Fostering environmental education within university foodservice.

Chelsea Slobbe

A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Dietetics

At the University of Otago, Dunedin, New Zealand

November 2015
Abstract

Background: In order to foster environmental education effectively, the universities need to implement environmental education in all areas, not just in the classroom. Environmental education encompasses knowledge and experience in teaching about how to care for the environment. University foodservices have the potential to foster environmental education outside the classroom. Understanding foodservice staff viewpoints is critical for engaging them in implementing environmental education in universities.

Objective: The research question was: do university foodservice staff think their workplace has the potential to foster environmental education? To answer this question, the objectives were two-fold. Firstly, the study sought to understand dominant viewpoints held amongst New Zealand university foodservice staff about the realities and desirability of fostering environmental education in their workplace. Secondly, to further understand these perspectives, this research sought to find the prevalence of the viewpoints and to profile them.

Design: Q methodology, a mixed methods approach to understanding dominant shared sets of perspectives, was used to determine a range of foodservice staff perspectives on environmental education. The study design integrated two phases. The first phase involved preliminary interviews with foodservice stakeholders and a card sorting activity to generate a series of viewpoints called factors. The second phase used the factors generated by phase one to develop a survey to determine the prevalence of perspectives in a wider national population of university foodservice staff. The survey also included behavioural scales, such as the New Ecological Paradigm scale (NEP) which measured pro-environmental orientation.
**Results:** Phase one revealed four dominant perspectives (factors). They included: The “Believer”, the “Relatively Positive Integrator”, the “Uncertain Contender” and the “Skeptic”. Phase one included 36 participants, the group included 47% male, 19% female and 53% came from residential halls and 47% came from campus food outlets. The 60 university foodservice staff that responded to the national survey included 58% female, 42% male and 85% came from residential hall foodservices. 25% of survey participants identified with the Believer narrative, 40% the Relatively Positive Integrator, 25% the Uncertain Contender and 10% the Skeptic. The New Ecological Paradigm scores were rated from a scale of 1-5 where five was the most positive score. The scores (from order of factors as above) included 3.7, 3.6, 3.4 and 3.2. There were no significant differences between factors for sociodemographic characteristics. Most statistical differences of all survey categories were found between the Believer and the Skeptic.

**Conclusion:** The results show that although differing views on environmental education exist, there are two main factors that are significantly different (Believers and Skeptics). The Skeptic disrupts common perspectives of environmental education, but this group was the lowest representing group in the survey. A common language of sustainability is vital in order for universities to foster environmental education successfully. So, this study gives hope for a common language of sustainability in university foodservice staff. However, university foodservices may need a paradigm shift in foodservice frameworks to enable environmental education to integrate with other foodservice outcomes.
Preface

This thesis was conducted with joint supervision from Dr. Miranda Mirosa from the department of Food Science and Carla Thomson from the Department of Human Nutrition.

The candidate was responsible for:

- Defining the research questions.
- Submission of ethical approval.
- Recruitment of participants.
- Development of Q set.
- Conducting and transcribing Q sort interviews.
- Thematic analysis with PQMethod software.
- Interpreting and writing narratives of the factors.
- Creating a national survey.
- Analyzing survey results.
- Writing thesis content.

The research was conducted from September until October 2014 and July until to November 2015.
Acknowledgements

Thank you to my supreme supervisors Miranda Mirosa and Carla Thomson. Your ongoing encouragement and creative ideas have extended my abilities to new heights. I was feeling quite nervous about completing a thesis after placement, but you have made it an exciting and a very sparkly process. Thank you to the University of Otago Human Nutrition department for funding for this project.

To all the participants who took place and shared their time and patience. This study could not have happened without you and I feel privileged to have the opportunity to speak with you and to learn more about your perspectives. Thank you to Martin Jones and Gary McNeil for receiving my multitudes of emails and requests; your partnership has been an immense blessing. It has been a privilege to work with you. To Jill Haszard, Anne Morrison, and Madeline Sim, thank you for guiding me through. Thank you for your continual smiles and willingness to help.

Thank you to the wonder women I have as flatmates, who have put up with my strange antics and made my life so rich. I will cherish those memories and take them with me wherever I go. Thank you to my family for your continual support through my whole five-year journey. For deep meaningful telephone calls, prayers, and encouragement.

I express my ultimate gratitude and praise to God. Thank you for all you have done and all you are going to do.
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1. Introduction

In the past decade, universities worldwide have made a commitment to integrate sustainable practices and environmental education. Environmental education is “a multi-disciplinary approach to learning that develops the knowledge, awareness, attitudes, values and skills that will enable individuals and the community to contribute towards maintaining and improving the quality of the environment”. To successfully teach environmental education, universities need to foster it both inside and outside the classroom. However, universities predominantly teach environmental education within the formal curriculum. Not only is the shortage of extracurricular learning a barrier to successful fostering but curricular based teaching itself comes with barriers, especially from teachers. In order for effective curricular based learning, all departments and teaching need to include environmental education in their courses so that every student has equal opportunity to learn. Little is known about the effectiveness of environmental education taught in an extra-curricular way.

Universities placing more effort into implementing an extra-curricular approach could help decrease some of the barriers to fostering environmental education university-wide. University foodservice, as an extra-curricular element of student life, could provide a platform for environmental education delivery. To address the limited knowledge of the effectiveness of university-wide environmental education, this study sought to answer the question ‘do university foodservice staff think their workplace has the ability to foster environmental education?’ To answer the question, this study used a mixed methods approach, called Q methodology. Q methodology finds dominant sets of viewpoints surrounding a topic and explores a deeper understanding of the similarities and differences between views of a selected group of
participants.\textsuperscript{8,9} It also demystifies conflict among opposing viewpoints, which can help with the development of future experiments and designs.\textsuperscript{10}

Understanding foodservice stakeholder perceptions on environmental education is important to enable it’s growth.\textsuperscript{11-13} Previous studies have shown a gap in knowledge of what motivates foodservice managers to integrate sustainable practices.\textsuperscript{14} Additionally, there is no academic discussion surrounding university foodservice staff attitudes towards environmental education as a goal of a university foodservice. Understanding the perspectives of stakeholders is an effective step that may help to give direction in fostering environmental education in university foodservice for students.\textsuperscript{15}
2. Literature Review

This chapter starts with firstly reviewing environmental education in higher education (2.1). Then secondly looks into literature that reflects the potential of university foodservice to foster environmental education (2.2). Lastly, this chapter explores the measurement of attitudes in qualitative research and Q methodology (2.3).

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curricular</td>
<td>The content of a course or programme of study. 16</td>
</tr>
<tr>
<td>Extra-curricular</td>
<td>Organized activities that are exclusive of the curriculum. 16</td>
</tr>
<tr>
<td>Environmental education</td>
<td>“A multidisciplinary approach to learning that develops the knowledge, awareness, attitudes, values and skills that will enable individuals and the community to contribute towards maintaining and improving the quality of the environment.” 3</td>
</tr>
<tr>
<td>Environmental literacy</td>
<td>Encompasses ecosystem services, ecological footprint and sustainability 17</td>
</tr>
<tr>
<td>Sustainability</td>
<td>“Capable of being maintained over the long term, and meeting the needs of the present without compromising the ability of future generations to meet their needs.” 18</td>
</tr>
<tr>
<td>University foodservice</td>
<td>The study defines university foodservice as: including residential hall foodservices that provide three meals a day for university students and on campus food outlets such as cafés, cafeterias and sandwich outlets.</td>
</tr>
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</table>

2.1 Environmental education in higher education

Declarations stating the need for higher education facilities to incorporate sustainable practices and produce environmentally literate students stress the important role environmental education has in higher education. 19-21 Beginning with the Stockholm declaration in 1972, there have been many declarations in response to the need for higher education to include environmental education as part of its teaching. 19 Since then, the Talloires Declaration in 1990 22 and the United Nations
Agenda 21 action plan in 1993\(^2\) (which both include environmental literacy education as a proponent for higher education facilities) have been adopted by universities around the world. \(^3\)

Even though environmental education is expanding in the formal curriculum and partly in extra-curricular activities, it is unclear how universities plan to foster environmental education through extra-curricular experiences.

One of the outcomes of environmental education is to change behaviour.\(^2\) The House of Lords Behaviour change table of interventions describes a spectrum of policy interventions to initiate behaviour change.\(^2\) The spectrum consists of four main categories: 1) regulation of the individual, 2) fiscal measures directed at the individual, 3) non-regulatory and 4) non-fiscal measures with relation to the individual.\(^2\) The later category also splits into another category called ‘choice architecture’, (also known as a ‘nudges’) a weaker kind of behaviour change intervention.\(^2\) Different environmental education methods integrate into the table to show how environmental education may change behaviour (for all references to the behavioral change table see Appendix I).

To fully review environmental education in higher education, this chapter reviews environmental education taught in (Section 2.1.1) and outside of the classroom (Section 2.1.2).

### 2.1.1 Curriculum-based environmental education

As universities around the world address environmental education, different views on how teachers may integrate it into their curriculum have emerged\(^\;2\;3\;\). Most of the learning through curriculum follows a cognitive learning approach\(^2\); a learning style that focuses on the knowledge of a student. Environmental education includes cognitive learning through ‘education in the environment’ (used
to develop skills) and ‘education about the environment’ (knowledge and understanding). Environmental education also includes ‘education for the environment,’ which is linked to ‘affective’ learning styles. Yet there is little affective learning included in the curriculum, which is learning that focuses on attitudes, values and behaviors. Affective learning is included in transformative sustainability learning through the ‘head, hands and heart’ model. The ‘head, hands and heart’ model integrates cognitive, psychomotor and affective learning. Shephard et al argue that sustainability attributes may be described in terms of cognitive learning but are underpinned by affective learning.

As affective learning is an integral part of environmental education, university teachers may find it difficult to add it into their curriculum. University teachers also have differing views on whether environmental education should even be included into their curriculum. Some university teachers tend to avoid affective learning out of fear of indoctrination. They also feel it covers personal subjects and find it harder to assess because of long term outcomes. However, a transdisciplinary focus is seen as an important way to integrate environmental education across the university; not just in a selected few curriculums. Some argue the university is not capable of teaching sustainability, as the subject is too complex. One of the barriers to incorporating environmental education is due to the broad spectrum of views university teachers have about including environmental education into their curriculum. Some university teachers believe there is no connection between sustainability and education, so having to include environmental education into their curriculum is more of an annoyance and time consuming.

