staff FG participant 2)*

The final part of the *future action and directions* theme was the assistance that participants offered for the future promotion of FNS. Some of these offers were: 1) assistance with linking FNS social networking into other university social networking, 2) opportunities to write for the monthly Health and Safety newsletter, 3) working with student groups in the business school to develop marketing and promotional activities and 4) opportunities to link in with university Orientation activities. There was an underlying pastoral care approach from some of the student support services, which often led to offers of assistance.

*“from our perspective, we don’t want students to be drinking a [energy drink] and eating a pie everyday” It’s not good for their brains , and it’s not good for their health so whatever we can do to help you know”*  
*(Source: Staff FG participant 8)*

This comment acknowledges participants’ belief in the importance of eating a balanced diet for university students. Key stakeholders having this attitude on campus is crucial to the continuation and future development of FNS.

#### ***7.3.1.4 Summary of thematic analysis of staff and student consultation***

The evidence provided by this thematic analysis demonstrated that some FNS actions were appropriate for participants'. In particular, the cost based actions were frequently mentioned. Some future actions were recommended, but participants' also suggested strengthening current actions before moving onto new ones. There was less recognition of the FNS programme than expected. This may have been because the communication activities such as posters, articles and recipes went largely unnoticed. However, it is important to note that even though participants were not aware of FNS per se, there was a meaningful shift towards the purchase of healthier choices on campus. This may indicate that creating a healthier eating environment without an extensive marketing campaign, can be appropriate and effective on a university campus.

#### **7.3.2 Thematic analysis of interview with foodservice manager**

The foodservice team are largely responsible for creating and maintaining a healthier eating environment. Therefore, it is important to evaluate the appropriateness of FNS from the point of view of the foodservice operation. The thematic analysis of the semi-structured interview with the foodservice manager (FSM), discusses the appropriateness of FNS actions and the implementation process for the foodservice operation. Three themes emerged from the analysis of the interview which discussed FNS actions, the challenges that FNS faced and how FNS could be developed in the future to better align with the priorities of the foodservice.

##### ***Theme one: Mixed success***

The *mixed success* theme brings together comments from the FSM about the implementation of FNS. The FSM thought the 'everyday' and 'sometimes' labels on the food were well implemented and encouraged purchase of healthier choices. In addition,

the FSM believed that actions focusing on cost reduction (fruit and muesli bars) alongside promotion in the food outlets were also well implemented and effective.

*“I think another reason why the sales [of fruit] did go up was also the point of sale you prepared. That made it in the customers face, because besides that there was no other advertising that I was aware of to the students. So if they were alert enough to know if you want a piece of fruit for 60c go to...”*

The FSM also highlighted that it was the simple changes that were most likely to be implemented because the foodservice staff were able to adapt to new operational practices. The FSM used the example of the ‘everyday’ and ‘sometimes’ labels as evidence of this.

*“I think it was successful because they [the labels] were there, the staff knew that on a particular type of pie they were supposed to put a certain coloured sticker. Whether they did that all the time, I don’t know, but I think they got into the habit because I was seeing enough labels around, as opposed to not seeing any labels around”*

The FSM believed that there was variability in the support of foodservice staff for FNS, which impacted on the implementation of certain actions such as the loyalty cards and the combo meals. When asked about what may have made some staff more supportive of FNS actions than others, the FSM responded:

*“because they believe in what you are trying to do. The others... ..may agree by nodding their heads but not demonstrate through their actions”*

The actions the FSM believed were not implemented as well as they should have been were those requiring more input and effort from the foodservice staff. During the development and implementation stage, the majority of communication was between the researcher and the foodservice management team. Some consultation occurred with

foodservice staff for some actions such as the labels. Unfortunately, the high turnover of staff in the foodservice made it challenging for the researcher to develop rapport and effective relationships with all the staff members.

The FSM also noted that actions reliant on communication between customers and the food outlets were not as successful as he would have wished. The FSM believed that there would have been benefits from additional and ongoing three-way communication between the food outlets, the researcher and customers. However, he acknowledged that facilitating this three-way communication would have *“required a huge amount of time by the researcher, which that person did not have”*.

### ***Theme two: Challenges of such a big project***

The *challenges of such a big project* theme incorporated the FSM’s thoughts about how the scope of FNS was both a source of strength and a source of challenge.

The FSM believed that the strength inherent in the scope of FNS was that the programme proactively tackled issues that were going to become more prominent in the future. The FSM located FNS as a *“very small part of a much bigger picture”*. He sees FNS as part of an international trend to create healthier eating environments in educational organisations. He believes there will be more demand for healthier choices in the future because there is more awareness of obesity and that the foodservice industry should be responsible for providing healthier choices for their customers.

The large scope of FNS was reflective of the results from the needs assessment, which the FSM believed was also a strength of FNS.

*“You needed to go through that process to confirm what was in our minds anyway. Otherwise we may well have been going down a track that was based upon one or two people’s opinions of what was needed”*

The FSM believed that the large scope of FNS also created weaknesses and challenges throughout the development and implementation process. The FSM believed



that the number of areas that the food outlets were trying to act upon and change became distracting at times.

*“I think during the whole process of the last 2 ½ years, because we’ve talked about so many different tangents areas as we’ve been down the journey. I’m not saying that I lost sight of where the end objective was, because I don’t think I did. But at times we got too tied up with what were good ideas and it’s the simple ideas that we achieved that unfortunately didn’t lead on to some of the more important ones”*

Implicit in the last part of this quote is the frustration the FSM felt that some staff had not bought into the ethos of the programme and how the limited buy in from staff impacted the success of FNS actions. The FSM mentioned differing priorities for staff members and also the different food outlets which were not always aligned with FNS actions. One example given was that the muesli bar was being removed from one of the food outlets because it did not fit with the “*style of the café*”. The FSM believed that staff buy in was a limiting factor for the success of FNS.

*“I think that the whole programme could’ve been more successful if we had more buy in from the staff”*

But, the FSM was also hopeful that the level of staff buy in would improve once FNS had been in place for a longer period of time.

*“I’m sure if you asked the staff members, once it [FNS] had been there for a year or more, they will give you a different answer, that yes they have understood, yes they have bought in”*

Although the FSM recognised that staff are more likely to buy into the ethos of FNS after it had been in place for longer, he stressed that the high staff turnover in the hospitality industry creates additional challenges in this area. High staff turnover rates mean that all foodservice staff do not necessarily transfer over between academic years.

However, all staff, regardless of their length of tenure, should meet the expectations of the FSM and promote FNS actions and interact with customers to encourage them to engage with FNS actions. It is possible that the high turnover rate of staff has created a situation in the food outlets where FNS actions will be maintained by all foodservice staff but further development of FNS will be coordinated by long standing or particularly motivated staff members.

### ***Theme three: Future development***

The *future development* theme details the FSM's ideas for the future for FNS, how it will be maintained and what areas need to be developed further. The main area that the FSM believed needed more development was communication between the food outlets and their customers

*"I don't think we have done a very good job of advertising to students  
that at outlet x there's now a range of ABC foods"*

The FSM indicated a desire to use more electronic forms of communication, including social networking tools. However, he believed that this may be challenging for the foodservice because of resourcing.

*"it comes back to me, and putting... It's not a priority right now. I'm  
well aware it's a high priority, it's just coming, putting the time and  
effort and resources – human, into it"*

The FSM talked about how FNS might continue in the food outlets. He spoke of a desire to be given information about what has been successful and unsuccessful *"so that we don't go and repeat and make the same mistakes"*. He acknowledged that in the future FNS may not include all the actions and that a key area for development is to find ways to *"say the same message in different formats"*. The FSM highlighted the need for the food outlets to use marketing strategies more effectively.

*“It’s their marketing of it [FNS]. Blowing their own trumpet, telling these students and staff to go into x café because there’s now a ... and I wish there was a way that we could easily blow our trumpet so that we’re getting the message [across]” I think it’s just something that we’ve just got to work at on an ongoing basis without trying to invest a lot of time”*

There exists in the FSM’s quotes evidence suggesting that there are competing tensions between wanting to promote FNS, yet not having the resources to do so. This is likely to be the case with most foodservice managers and food outlets. The foodservice industry can often be under-resourced and as a result can end up focussing on the next rush of customers rather than having the capacity to rise up and look at the big picture to develop proactive solutions (Lachat et al., 2011).

The interview with the FSM highlights some key findings for FNS that align with the thematic analysis of the participant consultation. Both groups identified the limited implementation of some FNS actions as well as the excellent implementation of others and that more communication would be beneficial. The FSM in particular recognised the high amount of human resource that would need to be committed to communication between the food outlets and the staff and students on campus to make a noticeable difference. Overall, both groups were positive about the start that FNS has made on campus. They recognised that there are challenges ahead, but the high level of support for FNS was apparent through offers of assistance and a willingness to continue to collaborate to develop FNS.

#### **7.4 Summary of the evaluation**

After FNS implementation, the AUT-managed food outlets promoted healthier choices through posters and labelling actions, although there was varying levels of recognition for these changes in the staff and student consultation. FNS actions and the

process of change were largely appropriate for the foodservice operation, revenue and gross profit were maintained and most strategies were implemented in the food outlets. Those actions that were not implemented required additional buy in from foodservice staff and were limited by the high staff turnover and competing priorities in the foodservice.

Furthermore, after FNS implementation there was a favourable change in purchasing behaviour of healthier choices, particularly in the snacks category, because of the provision of competitively priced fruit and healthier muesli bars. The congruence between the high recognition of competitively priced fruit in the participant consultation and the reported increase in fruit sales suggests this was an effective and appropriate action because of the primacy of cost in customers' food choice decisions. This evaluation demonstrates that the integrated, comprehensive and varied FNS programme was successful at creating a healthier eating environment in the four AUT-managed food outlets, without compromising their financial and operational objectives.

## **Chapter Eight: Discussion**

The Feed Your Need to Succeed programme successfully created a healthier eating environment on campus. Healthier choices were easier to identify and purchase (accessibility) because of labelling, cost based actions and product placement. Further, the number of healthier product lines (availability) in vending machines increased by 330% (food) and 52% (beverages). The proportion of healthier choices purchased in the AUT-managed food outlets increased from 26.5% to 31.1% over two years, whilst operational and financial objectives of the foodservice were maintained. The action research and collaboration with the foodservice and consultation with staff and students was integral to the appropriateness of FNS actions.

This chapter combines findings from all research stages to answer the research questions and provide context and explanation for the favourable evaluation findings. More specifically, evidence for the effectiveness and appropriateness of FNS is critiqued in the context of existing literature and then interwoven to create a ‘Guiding framework for foodservice change’. Finally, this chapter ends with discussion about contributions, limitations, strengths, significance of this research and avenues for future research before presenting conclusions for this body of work.

The dual focus, on the change process and outcomes, reflects the gap in the literature that this research aimed to fill. This research is timely because of the increasing support for regulation of eating environments (Swinburn et al., 2011; World Health Organisation, 2011a). Yet, there is little evidence demonstrating *how* a foodservice can go through a process of change to promote healthier choices without compromising financial or operational objectives.

### **8.1 Effectiveness of Feed Your Need to Succeed**

The effectiveness of FNS was defined by the extent to which accessibility, availability and the proportion of healthier choices purchased increased in the AUT-

managed food outlets. The research questions reflecting on the effectiveness of FNS were:

*What effect did the combined changes to create a healthier eating environment have on the availability and accessibility of healthier food and beverage choices on campus?*

*How do changes to the eating environment affect the purchase of healthier food and beverage choices on campus?*

An extensive search of the literature over three years, using the search terms: foodservice and food service intervention, foodservice and food service change, healthy eating programme and school food programme, found limited reports in food outlets (n=8) using sales reports as the primary outcome (table 8.1). There were no reported studies in food outlets, using sales reports as the primary measure, which collaboratively developed and implemented the breadth of actions in FNS. Furthermore, there was only one long term study of two years (French et al., 2004) reported. All other studies reported in table 8.1 implement actions for only three to five weeks. These short term studies can provide no clear conclusions about whether long term purchasing behaviour change was achieved. Nor are there any indications about whether the food outlets were able to maintain their revenue, gross profit or operational practices during the implementation of strategies. Short term pilots and feasibility studies provide proof of principle, but because they are often implemented in a more controlled environment, they may not necessarily reflect the reality of a naturalistic foodservice setting.

*Table 8.1 Comparison of Feed Your Need to Succeed with other programmes in food outlets that used sales as an outcome measure*

Location and reference	Baseline measures	Length of intervention	Actions			Outcomes	
			Pricing	Availability	Communication	Proportion of healthier choices available and number purchased	Revenue/profit
University food outlets (4) FNS	Two years sales reports	7-24 months (2 actions implemented earlier)	Competitively priced snacks Loyalty cards Combo meals	HC in VM Prime placement of HC Engagement with suppliers to reformulate	Communication with foodservice and customers to develop strategies HC labelled with a logo Awareness raising campaign Weekly articles and recipes	Year 1: ↔proportion of HC available, ↑22.7% HC (food) purchased: (29.4%→36.1% total purchases), ↑7.8% HC (beverages) purchased: (23.1%→24.9% total purchases) Year 2: ↔proportion of HC available, ↑330% proportion of HC (food) available in VM ↑52% proportion of HC (beverages) available in VM ↑4.4% HC (food) purchased: (36.1%→37.7% total purchases), ↑2.8% HC (beverages) purchased: (24.9%→25.6% total purchases)	Revenue ↑20% year 1 ↑4% year 2 Profit ↑25% year 1 ↓0.19% year 2  VM data not measured
Secondary school cafeteria (10 control, 10 intervention) (French et al., 2004)	Nil – case control study	Two years	Nil	↑ a la carte lower fat choices	School-wide, student based promotions of lower-fat options	↑51% HC available (intervention) ↓5% HC available (control) Year 1: ↑ mean percentage of sales of HC (27.5% intervention, 19.6% control, p=0.096) Year 2: ↑ mean percentage of sales of HC (33.6% intervention, 22.1% control, p=0.042)	↔ revenue in year one or two