There are also university teachers who have strongly positive views about incorporating environmental education into their curriculum. Through looking at teachers’ attitudes on including environmental education into the curriculum, Shephard et al identified four main perspectives. The
most positive group shared a strong advocacy belief, which had the largest difference from the other three groups. The other groups only had slight differences between them. The evidence from Shephard et al reveals that in order for environmental education to progress, university teachers need to recognise differing opinions and work together rather than challenge others to change their opinions. Similar studies that surveyed opinions of university teachers agree with Shephard et al, finding that the way university teachers teach environmental education needs to change, not necessarily the advocacy for it.

Although evidence confirms change is needed for environmental education to progress, there are many opinions on how change should occur. Methods of change include integrating alternative approaches to the way the curriculum is traditionally taught such as affective learning through media. Pearson et al found a subjective documentary was able to enhance affective learning and resulted in greater behaviour change than an objective video. Another way of changing the approach is through having a ‘hidden curriculum’ where environmental education is fostered as a by-product of the curriculum so the teacher can appear neutral and not worry about politics. A ‘hidden curriculum’ is a method of education where subtle concepts reinforce what it taught. For example, when students learn about the benefits of buying local food in lectures, the message is reinforced through university foodservices stating their use of local foods on their menu. Everett advocates for a hidden formal curriculum because students can see how their learning applies to the ‘real world’. Both affective learning through media and hidden curricula are examples of ‘choice architecture’. A hidden curriculum changes the physical environment so students can make environmentally friendly decisions easily. Affective learning through media provides subjective knowledge about an issue; however, it also goes beyond ‘choice architecture’ as the subjective nature of the media helps to persuade students to change their behaviour.
2.1.2 Extra curricular environmental education

Even though there are many ideas on how the curriculum can improve, there is little research into the success of fostering environmental education through extra-curricular activities. Sterling et al comment that universities have implemented sustainable practices more successfully than transforming the curriculum. A barrier to overcoming the struggles of curriculum based environmental education could be using a combination of both curricular and extra-curricular based approaches. The Higher Education Funding Council for England (HEFCE) guidelines encourage both extra-curricular and curricular based activities to guide how a university fosters environmental literacy. Dahle et al suggest employing extra-curricular activities such as open lectures, visible green bins with informing messages and campus newspapers as part of a university’s approach to foster environmental education. Cortese et al suggest that students need to participate in what they are learning. Normative feedback encourages active student participation, which is a method used to help change behaviour by giving feedback about the person’s progress in a particular behaviour. By using feedback, Peterson et al aimed to reduce the amount of electricity via a power usage gauge in a residential college. These types of activities also fall into ‘choice architecture’ as they change the physical environment. They also extend to the outer bounds of non-fiscal incentives as especially normative feedback promotes sustainable behaviour change with positive feedback. Extracurricular activities play an important part in fostering environmental education and can be fostered in a successful way by universities.

2.2 The potential for university foodservice to foster environmental education

The foodservice plays a major role in not only the future of the food systems relied on today but also the future of the planet. Natural resources such as water and energy are consumed and contaminated in vast amounts by the foodservice industry. Foodservices expend energy through
natural gas and electricity to power equipment; this energy use produces carbon dioxide (CO₂), which negatively affects the ozone layer. Food waste is a process that not only wastes water and energy but also money. University foodservices produce nearly 54 million tonnes of food waste each year (including edible and non-edible). Water is used in cleaning, steam operating equipment, and also as an ingredient in food and drink. Also, producing some basic ingredients requires more water and CO₂ than others, for example, beef production requires up to 20 times more water than growing legumes. Foodservices also produce varying amounts of CO₂, depending on the number of miles food has travelled across the country or the world.

To explore the potential university foodservices have to foster environmental education, this section includes a review of sustainable initiatives as well as environmental education in university foodservice. This section then goes on to explore the implications of environmental education in university foodservice. Lastly, a review of the influencing factors that influence foodservice managers to implement environmental education initiatives in their foodservice will be included in.

2.2.1 University approaches to integrating sustainable practices in their foodservice operations

Currently, universities are implementing successful initiatives to make their foodservices more environmentally sustainable. The majority of the changes focus around recycling, electricity use and food wastage. Chen et al surveyed 100 College and University Dining Services Administrators (CUDS) and found the three most common sustainable practices, out of a selection of 21, included 1) recycling fat, oil and grease, 2) recycling cardboard and 3) using recycled paper products. The three least practiced initiatives were 1) composting, 2) using Styrofoam cups and 3) serving locally grown foods. Although Chen et al found trayless dining lacking in universities;
some universities have implemented it with success in reducing food wastage. Trayless dining helps to reduce food waste by decreasing how much food students can serve themselves per meal occasion. Seattle University introduced ‘Trayless Thursdays’ and reduced food waste by 10.8% on those days. Kim et al found trayless dining in combination with education around food waste reduced food waste by 54% from baseline. Furthermore, a study by Thiagarajah et al found using the trayless system in a buffet-style university dining hall reduced food waste significantly by 18.4%.

2.2.2 University approaches to foster environmental education through their foodservice operations

Although some universities have implemented ‘green’ foodservice practices, only a few have introduced extracurricular environmental education initiatives via their university foodservice. Whitehair et al aimed to reduce food wastage through normative feedback by using two different posters. The researchers used one poster to provide a ‘simple, to-the-point prompt message’ and the other gave contextual information about food waste. The ‘simple, to-the-point prompt message’ had the most success and reduced food waste by 15%. The Harvard University Hospitality and Dining Service takes a holistic approach by creating a ‘Food Literacy Project’ that joins both sustainability and nutrition. They include environmental education into their program through having campus farmers markets, menu labels (e.g. local tomatoes in the salad bar) and sustainability representatives. The Food Literacy Project also includes a programme called the ‘Food Better’ challenge, which invites students to work in teams to innovate solutions for “a healthier, more sustainable and more equitable food system”. Although the Food Better challenge does not directly work with the university foodservice, it does involve students learning
about sustainable food practices in an extracurricular way. These examples show that university foodservices are able to foster environmental education.

### 2.2.3 Implications of environmental education in foodservice

Fostering environmental education through university foodservice could affect the nutrition of student consumers.  

Pelletier et al found students who had the most positive attitudes toward alternative food practices had a significantly healthier diet than those who had less a positive attitude (1.3 more servings of vegetables (p<0.001), more dietary fibre (p<0.001) and fewer added sugars (p<0.001). However, some sustainable eating habits conflict with some nutritional guidelines, such as eating more than two servings of fish per week and two to three servings of low fat dairy per day. Part of eating sustainably is to eat fewer animal foods (such as meat, dairy, fish and eggs) and choose more plant-based, locally produced and organic foods. A sustainable diet can still be a healthy diet, but extra thought is required to ensure protein and key nutrients from animal and non-local foods are not misplaced, but replaced with plant and locally grown alternatives.

Students’ environmental literacy level and their attitudes towards ‘green’ practices could also influence the ability of the foodservice to foster environmental education. Over 600 students from eight different programmes at the University of Otago completed a survey to assess environmental literacy. The results showed no significant difference of the level of environmental literacy in gender or years of study. Additionally, surveys assessing consumer choice of ‘green’ restaurants found those who practiced sustainable behaviors themselves were more likely to visit ‘green’ restaurants. They also found those who had positive emotions towards sustainability were more likely to pay extra for sustainably produced foods.
2.2.4 Influencing factors that impact a foodservice manager to decide whether to integrate environmental education initiatives.

Little is known about what motivates foodservice managers to integrate sustainable practices. Some foodservices are more motivated to include money saving initiatives in waste reduction such as recycling, energy efficiency and decreasing food waste rather than buy organic and local produce. Chen et al found that pressure from students and associates would motivate university foodservice administrators to incorporate more sustainable practices. Alternatively, from a staff perspective, Thiagarajah et al found that foodservice employees were supportive of trayless dining if it was successful in reducing waste. However, the staff felt that it did increase some of their workload, as more work was required to clean tables and dispose of broken tableware. These studies reflect that staff, administrators and customers all have different influences on their viewpoints about environmentally friendly foodservice. Therefore, a communication between these three stakeholder groups is necessary to find out how the foodservice can integrate sustainable practices and meet all stakeholder needs at the same time.

Foodservice managers use frameworks to run their foodservice successfully. A systems framework views a foodservice as a system where multiple parts of the foodservice all interrelate and feedback to each other. The traditional systems model of foodservice focuses on different influencing factors and the outcomes a foodservice produces. Major outcomes of the foodservice include: customer service, financial accountability and quality and food safety. Although, sustainability or environmental education is included as an outcome in this model, it could cause an unbalance with the other foodservice outcomes. The Triple Bottom Line framework is an alternative framework that includes sustainability as one of three underpinning factors, which are integrated together as an outcome of a business. The three factors are called the 3 P’s, which are price, planet and people. Rather than sustainability being an ‘added extra’ it becomes an integral part for a
business to succeed and grow. The outcomes of a foodservice motivate the decisions a manager makes so a framework that helps to integrate environmental education is vital to its success in a foodservice.

Frameworks guide the decisions managers make, but not necessarily their viewpoints. To understand more about what influences foodservice staff on their decisions involving environmental education, it is important to understand the spectrum of viewpoints foodservice staff have. How to explore these viewpoints is discussed in the following section.
2.3 Measuring Attitudes and Q Methodology

Q methodology (Q) is a mixed methods approach of qualitative and quantitative analysis that measures participants’ perspectives on a specific topic.\textsuperscript{67} Traditionally, Q was used in psychology but is becoming increasingly popular in different fields including sustainability\textsuperscript{68,69}, education for sustainability\textsuperscript{38}, nutrition\textsuperscript{15}, genetically modified food \textsuperscript{70} and food labelling\textsuperscript{9} Q methodology includes a variety of terms to describe each component of the method (Table 2).

<table>
<thead>
<tr>
<th>Q Methodology term</th>
<th>Definition</th>
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<tr>
<td>Concourse</td>
<td>A large pool of statements, which reflects the spectrum of attitudes on the topic.\textsuperscript{71}</td>
</tr>
<tr>
<td>Q set</td>
<td>A collection of statements refined from the concourse used in the Q-sort activity.\textsuperscript{72}</td>
</tr>
<tr>
<td>P set</td>
<td>The participants who sort the Q set.\textsuperscript{71}</td>
</tr>
<tr>
<td>Q sort</td>
<td>The pattern of distributed Q set statements in a forced normal distribution.\textsuperscript{71}</td>
</tr>
<tr>
<td>Correlation matrix</td>
<td>The correlation matrix contains all the data collected from the Q sorts. It contains all of the data variance and is where the factors are extracted from.\textsuperscript{73}</td>
</tr>
<tr>
<td>Factor</td>
<td>The end product of a Q methodology study: a common viewpoint shared by a group of participants in the Q study.\textsuperscript{71}</td>
</tr>
<tr>
<td>Factor array</td>
<td>A representative Q sort for a factor.\textsuperscript{74}</td>
</tr>
<tr>
<td>Factor analysis</td>
<td>The process whereby factors are extracted from the correlation matrix. \textsuperscript{71}</td>
</tr>
</tbody>
</table>

The method involves two key parts. Firstly, participants are asked to rank a number of statements on cards called the Q set into a forced quasi-normal distribution. Secondly, similarly ranked statements are grouped together to create factors.\textsuperscript{75 67 76} To create factors, researchers only need a small group of participants.\textsuperscript{77} This is because Q does not measure the prevalence of perspectives in a population but rather explores the similarities and differences between views.\textsuperscript{8,9} Q differs from other types of Research methodology (R methodology) as it uses a different type of reasoning. Q focuses on finding associations between people’s viewpoints, where R methodology focuses on the association of changeable aspects across participants.\textsuperscript{15,76,78} Q is a distinctive subjective measure, which enables researchers to gain a deeper understanding of viewpoints.
To explore measuring attitudes and Q methodology, this section includes comparing Q methodology to common types of subjective measurement (2.3.1), qualitative analysis in the foodservice research field (2.3.2) and integrating Q and R methodology (2.3.3).

2.3.1 Q Methodology compared to common types of subjective measurement

Common types of subjective measures include the Likert scale and the Semantic differential scale. The Likert scale involves participants rating the extent to which they disagree or agree with a statement. The Semantic differential scale uses a bipolar adjective scale where the ranking is averaged and seeks to measure specifically the affective and behavioral aspects of attitude. However, these techniques have weaker reliability and validity in their design and are often prone to include social desirability bias. The major advantage of these methods is that researchers find both methods quick and easy to use.

Q methodology is different to the Likert and Semantic differential scales. Reproducibility is important to determine the success of qualitative research, but Q does not claim reproducibility as a necessary strength because it seeks to only measure perspectives at one point in time. Even though reproducibility is not a limitation, Q does have other limitations not found in the Likert and Semantic scale. Some of these disadvantages come from respondent burden and the truthfulness of respondent’s. For example, respondent burden can come from the extended time required to take part in a card sorting activity and post-card sort interview as the process tends to take 45-60 minutes. Despite these disadvantages, Q combines the benefits of both qualitative and quantitative research which increases the quality of understanding about complexity, attitudes, beliefs and behaviours.
Researchers often use Q to understand stakeholder viewpoints surrounding an issue of interest. \cite{68,77} Comparison of factors (which represent dominant shared discourses) can give a picture of similarities and differences between groups of people. For example, Shephard et al (whose survey investigated university teachers attitudes towards ‘environmental literacy’) found Q helped to reveal a need for compromise and a teaching development course. \cite{38} Q does not aim to prove a hypothesis \cite{75} rather Q helps researchers to discover unexpected perceptions, which can then provide a platform for further research.\cite{9} Overall, researchers who use Q find that it can reveal a deeper multi-layered perspective in qualitative studies than other methods used commonly in qualitative research. \cite{15}

2.3.2 Qualitative analysis in the foodservice research field

Researchers have commonly used qualitative analysis in research involving the foodservice industry. \cite{83,87} Observations, focus groups and interviews are all effective methods of qualitative research, when conducting research in foodservice. Qualitative studies that involve sustainability in foodservice or attitudes in foodservice tend to use surveys and interviews. \cite{48,62,64,88} Quantitative researchers measuring sustainability find percentages that reflect sustainable practices within an institution or wider institutions. \cite{48,62} Some have integrated a mixed methods approach by including both qualitative and quantitative questions in their research design. \cite{64,88} For example, Wilson et al conducted a qualitative study which used a Likert online questionnaire to research attitudes, beliefs and behaviors about environmentally friendly health care foodservices. \cite{89} Limitations of the study were a low response rate and potential for social desirability bias. Studies similar to the ones mentioned here also tend to present their findings in percentages of the total group rather than creating different viewpoint groups. \cite{64,88} However, advantages of these study designs include measuring the frequency of viewpoints and relating these to a larger population.\cite{78}
2.3.3 Integrating Q and R methodology

Unlike the studies aforementioned in subsection 2.3.3, Q methodology can only reveal attitudes at one point in time and only in the specific group of participants included in the study. This prohibits its ability to extrapolate results to provide evidence of the prevalence of those attitudes in a larger population. However, when the results of a Q study are then combined with an R methodology design, the results can be used at a population level.\textsuperscript{90} Also by using R methodology with Q, researchers may connect factors with other variables. One way of doing this is having a large sample size for a Q study, that includes a quantitative survey beforehand.\textsuperscript{91} However, a limitation to this technique is a large amount of time that it takes, creating both researcher and respondent burden. Another method of combining both Q and R methodology within a study is through narrative evaluation.\textsuperscript{78} This method involves designing a survey wherein each factor obtained through a traditional Q study is represented with a summary containing the main elements of a specific point of view. The ‘narrative’ is then accompanied by a series of Likert questions which enable the participant to rate their agreement with the narrative.\textsuperscript{78} Some of the advantages of narrative evaluation within a survey include a more holistic overview and a clear way to see if a participant identifies with a viewpoint. Nevertheless, creating the narrative needs special care so that it does not produce misleading results and create a biased view of the factor.\textsuperscript{78} Adding R methodology to a Q study can increase the value of the results. There are multiple methods to do this,\textsuperscript{78} yet they come with both advantages and disadvantages.

A Q-R combination can be used to find the prevalence of a viewpoint in a population but also a platform to measure other variables that could be linked to a specific viewpoint. Hwang et al constructed a large scale mail survey that was based on interviews and Q methodology, whereas Baker et al combined Q in a study with demographic questions to find the prevalence of factors in a British population.\textsuperscript{92,93} One variable that could be attached to perceptions of environmental
education is pro-environmental orientation. A common way to measure pro-environmental orientation is through the new ecological paradigm scale. Shephard et al used the new ecological paradigm scale to measure environmental values and attitudes in students enrolled in post-compulsory education and found it to be an effective measure of pro-environmental orientation over time. The Regional Council in the North Island of New Zealand uses the scale in their surveys for residents each year. Results from the new ecological paradigm scale reveal that women tend to have a higher pro-environmental orientation than men and middle aged people also tend to have a higher pro-environmental orientation than other age groups.

Another way of measuring viewpoints about the environment is through the enduring involvement index. This index measures continuing interest rather than temporary interest in a subject. It has been used from a marketing perspective to measure involvement in products to find how much a consumer is attached to a product. Green et al used a modified version of the enduring involvement index in a wider context by looking at enduring involvement in youth soccer, rather than a product. Enduring involvement in sustainability could be attached to a wider viewpoint. This viewpoint could be a determining factor in understanding perspectives on fostering environmental education.

**Conclusion**

Environmental education is traditionally taught within the curriculum. Although there have been studies addressing viewpoints of university teaching staff, there has been little research of viewpoints of foodservice stakeholders. No studies that use Q methodology, to the author’s knowledge, exist on incorporating environmental education as part of a goal of a foodservice
establishment. Even though Q methodology can explore the range of perspectives on a topic it cannot be used to extrapolate for a larger population. This is the first study that seeks to use a model that uses both Q and R methodology to find the perspectives of foodservice stakeholders about the feasibility of a university foodservice to foster environmental education. This will enable the results to be extrapolated to a larger population, which will provide information that may be useful in other university settings.
3. Objective Statement

This research aims to unravel some of the mysteries surrounding an extracurricular approach to teaching environmental education in a university foodservice. Firstly, the majority of environmental education research focuses on curricular-based initiatives, rather than extracurricular. To demystify the role an extracurricular approach can play, it is vital to understand stakeholder viewpoints, as they will be the ones facilitating environmental education. Therefore, it is vital to understand staff attitudes in order to best tailor interventions accordingly.

The research question for the study was:

‘Do university foodservice staff think their workplace has the potential to foster environmental education?’

To answer the research question the objectives were two-fold:

1) To understand the dominant viewpoints held amongst New Zealand university foodservice staff about the realities and the desirability of fostering environmental education in their foodservice.
2) To find the prevalence of and to profile the viewpoints amongst New Zealand university foodservice staff.
4. Subjects and Methods

The literature review introduced Q methodology and how it combines with R methodology. This chapter describes the design and implementation of combining Q and R methodology to answer the research question: do university foodservice staff think their workplace has the potential to foster environmental education? To combine Q and R the study design was split into phase one (4.3) and phase two (4.4). Firstly, ethics will be discussed in section 4.1 and then to set the scene an overview of how the study design combined Q and R will be explained in section 4.2.

4.1 Ethical considerations

All phases of the study were underpinned by ethical approval. The study design was submitted and approved by the University of Otago Human Ethics Committee. An additional ethics application was submitted as the study design for phase two changed after submission of the first application. The reference for phase one ethics approval was D14/359 and the reference for phase two of the study was D15/295 (Appendix II and III). In phase one, participants were asked to share their personal beliefs through an open questioning technique and were audio recorded by the researcher. Every participant was advised that they could stop the interview at any time or to decline audio-recording of their response. For phase two, participants were asked to share their personal views and sociodemographic information via an online or printed survey. Consent was obtained from every participant either by signing a consent form or selecting the ‘I agree’ box in an online survey. All participant information was kept anonymous through coding. Each participant was notified that none of their information would be shared with anyone outside of the study.
4.2 Combining Q and R: a two phase study design

The subject of Q methodological studies should focus on one of three categories: 1) representations of a subject matter 2) understandings of it or 3) conduct in relation to it. As this study sought to find out the viewpoints of university foodservice staff, the research question for the Q study focused on the understanding of the subject matter. Limiting the Q set to ‘understandings’ enabled the participants to share their personal viewpoints about their foodservices. While in phase one (card sorting activity) the ‘understandings’ category was prioritised, phase two allowed for a more inclusive set of questions. Questions focusing on ‘representations’ asked university foodservice staff what they thought universally about environmental education in a wider university foodservice context. Also, because the Q study was centered on the ‘understandings’ of the topic it did not invite participants to share their perspective of examples of environmental education as this would overlap with the ‘responses’ category. Questions in the ‘responses’ category asked participants about solutions to a problem.

As noted above, in order for the research to include both Q methodology and R methodology techniques, the study design involved two phases (Figure 1). Phase one involved the Q methodological process and phase two was involved a national survey.
4.3 Phase one

This sections starts with an overview of Q (4.3.1), then follows with the key steps of implementing phase one. These steps include concourse development (4.3.2), Q-set development (4.3.3), a card sorting activity (4.3.4) and lastly factor analysis (4.3.5).