Location and reference	Baseline measures	Length of intervention	Actions			Outcomes	
			Pricing	Availability	Communication	Proportion of healthier choices available and number purchased	Revenue/profit
Secondary school (2) (French, Story, et al., 1997)	Three weeks	Three weeks	50% discount on fruit, baby carrots and salad	Introduced baby carrots	Minimal signage at point of choices	Average weekly purchases ↑ fruit (14.4 baseline, 63.3 discount period, 62.1 follow-up) ↑ carrots (35.6 baseline, 77.6 discount period, 42.0 follow-up) ↔ salad (14.6 baseline, 16.0 discount period, 16.0 follow-up)	Not measured
Restaurant (1) (Horgen & Brownell, 2002)	3 weeks 2 weeks interim baseline	43 days	↓20-30% HC for 3 weeks, then 2 weeks combined with health messages	Nil	Brief health messages about targeted HC	↔ overall sales Pricing results (mean daily sales): ↑ HC sandwich (1.81 → 12.9) ↑ HC salad (2.7 → 6.24) ↑ soup cup (6.71 → 15.24) ↑ soup bowl (3.24 → 8.33) Health message and combination results: No significant differences from preceding period but some significantly different from initial and interim baseline	Not measured
Workplace cafeteria (1) (Jeffery et al., 1994)	3 weeks	3 weeks intervention 3 weeks follow up	50% decrease in cost for fruit and salad	Doubled fruit and salad options	Nil	↑ 300% fruit and salad purchases during intervention ↑ mean salad purchases at follow up (8 → 12 pounds purchased per day) ↔ fruit purchases between baseline and follow up	Not measured
Workplace	3 weeks	6 months with	Nil	Study group	Study group 1:	↔ 5 out of 6 target categories	Not measured



Location and reference	Baseline measures	Length of intervention	Actions			Outcomes	
			Pricing	Availability	Communication	Proportion of healthier choices available and number purchased	Revenue/profit
cafeterias (17 between 4 study groups) (Steenhuis, van Assema, van Breukelen, et al., 2004)		first 3 weeks of sales used as measure		2: ↑HC available in 6 target categories (details unspecified)	Awareness raising about healthy eating Study group 3: HC labelled with encouraging signage	↑20% HC desserts on average between group 3 and group 1 (p<0.01)	
University hall of residence dining hall (1) (Buscher et al., 2001)	2 weeks baseline and 1 week follow up	4 weeks with one food category labelled each week	Nil	Nil	HC labelled with sensory and convenience attributes	↔ overall sales ↑ yoghurt (2.62% of transactions at baseline, 3.76% at follow up) ↑pretzels ↑ whole fruit (1.91% of transactions at baseline 3.26% at follow up)	Not measured
University campus convenience store (1) (Freedman & Connors, 2010)	6 weeks	5 weeks	Cost of labelled items same as unlabelled	Nil	HC marked with 'Fuel your life' shelf tag	↔ quantity of any one food items sold Trend emerging: ↑ overall sales of tagged items as a percentage of total sales in targeted category	Not measured
Workplace cafeterias ( 12 control, 12 intervention) (Vyth et al., 2011)	3 weeks	3 weeks intervention 3 weeks post-intervention	Cost of HC same as non HC	Nil	HC labelled with logo with an integrated awareness raising campaign	↑ 1 piece of fruit per 50 employees in intervention groups maintained throughout post-intervention period ↔ other target food items	Not measured

HC – healthier choices

FTE – full time employee

Two reported studies in food outlets (French et al., 2004; Steenhuis, van Assema, van Breukelen, et al., 2004) focused on increasing the availability and accessibility of healthier choices, whereas other reported studies only focus on increasing accessibility of healthier choices.

The lack of increase in the proportion of healthier product lines (availability) in the AUT-managed food outlets, contrasts with the 50% increase in the proportion of low fat product lines that French et al (2004) demonstrated over two years in secondary schools. However, similar to FNS, French et al (2004) identified a 22.2% increase in the proportion of healthier choices purchased over two years. FNS demonstrated increased purchase of healthier choices (25.8% to 31.1%) with decreased purchase of less healthy choices (40.4% to 33.2%), suggesting that customers were replacing less healthy choices with healthier choices. Purchase of 'undefined' choices also increased from 2008 to 2010 (33.8% to 35.7% of total purchases). This increase is attributable to the increase in sales of hot beverages (mainly coffee) and reflects the trend for increasing coffee consumption (McIlvain, Noland, & Bickel, 2011).

Steenhuis, van Assema, van Breukelen et al (2004) hoped to increase the availability of low fat choices in workplace cafeterias, but they do not report on whether availability increased or not. The process evaluation (Steenhuis, van Assema, Reubsæet, et al., 2004), identified that some catering managers believed their range of healthier choices was already extensive. Whereas others indicated that they were unable to source additional healthier choices from suppliers.

As outlined in Chapter six, section 6.2.4, one of the FNS foodservice support actions was working with suppliers to source and encourage reformulation to make their products healthier. This process of working with suppliers, aimed to maximise the chances of the food outlets being able to source healthier choices. Sourcing healthier foods for the

AUT University vending machines was particularly challenging. It took two years of conversations between the researcher and the vending contractor to identify and stock a full product range. However, availability of healthier choices eventually increased in the food (330%) and beverage (52%) vending machines.

Short term studies of three to five weeks, implemented one or two types of actions, often attempting to isolate which action was most effective (table 8.1). Offering discounts appears to substantially increase purchase of healthier choices (French, Story, et al., 1997; Horgen & Brownell, 2002; Jeffery et al., 1994). However, the discounts of 50% used by Jeffery et al (1994) and French, Story et al (1997) may not be sustainable for a food outlet because of the possible impact on revenue and gross profit. Similar to FNS, Horgen and Brownell (2002) offered a smaller discount that was determined cooperatively with foodservice management, but only for a five week period. Unlike FNS, none of these studies measured revenue or gross profit, so the financial impact of the discounts is unclear. In FNS, the discounts offered did not negatively impact revenue or gross profit. Offering fruit at a discounted price (25% less than previous) from 2008 was responsible for most of the 49% increase in purchase of ‘everyday’ snacks. Furthermore, the snacks category had the largest increase in purchase of ‘everyday’ choices, suggesting that offering fruit at a discounted price was an effective FNS action.

Offering discounts may have been an effective strategy because the financial climate of New Zealand was unstable during the development and implementation of FNS. There was a recession in 2008 and 2009, and consequently very slow economic growth in 2010 (Statistics New Zealand, 2011b). As a group, university students are more likely to be impacted by economic downturn because they typically have a low income and are reliant on part time jobs.

A survey of New Zealand university students (New Zealand Union of Students' Associations, 2011), demonstrated that in the 2010 academic year only 65% of university students were employed in regular or casual work, down from 90% in 2007. Furthermore, in 2010, annual income of New Zealand university students was \$5,892, decreased from \$7,584 in 2007 (New Zealand Union of Students' Associations, 2011). Yet, food expenditure (approximately \$50 per week) has remained constant since 2007, even though food prices in New Zealand have increased by 14.2% (Statistics New Zealand, 2009, 2010a, 2011a) between 2008 and 2010. This means that with \$50 per week, students in 2010 were able to buy less or poorer quality food than they could in 2007, suggesting that students might purposively shop for better value for money food and beverage purchases.

The SHOP study (Ni Mhurchu, Blakely, Jiang, Eyles, & Rodgers, 2010) provides a local comparison of the impact of pricing actions on the purchase of healthier choices in a New Zealand supermarket. Ni Mhurchu et al (2010) identified that a 12.5% discount on healthier choices resulted in an 11% increase in purchase of healthier choices, particularly fruit and vegetables, compared to no change in the tailored education or control groups. The increase in healthier choices purchased was sustained at follow up (12 months), which was six months after pricing discounts had ceased.

Findings from the SHOP study and this thesis supports the argument that providing competitively priced fruit is an effective action to increase the purchase of healthier choices in different settings. Further support for this argument can be found in the consultation with participants' where the primacy of cost was a clear theme in both the needs assessment and the evaluation stages.

Labelling of healthier choices is another action frequently investigated in the literature (table 8.1) with variable results. Several studies (Buscher et al., 2001; Freedman & Connors, 2010; Steenhuis, van Assema, van Breukelen, et al., 2004; Vyth et al., 2011),

demonstrate increasing purchase of healthier choices with the addition of labelling, but only within one type or category of targeted food for example fruit. It is not clear in FNS whether the labelling and promotional actions had a direct impact on the purchasing behaviour. There was increased purchase of healthier choices within the prepared bread products category, where the only FNS action was the addition of labels identifying healthier choices. However, the mechanism for this increased purchase is not clear, customers may have been preferentially choosing or alternatively, foodservice staff may have been preferentially preparing, the healthier prepared bread products.

In summary, the first two research questions in this thesis asked how FNS actions impacted the availability, accessibility and purchase of healthier choices. FNS increased the accessibility, but not the availability of healthier choices in the AUT-managed food outlets. Yet, the purchase of healthier choices increased markedly after the implementation of FNS. This finding indicates that strategies addressing accessibility such as discounts, promotions, product placement and labelling may be more effective at increasing the purchase of healthier choices than increasing availability. The success of the competitively priced fruit in particular, demonstrates that discounts do not have to be significant to impact the purchase of healthier choices. This is an important finding, because only one reported study (Horgen & Brownell, 2002) investigates the impact of small discounts on the purchase of healthier choices in food outlets. No reported studies have been found that investigate the impact of discounting healthier choices on revenue or gross profit of food outlets.

## **8.2 Appropriateness of Feed Your Need to Succeed actions and process of change**

The effectiveness of FNS was in part influenced by the appropriateness of the actions and the process of change for the foodservice operation and AUT University staff and students. The appropriateness of FNS was decided by whether foodservice financial

and operational objectives were maintained, and whether FNS actions reflected staff and students perceived needs. Foodservice financial objectives were that revenue and gross profit were maintained or increased and the main operational objective was that foodservice staff workload would not increase. Two research questions reflected on the appropriateness of FNS:

*How can a healthier eating environment be created without compromising the financial and operational objectives of the foodservice operation?*

*How does consultation and collaboration with staff and students influence the appropriateness of the changes made to create a healthier eating environment?*

The impact of creating a healthier eating environment on revenue and gross profit is a gap in the current knowledge base but has been identified as a barrier for foodservice managers (Dwyer et al., 2004; Lachat et al., 2011; Steenhuis, Van Assema, & Glanz, 2001). One of the strengths of this research is the detailed investigation of the impact of creating a healthier eating environment on the revenue and gross profit of the foodservice operation. In studies where healthier choices are substituted for similarly priced less healthy choices, you would expect to see a null impact on revenue. However, depending on the gross profit margin on the healthier items, the gross profit may be impacted by the increased proportion of healthier choices purchased.

Similar to FNS, studies analysing the impact of purchasing changes on revenue and/or gross profit (Brown & Tammineni, 2009; Fiske & Cullen, 2004; French, Jeffery, et al., 2001; French et al., 2004; Gorton et al., 2010) indicate that revenue and/or gross profit were maintained. However, only one study was set in a food outlet (French et al., 2004), the other three studies investigated vending machines. Sales patterns from vending machines would differ from food outlets, particularly because of the hours of access. In addition,

there is only one reported study in beverage vending machines that investigates how the increased purchase of healthier choices impacted gross profit. This thesis provides conclusive evidence that healthier choices, including those discounted between 10% and 25%, contributed a greater proportion of revenue and gross profit at evaluation compared with baseline in food outlets. Therefore, creating a healthier eating environment, and increasing the purchase of healthier choices is not necessarily associated with decreases in revenue and gross profit, if changes are appropriate for the foodservice operation and the customers.

If changes are appropriate for the operational objectives of the foodservice operation, then they will be easily and successfully implemented. The only previously reported study of a collaborative foodservice programme indicated that all foodservice guidelines were “implemented to some degree” (Nicklas & O'Neil, 2000, p. 209) in the school food outlets. In contrast, there was mixed success for the implementation of FNS actions reported by the foodservice manager and the observational environmental audit. Successfully implemented FNS actions were typically those that required less initiative by the foodservice staff. For example, labelling healthier choices with ‘everyday’ and ‘sometimes’ labels, was clear and straightforward for staff to implement and did not require much additional work. The success of this action was due to the collaborative adoption and adaptation of a FNS-specific Food and Beverage Classification System, to clearly and easily identify ‘everyday’ and ‘sometimes’ choices (see Chapter six, section 6.3.2).

The favourable performance of simple and easy to implement actions is supported in the literature (Dwyer et al., 2004; Steenhuis et al., 2001) because staff training can be an issue in foodservice operations. Many foodservice operations, similar to the AUT University foodservice operation, have a high staff turnover and foodservice staff can be low skilled and often untrained (Lachat et al., 2011). This supports the contention that

changes to the eating environment that can be implemented without extensive staff training, are likely to be more successful in foodservice operations.

The FSM did question the appropriateness of trying to implement 15 actions at once in FNS. This is a valid concern, particularly in light of previous research indicating that foodservice operators believe that straightforward programmes are the best to implement (Economos et al., 2009; Macaskill et al., 2000). The FSM offered the critique that FNS should have incorporated fewer changes, so that the researcher could provide more communication and support for the foodservice team.

The FNS foodservice support actions were based on a relationship building approach, which the FSM believed was mostly effective. This belief of the FSM resonates with studies that reflect on how interpersonal relationship factors influenced the implementation of programmes in school foodservices. In schools, effective relationships were consistently mentioned as contributors to successful implementation and maintenance of programmes (Cho & Nadow, 2004; Goldberg et al., 2009; McCullum-Gomez, Barroso, Hoelscher, Ward, & Kelder, 2006; Thomas et al., 2010). Goldberg et al (2009) in particular, used a relationship based approach with the foodservice that was similar to the intensive relationship approach used in FNS. Goldberg et al (2009) believed that their communication, training and relationship building were crucial to developing “buy in from the group that was most critical to success but somewhat resistant to change at the outset” (Goldberg et al., 2009, p. 6).

Thomas et al (2010) talks about familiarity being a characteristic of an effective working relationship. The FSM, reflecting on communication between the customers and the researcher, stated that he believed the needs assessment stage, to understand customers’ perspectives, was essential to ensure the actions implemented were the right ones. From the researcher’s point of view, the needs assessment was a crucial step in initiating



relationships with stakeholders, who then offered assistance for the continuation of FNS at the evaluation stage. The needs assessment stage acted as a process of familiarisation with stakeholders that helped to create more effective relationships. Patton (2011) also talks about the importance of establishing contact early on with stakeholders to ensure that their thoughts and opinions are being sought and incorporated into the programme. This inclusion helps stakeholders gain a sense of ownership of the programme, which makes them more likely to take a role in the continuation of a programme once the change agent has left.

Continuation of school food programmes in New Zealand (Walton et al., 2010) have been impacted by competing priorities such as resources (time and staffing), foodservice perceptions about healthier food and customers' needs. Tensions caused by the perceptions of foodservice management and staff can be critical for creating healthier eating environments. There is a perception held by many foodservice operations that "customers go to a restaurant to have an enjoyable meal and indulge themselves, rather than to eat healthy foods" (Dwyer et al., 2004, p. 8). Whilst a university food outlet is not necessarily an 'indulgent' setting, this is still a common tension that exists in the foodservice industry (Lachat et al., 2011). The FNS actions were developed collaboratively to minimise the impact on foodservice staff workload and there was support for a shift towards a healthier eating environment within key people in the AUT-managed food outlets. Yet, in the evaluation stage, the FSM still alluded to tensions caused by lack of resources and competing priorities that impacted on the extent of the implementation of FNS actions.

There is no easy solution to resolve the tension and competing priorities that foodservice staff perception causes when creating a healthier eating environment. This is why it is important to provide evidence that customers can preferentially buy healthier choices without negatively impacting revenue or gross profit. Furthermore, foodservice

operations need a practical framework demonstrating how they can successfully move through a process of change without compromising operational or financial objectives.

To maintain financial objectives of a foodservice operation, changes to create a healthier eating environment must be appropriate for customers needs. However, foodservice operations must balance meeting customers perceived needs with healthy eating guideline recommendations. Most FNS actions were aligned with participant desires expressed in the needs assessment stages and the New Zealand Food and Nutrition Guidelines (New Zealand Ministry of Health, 2003). Variety was promoted through the ‘everyday’ and ‘sometimes’ labels on prepared bread products, snacks and beverages. Approximately 150 (30.5%) product lines were labelled in the largest AUT-managed food outlet. Moderation was promoted through the inclusion of a per serve energy requirement in the FNS FBCS. Furthermore, fruit and vegetables were promoted through competitively priced fruit and the introduction of salads into all AUT-managed food outlets. Finally, the foodservice team were encouraged to use lean meat products in the kitchen.

Actions targeting cost and convenience were identified as appropriate by participants in the needs assessment and the evaluation stages. In contrast, the communication actions (posters, articles and recipes) were not reported by participants in the evaluation when prompted about what FNS actions they had noticed. The poor recognition of FNS communication actions contrasts with other research indicating that posters were noticed by 83.6% (Nicklas & O'Neil, 2000) and 69% (French et al., 2004) of students after one year of promotions. Why the posters and other communication actions went unnoticed is unclear, and may need to be addressed by FNS in the future.

The appropriateness of the cost saving actions was emphasised through participants’ comments highlighting the primacy of cost. The competitively priced fruit in particular, was volunteered by participants’ as one of the most effective actions. The 2008/2009 Adult

Nutrition Survey identified that New Zealanders reported eating more fruit than in 1997, with 55% of men and 66% of women self-reporting eating the recommended two serves of fruit every day (New Zealand Ministry of Health & University of Otago, 2011). Another key finding from the New Zealand Adult Nutrition Survey is that the proportion of New Zealanders with low food security has increased from 1.6% to 5.6% for males and 3.8% to 8.8% for females between 1997 and 2008/2009. Division of food security according to age group indicates that the 19-30 age group have some of the highest levels of low food security (7.5% men. 13.1% women). Since the National Nutrition Survey, food prices have increased by 14.2% (Statistics New Zealand, 2010a, 2011a), as has unemployment amongst students (New Zealand Union of Students' Associations, 2011). Therefore, implementing cost based actions was highly appropriate because of the financial constraints many university staff and students may be facing.

Although cost based actions were appropriate to implement, some of them (combo meals and loyalty cards) were not well recognised by participants' in the evaluation. However, as discussed earlier, these actions, which required that foodservice staff tell customers about the actions, were not consistently implemented in the food outlets. This inconsistent implementation supports the FSM's belief that not all foodservice staff bought into FNS. The limited staff buy in may have been caused by too little communication (Patton, 2011) or by competing priorities (Lachat et al., 2011). It is possible that integrated communication, such as providing students with a loyalty card and a list of combo meals in their orientation pack, may have created more customer demand and therefore, less reliance on foodservice staff promotion.

In the evaluation stage, similar to the needs assessment stage, participants expressed dissatisfaction with aspects of the current foodservice provision relating to perceived freshness and variety. The NEMS-R audit, at both baseline and evaluation, established that

the largest variety of food and beverage choices on campus were in the AUT-managed food outlets. The sales reports demonstrated that variety in the AUT-managed food outlets increased by 36% between 2008 and 2010. Increasing food variety is posited to be linked to overeating (Cohen, 2008; Swinburn et al., 2011), as well as increased customer satisfaction (Ko, 2009). No explicit FNS actions targeted variety in the food outlets because of the incongruence between perceived needs and the posited detriments of increased variety, yet variety substantially increased for unknown reasons. Previous research in a worksite food outlet (Resnick, Gregoire, Lafferty, & Lipson, 1999), indicated that labelling existing healthier choices increased customer satisfaction with the availability of healthier choices, even though availability did not increase. In contrast, the labelling in FNS did not appear to be successful at increasing the perception of increased variety of healthier choices.

In summary, the third and fourth research questions focused on how the process of consultation and change contributed to the development and implementation of appropriate FNS actions. The evaluation highlighted the appropriateness of FNS actions for the foodservice operation because financial objectives were not compromised. Some FNS actions (two) did not meet operational objectives because they required more time and input from foodservice staff. These actions were typically not recognised by participants' in the evaluation stage. Cost based and convenience actions were appropriate for staff and students, however, communication actions could have been more appropriate.

### **8.3 Guiding Framework for Foodservice Change**

Combining the findings about the effectiveness and appropriateness of FNS and the process of change informed the development of a 'Guiding framework for foodservice change' which reflects the final research question:

*Which aspects of this research project can be incorporated into a framework for other foodservice operations to guide them through a transition to a healthier eating environment?*

This section presents and discusses the ‘Guiding framework for foodservice change’ (figure 8.1).

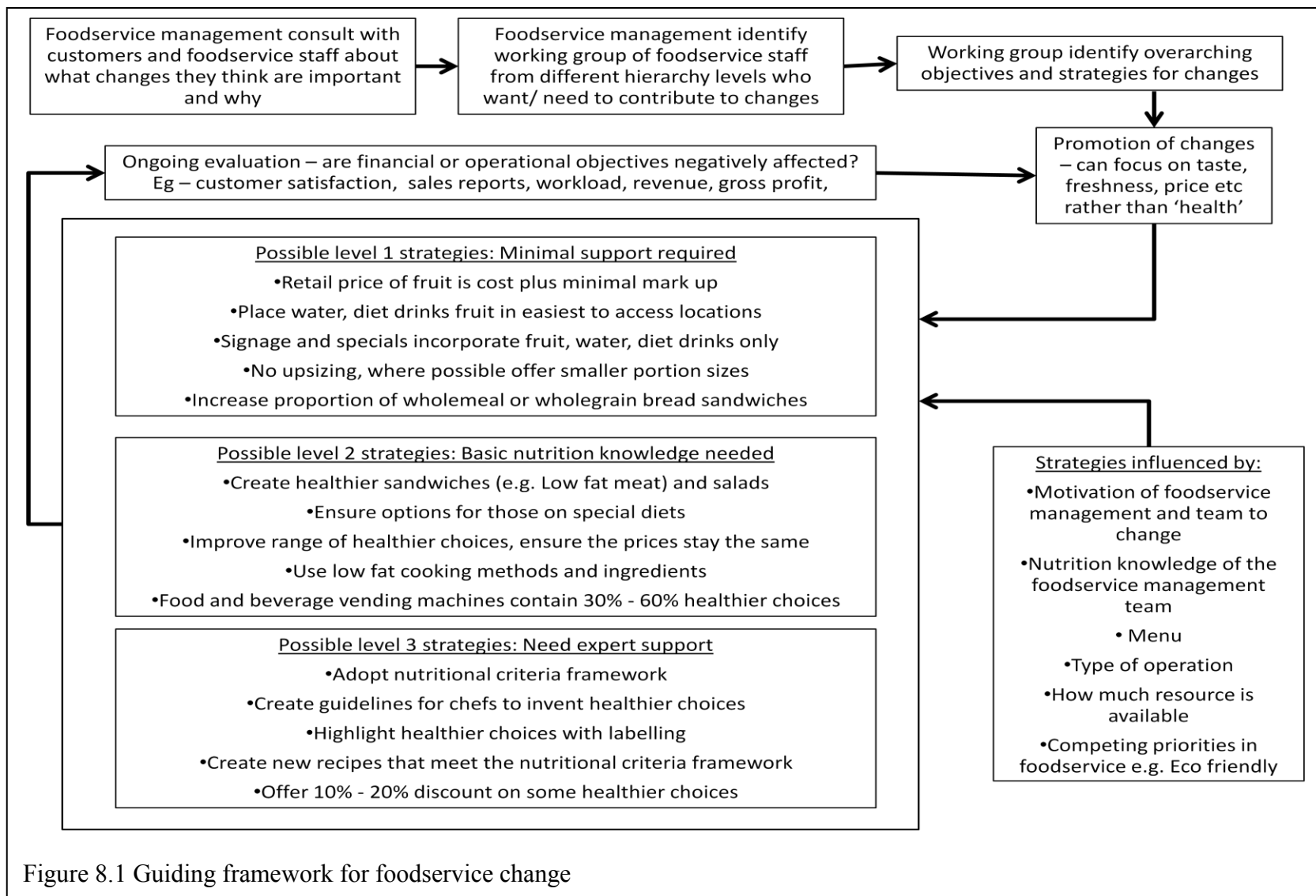


Figure 8.1 Guiding framework for foodservice change

This guiding framework provides a process and possible strategies for change, stratified by the level of nutrition knowledge and nutrition professional support the foodservice would require. The process for change is characterised by consultation, collaboration and ongoing evaluation which reflects the action research process of change used at AUT University, and the approach supported by the literature (Economos et al., 2009; Lachat et al., 2009; Macaskill et al., 2000). Possible, rather than definitive, strategies, are provided because each foodservice has different needs and environmental changes typically are more successful when they are tailored and negotiated for the specific foodservice environment (Beresford et al., 2001; Goldberg et al., 2009; Lassen et al., 2003).

Communication with customers is an important theme within this framework. Communication may not necessarily be explicitly about health, it could relate to other characteristics of the food (Buscher et al., 2001) or other ‘causes’, such as eco friendly, which customers have identified as important to them (Lachat et al., 2011). Communication with customers must relate to the priorities customers identified through consultation in the beginning stages of the change process. Communication within the foodservice about why creating a healthier eating environment is important, and communal identification of goals, objectives and priority areas, is also important to ensure ongoing support and assistance for the change process.

The three different levels of strategies reflect which FNS actions required more involvement and input from the researcher. Actions requiring little or no input are level one strategies, whereas actions that required extensive nutrition knowledge and nutrition professional input and expertise are identified as level three strategies. Level one strategies should be able to be implemented by any foodservice operation regardless of levels of nutrition knowledge. However, strategies need to be tailored to reflect the influences of the

menu and type of operation. A ‘hole in the wall’ operation with five menu items will have very different needs to a large food outlet with multiple categories of products.

Factors such as motivation and nutrition knowledge of foodservice management are likely to influence foodservice change. Foodservice managers who believe that creating healthier eating environments is not a sound business decision are unlikely to change their environment without some kind of employer or government regulation. However, foodservice managers who are motivated to change, can use the framework and evidence in this thesis to identify *how* and *what* to change in their food outlets, according to their level of nutrition knowledge and access to nutrition professional support.

The literature supports small, simple changes for foodservice operations (Economos et al., 2009; Macaskill et al., 2000). Furthermore, the limited resource available for proactive development in foodservice operations was highlighted in the interview with the foodservice manager. Therefore, an approach of small, simple changes is recommended in the framework.

Competing priorities influencing implementation, such as different interpretation of ‘healthier foods’, were identified in FNS, and have been identified in New Zealand (Walton et al., 2010) and international literature (Lachat et al., 2011; Williams, 2009). It may be that aligning healthier choices with other causes such as eco friendly, local, or seasonal menu items may be a possible solution for the competing priorities (Lachat et al., 2011).

This ‘Guiding framework for foodservice change’ may assist interested foodservice managers to transition through a process of change to create a healthier eating environment. Changing eating environments is a complex and multifaceted process requiring negotiation and collaboration. This framework provides one small answer to the call for change in the eating environments to improve nutritional status. This framework aligns with the ‘food consumption’ cluster of the Foresight Obesity System Map (Butland et al., 2007). More



specifically, the framework has the potential to target the ‘convenience of food offering’, ‘variety of food’, ‘energy-density of food offerings’ and ‘portion size’ variables of the food consumption cluster. The ongoing challenge for creating healthier eating environments is application and translation into other eating environments that have different needs and motivations.

## **8.4 Significance of the Research**

There are three areas of implications of this research for the application and translation of creating healthier eating environments: the eating environment at AUT University, for New Zealand foodservice operations, and finally for New Zealand public health policy and regulation.

### **8.4.1 For the eating environment at AUT University**

The implications for the AUT-managed food outlets are to: focus on communication and engaging customers more effectively about FNS actions, investigate additional feasible cost based actions, and finally, extend the programme to the contracted outlets. Some actions require leadership from the foodservice manager and further collaboration with key stakeholders on campus. A network of key stakeholders has already been established on campus through this research, however, work needs to continue to maintain momentum of this network.

### **8.4.2 For foodservice operations in New Zealand**

This research demonstrated that small changes, aligned with foodservice operational and financial objectives, can create a healthier eating environment and influence the purchasing behaviour of customers. This research is the first to provide conclusive evidence that foodservice operations can create and sustain healthier eating environments without

compromising revenue, gross profit or staff workload. The ‘Guiding framework for foodservice change’ provides a series of pragmatic and practical solutions for how foodservice operations could create and maintain a healthier eating environment.

Part of the success of FNS was the dedicated time the change agent contributed to developing and implementing changes (see Chapter six). Creating a healthier eating environment requires leadership by an individual or preferably a team, and support from senior management. However, healthier choices are often not a priority area for foodservice managers. Increasing numbers of competing priorities and limited resources, highlight that actions to create a healthier eating environment must require minimal operational change. Small changes can be implemented over a series of months to minimise the workload on the leader of the change process.