4.3.1 Overview of Q

Q methodology is a process of different steps with specific terms to describe the different components of the process (refer to table 1 for common definitions used in Q methodology). The Q methodology process can be compared to a cooking competition such as Masterchef (Figure 2). Relating Q to cooking was an idea first described by Tuler et al. Q methodology involves participants sorting statements into a forced normal distribution. The statements are selected from a large pool of statements, called the concourse, which aims to represent viewpoints surrounding a topic. The concourse can be likened to a shopping list that represents ingredients particular to a
type of Cuisine. For example, a shopping list representing French Cuisine would include ingredients such as Brie, a Baguette and Herbes de Provence. The smaller set of statements the participants sort can be likened to a group of selected ingredients from the shopping list that would be used to create a recipe. This smaller group of ingredients is called the Q set. When participants sort the Q set statements, they sort them into a forced distribution or ‘create recipes’ known as Q sorts. Next, all the Q sorts are entered into a computer program which combines all the information from Q sorts together. This is known as the correlation matrix. Here, the recipes are all collected together to create a cookbook. However, the aim of Q is not to produce a cookbook but rather to organize the recipes and create separate chapters. The chapters are known as ‘factors’. Some of the recipes will be excluded from the chapters because they do not fit and some will be excluded because they could go in multiple chapters. There are no ‘winners’ in Q. Rather the aim is to produce factors which reflect the main different types of Q sorts participants make.

4.3.2 Starting in the Q kitchen: concourse development

Phase one of the study began with a card sorting activity. The preliminary task of conducting the card sorting activity was to create the concourse. The purpose of the concourse was to gather statements, which reflect all perspectives surrounding the topic. Once the concourse was created it was refined to a small representative set of statements called the Q set. Using the Masterchef metaphor, in order for the competition organisers to select the ingredients, they first interview chefs on a particular type of Cuisine.
The organisers then use information from the interviews to write a ‘shopping list’ of ingredients that represent the Cuisine. This ‘shopping’ list is like the concourse. In this study, the concourse was created through two means: (a) primary data collected from preliminary interviews (n=5) and (b) selected statements from research and grey literature. These two collection methods are described in turn below. The participants can be thought of as the ‘chefs’. They were recruited via sampling of convenience and included researchers in environmental education (n=2) and foodservice staff/managers (n=3). Participants were contacted via email and sent an information sheet (Appendix IV). During the interview, the researcher used a semi-structured interview technique and open-ended questions (Appendix V). The focus of interviews was on the participants’ knowledge of environmental education and their attitudes and beliefs about environmental education being fostered in university foodservice. Researchers were asked about their research on environmental education. Foodservice staff were asked about their current level
of understanding about environmental education and whether they thought it could be implemented in their foodservice and university foodservices. Interviews were audio recorded and transcribed by the researcher. Participants signed a consent form at the beginning of the interview. Interviews took between 30-45 minutes. Statements were then drawn from the interviews and other sources to create the concourse. Interviews were stopped when there was saturation of statements from interviews and from other sources.

It is an accepted part of the concourse development stage to use a varied number of sources to pick statements to enable the concourse to contain a diverse range of perspectives. The second means of concourse development involved selecting statements from grey literature, blogs, websites and scientific literature. To ensure a balance of viewpoints, statements with similar meanings were grouped together through thematic analysis. Six groups of similar meaning were drawn from the concourse to create themes. A table was created to organise statements that fitted under the themes.

The concourse table consisted of three columns: positive, negative and neutral. The table was created to ensure balance of the statements (refer to figure 3 for an excerpt from the concourse table). Balance in Q methodology refers to statements representing an even spread of opinions so that the participant is able to place statements on either side of the neutral column. In total, there were 97 statements included in the concourse. For each of the six themes, there were five to six sub-themes of statements. Not all categories included three statements ranging from positive to negative (Appendix VI).
4.3.3 The Q set development making the ‘ingredient list’ from the ‘shopping list’

Having discussed the development of the concourse this section covers creating the ‘ingredient list’ from the ‘shopping list’, otherwise known as Q set creation. Watts and Stenner state there is no perfect method to create a Q set. Creating a Q set can be related to a craft and ‘an art more than science’. 

<table>
<thead>
<tr>
<th>Financial</th>
<th>+ve</th>
<th>Neutral</th>
<th>-ve</th>
</tr>
</thead>
<tbody>
<tr>
<td>What the focus of the foodservice income should be targeted at</td>
<td>Environmental education will have a positive effect on consumer demand</td>
<td>Why can’t environmental education be parallel to the growth in customer service</td>
<td>I think my foodservice should focus on consumer demand rather than environmental education</td>
</tr>
<tr>
<td>Financial feasibility</td>
<td>A common misconception is that integrating environmental education costs more money</td>
<td>Financial accountability is of more importance than environmental education.</td>
<td>Environmental education in my foodservice would be too expensive.</td>
</tr>
<tr>
<td>The financial structure of university foodservice</td>
<td>Environmental education can be woven into my foodservice corporate side to help improve its finance</td>
<td></td>
<td>My foodservice is a business, therefore it cannot educate when it is set up to make money</td>
</tr>
<tr>
<td>Staff income in relation to foodservice education role</td>
<td>Staff should be paid more if they are involved with environmental education as it takes more effort to be more environmental friendly.</td>
<td></td>
<td>Staff should not be involved with environmental education, as their role is not a teaching job.</td>
</tr>
<tr>
<td>Meeting budgets</td>
<td>Lessening environmental impact can increase profit</td>
<td>Any extra costs environmental education would create would be balanced by some of the savings it would create as well.</td>
<td>My foodservice will lose money if it fosters environmental education.</td>
</tr>
<tr>
<td>Promotion of foods at university foodservice</td>
<td>My foodservice should have strict guidelines for what food is sold as the selling of any food promotes it.</td>
<td>We should be allowed to have non-environmentally friendly foods; we just should not promote them.</td>
<td>My foodservice should be able to promote any food to students.</td>
</tr>
</tbody>
</table>

**Figure 3.** A section from the concourse table which shows the theme ‘Financial’ and the six sub-themes. The statements in bold were included in the Q set

The goal of creating a Q set is to have enough coverage to represent the topic. A standard Q set ranges between 40 to 80 statements. The Q set was made by selecting 42 statements from the
concourse. Seven statements from each of the six themes (Appendix VII). Statements that focused on foodservice staff understandings of fostering environmental education in their workplace were included to keep within the ‘understandings’ category. The number of statements was chosen to reduce respondent burden and to make the card sort activity less time consuming. The 42 item Q set was then pretested by two participants to ensure balance of statements and clarity. A small number of statements needed to be reworded to make the statement easier for participants to understand.

The card sorting activity involved participants sorting the statements into a grid (Figure 4). An 11 point grid was chosen as Durning et al recommends an 11 point grid (-5 to +5) for Q sets ranging from 40-60 statements. The grid shape can range from steep to narrow depending on the knowledge participants have about the research topic. A steeper distribution includes more room to place statements in the neutral columns, whereas a narrow grid has more room for statements to be placed towards the extreme ends of positive and negative. A steeper curve was chosen as staff would be more unfamiliar with the topic as it is a new idea to include environmental education as an outcome of their foodservice.

In pre-testing, participants found the steep grid useful as there was only one card per the most extreme ends (one for -5 and one for +5). A Likert style scale was used at the top of the grid to aid participants in ranking the statements. Each card was coded randomly and numerically from 1-42. Once the participant sorted the statements, the researcher noted the pattern of statements. The interviews and sorts were coded based on the occupation of the participant.
Participant recruitment: P-set (Masterchef contestants)

To this point this chapter has discussed developing the concourse and Q set. The next section covers participant involvement with the Q set. Participants were chosen based on the type of foodservice they worked in and their role. The aim of participant selection was to recruit a range of participants from both types of foodservices but also a range of differing staff roles within the foodservice (Figure 5). University foodservice staff were included from residential hall foodservice and campus food outlets (the two main types of university foodservice.)

![Q sort grid with the condition of instruction](image)

**Figure 4.** Q sort grid with the condition of instruction.

Universities often offer their own catering, but catering staff were not included in the study, as they do not have as much contact with students. The study defined residential hall foodservice as a foodservice that provides a primary source of food (three meals per day) for students living at the
hall. University union foodservice outlets were defined as retail food outlets which included cafés, sandwich bars and food court style dining.

To recruit participants, a meeting was held with the university union operations manager at the University of Otago to discuss study protocol. The operations manager participated in the study and gave contact information for supervisors/managers of various outlets across the University of Otago. The supervisors/managers were contacted by email/phone and sent an information sheet. They were also asked if they had two or three staff members who would also like to take part in the study. The same technique was used to recruit residential college foodservice staff via a meeting with the college-catering manager at the University of Otago. Some university residential hall foodservices operated independently from University of Otago college catering, so those foodservice managers were contacted directly by the researcher.

![Diagram](image-url)

**Figure 5.** Phase one participants
4.3.4 Card sorting activity (recipe creation)

Participants were involved in a card sorting activity which included 1) sorting the Q set statements and 2) a one to one interview about the method of card sorting and their thoughts about the topic. After the card sorting activity, participants completed a behavioural change intervention questionnaire. The card sorting activity was conducted at the foodservice the staff member worked at and lasted approximately 35-45 minutes. The interview protocol outlined in an information sheet given to participants at the time of the interview (Appendix VIII).

**Card sorting activity part one: sorting the Q set statements**

At the start of the Q sort, participants were asked about their knowledge of the study and environmental education. Then participants were asked to sign a consent form and given a combination of verbal and written instructions on how to sort the Q sort statements (Appendix IX and X). Participants were made aware they could ask questions at any time. The researcher gave participants a condition of instruction, which stated to sort the statements in order to reflect their attitudes and beliefs about the desirability and realities of fostering environmental education within the university foodservice they work in. Participants were then asked to sort the statements into the following three sections: 1) statements that reflected most like how they thought 2) statements that reflected least like how they thought and 3) statements they felt less strongly/neutral toward. Participants were then guided to sort the statements into the grid that best reflected their attitudes and beliefs. Once the participant finished the sort, the codes of each statement were noted onto a smaller copy of the grid by the researcher.
Card sorting activity part two: interview

After part one of the card sorting activity, an interview was conducted to gain more understanding about the way participants sorted the Q set. Explanations from participants about how they sorted the Q set helped to identify key differences between factors and to create narratives to describe each of the factors. Participants were asked if they had any difficulties with the card sorting activity. Then the researcher asked why they chose to put statements in certain squares. Specific statements that were asked about were at -5, +5, 0, +3 and -3. Participants were then asked if there were any statements they would like to talk about or any statements that resonated with them. Participants were then informed the interview was about to close and if they had any last comments they would like to mention about their beliefs. Interviews ranged from three to fifteen minutes in length. Each interview was audio recorded and transcribed by the researcher.

Behavioural change questionnaire

An online questionnaire was constructed from the behavioural change table referenced in the literature review (Appendix 1). As mentioned above in 4.1, because the Q study focused on understandings of the research topic the Q set did not include any examples of environmental education. The ‘responses’ to the subject matter were included in an additional survey to help profile factors. The survey included different examples from the behavioural change table ranging in severity of initiatives. Two surveys were made using Qualtrics to tailor initiatives specific to residential halls and campus food outlets. Questions included a section from the behavioural change table and an example. A five point Likert scale was then used to ask participants how feasible they felt the measure was to implement in their foodservice. Participants were also asked what foodservice they worked for and their job title to match Q sorts with the survey. The study
concluded with asking participants if they had implemented any of the measures in the survey or other interventions to foster environmental education in their foodservice.

4.3.5 Factor analysis (chapter creation)

PQ Method software, a statistical program created specifically for Q methodology studies, is recommended by Watts and Stennor as it is easy to use and free to download. The software for Mac was used to analyse the data collected from the Q sorts. Statements were entered manually into the programme and coded from 1-42. Each Q-sort was also entered manually into the programme and coded. Coding was based on what foodservice the participant worked in and their role in their foodservice. Both residential hall staff and campus staff data were entered in together as the study was not looking at the difference between the two groups in the first phase of the study design.

**Correlation matrix (cookbook)**

As mentioned in 4.2.1, each of the statements is like an ingredient, each Q sort like a recipe. Collating all the ‘recipes’ into the PQ method software produces a cookbook or the ‘correlation matrix’. The correlation matrix contains all the variability and meaning of the data collected which is known as study variance. It is from the correlation matrix that information can be found on shared meaning between the Q sorts. 73 The groups of shared meaning are known as ‘factors’. The factors can be likened to ‘chapters’ created from the recipes in a cookbook. The programme will automatically generate seven factors, the factors are deemed significant if they contain more than two significant statements of shared meaning based on the significant factor loading. 73
Rotating factors

To extract the factors from the correlation matrix, a factor analysis programme was run. There are two options for factor analysis on the PQ method programme: 1) Centroid and 2) Principal Components Analysis (PCA). Centroid analysis was chosen because it is the most favoured option amongst Q methodology researchers. In previous studies, little difference was found between the two different analysis options. The next step was to rotate the factors to increase the purity of saturation. After rotation, significant factor loadings were flagged. A significant factor loading was calculated using the equation: 

$$ \frac{1}{n} $$

( n represents the number of statements in a Q set). Significant factor loadings were flagged if they were equal to or larger than 0.40 unless they were confounded (where a Q sort loaded onto more than one factor). Factors with two or more significant factor loadings were kept. The significant factor loading of 0.40 resulted in five factors, two were discarded as they were not significant. The significant factor loading was increased to 0.41 to refine the factors further. Three to four factors were desired for simplicity and less respondent burden. Also, fewer factors are more favourable as the factors are understood better when there is a smaller number. A significant factor loading of 0.41 resulted in four factors. The factors represented 51% of the data. Watts and Stennor recommend that factors should explain upwards of 35-40% of the data, so the four factors were kept.

A data sheet was produced in the final stage of the PQMethod programme. The information from the data sheet was used to create factor arrays for each factor. A factor array is a Q sort that represents the viewpoint for a factor. The normalized factor scores were used to create factor arrays for each factor. The process involved converting the Z scores to guide the ranking the statements. The statements with the highest positive Z score were in the +5 position and the most negative Z score were in the -5 position. The factor arrays acted as a foundation for interpreting the factors. The factor arrays also display distinguishing and consensus statements for each factor.
Distinguishing statements are those ranked significantly different from other factors ($p < 0.01$). Factors can have the same statements they are distinguished by, however what differs is the ranking of the statements rather than the statement itself. Consensus statements are those that one or more factors ranked in the same position. Unlike the distinguishing statements, these statements show areas of agreement rather than differences. Factor analysis or ‘chapter creation’ concluded phase one of the study design.

**4.4 Phase 2: survey implementation**

A survey was created to find the prevalence of viewpoints identified in the first phase of the study. As mentioned in the literature review (2.2.3), Q methodology can be combined with R methodology to enable the researcher to find the prevalence of factors in a larger population. The aims of the survey were 1) to measure the prevalence of identified viewpoints in a wider nationwide sample and 2) to profile individuals who identify with specific factors.

To detail phase two survey implementation, this section includes an explanation of the survey design (4.4.1), participant recruitment (4.4.2) and data analysis (4.4.3).

**4.4.1 Survey design**

The survey integrated the narratives of each factor with Likert style questions, scales and demographic information to profile staff who identified with a factor. The survey was created using Qualtrics survey software by the researcher (For references to the survey please see Appendix XI). The survey design involved five main sections (Figure 6).
**Section one**

In section one, participants were given survey content information. An information sheet and consent information were not included in the survey but were provided as additional documents (Appendix XII and XIII). In order to participate in the study, a consent box had to be selected; it stated that the participant had read and agreed with both the consent form and information sheet.

<table>
<thead>
<tr>
<th>Section:</th>
<th>Content:</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>Welcome and consent tick box</td>
</tr>
<tr>
<td>Two</td>
<td>Included the narrative evaluation model, where key statements and phrases from the Q study factors were summarised to give a reflection of the perspective. The ‘narrative’ was also accompanied by Likert style questions.</td>
</tr>
<tr>
<td>Three</td>
<td>Asked questions about the feasibility of including different measures of environmental education specific to the participant’s foodservice.</td>
</tr>
<tr>
<td>Four</td>
<td>Included questions from two scales, which included the new ecological paradigm scale and the enduring involvement index.</td>
</tr>
<tr>
<td>Five</td>
<td>Asked for socio-demographic information such as gender, age, and occupation, and length of time working in occupation.</td>
</tr>
</tbody>
</table>

**Figure 6.** Survey outline: an overview of the five sections of the phase two survey

**Section two**

Results from the factor analysis were used to create narratives and were combined with Likert style questions. The narrative was written from the perspective of a hypothetical person who belonged to the factor group. Strongly positive, distinguishing and neutral statements as well as transcripts, were analysed to create the narratives. Watts and Stennor state the interpretation of a factor should communicate the same feeling a participant was driven by when they arranged the Q set into the Q sort. To incorporate the feeling, they recommend including an interplay of viewpoints and to have the interpretation in the first person. For this reason, transcription quotes were interwoven into the narratives. Results from the behavioral change survey were not included in the narratives.
as there was no significant difference between the factors that would be useful in categorising the narratives.

The narratives were then validated by participants who were highly correlated with the factor. This was done to check how much the participant identified with the narrative and whether it accurately reflected their views. One participant was selected from each of the four factors. An email was then sent to the selected participants which included the narrative and asked if the participant could identify with it and if they could give feedback (refer to Appendix XIV for the email sent to participants).

Section three

Section three included the same behavioural change survey questions as the one implemented alongside the card sorting activity in phase one (4.3.4). Participants were asked which type of foodservice they worked in and directed them to the most appropriate survey. The behavioural change survey was included to find a difference in perceived feasibility of an initiative between factors. For example, the Believers may think a ‘restriction of choice’ initiative is more feasible than the Skeptic. The initiative questionnaire is included in Appendix XI.

Section four

Section four included two scales: the new ecological paradigm scale and the enduring involvement index. The new ecological paradigm index is made up of 15 Likert style questions and measures pro-environmental orientation. The enduring involvement index measures continuing interest or enthusiasm rather than short term interest in a subject. The index included five questions. These scales were chosen to profile the enthusiasm of staff about environmental change and also their enduring interest to see if there was a difference between factors.
Section five

The last section contained questions about sociodemographic details. Surveys from Statistics New Zealand were used to guide the structure of the questions. A variety of questions were asked to find if a factor could be linked to a specific piece of sociodemographic information. For example, in the card sorting activity there were only managers who made up the Skeptic group; section five could show whether Skeptics were more likely to have a managerial role than other factors.

4.4.2 Participant recruitment

To be included in the study, participants needed to be older than 18 years and currently employed as a university foodservice staff member in either a residential college or a campus food outlet in any capacity (i.e. part time/full time/temporary/casual/permanent). To recruit participants, foodservice managers from eight New Zealand universities were contacted via email and asked if they would like to join the study and distribute the survey to their staff (Appendix XV). Foodservice managers could choose from a range of distribution options: 1) A URL to the online survey, information sheet and consent form sent via email, for the foodservice manager to forward to staff; or 2) A package of printed surveys, consent forms, and information sheets with return postage; or 3) For the researcher to visit the university foodservice and distribute a set of iPads to the staff where the survey would be done online. (This option was only offered to South Island universities).

Survey distribution

Eight managers representing six universities agreed to participate in the survey. One manager preferred printed surveys and one preferred both. Another asked if a PDF version of the survey could be sent so that they could print it themselves. When the survey was ready to launch, managers were sent an email which explained they would be sent another email to forward onto their staff.
The staff email contained a link to the survey, consent form and information sheet. The printed survey option included a pack containing printed surveys, information sheets and consent forms which were sent to managers with a prepaid and self-addressed postage bag. All participants who completed the survey before a specified time were eligible to go in the draw to win a $100 New World Supermarket voucher. As the surveys were kept anonymous, participants were able to enter the competition by emailing the researcher with ‘survey completion’ in the subject line. To gather more participants, managers from seven residential colleges in Dunedin were contacted via phone to ask if the researcher could drop off printed surveys for staff. The competition was also extended to participants who completed the printed surveys. The printed surveys had space for the participant to write their email address. The survey included extra information to explain the competition but also informed the participant that their email address would not be used in the study; only as a means of contact if they won the competition. The survey was live from the 16th of September to the 9th of October 2015. The survey closed due to time constraints.

4.4.3 Data analysis

Answers from the printed surveys were manually entered into the online survey by the researcher. All data was downloaded onto an Excel spreadsheet from Qualtrics. All of the data was analysed in comparison to which factor a participant identified with. A P-value of 0.05 was considered significant for the results of the study. The overarching aim of the statistical analysis was to profile factors based on their answers to the survey. To achieve this aim, there were three objectives. The first was to find the percentage of participants who identified with each factor. The second objective was to find if the scales used in sections two to four could be used to profile each factor based on their scores on 1) perceived feasibility of initiatives (section two) and 2) pro-environmental orientation (measured through the new ecological paradigm scale and enduring involvement index in sections three and four). The last objective was to find whether factors could be profiled through
sociodemographic information such as their sex, type of foodservice role and prior environmental education.