Foodservice operations still face multiple challenges, such as high staff turnover (Lachat et al., 2011), that influence buy-in of staff members and the maintenance of healthier eating environments. Therefore, changes need to be operationalised and institutionalised so they are less likely to be impacted by high staff turnover. Another challenge for foodservice operations is sourcing appropriate healthier choices. In this regard, foodservice operations would be greatly assisted by reformulations in the food industry. There is already some excellent work in this area (L. Young & Swinburn, 2002), but it is challenging to access cost effective healthier choices in some food categories such as snacks.

#### **8.4.3 For public health policy and regulation in New Zealand**

This research has demonstrated that a pragmatic nutrition profiling tool should be adopted before effective public health policy for healthier eating environments can be written and operationalised in food outlets. This research identified that adopting the FNS

FBCS to identify healthier choices, was critical to the success of the development and implementation of FNS because it was an important tool in conversations with food and beverage suppliers. Furthermore, discussing the nutritional criteria with foodservice staff raised interest in which foods were healthier and why.

The second implication of this research for New Zealand public health policy, is that there should be mandatory provision of some healthier choices in educational organisations including tertiary institutions. However, the mandatory regulation should allow for foodservice operations to tailor actions to suit their particular operation. The Foresight Obesity Systems Map (Butland et al., 2007), identifies that when existing habits are broken, for example, starting a new school or leaving home, opportunities exist to develop new habits. However, for these new habits to be attained and maintained, a supportive and appropriate environment needs to exist, which is one reason why educational institutions are an ideal place to create healthier eating environments.

Mandatory provision of some healthier choices could be an effective public health policy to provide foodservice managers with the impetus to start making changes. The successful promotion and increased purchase of healthier choices achieved by FNS, is in part due to the intensive tailored approach taken. It is not feasible for every foodservice to be offered this assistance. In FNS, factors such as competing priorities, limited resources and negative perceptions about healthier choices impacted the implementation of actions. In many foodservice operations, these factors may be more dominating than they were in FNS (Lachat et al., 2011) and may be a significant barrier to creating a healthier eating environment.

Mandatory provision of some healthier choices is also likely to encourage the food industry to reformulate because there is a guaranteed demand for healthier choices (Lobstein & Davies, 2009). Guaranteed demand will allow for economies of scale, which in

turn, increases the cost effectiveness of healthier choices. This research has shown the benefit of food outlets being able to provide competitively priced healthier choices; a large guaranteed demand for healthier choices should drive the production of competitively priced healthier choices.

## **8.5 Contributions of this Research**

This research has contributed to the body of knowledge in two ways. First, it has provided valuable evidence about how a foodservice operation can successfully create a healthier eating environment without compromising financial or operational objectives. Second, it demonstrated how action research can be used to successfully guide the process of change in a foodservice operation.

This thesis is the first to offer a detailed analysis of the impact of increased promotion and purchase of healthier choices on revenue, gross profit, and gross profit margins. This information constitutes a significant contribution to knowledge about the impact of creating healthier eating environments on foodservice operations. This contribution is particularly important in light of the international trend to implement mandatory provision of healthier choices in schools (World Health Organisation, 2008), and the increasing interest in regulation of other eating environments (Gortmaker et al., 2011). Further, this thesis offers a New Zealand specific example of the successful development and implementation of a programme to create a healthier eating environment.

The second major area of contribution to knowledge this thesis offers, is the utility of using action research to guide the process of change in a foodservice operation. The action research process is well aligned with the continuous quality improvement model used by many foodservice operations (Duncan & Jensen, 2010). However, action research has not previously been used for the development of programmes to create healthier eating

environments. Therefore, providing evidence of the benefit of this methodology to develop pragmatic, negotiated actions to create healthier eating environments is a significant contribution to knowledge.

## **8.6 Limitations of this Research and Feed Your Need to Succeed**

There are some limitations of this research that need to be acknowledged. This research project was undertaken with only one foodservice operation and no comparison or control; therefore change on campus may have been caused by factors other than FNS. The reason for not including a control site is because there were no comparable food outlets (see chapter four, section 4.1). Without a legitimately comparable control food outlet, comparisons for FNS research findings were limited to identifying relevant population trends, for example decreasing income and expenditure on food.

Notwithstanding the lack of a control group, there were clear links between some actions and increases in sales of healthier choices (for example increasing sales of fruit when price decreased). However, because of the lack of control, attribution between FNS actions and purchasing behaviour cannot be conclusively demonstrated for FNS actions.

There are three limitations related to the scope of this research. First, this research is unable to extrapolate the purchase of food items to actual eating patterns, because sales reports rather than dietary intake were measured. However, sales data can be a more objective measure of dietary behaviour than self-reported intake, which is often prone to under-reporting of some foods and over-reporting of others (Macdiarmid & Blundell, 1997). There is the possibility of compensatory behaviour, whereby customers make healthier choices on campus, but then less healthy choices off campus (Steenhuis et al., 2010). The scope of this research was to work through a process of change on campus and

identify any impact on purchasing behaviour in the modified food outlets rather than modification of individuals' eating patterns. This is an area for future research.

Second, the qualitative data could have been more in-depth; conducting additional interviews and focus groups to ensure a more representative sample. Recruitment, time and resource constraints restricted the scope of the qualitative data. There were nine participants in the needs assessment focus groups and eleven participants in the evaluation focus groups and semi-structured interviews. However, even with this small number of participants there clear themes and repetition of ideas emerged from the focus group and interview transcripts. Recruitment of additional participants were unsuccessful because of workload and sickness. There were two ways the impact of the small participant groups were minimised. Firstly, summaries of the qualitative data were provided to the members of the FNS advisory group (n=15) for comment. Furthermore, qualitative findings were triangulated with quantitative data to provide an additional check for the validity of the results.

Third, the lack of sales reports from vending machines and the missing data from one food outlet may have limited the analysis. Data about purchases from vending machines may have provided more conclusive evidence that a healthier eating environment was created on campus. The missing data from one food outlet constitutes only 2.7% of the items sold in that food outlet in 2008, and only within one category (prepared bread products). Data sets for the total number of items purchased, total revenue and total gross profit for that year were complete and analysis for prepared bread products only includes years where complete data were available. Therefore, the missing data should not influence the results of this research.

Another limitation of this research is that the results are not generalisable to other foodservice operations because of the lack of comparable control group or similar

operations and demographics in other Universities. However, this research does not seek to generalise the specific actions of the FNS programme to other foodservice operations.

Whilst this research has created a ‘Guiding framework for foodservice change’ (section 8.3), this is not a ‘recipe’ that foodservice operations can blindly follow. Part of the success of FNS was that actions were tailored to suit the operational practices and product mix of the AUT-managed food outlets. Other food outlets may have a different product mix or operational practices, therefore actions need to be tailored to suit the particular environment that they are being implemented in.

The final limitation relates to the FNS programme and the operation it was implemented in rather than the research process. The top hierarchy of the university and of the foodservice management team were motivated to create a healthier eating environment, which may have caused actions to be implemented more enthusiastically than they would be in other settings. Support from both management (Dexter, 2010) and all members of the community (Lovell, Kearns, & Rosenberg, 2011) are important for successful organisational change. As identified in Chapter seven, section 7.3.2, there were foodservice staff who “*did not believe in FNS*”, which may have influenced the implementation of actions. Therefore, the motivation of the managers may have been balanced by foodservice staff members who were not motivated.

## **8.7 Strengths of this Research**

The strengths of this research was the unique, integrated, comprehensive and multifaceted FNS programme developed through collaborative action research methodology. By developing and implementing FNS in a naturalistic setting, the evidence is more relevant and useful because the researcher created a healthier eating environment

amongst the uncontrolled variables that foodservice managers interpret and manage every day.

The motivation and enthusiasm of the foodservice manager and participants to create a healthier eating environment was also a strength of this research. This enthusiasm was harnessed by the critical success factor of creating diverse and effective working relationships on and off campus. These relationships facilitated the development of a tailored programme, that balanced customer and foodservice needs with healthy eating guidelines. Furthermore, the motivation and enthusiasm of key contributors to the development and implementation of FNS are crucial for the continuation and future development of FNS on campus.

Another strength of this thesis was the use of action research methodology alongside the researcher's involvement as the key change agent. The researchers' background and experience as a foodservice dietitian, allowed her to provide pragmatic support and guidance for the foodservice through iterative action research learning cycles. In addition, the researchers experience, the effective relationships and the use of action research learning cycles, enabled the development and implementation of negotiated win-win actions, which contributed to the success of FNS.

The final strength of this research was the comprehensive analysis of revenue and gross profit through the use of computerised sales reports detailing every item purchased in the AUT-managed food outlets. No previous studies have been able to make strong conclusions about the impact creating healthier eating environments had on revenue and gross profit of a food outlet.



## **8.8 Future Research**

The discussion of strengths, limitations and contributions of this research has also highlighted directions for future research, such as longer term follow up of FNS on campus and investigation about different options to facilitate the creation of healthier eating environments.

Further research into the effects of creating a healthier eating environment on campus could follow purchasing behaviours of individuals. Whilst there is some indication that customers were replacing less healthy choices for healthier ones, this is not a strong finding in this thesis. Evidence demonstrating that individuals substituted healthier choices for less healthy choices would build a strong case for the benefit of changing the eating environment. A more in-depth analysis of customer behaviour, with attention to factors such as culture, age and gender, would provide information about whether FNS encouraged new customers or whether existing customers were encouraged to change their habits.

The cost of implementing FNS to the university, in relation to the benefits for health and academic performance of students, could be identified through cost effectiveness modelling. Some outcomes, such as increasing fruit consumption, could be related to disability-adjusted life years. This cost effectiveness modelling would provide valuable information for government and university policy makers about the cost benefits of creating a healthier eating environment (Gortmaker et al., 2011).

Further research investigating new tools to identify healthier choices that do not require nutritional software would be beneficial for foodservice operations. FNS used an adapted Food and Beverage Classification System (New Zealand Ministry of Health, 2008a), and analysed all the recipes using food composition tables. However, most retail foodservice outlets would not have access to food composition tables. Therefore, other

frameworks such as the Healthy Meal Index (Lassen et al., 2010), may be easier to operationalise for foodservice managers. Further research could seek to identify whether the Healthy Meal Index is appropriate for a New Zealand setting, or to create an alternative pragmatic framework.

Finally, the ‘Guiding framework for foodservice change’ developed in this research needs to be further investigated by nutrition professionals and foodservice managers to determine its’ utility and relevance in varied settings. Nutrition knowledge of the foodservice manager and staff is identified in the framework as an influencing factor for change. Further investigation into the impact of increased nutrition knowledge of foodservice managers on the successful creation of healthier eating environments could be beneficial.

## **8.9 Conclusion**

This research successfully increased the purchase of healthier choices by collaboratively developing and implementing a programme to create a healthier eating environment, without compromising foodservice financial and operational objectives. The collaboration and consultation provided insight into the strengths and challenges for foodservice operations wanting to create a healthier eating environment. The development and implementation of negotiated, win-win, pragmatic solutions were critical but challenging. There were diverse stakeholders, often with competing priorities and perceptions, but this is the reality of the foodservice industry. Integrating these different viewpoints resulted in the creation of an effective and appropriate programme to create a healthier eating environment.

This thesis demonstrated that creating a healthier eating environment can shift purchasing behaviour towards healthier choices. In the current climate, where pressure to

create healthier eating environments is becoming more apparent, this research provides valuable information for both foodservice operations and policy makers. This thesis contributes to the existing body of knowledge and contributes new knowledge about understanding change in the eating environment. This body of work provides evidence that creating a healthier eating environment can favourably shift purchasing patterns. However, the evidence provided about *how* foodservice operations can make changes, without compromising financial or operational objectives, is essential for encouraging foodservice operations to create healthier eating environments.

## **Appendices**

### **Appendix A: Ethical Approval Forms**



# MEMORANDUM

## Auckland University of Technology Ethics Committee (AUTEC)

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To: Elaine Rush  
From: **Madeline Banda** Executive Secretary, AUTEC  
Date: 21 January 2009  
Subject: Ethics Application Number 08/279 **Creating a healthier eating environment on campus at Auckland University of Technology.**

---

Dear Elaine

Thank you for providing written evidence as requested. I am pleased to advise that it satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC) at their meeting on 8 December 2008 and that I have approved your ethics application. This delegated approval is made in accordance with section 5.3.2.3 of AUTEC's *Applying for Ethics Approval: Guidelines and Procedures* and is subject to endorsement at AUTEC's meeting on 9 February 2009.

Your ethics application is approved for a period of three years until 20 January 2012.

I advise that as part of the ethics approval process, you are required to submit the following to AUTEC:

- A brief annual progress report using form EA2, which is available online through <http://www.aut.ac.nz/about/ethics>. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 20 January 2012;
- A brief report on the status of the project using form EA3, which is available online through <http://www.aut.ac.nz/about/ethics>. This report is to be submitted either when the approval expires on 20 January 2012 or on completion of the project, whichever comes sooner;

It is a condition of approval that AUTEC is notified of any adverse events or if the research does not commence. AUTEC approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are reminded that, as applicant, you are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

Please note that AUTEC grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to make the arrangements necessary to obtain this.

When communicating with us about this application, we ask that you use the application number and study title to enable us to provide you with prompt service. Should you have any further enquiries regarding this matter, you are welcome to contact Charles Grinter, Ethics Coordinator, by email at [charles.grinter@aut.ac.nz](mailto:charles.grinter@aut.ac.nz) or by telephone on 921 9999 at extension 8860.

On behalf of the AUTEC and myself, I wish you success with your research and look forward to reading about it in your reports.

Yours sincerely



Madeline Banda  
**Executive Secretary**  
**Auckland University of Technology Ethics Committee**

Cc: Alicia Crocket [alicia.crocket@aut.ac.nz](mailto:alicia.crocket@aut.ac.nz)

# Participant Information Sheet



## **Date Information Sheet Produced:**

14<sup>th</sup> November 2008

## **Project Title**

Creating a healthier eating environment on campus at AUT

## **An Invitation**

You are invited to be part of a research project to create a healthier eating environment on campus at AUT. This research will be written up as a PhD thesis by Alicia Crocket the student researcher. Your involvement in this study is voluntary, and it is your choice as to whether or not you wish to participate.

## **What is the purpose of this research?**

The purpose of this research is to work with the staff and students on campus at AUT to create a strategy for making changes to create a healthier eating environment and then to evaluate the success and sustainability of these changes. The eventual aim of this research is to form a model or a set of guidelines for other institutions and businesses that want to create a healthier eating environment in their workplace.