Analysis from section one provided the results needed to meet objective one. Section one included three questions with each factor narrative: 1) How much participants agreed with the narrative, 2) how desirable the viewpoint was and 3) if participants thought other foodservice staff thought in a similar way to the factor represented. At the end of section one, participants were asked what factor they identified with the most. The data from this section was used to find differences between those who had identified with a factor and their scores with the first two questions included with the narrative. This was done to find how agreeable and desirable an identified factor was to the participant. For example, a participant may have identified with a factor but only moderately agreed with it.

Analysis from section two to four provided the results needed to meet objective two. The two different scales to measure pro-environmental education were analysed differently. The initiative questionnaire contained a five-point Likert scale for each question. Similar to section one, a score of one was the most positive and a score of five the least. The results were analysed per question. So, for each question there was a score for each factor. The new ecological paradigm questions also contained a five point Likert scale, each question was given a score of one to five (five reflecting the most pro-environmental choice). Questions were not analysed individually rather a mean was calculated from all 15 questions to give participants a score between one and five. The new ecological paradigm scale reversed the direction of some of the questions throughout the survey. This means that a ‘strongly agree’ was the most pro-environmental choice in one question but in another the least. To make scoring consistent, the researcher reversed some of the scores so that the most pro-environmental score was five and the least one. The scoring for the enduring
involvement index was exactly the same as the initiative questionnaire (the most positive score was one and the least was the highest number in the scale.) Except not all questions had the same number point scales. The index comprised of five questions, three questions had an eight-point scale, one question a four points scale and the last a five-point scale.

The third objective was to investigate differences in sociodemographic characteristics between viewpoints as part of the profiling process. Factors were not given scores for this section as this section was quantitative rather than qualitative. The statistical tests were similar across the five sections of the scale. Sections one to four were analysed with a one-way ANOVA and a Bonferroni posthoc test. Section five (sociodemographic section) was analysed with a Fishers exact test.

**Incentives**

The phase two survey included two incentives. Fifteen participants entered the $100 New World voucher competition. Each entry was coded from 1-15 and entered into a random number generator by the researcher. The winning participant was contacted via email and sent the voucher via the post. 60 participants completed the survey. An additional four surveys were completed but were not included in the study as they came in the post after the survey had closed. These four surveys were counted in a monetary donation to KidsCan. A total of $64.00 was donated to KidsCan. Kidscan is a New Zealand charity that provides food and clothing to New Zealand children living in poverty.
5. Results

This section begins with results from the Q study (phase one), including Q sort participants’ sociodemographic details and the results of the analysis (5.2). The results of the national survey (phase two) are covered in section 5.3, 5.4 and 5.

5.1 Q sort participant sociodemographic details

Thirty-six Q sort activity participants were included in the study, 47% male and 53% female (Table 3). Exactly half of the participants held a manager role and half held another staff role in the university foodservice. There was also an equal representation between the numbers of participants from each type of foodservice, 53% were from a residential hall and 47% were from a campus food-outlet.

Table 3. Sociodemographic data of the Q-sort participants (n=36): Gender, type of foodservice and job role.

<table>
<thead>
<tr>
<th></th>
<th>Number of participants</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>17</td>
<td>47%</td>
</tr>
<tr>
<td>Female</td>
<td>19</td>
<td>53%</td>
</tr>
<tr>
<td><strong>Type of foodservice:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential Hall</td>
<td>19</td>
<td>53%</td>
</tr>
<tr>
<td>Campus food-outlet</td>
<td>17</td>
<td>47%</td>
</tr>
<tr>
<td><strong>Job role:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manager</td>
<td>18</td>
<td>50%</td>
</tr>
<tr>
<td>Staff member</td>
<td>18</td>
<td>50%</td>
</tr>
</tbody>
</table>

5.2 Factor overview

This section provides an overview of the factors, including factor loadings (5.2.1), factor interpretation (5.2.2) and consensus statements (5.2.3). The factor interpretation includes a factor array for each factor. As mentioned in the methods section (4.2.5), a factor array is a representative Q sort for the factor.74
5.2.1 Factor Loadings

Four factors were identified from the correlation matrix. Twenty-two Q sorts significantly loaded onto the factors, seven were not significant and seven were confounded as they loaded onto two or more factors (Table 4).

5.2.2 Factor Interpretation

This section explores the four different factors. The exploration of each factor includes the highest ranked positive and negative statements, distinguishing statements and the narratives created for the phase two surveys.

Factor 1: The Believers

Fifteen participants significantly loaded onto this factor, three residential college managers, five residential college staff, two campus food outlet managers and five campus outlet staff. The factor had an Eigenvalue of 9.72 and explained 27% of the study variance. Participants ranked a Q sort of 42 statements from a scale of -5 to +5. The full Q set statements can be found in Appendix VII. The most positive statement for this group (statement 15), reveals that participants strongly believed environmental change is both an individual and shared responsibility. The positively ranked statements were focused around the role of their university and of society to act as a steward of the earth’s resources. The Believers were the only factor to exclude student focused statements in columns +4 and +5. They perceived minimal barriers to fostering environmental education and felt strongly about the need for it in their foodservice.
Table 4. Factor loading: significant factors are in bold and marked with a X. Confounding statements are italicised.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
</tr>
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<td>0.1157</td>
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<td>0.4559X</td>
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<td>0.0452</td>
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<td>0.2088</td>
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<td>0.1157</td>
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<td>-0.0251</td>
<td>0.0081</td>
</tr>
<tr>
<td>36</td>
<td>-0.1205</td>
<td>0.0371</td>
<td>-0.0689</td>
<td>0.4685X</td>
</tr>
</tbody>
</table>

| Eigenvalues  | 9.72 | 3.6 | 3.24 | 1.8 |
| Variance (%) | 27   | 10  | 9    | 5   |

Total Variance (%) 51%

1The factor loadings represent how closely a participant’s arrangement of statements matches a factor. The researcher manually flagged each value if it was above 0.41. If a participant had a value above 0.41 in two or more factors, then this value was discarded to avoid confounding.
The Believers had six distinguishing statements. Distinguishing statements are those that are significant to a specific factor (p< 0.05). A neutrally ranked distinguishing statement showed the Believers were uncertain about whether environmental education should be mandatory in their foodservice (statement 39). However, they ranked this statement most positively out of all the factors. The most negative distinguishing statement was ranked -2: ‘I think my foodservice should focus on consumer demands rather than environmental education’ (statement 3). One participant stated, “I think we can educate so that the demand is in the environment’s favor.”

The most negative ranking for this group was statement 18. Participants felt environmental education was not a political agenda but rather a fact of life that everyone needed to play a part in. The perspective on statement 18 was coherent with the three -4 rankings which were negative about environmental education not having a place in their foodservice.

The Believer narrative

The Believer wants to play a part in initiating environmental education in their foodservice. They feel that living in a sustainable way is not only their responsibility but everyone’s responsibility.

The Believer says: “I strongly agree that when it comes to environmental change, everyone has a responsibility to play a part. So I think my foodservice should play a part also by providing environmental education to students. The University should definitely do more to teach environmental education, yet I am undecided whether it should be mandatory in my foodservice. Environmental education is not a political agenda; it is a fact of life that I think we should all take on board. I don’t think environmental education would restrict choice although consumer demand cannot be ignored. I think we can educate so that the demand is in the environment’s favor. I am happy to be a part of an educational program.”
Factor 2: The Relatively Positive Integrator

Two participants, one residential college staff member and one campus food outlet manager were significantly loaded onto this factor. The factor had an Eigenvalue of 3.6 and explained 10% of the study variance.

The most positive statement for this group was item 8 “Customer service should underpin everything we do in my foodservice.” Two of the distinguishing statements for this group were in the +4 loading which centered around students. This factor was the most student oriented. The Relatively Positive Integrators positivity towards environmental education stemmed from their belief that environmental education would be beneficial for students (statement 36). However, this group was uncertain whether they should prioritise customer service over environmental education.

The Relatively Positive Integrator had five distinguishing statements; two have been mentioned above. The distinguishing statements 7 and 27 reveal that the Relatively Positive Integrator is unsure of prioritising financial and hygiene outcomes over environmental education. However, they are relatively positive about including environmental education as an outcome in their foodservice.

The most negative statement for the Relatively Positive Integrator factor was statement 38 “there is no need to teach environmental education at my foodservice.” Although, the Relatively Positive Integrator prioritises customer service they did not strongly disagree that there was no place for environmental education in their foodservice. This may show they think that environmental education could be integrated into providing customer service. The Relatively Positive Integrator ranked statement 15 (the Believers -5 ranking) in the -4 column, “Environmental education is
political correctness gone mad and I don’t think it should be fostered in my foodservice.” This group, therefore, shows similarities with the Believers but places customer service as a higher barrier.

**The Relatively Positive Integrator narrative**

*The Relatively Positive Integrator thinks that environmental education cannot be prioritized over customer service, but it could be integrated into the overall aims of their foodservice.*

“I strongly believe that in my foodservice our ultimate aim should be to meet customer needs. I think students will have a good response to environmental education in my foodservice and I believe that we are all responsible for environmental change, so there is a need to foster environmental education in my foodservice. I am on the fence about whether environmental education should be prioritized over financial and hygiene outcomes and also unsure whether my foodservice should focus on environmental education at the expense of customer service. However, I think that environmental education might be able to improve the financial outcomes of my foodservice.”

**Factor 3: The Uncertain Contender**

Two participants were significantly loaded onto this factor which included one residential college manager and one campus food outlet staff member. The Uncertain Contender factor had an Eigenvalue of 3.24 and explained 9% of the study variance.

The most positive statement for this factor was the same as the Relatively Positive Integrator: item 8 “Customer service should underpin everything we do in my foodservice”. Unlike the Relatively Positive Integrator, the Uncertain Contender factor struggled with the idea of how to integrate
environmental education with current foodservice outcomes such as customer, finance and hygiene. The struggle is well represented through the statements that load onto the +4 column. Here, the Uncertain Contender agreed that everyone is responsible for environmental change but they also positively ranked financial and hygiene outcomes higher than environmental education.

The Uncertain Contender had three distinguishing statements. One showed they were unsure if their foodservice should act as a role model for students. Although this factor believes their foodservice has responsibility to play a part in environmental change, they are unsure if this extends to fostering environmental education.

The Uncertain Contender felt most negatively about statement 10 “Environmental education should stay within environmental science”. However, this meant statement 38 “There is no need to teach environmental education at my foodservice” was ranked more positively. In the negative columns the struggle was again represented as they felt positive about environmental education but unsure of how it could fit it with their current procedures.
The Uncertain Contender narrative

*The Uncertain Contender thinks that environmental education is a good idea, but in reality it seems difficult to both meet expectations from higher management and foster environmental education.*

In my foodservice, customer service, financial and hygiene outcomes need to be top priority because at the end of the day you are running a business. So environmental education could be limited in my foodservice. In saying that, environmental education should not just stay in environmental science; we do have a responsibility to care for our environment. I am unsure whether our foodservice should act as a role model for students. I don’t know much about the student response; I think there would be a mixed bag of responses. I think environmental education needs to be taught, but I feel a sense of struggle between integrating it and also meeting demands from higher management.”

Factor 4: The Skeptic

Three participants, one residential college manager and two campus food outlet managers were significantly loaded onto this factor. The factor had an Eigenvalue of 1.8 and explained 5% of the study variance.

The most positive ranked statement for the skeptic factor was statement 26, “students have a varied amount of concern about the environmental impact of food”. Slightly similar to the Relatively Positive Integrator factor, the Skeptics prioritise their customers. Statement 8 was ranked as +4 whereas the same item was ranked as +5 for both the Relatively Positive Integrator and Uncertain Contender. Following on from their most strongly ranked statement the Skeptics also believed that environmental education would only benefit those who already had a high level of environmental
literacy (statement 30). This group is surer that environmental education should be of less priority than financial and hygiene outcomes (statement 27).

This group had ten distinguishing statements, the highest amount of the factors. Unlike the other factors where statement 18 was ranked positively, the Skeptics ranked statement 18 in the neutral column. Also, another distinguishing statement reveals that the Skeptic’s viewpoint was almost opposite in the extremities to the Believer as they ranked the Believer +5 ranking as their -4 ranking (statement 15). Skeptics were also unsure about the need for environmental education in their foodservice (statement 38). The Skeptic was the most positive out of all the factors for statement 33: the current foodservice system is too ingrained so that it cannot be changed to foster environmental education. These negative statements reflect the skeptical nature of the factor. Although they do not directly oppose environmental education, they are skeptical of fostering it in their foodservice.

The most strongly negatively ranked statement for the Skeptic was item 39 ‘environmental education should be mandatory in my foodservice’. This statement shows that the believers and Skeptics are not in direct opposition to each other as the believers ranked this statement in their neutral column. Skeptics felt strongly about not being told what to do. Although, they believe finance and hygiene are mandatory issues, they rate these outcomes as a higher priority than environmental education. Unlike the Relatively Positive Integrator, the Skeptic factor did not believe students would have a good response, so their approach was more negative to fostering environmental education.
The Skeptic narrative

*The Skeptic is not opposed to the idea of environmental education but thinks that it will not integrate well into their foodservice model.*

“I firmly believe that there would be a mixed response from students. Customer demand should guide our decisions, and I don’t see a large demand from students. It would only appeal to those who already have concern about the environment. I strongly disagree about making environmental education mandatory in my foodservice, yet I am unsure whether there is a need for it in my foodservice. We are set up as a business and environmental education will most likely cost us more. Plus the way we keep to hygiene standards needs to come first. I don’t feel like we are responsible for environmental change as a foodservice. We produce food, we are not educators, so I struggle to envisage how environmental education could be a top priority. I am not sure whether my foodservice is the best place for environmental education to occur.”

5.2.3 Consensus statements

There were 22 consensus statements: 20 were statements shared by two factors and two statements were shared by three factors (Table 5). No statements ranked the same for all four factors. Consensus statements can be useful in finding agreement between factors. Some consensus statements between two factors have been mentioned previously. There were three factors that shared consensus with statements 1 and 34. All factors shared a negative view about statement 34, that the right people could not help implement environmental education. All factors also shared an uncertain viewpoint about why the foodservice could not be parallel to the growth in customer service. Even though the Believer and the Skeptic are at the two extremes of the factor scale there were three consensus statements between them (Statements 1, 34 and 42). However, these statements ranged around the uncertain area of the grid.
<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
</tr>
</thead>
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<td>-1</td>
<td>0</td>
<td>0</td>
</tr>
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</tr>
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*Shaded rankings show consensus between three or more statements*

**Summary**

Four dominant factors emerged from the phase one Q study: The Believer, The Relatively Positive Integrator, the Uncertain Contender and the Skeptic. These factors reflected a spectrum of attitudes towards environmental education within university foodservice and are summarised in the figure below (Figure 7).
5.3 Phase two results:

So far this section has covered phase one results. This next section will cover the results found as part of the national survey in phase two. The phase two results include the following: sociodemographic information (5.3.1), factor profiles (5.4) and the new ecological paradigm scale (5.5).

5.3.1 Sociodemographic information
Sixty university foodservice staff took part in the survey (refer to Table 6 below).
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<th>Characteristic</th>
<th>Total: n=60</th>
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</tr>
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<td>Otago</td>
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</tr>
<tr>
<td>Massey</td>
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</tr>
<tr>
<td>Victoria</td>
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<td>Auckland</td>
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<tr>
<td>Lincoln</td>
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<tr>
<td><strong>Type of foodservice</strong></td>
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<tr>
<td>&gt;1</td>
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<tr>
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<td>Barista</td>
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<tr>
<td>Cleaning staff</td>
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<td><strong>Environmental education as part of training</strong></td>
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<td>Samoan</td>
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<td>Chinese</td>
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<tr>
<td>45-54</td>
<td>14 (23)</td>
</tr>
<tr>
<td>55-64</td>
<td>7 (12)</td>
</tr>
<tr>
<td>65+</td>
<td>1 (2)</td>
</tr>
<tr>
<td>No response:</td>
<td>1 (2)</td>
</tr>
</tbody>
</table>
Participants came from six out of eight New Zealand universities. There were no significant differences for sociodemographic characteristics between factors. Therefore, factors could not be profiled based on those characteristics. There were 37 (62%) participants who came from the University of Otago. There was a wide variety of ethnicities included in the study, 20% of participants identified themselves in the ‘other’ category, which included Fijian, South African, Australian, Filipino, Thai, and African. Most participants came from residential college foodservice. Table 5 illustrates further sociodemographic characteristics of the participant population.

5.4 Factor profiles

This section describes the results from specific survey sections for each factor. Each factor profile begins with results from section one (narratives). Refer to Table Seven below for all findings from section one. Following section one results, each factor profile then includes results from section two (initiatives) and section four (enduring involvement index). Refer to Table Eight below for all findings from sections two and four. The following factor profiles should be read with reference to Tables Seven and Eight.
Table 7. Section one narrative scores

<table>
<thead>
<tr>
<th>Identification with Narrative</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>n(%)</td>
<td>15 (25%)</td>
<td>24 (40%)</td>
<td>15 (25%)</td>
<td>6 (10%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factor narrative</th>
<th>Mean narrative score</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Believer:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How much do you agree/disagree</td>
<td>1.5</td>
<td>1.9</td>
</tr>
<tr>
<td>How desirable</td>
<td>1.5</td>
<td>1.8</td>
</tr>
<tr>
<td>Relatively Positive Integrator:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How much do you agree/disagree</td>
<td>2.0</td>
<td>1.7</td>
</tr>
<tr>
<td>How desirable</td>
<td>2.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Uncertain Contender:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How much do you agree/disagree</td>
<td>3.1</td>
<td>2.6</td>
</tr>
<tr>
<td>How desirable</td>
<td>3.5</td>
<td>2.6</td>
</tr>
<tr>
<td>Skeptic:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How much do you agree/disagree</td>
<td>3.8</td>
<td>4.0</td>
</tr>
<tr>
<td>How desirable</td>
<td>3.8</td>
<td>3.8</td>
</tr>
</tbody>
</table>

1 Mean on a likert scale of 1 to 5, where 1=strongly agree, 2=agree, 3=neutral, 4=disagree, and 5=strongly disagree.
2,5 Indicates the viewpoint that contributed to the difference between the groups.

2 Factor 1: Believer: (a) Skeptic differed from all other factor groups (p<0.05).
2 (b) Both the Uncertain Contender and Skeptic differed from the Believer (p<0.05).
3 Factor 2: Relatively Positive Integrator: (a) Skeptic differed from all other factor groups (p<0.05) (b) The Skeptic differed from the Relatively Positive Integrator (p<0.05).
4 Factor 3: Uncertain Contender (a) The Uncertain Contender differed from the Believer and Relatively Positive Integrator (p<0.01) (b) The Uncertain Contender and Skeptic differed from the Believer (p<0.005).
5 Factor 4: Skeptic: (a) The Uncertain Contender differed from the Believer and Relatively Positive Integrator (p<0.01) The Skeptic differed from Believer and Relatively Positive Integrator (p<0.01). (b) The Uncertain Contender differed from the Relatively Positive Integrator (p<0.05). The Skeptic differed from the Relatively Positive Integrator (p<0.01).
The survey scores for section 2 include a five point Likert scale. Scores ranged from one to five. The most pro-environmental choice is one and the least pro-environmental choice is five.

The survey scores for section 4 included three questions with an eight point scale, one question with a four point scale and the last question had a five-point scale. Similar to section two, the scores range from one being most positive to the end of the scale most negative.