## **How was I chosen for this invitation?**

Any staff and students who spend time on campus at AUT are invited to be involved in this research. There are two possible ways that you can get involved, firstly, through this webpage where you can discuss your comments and thoughts about the project and healthy eating on campus. The other option if you wish to make more of a contribution is that you can volunteer to be part of the focus groups that will work with the researcher to prioritise areas to work on, discuss possible changes and then after the intervention evaluate the changes and strategies that have been used. If you wish to be involved in the focus groups please let the researcher know, you will be given another information sheet and consent form to read and sign.

## **What will happen in this research?**

As a participant using this webpage you will be asked to contribute your ideas about healthy eating on campus and what your thoughts about possible barriers and effective strategies might be. Once the intervention is underway you may be asked to comment on whether you think it is effective and sustainable or not.

## **What are the discomforts and risks and how will they be alleviated?**

There are no discomforts or risks associated with your participation in this web forum. Any comments you make will be anonymous, however we will ask identification of whether the contributor is undergraduate or post graduate student, academic or allied staff, part time or full time, male or female and age range to be able to categorise and weight responses.

## **What are the benefits?**

The benefit for you is that you get to have a say in how this intervention will be carried out on campus. This intervention has the potential to positively impact the health of everyone on campus but for it to work effectively it needs to be developed in part by the staff and students on campus to

make it truly successful. Your input at the development stage will help greatly in making it an intervention that is useful and suits the needs of as many people as possible.

**How will my privacy be protected?**

Any comments you make on the webpage will remain anonymous

**What are the costs of participating in this research?**

As a participant using this webpage you are able to spend as much or as little time as you wish making comments.

**How do I agree to participate in this research?**

By posting your comments on this webpage you are agreeing to participate in this research.

**Will I receive feedback on the results of this research?**

If you would like to receive feedback on the results of this research please contact the researcher.

**What do I do if I have concerns about this research?**

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Professor Elaine Rush, Ph 921 9999 ext 8091 [elaine.rush@aut.ac.nz](mailto:elaine.rush@aut.ac.nz)

Concerns regarding the conduct of the research should be notified to the Executive Secretary, AUTEK, Madeline Banda, [madeline.banda@aut.ac.nz](mailto:madeline.banda@aut.ac.nz) , 921 9999 ext 8044.

**Whom do I contact for further information about this research?**

***Researcher Contact Details:***

Alicia Crocket  
PhD candidate  
Email: [alicia.crocket@aut.ac.nz](mailto:alicia.crocket@aut.ac.nz)  
Phone: (09) 921 9999 extension 7250

***Project Supervisor Contact Details:***

Professor Elaine Rush,  
Email: [elaine.rush@aut.ac.nz](mailto:elaine.rush@aut.ac.nz)  
Ph 921 9999 ext 8091

Approved by the Auckland University of Technology Ethics Committee on 21<sup>st</sup> January 2009, AUTEK Reference number 08/279



# Participant Information Sheet



## **Date Information Sheet Produced:**

14<sup>th</sup> November 2008

## **Project Title**

Creating a healthier eating environment on campus at AUT

## **An Invitation**

You are invited to be part of a research project to create a healthier eating environment on campus at AUT. This research will be written up as a PhD thesis by Alicia Crocket the student researcher. Your involvement in this study is voluntary, and it is your choice as to whether or not you wish to participate.

## **What is the purpose of this research?**

The purpose of this research is to work with the staff and students on campus at AUT to create a strategy for making changes to create a healthier eating environment and then to evaluate the success and sustainability of these changes. The eventual aim of this research is to form a model or a set of guidelines for other institutions and businesses that want to create a healthier eating environment at work but don't know how.

## **How was I chosen for this invitation?**

We are looking for people who are interested in healthy eating and would like to have a say in how a healthier eating environment is created and maintained on campus at AUT. You have been chosen in part because you can speak for a group of people on AUT campus, however any individual is invited to participate in these focus groups. We have contacted AuSM, groups on campus for students and staff, and used the personal networks of the supervisor Professor Elaine Rush. Your name has been put forward as someone who might be interested in helping us to create a healthier eating environment on campus that best meets the needs of the staff and students. If you do not wish to be involved in this project please let the researcher know and you will not be approached again and you will not be disadvantaged in any way for declining.

## **What will happen in this research?**

As a participant in these focus groups you will be asked to contribute your ideas about healthy eating on campus. There will be a series of three focus groups you will be involved in over a period of approximately 18 months. The first group will be identifying key priority areas to target and possible barriers to change. The second focus group will then discuss possible strategies to meet these needs then a final focus group will be carried out after the intervention has occurred to evaluate the success and sustainability of the strategies. If necessary, you may be contacted by the researcher after the focus group if the researcher feels something needs to be clarified or discussed further. Each focus group will take about an hour and will involve a maximum of 10 people. Focus groups will be audiotaped and transcribed by the researcher. Respondents will be asked to provide information on their gender, postgraduate or undergraduate student, allied or academic staff, and age range. This information may be used to report themes and categories of feedback but as an individual you will not be identifiable.

## **What are the discomforts and risks and how will they be alleviated?**

There should be no discomforts or risks associated with your participation in these focus groups. Any comments you make will remain confidential and you can withdraw from the study anytime you wish without being disadvantaged in any way.

**What are the benefits?**

The benefit is that you get to have a say in how this intervention will be carried out on campus. This intervention has the potential to positively impact the health of everyone on campus but for it to work effectively it needs to be developed in part by the staff and students on campus to make it truly successful. Your input at the development stage will help greatly in making it an intervention that is useful and suits the needs of as many people as possible.

**How will my privacy be protected?**

Any comments you make in the focus group will remain confidential and focus group participants will be reminded that responses will remain confidential within the group.

**What are the costs of participating in this research?**

These focus groups will take approximately one hour each and there will be three focus groups over approximately 18 months to two years.

**What opportunity do I have to consider this invitation?**

You may like to think about this for a day or two before you make a decision.

You do not have to take part in this study. Should you choose not to take part this will not disadvantage you in any way. If you do agree to take part you are free to withdraw from the study at any time, without having to give a reason and this will not disadvantage you in any way. If you have any queries or concerns regarding your rights as a participant in this study you may wish to contact a Health and Disability Advocate, telephone 0800 555 050 for Northland to Franklin.

**How do I agree to participate in this research?**

Please complete the attached consent form.

**Will I receive feedback on the results of this research?**

If you would like to receive feedback on the results of this research please contact the researcher.

**What do I do if I have concerns about this research?**

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Professor Elaine Rush, Ph 921 9999 ext 8091 [elaine.rush@aut.ac.nz](mailto:elaine.rush@aut.ac.nz)

Concerns regarding the conduct of the research should be notified to the Executive Secretary, AUTEC, Madeline Banda, [madeline.banda@aut.ac.nz](mailto:madeline.banda@aut.ac.nz), 921 9999 ext 8044.

**Whom do I contact for further information about this research?**

***Researcher Contact Details:***

Alicia Crocket  
PhD candidate  
Email: [alicia.crocket@aut.ac.nz](mailto:alicia.crocket@aut.ac.nz)  
Phone: (09) 921 9999 extension 7250

***Project Supervisor Contact Details:***

Professor Elaine Rush,  
Email: [elaine.rush@aut.ac.nz](mailto:elaine.rush@aut.ac.nz)

Ph 921 9999 ext 8091

**Approved by the Auckland University of Technology Ethics Committee on 21<sup>st</sup> January 2009, AUTC Reference number 08/279**

**Nutrition Environment Measures Survey (NEMS)**  
**RESTAURANT MEASURES—DATA COLLECTION**

Month / Day / Year

no

Web Site URL: \_\_\_\_\_

Comments:

### 9) Size of Restaurant:

☐ yes ☐ no

☐ yes ☐ no

☐ Seating capacity = 

--	--	--

OR ☐ Number of tables = 

--	--	--

Comments: \_\_\_\_\_  
\_\_\_\_\_

Comments:

**Nutrition Environment Measures Survey (NEMS)**  
**RESTAURANT MEASURES—DATA COLLECTION**

Restaurant ID:   -   -

Date:   /   /

Month/Day/Year

Rater ID:

**Site Visit (Observation)**

**Select One**

**Comments**

10) Restaurant has a salad bar ☐ yes ☐ no \_\_\_\_\_

11) Signage/Promotions ☐ yes ☐ no \_\_\_\_\_

a. Is nutrition information posted near point-of-purchase, or available in a brochure?

b. Do signs/table tents/displays highlight healthy menu options? ☐ yes ☐ no \_\_\_\_\_

c. Do signs/table tents/displays encourage **healthy** eating? ☐ yes ☐ no \_\_\_\_\_

d. Do signs/table tents/displays encourage unhealthy eating? ☐ yes ☐ no \_\_\_\_\_

e. Do signs/table tents/displays encourage overeating (all-you-can-eat, super-size, jumbo, grande, supreme, king size, feast descriptors on menu or signage)? ☐ yes ☐ no \_\_\_\_\_

f. Does this restaurant have a low-carb promotion? ☐ yes ☐ no \_\_\_\_\_

g. Other? \_\_\_\_\_ ☐ yes ☐ no \_\_\_\_\_

**Menu Review/Site visit**

12) a. Chips ☐ yes ☐ no \_\_\_\_\_

b. Baked chips ☐ yes ☐ no \_\_\_\_\_

13) a. Bread ☐ yes ☐ no \_\_\_\_\_

b. 100% wheat or whole grain bread ☐ yes ☐ no \_\_\_\_\_

14) 100% fruit juice ☐ yes ☐ no \_\_\_\_\_

15) 1% Low-fat, skim, or non-fat milk ☐ yes ☐ no \_\_\_\_\_

**Nutrition Environment Measures Survey (NEMS)**  
**RESTAURANT MEASURES—DATA COLLECTION**

Restaurant ID:   -   -

Date:

Month / Day / Year

Rater ID:

Menu Review	Select One	Choices (#)	Comments
16) Main Dishes/Entrees:	<input type="radio"/> yes	# <input type="text"/> <input type="text"/> <input type="text"/>	
a. Total # Main Dishes/Entrees	<input type="radio"/> no		
b. Healthy Options	<input type="radio"/> yes	<input type="text"/> <input type="text"/>	
	<input type="radio"/> no		
17) Main dish salads:			
a. Total # Main dish salads	<input type="radio"/> yes	<input type="text"/> <input type="text"/>	
	<input type="radio"/> no		
b. Healthy Options	<input type="radio"/> yes	<input type="text"/> <input type="text"/>	
	<input type="radio"/> no		
c. Low-fat or fat free salad dressings	<input type="radio"/> yes	<input type="text"/> <input type="text"/>	
	<input type="radio"/> no		
18) Fruit (w/out sugar)	<input type="radio"/> yes	<input type="text"/> <input type="text"/>	
	<input type="radio"/> no		
19) Non-fried vegetables (w/out sauce)	<input type="radio"/> yes	<input type="text"/> <input type="text"/>	
	<input type="radio"/> no		
20) Diet soda	<input type="radio"/> yes		
	<input type="radio"/> no		
21) Other healthy or low calorie beverage?	<input type="radio"/> yes _____		
	<input type="radio"/> no		

**Nutrition Environment Measures Survey (NEMS)**  
**RESTAURANT MEASURES—DATA COLLECTION**

Restaurant ID:   -  -

Date:    /   /    
 Month / Day / Year

Rater ID:

**Menu Review/Site Visit**

**Select One**

**Comments**

22) a. Nutrition information on menu (paper or posted menu)

☐ yes ☐ no

\_\_\_\_\_  
 \_\_\_\_\_

b. Healthy entrees identified on menu

☐ yes ☐ no

\_\_\_\_\_  
 \_\_\_\_\_

c. Reduced-size portions offered on menu

☐ yes ☐ no

\_\_\_\_\_  
☐ standard \_\_\_\_\_

d. Menu notations that encourage healthy requests

☐ yes ☐ no

\_\_\_\_\_  
 \_\_\_\_\_

e. Other? \_\_\_\_\_

☐ yes ☐ no

\_\_\_\_\_  
 \_\_\_\_\_

**23) Barriers**

a. Large portion sizes encouraged?  
 Super-size items on menu

☐ yes ☐ no

\_\_\_\_\_  
 \_\_\_\_\_

b. Menu notations that discourage special requests  
 (e.g. *No substitutions* or charge for substitutions)

☐ yes ☐ no

\_\_\_\_\_  
 \_\_\_\_\_



**Nutrition Environment Measures Survey (NEMS)**  
**RESTAURANT MEASURES—DATA COLLECTION**

Restaurant ID:   -   -

Date:   /   /    
 Month / Day / Year

Rater ID:

**23) Barriers (Cont.)**

**Select One**

**Comments**

c. All-you-can-eat or “Unlimited trips”

☐ yes

\_\_\_\_\_

☐ no

\_\_\_\_\_

d. Other? \_\_\_\_\_

☐ yes

\_\_\_\_\_

☐ no

\_\_\_\_\_

**24) Pricing**

a. Sum of individual items compared to combo meal

☐ more

☐ less

\_\_\_\_\_

☐ same

☐ NA

\_\_\_\_\_

b. Healthy entrees compared to regular ones

☐ more

☐ less

\_\_\_\_\_

☐ same

☐ NA

\_\_\_\_\_

c. Charged for shared entrée?

☐ yes

\_\_\_\_\_

☐ no

\_\_\_\_\_

d. Smaller portion compared to regular portion

☐ yes

☐ NA

\_\_\_\_\_

(If 22c is No or Standard then mark N/A.)

☐ no

\_\_\_\_\_

e. Other? \_\_\_\_\_

☐ more

☐ less

\_\_\_\_\_

☐ same

☐ NA

\_\_\_\_\_

**Nutrition Environment Measures Survey (NEMS)**  
**RESTAURANT MEASURES—DATA COLLECTION**

Restaurant ID:   -   -

Date:    /    /     
 Month / Day / Year

Rater ID:

**Menu Review**

**25) Kid's menu?**

**Select One**

**Comments**

- |   |  |                |
|---|--|----------------|
| a. Age limit  | <input type="radio"/> yes <input type="radio"/> no<br><input type="radio"/> 10 & Under <input type="radio"/> 12 & Under <input type="radio"/> Other <input type="radio"/> NA | _____<br>_____ |
| b. Any healthy entrees?   | <input type="radio"/> yes <input type="radio"/> no <input type="radio"/> NA  | _____          |
| c. 100% fruit juice   | <input type="radio"/> yes <input type="radio"/> no <input type="radio"/> NA  | _____          |
| d. 1% low-fat, skim or non-fat milk   | <input type="radio"/> yes <input type="radio"/> no <input type="radio"/> NA  | _____          |
| e. Are there any free refills on unhealthy drinks?                                | <input type="radio"/> yes <input type="radio"/> no <input type="radio"/> NA  | _____          |
| f. Are there any healthy side items<br>(either assigned or to choose)?            | <input type="radio"/> yes <input type="radio"/> no <input type="radio"/> NA  | _____          |
| g. Can you substitute a healthy side for an assigned<br>unhealthy one?            | <input type="radio"/> yes <input type="radio"/> no <input type="radio"/> NA  | _____          |
| h. Do any entrees that have assigned sides include<br>an assigned healthy side?   | <input type="radio"/> yes <input type="radio"/> no <input type="radio"/> NA  | _____          |
| i. Is an unhealthy dessert automatically included<br>in a kid's meal?             | <input type="radio"/> yes <input type="radio"/> no <input type="radio"/> NA  | _____          |
| j. Are there any healthy desserts<br>(either free or at additional cost)?         | <input type="radio"/> yes <input type="radio"/> no <input type="radio"/> NA  | _____          |
| k. Is nutrition information (e.g. calories or fat)<br>provided on the kid's menu? | <input type="radio"/> yes <input type="radio"/> no <input type="radio"/> NA  | _____          |
| l. Other unhealthful eating promotion?  | <input type="radio"/> yes <input type="radio"/> no <input type="radio"/> NA  | _____          |
| m. Other healthful eating promotion?  | <input type="radio"/> yes <input type="radio"/> no <input type="radio"/> NA  | _____          |

## Appendix C: Adapted Nutrition Environment Measures Survey-Restaurants audit

### Nutrition Environment Measures Survey (NEMS) AUT University food outlets—DATA COLLECTION

Name of food outlet: \_\_\_\_\_

Date:    /    /

Rater Initials:

Month / Day / Year

#### 1) Type of menu:

No menu: ☐ yes ☐ no

Noticeboard: ☐ yes ☐ no

Labels by foods ☐ yes ☐ no

Other: ☐ yes ☐ no

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

#### 2) Food items available:

Hot meals: ☐ yes ☐ no

Hot snacks: ☐ yes ☐ no

Cold meals: ☐ yes ☐ no

Cold snacks: ☐ yes ☐ no

Other ☐ yes ☐ no

Comments: \_\_\_\_\_

\_\_\_\_\_

#### 3) Beverage items available:

Hot drinks: ☐ yes ☐ no

Cold drinks: ☐ yes ☐ no

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

#### 4) Hours of operation:

☐ Monday – Friday only

Semester time: ☐ open ☐ closed

☐ B: 6:00-11:00 am

☐ L: 11:00 am-3:00 pm

☐ D: 5:00 pm to Close

Closing time:   :   ☐ AM ☐ PM

☐ no set hours, changes based on demand

#### Data Source(s): ☐ Sign ☐ Interview

☐ Open at weekends

Semester break: ☐ open ☐ closed

☐ B: 6:00-11:00 am

☐ L: 11:00 am-3:00 pm

☐ D: 5:00 pm to Close

:   ☐ AM ☐ PM

Saturday - Sunday: ☐ open ☐ closed

☐ B: 6:00-11:00 am

☐ L: 11:00 am-3:00 pm

☐ D: 5:00 pm to Close

:   ☐ AM ☐ PM

#### 5) Size of food outlet:

☐ Number of tables =

OR

☐ Part of a food court

Comments: \_\_\_\_\_

**Nutrition Environment Measures Survey (NEMS)**  
**AUT University food outlets—DATA COLLECTION**

Name of food outlet: \_\_\_\_\_

Date: 



 / 



 /

Rater Initials:

Month / Day / Year

**Site Visit (Observation)**

**Select One**

**Comments**

6) Outlet has salad options available

☐ yes ☐ no \_\_\_\_\_

a. Low fat dressings are available

☐ yes ☐ no \_\_\_\_\_

7) Signage/Promotions

a. Is nutrition information posted near point-of-purchase, or available in a brochure? ☐ yes ☐ no \_\_\_\_\_

b. Do signs/table tents/displays highlight **healthy menu options**? ☐ yes ☐ no \_\_\_\_\_

c. Do signs/table tents/displays encourage **healthy** eating? ☐ yes ☐ no \_\_\_\_\_

d. Do signs/table tents/displays encourage **unhealthy** eating? ☐ yes ☐ no \_\_\_\_\_

e. Do signs/table tents/displays encourage overeating (all-you-can-eat, super-size, jumbo, grande, supreme, king size, feast descriptors on menu or signage)? ☐ yes ☐ no \_\_\_\_\_

f. Other? \_\_\_\_\_ ☐ yes ☐ no \_\_\_\_\_

8) Placement of healthier options

a. Are healthier food items placed in prominent line of sight, easy to get to locations? ☐ yes ☐ no \_\_\_\_\_

b. Are healthier beverages placed in prominent, line of sight, easy to access locations? ☐ yes ☐ no \_\_\_\_\_

**Nutrition Environment Measures Survey (NEMS)  
AUT University food outlets—DATA COLLECTION**

Name of food outlet: \_\_\_\_\_

Date:

Rater Initials:

Month / Day / Year

Menu Review	Select One	Choices (#)	Comments
9) Main Dishes/Sandwiches/Rolls etc	<input type="radio"/> yes	# <input type="text"/> <input type="text"/>	_____
a. Total # Main Dishes/Sandwiches etc	<input type="radio"/> no		_____
b. Healthier options	<input type="radio"/> yes	# <input type="text"/> <input type="text"/>	_____
	<input type="radio"/> no		_____
c. Wholemeal/wholegrain sandwiches and rolls available?	<input type="radio"/> yes	# <input type="text"/> <input type="text"/>	_____
	<input type="radio"/> no		_____
10) Non-fried vegetables (w/out sauce)	<input type="radio"/> yes	# <input type="text"/> <input type="text"/>	_____
	<input type="radio"/> no		_____
11) Snacks:	<input type="radio"/> yes	# <input type="text"/> <input type="text"/>	_____
a. Total # snack options	<input type="radio"/> no		_____
b. Healthier options	<input type="radio"/> yes	# <input type="text"/> <input type="text"/>	_____
	<input type="radio"/> no		_____
12) Fruit (w/out sugar)	<input type="radio"/> yes	# <input type="text"/> <input type="text"/>	_____
	<input type="radio"/> no		_____

**Nutrition Environment Measures Survey (NEMS)**  
**AUT University food outlets—DATA COLLECTION**

Name of food outlet: \_\_\_\_\_

Date:

--	--	--	--	--	--

Rater Initials:

--	--

Month / Day / Year

13) Diet soft drink

☐ yes

\_\_\_\_\_

☐ no

\_\_\_\_\_

14) Other healthier or low calorie beverage?

☐ yes

\_\_\_\_\_

☐ no

\_\_\_\_\_

\_\_\_\_\_

15) Low fat milk available?

☐ yes

\_\_\_\_\_

☐ no

\_\_\_\_\_

**Nutrition Environment Measures Survey (NEMS)  
AUT University food outlets—DATA COLLECTION**

Name of food outlet: \_\_\_\_\_

Date: 



 / 



 /

Rater Initials:

Month / Day / Year

**Menu Review/Site Visit**

**Select One**

**Comments**

16) a. Nutrition information available

☐ yes ☐ no

\_\_\_\_\_

\_\_\_\_\_

b. Healthy options identified

☐ yes ☐ no

\_\_\_\_\_

\_\_\_\_\_

c. Reduced-size portions offered

☐ yes ☐ no

\_\_\_\_\_

☐ standard

\_\_\_\_\_

d. Point of choice labeling encouraging healthy requests is prominent ☐ yes ☐ no

\_\_\_\_\_

\_\_\_\_\_

e. Other? \_\_\_\_\_

☐ yes ☐ no

\_\_\_\_\_

\_\_\_\_\_

17) Barriers

a. Large portion sizes encouraged?

☐ yes ☐ no

\_\_\_\_\_

Super-size items on menu

\_\_\_\_\_

b. Menu notations that discourage healthier requests

☐ yes ☐ no

\_\_\_\_\_

(e.g. *No substitutions* or charge for substitutions)

\_\_\_\_\_

c. All-you-can-eat or “Unlimited trips”

☐ yes ☐ no

\_\_\_\_\_

\_\_\_\_\_

d. Other? \_\_\_\_\_

☐ yes ☐ no

\_\_\_\_\_

\_\_\_\_\_

**Nutrition Environment Measures Survey (NEMS)**  
**AUT University food outlets—DATA COLLECTION**

Name of food outlet: \_\_\_\_\_

Date: 



 / 



 /

Rater Initials:

Month / Day / Year

**Barriers (Cont.)**

**Select One**

**Comments**

18) Pricing

a. Sum of individual items compared to combo meal

☐ more    ☐ less \_\_\_\_\_

☐ same    ☐ NA \_\_\_\_\_

b. Healthier choices compared to regular ones

☐ more    ☐ less \_\_\_\_\_

☐ same    ☐ NA \_\_\_\_\_

d. Smaller portion compared to regular portion

☐ more    ☐ less \_\_\_\_\_

(If 22c is No or Standard then mark N/A.)

☐ same    ☐ NA \_\_\_\_\_

e. Other? \_\_\_\_\_

☐ more    ☐ less \_\_\_\_\_

☐ same    ☐ NA \_\_\_\_\_



## **Appendix D: Nutrition Environment Measures Survey-Restaurants Audit Protocol**

### **Protocol NEMS survey AUT University**

#### **General completion tips**

1. Write legibly
2. Check your work
3. Use the correct line/bubble
4. Write the name of the outlet, your initials and the date at the top of each page

#### **Cover page**

Record your initials at the top of the page

Record the name of the café and which campus the food outlet is on

Record the date and start/end times for each data source as you complete the data collection

#### **Page 1**

##### **Question 1: Data source**

Record all the data sources that you use in completing the data collection form for this assessment.

##### **Question 2: Type of menu**

Record what type of menu the café has. There may be more than one option for example a café might have a blackboard menu as well as labels by foods. Only record them as two separate options if the foods on the menus are different.

##### **Question 3 – 4: food and beverage items available**

Record all the types of food that are available in the cafe, You can choose multiple items

##### **Question 5: Hours of operation**

Note: The hours listed beside breakfast (B), lunch (L), and dinner (D) are approximate times. For example, for a café that is open 7:30 am – 2:30pm, mark B (breakfast) and L (lunch).

Record the following:

- Data source (sign or interview)
- The days the cafe is open Mon – Fri or on weekends and whether it is open only in semester time or in semester breaks as well

- Record whether the cafe is open for breakfast (B), lunch (L) and/or dinner.
- Record the latest hour open and mark am or pm.
- If there are no set hours block out this bubble

Question 6: Size of food outlet:

Record the number of tables of any size, count both exterior and interior tables.

Write in comments whether there are external tables

If the café is in a food court and has no assigned tables, fill in '0' in seating capacity and block out the 'food court' bubble.

If the café is in a food court but has assigned tables count the tables and record and also block out the 'food court' bubble.

**Page 2**

Question 7: Salad bar

Record whether the café has a salad bar

Question 8: Signage/Promotions

Record the following:

a) Nutrition information near point of purchase

- Is nutrition information posted near point-of-purchase, or available in a brochure that is prominently displayed.

b) Signs/table tents/displays highlight healthy menu options

- Signage may relate to nutritional value/type of food (grilled food/salads).  
For example: "Try a low fat option – We feature salads with fat free dressing"

c) Signs/table tents/displays encourage healthy eating

- Signage that encourages healthy choices. For example, "Fruit and vegetables – The smart choice!"

d) Signs/table tents/displays encourage unhealthy eating

- Signage that is related to nutritional value/type of food (promoting rich desserts and fried foods) or price (combo discounts). For example, "Try our cheesecake: Rich and creamy", posters featuring pictures of high-fat foods, promotional signs or posters pushing combo discounts.

e) Signs/table tents/displays encourage overeating (all you can eat, super size jumbo, grande, king size etc)

- Related to quantity

f) Other

- Note any other signage of displays that would influence food purchasing.

#### Question 9: Placement of healthier options

Record whether healthier food and beverage choices are placed at eye level and in locations that are easy to choose. For example water in fridges at eye level and closest to the opening of the door

If you are unsure whether choices are healthy or not mark no and then write comments about what you are unsure about.

### **Page 3**

#### Question 9: Main dishes/Sandwiches/Rolls etc

a. Count the total number of meals (main dishes, sandwiches, rolls etc).

Use the following guidelines

- Each item must be distinctly different, either in ingredients, proportion of ingredients or preparation method
- Build your own e.g. noodle bar counts as 1 choice
- Example: ham sandwich counts separate to a ham salad sandwich or a chicken sandwich.
- Example: Stirfry on rice counts separately to stirfry on noodles

b) Record if there are healthier options available and how many choices there are. If calorie and fat information or a healthy symbol or notation are provided mark 'yes'. If not, mark 'no'. If healthier choices are available follow the steps below to count whether the options meet the NEMS definition of 'healthy'.

#### If nutrition information is available:

1. Count the number of **mains (except sandwiches)** that meet **all three** of the following criteria:

- a)  $\leq 800$  calories
- b)  $\leq 30\%$  of calories from fat (see % Fat Chart)
- c) If saturated fat data are available, then check to see if the items that meet the total fat criterion also have  $\leq 10\%$  of calories from saturated fat (see % Fat Chart).

2. Count the number of **sandwiches** that meet **all three** of the following criteria:
  - a)  $\leq 650$  calories
  - b)  $\leq 30\%$  of calories from fat (see % Fat Chart)
  - c) If saturated fat data are available, then check to see if the items that meet the total fat criterion also have  $\leq 10\%$  of calories from saturated fat (see % Fat Chart).
3. Add the numbers of sandwiches meeting the criteria and record in **#16b** on data collection form.
4. If a menu does not have any healthy options, write "0" in the # box.

If nutrition information is **not** available:

Record the number of meals identified as healthier choices for example with "**light**," "**heart healthy**," "**healthy**," sometimes designated with a small heart symbol or a tick. If a menu does not have any healthy options clearly marked, write "0" in the # box.

- c) Record if wholemeal or wholegrain sandwiches and rolls are available and give an indication in the comments section what the proportion of wholemeal to white.

#### % Fat Chart

Total fat		Saturated fat	
Kilojoules	$\leq$ grams of fat	Kilojoules	$\leq$ grams of saturated fat
$\leq 749$	5 grams	$\leq 619$	1 grams
750 – 874	6 grams	620 – 999	2 grams
875 – 999	7 grams	1000 – 1329	3 grams
1000 – 1124	8 grams	1330 – 1749	4 grams
1125 – 1249	9 grams	1750 – 2089	5 grams
1250 – 1374	10 grams	2090 – 2459	6 grams
1375 – 1499	11 grams	2460 – 2879	7 grams
1500 – 1624	12 grams	2880 – 3214	8 grams
1625 – 1749	13 grams	3215 – 3344	9 grams
1750 – 1874	14 grams		
1875 – 1999	15 grams		
2000 – 2124	16 grams		
2125 – 2249	17 grams		
2250 – 2374	18 grams		
2375 – 2499	19 grams		
2500 – 2624	20 grams		
2625 – 2749	21 grams		
2750 – 2874	22 grams		
2875 – 2999	23 grams		
3000 – 3124	24 grams		
3125 – 3249	25 grams		

3250 – 3344	26 grams
-------------	----------

#### Question 10: Snacks

a) Count the total types of snacks (see list below).

List of snacks

- Baking - scones, muffins, slices, cakes, cookies, muesli bars
- Chips
- Chocolate
- Lollies
- Nut mixes
- Yoghurt

b) Record the number of types of snacks identified as healthier choices for example with “**light**,” “**heart healthy**,” “**healthy**,” sometimes designated with a small heart symbol or a tick. If a menu does not have any healthy options clearly marked, write “0” in the # box.

Write in the comments section which snacks were labelled as healthier

For example if 1 flavour of muesli bar is marked as a healthier choice write ‘1’ in the box and write the muesli bar flavour in the comments section

#### Question 11 and 12: Non-fried vegetables and fruit

Record if there are any non-fried vegetables available and then record the number, for example steamed carrots. These must be available separately, do not count them if they are part of a mixed dish.

#### Question 13: Diet soft drink

Record if there are diet soft drinks available and record approximately how many type

### **Page 4**

#### Question 14: Other healthier or low kilojoule drinks

Record whether the café offers other low kilojoule beverages e.g. flavoured water, unsweetened iced tea. A low kilojoule beverage is one that has less than 160kJ per serve.

#### Question 15: Low fat milk

Record whether low fat milk is available. Flavoured milk doesn't count even if it's low fat. If it is only available for coffee write this in the comments section.

## **Page 5**

### Question 16: Facilitators and supports

- a) Record if nutrition information is available. Record in the comments section where the information is available e.g. internet site, point of choice, point of sale etc.
- b) Healthier options labelled: Record if healthier options are identified either on the food itself or on the menu
- c) Reduced portion sizes: Record if reduced portion sizes are available. If multiple sized options are a standard part of the menu e.g. small and large salad, mark 'standard'
- d) Point of choice labelling: Record if there is point of choice labelling that encourages healthier choices e.g. order trim milk with your coffee. Write details in the comments section
- e) Other: Note any other facilitators and supports on the menu

### Question 17: Barriers

- a) Large portion sizes: Record if the café promotes large portion sizes e.g. large only 20c extra
- b) Menu notations: Record if there are menu notations that discourage healthier requests e.g. 'No substitutions'.
- c) 'All you can eat': Record if an 'All you can eat' or free refill option is available
- d) Other: Record any other barriers not previously noted and describe in comments

## **Page 6**

### Question 18: Pricing

- a) Combo meals: Identify if combo meals are more, the same or less than purchasing individual items

Definition of a combo meal:

- A combo meal combines several menu items that would otherwise be sold separately
- It may include a drink but not necessarily

- It is not a meal with side dishes e.g. curry, rice and salad but separate items with separate prices, put together as a “combo”.

b) Healthier choices compared to regular ones: Identify if healthier meal options are more expensive, the same or less than regular meal options. If there are no marked healthier choices (Question 9b), mark NA

c) Smaller portion price: Record if smaller portions are the same price or less than a regular portion

d) Other: Not any additional pricing incentives that encourage overeating or healthier

## Appendix E: Desirable Characteristics of Nutrient Profiling Tool

*Table E1 Desirable characteristics of a Nutrient Profiling Tool for Feed Your Need to Succeed*

Characteristic	Explanation and justification
Appropriate for New Zealand	Allows for the assessment of popular, uniquely New Zealand foods such as meat pies, toasted sandwiches and sausage rolls
Considers positive as well as negative nutrients	One of the overarching principles of FNS is that healthier foods exist on a spectrum and it is unrealistic to expect that food and beverage choices will move to the healthiest options without intermediary steps. Therefore, the final criteria to classify products needs to allow for differentiation of foods in categories that have traditionally been ‘unhealthy’ (such as pies). Considering positive nutrients such as fibre allows for more effective differentiation and a more holistic approach to food.
Realistic for an environment where foods are made onsite	Foods made in onsite kitchens are more likely to be slightly different every day because of who is making them. Whilst this was controlled at AUT as much as possible by using standardised recipes there is still likely to be some fluctuation. As a result of this fluctuation it was not realistic to have nutritional classifications with tight cut-offs.
Considers portion size	Eating a large portion of a healthier choice can sometimes have the same effect as eating a small portion of a less healthy choice. Therefore, it was important to consider how much one portion was, particularly for pre-portioned items such as sandwiches and pies
Has separate criteria for different food and beverage categories	In the food outlets on campus there was a wide range of products available. To consider foods on a spectrum of healthiness it was important to have different criteria for different products. This allowed for a more accurate assessment of which products were healthier in food and beverage categories that served different needs for example such as snacks versus meals and beverages versus food.
Classification system allows for simple identification of healthier options at point of choice	Participants in the focus group and the foodservice manager were clear that they wanted simple and easy identification of healthier options at point of choice. Participants did not want to have to interpret numbers or complication rating systems to identify healthier options.



## Appendix F: Original Food and Beverage Classification System

*Table F1 The original food and beverage classification system nutrient framework for schools*

Product category	Everyday	Sometimes	Occasional
<u>Beverages</u>			
Water	All plain water with nothing added	Not applicable	Not applicable
Flavoured and/or fortified water and sports drinks	Not applicable	Package size $\leq$ 450ml Energy $\leq$ 50kJ/100ml	Package size $>$ 450ml Energy $>$ 50kJ/100ml
Artificially sweetened carbonated beverages Examples include 'diet', 'light', and 'zero' carbonated beverages (soft drinks)	Not applicable	Package size $\leq$ 400ml	Package size $>$ 400ml
Vegetable and/or fruit juice Examples include pure vegetable and/or fruit juices	Not applicable	Package size $\leq$ 250ml	Package size $>$ 250ml
Flavoured milks and drinking yoghurts Examples include flavoured cow's milk, soy milk and rice milk	Not applicable	Package size $\leq$ 350ml Total fat $\leq$ 3.3g/100ml	Package size $>$ 350ml Total fat $>$ 3.3g/100ml
Vegetable and/or fruit drinks Examples include fruit flavoured drinks and fruit smoothies	Not applicable	Package size $\leq$ 250ml or Package size $\leq$ 350ml and Energy $\leq$ 90kJ/100ml	Package size $>$ 350ml or Package size $>$ 250ml and Energy $>$ 90kJ/100ml
Milk (excludes cream – see catering guidelines) Examples include plain cow's milk, soy milk, goat's and rice milk	Total fat $\leq$ 2.0g/100ml	Total fat $\leq$ 3.3g/100ml	Total fat $>$ 3.3g/100g
<u>Vegetables and Fruit</u>			
Fresh, canned and frozen vegetables and/or vegetable mixes (except potato, kumara, taro and tapioca)	No added fat	Saturated fat $\leq$ 1.5g/100g	Saturated fat $\geq$ 1.5g/100g

Product category	Everyday	Sometimes	Occasional
Potato, kumara, taro and tapioca (Examples include fresh, frozen or mashed potato, kumara, taro and/or tapioca products)	Not added fat No added salt	Energy $\leq$ 1000kJ/100g Saturated fat $\leq$ 5g/100g Sodium $\leq$ 450mg/100g	Energy > 1000kJ/100g Saturated fat > 5g/100g Sodium > 450mg/100g
Fresh, frozen and canned fruit, fruit tubs and pureed fruit	No added fat No added salt No added sugar or artificial sweetener	All other fresh, frozen and canned fruit, fruit tubs and pureed fruit	Not applicable
Dried vegetables and/or fruit, vegetable and/or fruit leathers and chips Examples include vegetable and/or fruit chips for example banana chips	Not applicable	$\geq$ 95% vegetable and/or fruit Saturated fat $\leq$ 3g/serve	< 95% vegetable and/or fruit Saturated fat $\geq$ 3g/serve
<u>Breads and Cereals</u>			
Rice, pasta, noodles and couscous Examples include fresh and dried pasta, rice, couscous, noodle cups/Instant noodles, rice risotto and savoury rice, and canned spaghetti	No added fat No added salt	Energy $\leq$ 1000kJ/100g Saturated fat $\leq$ 1.5g/100g Sodium $\leq$ 450mg/100g	Energy > 1000kJ/100g Saturated fat > 1.5g/100g Sodium > 450mg/100g
Bread or bread products and fruit breads Examples include all wholemeal, wholegrain, multigrain, and while breads, muffin splits, crumpets, bagels, wraps, flat breads, rolls, fruit breads, non-iced buns, rewena bread, fa'apapa, garlic bread and croissants	Saturated fat $\leq$ 1.5g/100g Sodium $\leq$ 450mg/100g Fibre $\geq$ 3g/100g	Saturated fat $\leq$ 4.0g/100g	Saturated fat > 4g/100g
Breakfast cereals Examples include wheat biscuits, bran, rice and corn flakes and bubbles, rolled oats and muesli	Saturated fat $\leq$ 1.5g/100g Sodium $\leq$ 450mg/100g Fibre $\geq$ 3g/100g	Saturated fat $\leq$ 4g/100g Sodium $\leq$ 600mg/100g Fibre $\geq$ 4g/100g	Saturated fat > 4g/100g Sodium > 600mg/100g Fibre < 4g/100g
<u>Milk and products</u>			
Milk (excludes cream – see catering guidelines) Examples include plain cow's milk, soy milk, goat's and rice milk	Total fat $\leq$ 2.0g/100ml	Total fat $\leq$ 3.3g/100ml	Total fat > 3.3g/100g

Product category	Everyday	Sometimes	Occasional
Cheese Soft and hard cheese. Examples include ricotta, cottage cheese, cheddar, cheese slices and cream cheese	Saturated fat $\leq 5\text{g}/100\text{g}$ Sodium $\leq 450\text{mg}/100\text{g}$	All other cheeses	Not applicable
Milk-based snack foods Examples include yoghurt, custards, dairy desserts, and creamed rice, and soy versions of these items	Energy $\leq 600\text{kJ}/\text{serve}$ Saturated fat $\leq 1.5\text{g}/\text{serve}$	Energy $\leq 1000\text{kJ}/\text{serve}$ Saturated fat $\leq 3\text{g}/\text{serve}$	Energy $> 1000\text{kJ}/\text{serve}$ Saturated fat $> 3\text{g}/\text{serve}$
Flavoured milks and drinking yoghurts Examples include flavoured cow's milk, soy milk and rice milk	Not applicable	Package size $\leq 350\text{ml}$ Total fat $\leq 3.3\text{g}/100\text{ml}$	Package size $> 350\text{ml}$ Total fat $> 3.3\text{g}/100\text{ml}$
<u>Meat, fish, canned and pouched fish and seafood</u> Fresh, frozen, canned and pouched fish and seafood	No added fat No added oil	All other fresh, frozen, canned and pouched fish and seafood	Not applicable
Processed meat, fish, poultry and seafood products Examples include mince meat patties, crumbed or coated poultry and fish, fish patties, fish fingers, surimi and other processes seafood	Not applicable	Energy $\leq 1000\text{kJ}/100\text{g}$ Saturated fat $\leq 5\text{g}/100\text{g}$ Sodium $\leq 450\text{mg}/100\text{g}$	Energy $> 1000\text{kJ}/100\text{g}$ Saturated fat $> 1.5\text{g}/100\text{g}$ Sodium $> 450\text{mg}/100\text{g}$
Meat, poultry and eggs Examples include plain beef, lamb, pork, chicken and turkey, plain mince (with no added ingredients) and egg dishes	Visibly lean, unprocessed meat and poultry. Eggs cooked with no added fat and no added salt	All other unprocessed meat and poultry and egg dishes	Not applicable
Ready-to-eat sandwich meats Examples include ham, salami, and luncheon-type meats	Not applicable	Total fat $\leq 5\text{g}/100\text{g}$ Saturated fat $\leq 2\text{g}/100\text{g}$	Total fat $> 5\text{g}/100\text{g}$ Saturated fat $> 2\text{g}/100\text{g}$
Sausages, frankfurters and saveloys	Not applicable	Saturated fat $\leq 7.5\text{g}/100\text{g}$ Sodium $\leq 900\text{mg}/100\text{g}$	Saturated fat $> 7\text{g}/100\text{g}$ Sodium $> 900\text{mg}/100\text{g}$
Meat alternatives (vegetarian options) Examples include vegetarian 'meats' and 'sausages', nutmeat, falafel, tofu and tempeh	Total fat $\leq 10\text{g}/100\text{g}$ Saturated fat $\leq 5\text{g}/100\text{g}$ Sodium $\leq 450\text{mg}/100\text{g}$	Sodium $\leq 900\text{mg}/100\text{g}$	Sodium $> 900\text{mg}/100\text{g}$

Product category	Everyday	Sometimes	Occasional
Dried and canned peas, beans and lentils (pulses) Examples include lentils, split peas, chickpeas, red kidney beans, baked beans, canned bean mixes, and flavoured dried peas and beans	No added fat	Saturated fat $\leq$ 5g/serve	Saturated fat $>$ 5g/serve
<u>Mixed meal dishes</u> Mixed meal items Items that are a combination of foods from one or more food groups. These are promoted as stand alone items that are consumed on their own or as the main item of a meal. Examples include pizza with a bread or pastry base, pasta dishes including filled pasta, lasagne and macaroni cheese, sushi and calzones.	Energy $\leq$ 1000/100g Saturated fat $\leq$ 5g/100g Sodium $\leq$ 450mg/100g	Energy $\leq$ 1000/100g Saturated fat $\leq$ 5g/100g Sodium $\leq$ 450mg/100g	Energy $>$ 1000/100g Saturated fat $>$ 5g/100g Sodium $>$ 450mg/100g
Soup All fresh, canned and powdered soup mixes and chowders	Saturated fat $\leq$ 1.5g/100ml Sodium $\leq$ 450mg/100ml Fibre $\geq$ 1g/100ml	Energy $\leq$ 1000/100ml Saturated fat $\leq$ 1.5g/100ml Sodium $\leq$ 450mg/100ml	Energy $>$ 1000/100ml Saturated fat $>$ 1.5g/100ml Sodium $>$ 450mg/100ml
Filled sandwiches, rolls and wraps All filled bread, flavoured bread, flat bread and pita bread. Examples include sandwiches, filled rolls, wraps, American hot dogs and burgers	Energy $\leq$ 1000kJ/100g Energy $\leq$ 1500kJ/serve Saturated fat $\leq$ 5g/serve Sodium $\leq$ 600mg/100g	Energy $\leq$ 1200kJ/100g Energy $\leq$ 1500kJ/serve Saturated fat $\leq$ 7.5g/serve Sodium $\leq$ 750mg/100g	Energy $>$ 1200kJ/100g Energy $>$ 1500kJ/serve Saturated fat $>$ 7.5g/serve Sodium $>$ 750mg/100g
Pastry products Examples include savoury pies, sausage rolls, spring rolls, quiches and samosas	Not applicable	Energy $\leq$ 1000kJ/100g Energy $\leq$ 1500kJ per serve Saturated fat $\leq$ 5g/100g Sodium $\leq$ 350mg/100g	Energy $>$ 1000kJ/100g Energy $>$ 1500kJ per serve Saturated fat $>$ 5g/100g Sodium $>$ 350mg/100g
<u>Snack foods</u> Milk-based snack foods Examples include yoghurt, custards, dairy desserts, and creamed rice, and soy versions of these items	Energy $\leq$ 600kJ/serve Saturated fat $\leq$ 1.5g/serve	Energy $\leq$ 1000kJ/serve Saturated fat $\leq$ 3g/serve	Energy $>$ 1000kJ/serve Saturated fat $>$ 3g/serve

Product category	Everyday	Sometimes	Occasional
Packaged sweet snack foods Examples include biscuits, bars, cereal bars and sweetened popcorn	Not applicable	Energy $\leq$ 1900kJ/100g Energy $\leq$ 600kJ/serve Saturated fat $\leq$ 2g/serve Sodium $\leq$ 200mg/serve Fibre $\geq$ 1g/serve	Energy > 1900kJ/100g Energy > 600kJ/serve Saturated fat > 2g/serve Sodium > 200mg/serve
Packaged savoury snack foods Examples include crackers, bars, chips, potato crisps, rice crackers, and plain popcorn	Not applicable	Energy $\leq$ 1800kJ/100g Energy $\leq$ 600kJ/serve Saturated fat $\leq$ 3g/serve Sodium $\leq$ 200mg/serve	Energy > 1800kJ/100g Energy > 600kJ/serve Saturated fat > 3g/serve Sodium > 200mg/serve
Baked snack foods Examples include cakes, pancakes, pikelets, iced buns, sweet and savoury muffins, scones and sweet pastries for example, Danish pastries and fruit bars. (Excludes biscuits and pre-packaged bars.)	Not applicable	Energy $\leq$ 1800kJ/100g Energy $\leq$ 900kJ/serve Saturated fat $\leq$ 3g/serve Fibre $\geq$ 1.5g/serve	Energy > 1800kJ/100g Energy > 900kJ/serve Saturated fat > 3g/serve Fibre > 1.5g/serve
Dried fruit, nut and seed mixtures Examples include any dried fruit and/or nut and/or seed sold as a mixture or sold separately	No added salt Package size $\leq$ 20g Saturated fat $\leq$ 3g/serve Sodium $\leq$ 200mg/serve	Package size $\leq$ 30g Saturated fat $\leq$ 5g/serve Sodium $\leq$ 200mg/serve	Saturated fat > 5g/serve Sodium > 200mg/serve
Ice creams, ice blocks, frozen yoghurts and jellies Ices, ice blocks, ice creams. Frozen yoghurts, gelato, slushies, fruit and jelly tubs, and jelly snacks	Not applicable	Energy $\leq$ 600kJ/serve Saturated fat $\leq$ 3g/serve	Energy > 600kJ/serve Saturated fat > 3g/serve

Source: 'Food and beverage classification system nutrient framework for schools' (New Zealand Ministry of Health, 2008a)

## Appendix G: Waitemata DHB Better Vending for Health Guidelines

*Table G1 Better vending for health guidelines (food)*

Product category	Better choices	Other choices
Snack foods	Energy $\leq$ 800kJ/packet Saturated fat $\leq$ 1.5g/100g Sodium $\leq$ 450mg/100g	$\leq$ 800kJ/packet

Source: (Waitemata District Health Board, 2008)

*Table G2 Better vending for health guidelines (beverages)*

Green beverages	Amber beverages	Red beverages
Water	Fruit juices - 250ml pack size or smaller	Carbonated sweetened beverages
Plain, reduced-fat milk and calcium enriched soy beverages	Reduced-fat, flavoured milk, calcium enriches soy beverages and drinking yoghurts - 350ml package size or smaller	Full-fat, plain and flavoured milks
	Artificially sweetened carbonated beverages – 400ml package size or smaller	Fruit juices > 375ml bottle
	Sports beverages, sports waters and flavoured waters with $\leq$ 50kJ per 100mls – 450ml package size or smaller	Fruit drinks and cordials with > 90kJ per 100mls
	Fruit drinks with $\leq$ 90kJ per 100mls – 350mls package size or smaller	Any beverages listed in the AMBER category that is larger than the recommended package size.

Source: (Waitemata District Health Board, 2008)

## **Appendix H: Salad Guidelines**

Our healthier choice guidelines are based on how much energy, fat and salt there is in the food. This page outlines the main ingredients that contribute to energy, fat and salt and gives some guidelines about how much to use of some key ingredients so you can combine flavours and ingredients and know the final products will still be an 'everyday' food.

Please make sure there is at least one 'Everyday/green sticker' salad every day as well as a green leaf salad.

If you use a commercial low fat dressing, no extra oil and no more than 2 'high fat ingredients' in a salad it can have a green 'everyday' sticker.

French Maid low fat dressings are: - Honey mustard, balsamic, peppercorn vinaigrette, coriander, ginger and lime, Italian

### **High fat salad ingredients**

The following ingredients are high fat ingredients so use less than 2 of them per salad and use them as an accompaniment rather than a main ingredient.

- Avocado
- Croutons
- Crispy (fried) noodles
- Nuts
- Olives
- Pesto
- Sausage or other processed meat e.g salami
- Sour cream
- Mayonnaise – unless low fat mayonnaise
- Full fat dressings e.g Caesar, aioli
- Bacon
- Cheese
- Egg

### **Amount of dressing to use:**

Oil based dressings are also high fat, so if you are using an oil based dressing that you have made, allow less than 1 Tbsp (15ml) of oil per serve.

Mayonnaise/ranch and seafood dressing are also high fat so use no more than 1cup/250ml of mayonnaise per 1kg of potato.

Pesto is another high fat dressing so use no more than 140g pesto (2/3 cup) per 500g bag of pasta.

**Starchy ingredients**

Too much starchy food in a serve of salad can also give too much energy. Bulk starch based salads out with other non-starchy vegetables e.g beans, carrots, cauliflower, capsicum, mushrooms etc.

The main starchy vegetables to watch out for are kumara, potato and corn so aim for no more than 1 cup of starchy ingredient or 200g per serve.

Also watch out for starchy foods like couscous, pasta, rice allow 90g of dried ingredient per serve.

**Salty ingredients**

Ingredients that add salt to a salad are things that are preserved in brine such as capers, olives and some tuna. If you're using these ingredients don't add any extra salt to the salad, OR rinse the capers and olives before you add them to the salad to remove the excess brine.



## Appendix I: Nutrition Environment Measures Survey-Restaurants Baseline and Evaluation Results Tables

*Table II Food/beverage review of all University food outlets – baseline and evaluation results*

Audit measure	Contracted outlets (n=10)		AUT-managed outlets (n=4)		All outlets (n=14)	
	Pre	Post	Pre	Post	Pre	Post
<u>Main dishes</u>						
Range	2 - 34	3 – 40	26 - 48	22 – 54	2 - 48	3 – 54
Average	17.9	22.2	34	37.5	22.9	26.6
Median	17	18.5	34	37	23	23
Percentage main dishes identified as healthier choices	1 (24) <sup>a</sup>	1 (20)	0 (0)	4 (5 - 39) <sup>b</sup>	1 (24) <sup>a</sup>	5 (5–39) <sup>b</sup>
Wholemeal/wholegrain options available	1 (7.1)	1(7.1)	4 (28.6)	4 (28.6)	5 (35.7)	5 (35.7)
<u>Snacks</u>						
Range	0 - 12	2 – 26	28 - 42	28 – 56	0 – 42	2 – 56
Average	4.8	4.5	37.3	42.25	14.1	10
Median	3	8.3	39	39.5	7	18.0
Percentage snacks identified as healthier	1 (20) <sup>a</sup>	1(20) <sup>a</sup>	0 (0%) <sup>a</sup>	4 (13–46) <sup>b</sup>	1 (20) <sup>a</sup>	5 (13-46) <sup>b</sup>
<u>Healthier choices available</u>						
Salad options available	2 (14.)	2 (14.2)	3 (21)	4 (28.6)	5 (35.7)	6 (42.9)
Low fat dressings available	1 (7.1)	1 (7.1)	0 (0)	0 (0)	1 (7.1)	1 (7.1)
Non fried vegetables without sauce available	1 (7.1)	1 (7.1)	1 (7.1)	1 (7.1)	2 (14.2)	2 (14.2)
Fruit without sugar available	2 (14.2)	2 (14.2)	4 (28.6)	4 (28.6)	6 (42.9)	6 (42.9)
Diet soft drink available	9 (64.3)	9 (64.3)	4 (28.6)	4 (28.6)	13 (92.9)	13 (92.9)
Other healthier beverages available	10 (71.4)	10 (71.4)	4 (28.6)	4 (28.6)	14 (100)	14 (100)
Low fat milk available	3 (21.4)	3 (21.4)	4 (28.6)	4 (28.6)	7 (50)	7 (50)

( ) bracketed number represents percentage of all 14 outlets

<sup>a</sup> The number represents how many food outlets identified healthier choices, the percentage represents the proportion of the food in that outlet identified as healthier choices.

<sup>b</sup> the percentage represents the range of percentage of choices that were identified as healthier

*Table I2 Endpoint promotions in all University food outlets – baseline and evaluation results*

Audit measure	Contracted outlets (n=10)		AUT-managed outlets (n=4)		All outlets (n=14)	
	Pre	Post	Pre	Post	Pre	Post
Healthier menu options promoted	1 (7.1)	1 (7.1)	0 (0)	3 (21.4)	1 (7.1)	4 (28.6)
Healthier eating promoted	0 (0)	0 (0)	0 (0)	4 (28.6)	0 (0)	4 (28.6)
Unhealthy eating promoted	0 (0)	3 (21.4)	0 (0)	0 (0)	0 (0)	3 (21.4)
Promotion encouraging overeating	3 (21.4)	3 (21.4)	0 (0)	0 (0)	3 (21.4)	3 (21.4)
Healthier foods have preferential placement	2 (14.3)	1 (7.1)	3 (21.4)	3 (21.4)	5 (35.7)	4 (28.6)
Healthier beverages have preferential placement	0 (0)	0 (0)	4 (28.6)	4 (28.6)	4 (28.6)	4 (28.6)

( ) bracketed number represents percentage of all 14 outlets

*Table 13 Endpoint facilitators and barriers to making healthier choices in all University food outlets – baseline and evaluation results*

Audit measure	Contracted outlets (n=10)		AUT-managed outlets (n=4)		All outlets (n=14)	
	Pre	Post	Pre	Post	Pre	Post
<u>Facilitators</u>						
Nutrition information available	1 (7.1)	1 (7.1)	0 (0)	0 (0)	1 (7.1)	1 (7.1)
Healthier options identified	1 (7.1)	1 (7.1)	0 (0)	4 (28.6)	1 (7.1)	5 (35.7)
Reduced-sized portions available	7 (50) <sup>a</sup>	5 (35.7) <sup>a</sup>	1 (7.1) <sup>a</sup>	1 (7.1) <sup>a</sup>	8 (57.1) <sup>a</sup>	6 (42.9) <sup>a</sup>
Point of choice signage encouraging healthier requests	0 (0)	1 (7.1)	0 (0)	0 (0)	0 (0)	1 (7.1)
<u>Barriers</u>						
Larger portion sizes encouraged	1 (7.1)	1 (7.1)	0 (0)	0 (0)	1 (7.1)	1 (7.1)
Signage discouraging healthier requests	0 (0)	1 (7.1)	0 (0)	0 (0)	0 (0)	0 (0)
All you can eat option	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<u>Pricing barriers</u>						
Individual meal items more expensive than a combo	6 (42.9)	5 (35.7)	0 (0)	3 (21.4)	6 (42.9)	8 (57.1)
Healthier choices same price as regular choices	1 (7.1)	1 (7.1)	0 (0)	4 (28.6)	1 (7.1)	5 (35.7)
Smaller portion cheaper than regular portion	7 (50) <sup>b</sup>	5 (35.7) <sup>b</sup>	1 (7.1) <sup>b</sup>	1 (7.1) <sup>b</sup>	8 (57.1) <sup>b</sup>	6 (42.9) <sup>b</sup>

( ) bracketed number represents percentage of all 14 outlets

<sup>a</sup> food outlets offer multiple sizes for their meals (small, medium and large)

<sup>b</sup> smaller portion sizes were cheaper but not proportionally cheaper

## **Appendix J: Nutritional Impact of Changing Heated Savouries Supplier**

A detailed analysis, incorporating the nutritional composition and how many were purchased of each flavour meat pie, from before and after the supplier had changed identified how changing the heated savouries supplier impacted the nutritional composition of the meat pies sold on campus

Sales for each flavour of meat pie were extracted from the point of sale software from June 2008 – May 2009 and June 2009 – May 2010. Total amounts and percentage changes in fat, saturated fat, energy and salt were reported.

*Table J1: Comparison of nutritional composition of pies purchased in the AUT-managed food outlets from June 2008 – May 2009 and June 2009 – May 2010*

	June 2008 – May 2009 (n=37824)	June 2009 – May 2010 (n=35445)
Energy (megacal)	15956	13513
Total fat (kg)	847	664
Saturated fat (kg)	475	295
Salt (kg)	28	14

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