Table 8. Individual question scores for each factor in the sections two and four

<table>
<thead>
<tr>
<th>Survey section</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 2: Initiatives</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restrict choice</td>
<td>2.5</td>
<td>2.9</td>
<td>3.0</td>
<td>4.0</td>
<td>0.239</td>
</tr>
<tr>
<td>Fiscal incentives</td>
<td>2.9</td>
<td>3.1</td>
<td>3.6</td>
<td>4.2</td>
<td>0.035</td>
</tr>
<tr>
<td>Fiscal disincentives</td>
<td>2.2</td>
<td>3.0</td>
<td>3.6(^2)</td>
<td>3.6</td>
<td>0.010</td>
</tr>
<tr>
<td>Non-fiscal incentives and disincentives</td>
<td>2.1</td>
<td>1.7</td>
<td>2.5</td>
<td>2.6</td>
<td>0.116</td>
</tr>
<tr>
<td>Persuasion</td>
<td>1.9</td>
<td>2.0</td>
<td>2.6</td>
<td>2.8</td>
<td>0.177</td>
</tr>
<tr>
<td>Provision of Information</td>
<td>1.7</td>
<td>2.3</td>
<td>2.8(^2)</td>
<td>3.0</td>
<td>0.021</td>
</tr>
<tr>
<td>Changes to physical environment</td>
<td>3.0</td>
<td>3.4</td>
<td>3.3</td>
<td>4.0</td>
<td>0.413</td>
</tr>
<tr>
<td>Changes to the default policy</td>
<td>2.4</td>
<td>2.9</td>
<td>3.3</td>
<td>2.6</td>
<td>0.334</td>
</tr>
<tr>
<td>Use of social norms and salience</td>
<td>1.5</td>
<td>1.4</td>
<td>2.3(^3)</td>
<td>2.6(^3)</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>Section 4: Enduring Involvement Index</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The quality of your social life</td>
<td>4.6</td>
<td>4.2</td>
<td>4.8</td>
<td>5.0</td>
<td>0.513</td>
</tr>
<tr>
<td>Your present job or career</td>
<td>2.4</td>
<td>2.1</td>
<td>2.4</td>
<td>3.2</td>
<td>0.083</td>
</tr>
<tr>
<td>Your future job or career plans</td>
<td>2.3</td>
<td>2.0</td>
<td>2.3</td>
<td>3.2</td>
<td>0.082</td>
</tr>
<tr>
<td>How interested are you in the subject</td>
<td>1.5</td>
<td>1.7</td>
<td>2.1</td>
<td>2.2</td>
<td>0.042</td>
</tr>
<tr>
<td>How frequently do you find yourself thinking about</td>
<td>2.5</td>
<td>2.4</td>
<td>3.3(^3)</td>
<td>3.5</td>
<td>0.011</td>
</tr>
</tbody>
</table>

1 The survey scores for section 2 include a five point Likert scale. Scores ranged from one to five. The most pro-environmental choice is one and the least pro-environmental choice is five.

The survey scores for section 4 included three questions with an eight point scale, one question with a four point scale and the last question had a five-point scale. Similar to section two, the scores range from one being most positive to the end of the scale most negative.

2-3 Indicates the viewpoint that contributed to the difference between the groups.

2 Section two: Each group was significantly different from the Believer factor (factor 1)(p<0.05)

3 Section four: The Uncertain Contender (factor 3) score was significantly different from the Relatively Positive Integrator (factor 2) (p<0.05).
5.4.1 The Believer

In section one, participants were asked how much they agreed with and how desirable each factor was. At the end of section one, participants were asked which factor they identified most with. 15 participants (25%) self-identified with the Believer group out of all the factor narratives (Table 6). Out of those 15 participants with the Believer viewpoint, 60% strongly agreed with the Believer narrative, 30% agreed and 7% were neutral. 53% found the Believer narrative very desirable and 47% somewhat desirable. For the initiative questionnaire, participants were asked how feasible they thought each initiative was on a five point scale from ‘definitely feasible’ to ‘definitely not feasible’. Each point was given a score from one to five (one being most positive and five the least). When asked how feasible initiatives were, the Believer scores ranged from 1.5 to 3, which indicated they did not think any of the initiatives were not feasible. In the enduring involvement index, three questions had an eight point scale, one had a four point scale and the last question had a five point scale. A similar scoring system was used for this index as the initiative questionnaire, where the most positive score was one and the least positive the highest number in the scale (e.g. for a seven point scale it would be seven). The Believer scores ranged from 1.5 to 4.6 (Table 7).

5.4.2 The Relatively Positive Integrator

Twenty four participants (40%) identified with the factor. Out of those 24 participants with the Relatively Positive Integrator viewpoint, 33% strongly agreed, 63% agreed and 4% neutral. 46% found the narrative very desirable, and 54% selected ‘somewhat desirable’.
For the initiatives section, the Relatively Positive Integrator scores ranged from 1.4 to 3.4, which like the Believer, indicated they did not think any of the initiatives were unfeasible.

For the enduring involvement index, the Relatively Positive Integrator scores ranged from 1.7 to 4.2.

5.4.3 The Uncertain Contender
15 (25%) participants identified with the Uncertain Contender narrative. Out of those 15 participants with the Uncertain Contender viewpoints 60% strongly agreed with the narrative, 20% agreed and 20% were neutral. 40% found the narrative very desirable, 33% somewhat desirable and 8% neutral. For the initiative questionnaire, the Uncertain Contender scores ranged from 2.3 to 3.6, which shows the Uncertain Contender may be leaning towards rating some initiatives as not feasible. For the enduring involvement index, the Uncertain Contender scores ranged from 2.1 to 4.8.

5.4.4 The Skeptic
Six (10%) participants identified with the Skeptic narrative. Out of those six participants with the Skeptic viewpoint, 50% strongly agreed with the narrative and 50% agreed. 33% found the Skeptic narrative very desirable, 33% somewhat desirable and 33% neutral. For the initiative questionnaire, the Skeptic scores ranged from 2.6-4.2, which shows that though the Skeptics may think some initiatives were not feasible, they did not think any initiatives were definitely not feasible. For the enduring involvement index, the Skeptic scores ranged from 2.2 to 5.
5.5. New ecological paradigm scale

There were fifteen questions in the scale. For each question in the new ecological paradigm scale, there was a five point scale ranging from strongly agree to strongly disagree. Unlike the initiative questionnaire and enduring involvement index, the most positive score was five and the least was one. The scores from the scale were added together and then an average ranging from 1-5 was given to each participant to represent their pro-environmental orientation. All of the scores were similar between the groups and ranged in a spectrum of the neither agree/disagree zone (Table 9). However, the Believer score was the highest and the Skeptic score was the lowest. The only significant difference was between the Skeptic and Believer scores (p=0.045). Although the Believer and Skeptic were the extreme ends of the factor spectrum, they are were not on the extreme ends of the new ecological paradigm scale of one and five. In fact, the Skeptic was the nearest to neutral, rather than having an anti-environmental orientation.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Mean score (Std dev)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Believer</td>
<td>3.7 (0.49)</td>
</tr>
<tr>
<td>Relatively Positive Integrator</td>
<td>3.6 (0.32)</td>
</tr>
<tr>
<td>Uncertain Contender</td>
<td>3.4 (0.45)</td>
</tr>
<tr>
<td>Skeptic</td>
<td>3.2 (0.42)</td>
</tr>
</tbody>
</table>

P-value 0.020*

*There was a significant difference between the groups. The difference was between the Believer and the Skeptic (p=0.045).
6. Discussion and conclusion

Chapter six will discuss how the results compare and contrast to the current literature. This section includes a discussion of motivators and barriers for change (6.1) what fostering environmental education could look like in a university foodservice (6.2) and strengths and limitations of the study (6.3).

6.1 Motivators and barriers to fostering environmental education in university foodservice

6.1.1 Motivators

The results from both phases of the study can help identify what might motivate university foodservice staff to foster environmental education in their foodservice. Chen et al. explored the motivators and barriers to university foodservice staff implementing sustainable initiatives. Although their study did not explore environmental education initiatives, the results do provide insight of university foodservice staff viewpoints. Chen et al. reported the highest motivator for staff to implement sustainable initiatives was pressure from students and administrators. This is true of the Uncertain Contenders and Skeptics as the Uncertain Contenders were unsure how well students would respond and the Skeptics believed students would have a poor response. In another study, Chen et al. found foodservices who had most initiatives were ones where the staff had received environmental education. Only 15% of the phase two participants of this study had received environmental education as part of their training. Introducing environmental education to staff could help them to change their viewpoints on the feasibility of environmental education initiatives in their foodservice. However, this now poses the question of the content and direction of environmental education directed at university foodservice staff.
The content and direction should not focus on increasing the pro-environmental orientation of staff as shown by the results of the phase two survey. The new ecological paradigm scale and enduring involvement index were used in the phase two survey to measure pro-environmental orientation. All of the factors had new ecological paradigm scores that grouped together in the neither agree/disagree score region. The only difference was between the Skeptics and the Believers; however, both of their scores were also near the ‘neither agree/disagree’ score region. Given that these results show the level of pro-environmental orientation was not a predictor of the factor a staff member identified with, professional learning for staff should not focus on trying to change pro-environmental orientation.

6.1.2 Barriers to fostering environmental education

All of the factors had differing viewpoints on three foodservice outcomes: customer service, financial accountability, and hygiene practices. All of the factors, except the Believer, felt environmental education could be a potential barrier to these outcomes. For the Uncertain Contender and Skeptic, financial accountability was a major barrier to environmental education. The Uncertain Contender was uncertain as to how environmental education and finance could work coherently together in their foodservice. The most favored initiative by the factors was a cost-effective one which is similar to the results from the Chen et al study that found the most popular sustainable initiatives saved money. The cost effective initiative favoured by participants in the survey was included in the ‘choice architecture’: using social norms and salience through a poster. A similar initiative was used by Whitehair et al in helping students to reduce food waste. However, this kind of initiative leans more toward a ‘hidden curriculum’ spectrum of learning as students are made aware of the sustainable practices in a university foodservice rather than confronted with behaviours they need to change themselves. Although, this initiative is not a direct extra-curricular activity it does help integrate environmental education across wider sectors in a university. Everett
praises the hidden curriculum as a means of environmental education. She further explains the importance if a university ‘practising what it preaches’ to benefit the learning of its students.\textsuperscript{7}

However, a hidden curriculum combined with choice architecture is quite a subtle form of education; it does not have the same predominant voice as curricular-based teaching.\textsuperscript{7} It also does not include affective learning, which is an integral part of environmental education and needed in order for successful implementation.\textsuperscript{25,27,33} Sipos et al argues that a ‘head, hands and heart’ approach is the best way to teach environmental education.\textsuperscript{33} An initiative included in the phase two survey taken from one suggested by Sipos et al, was for students to plant a garden and then use produce from the garden to prepare a meal\textsuperscript{33}. This initiative encompassed the ‘head, hands and heart model’ and was also part of choice architecture in the ‘changes to physical environment’ category.\textsuperscript{26} However, most factors were unsure about the feasibility of this initiative (scores ranged from 3- 4 indicting ‘maybe feasible’ to ‘probably not feasible’). This kind of initiative was one of the newly integrated initiatives by 7\% of the foodservices included in the Chen et al study.\textsuperscript{48} A barrier to this kind of initiative might be cost, as this was an important factor for the Uncertain Contender and Skeptics. The student response to this initiative is unknown. If there were a poor response, this would mean three out of four factors would not be on board, as they would not achieve their customer service outcome.

6.2 Is fostering environmental education in a university foodservice feasible?

Three factors were concerned about the outcomes of their foodservice and how environmental education fits in. Unity is needed so that environmental education works with the outcomes of a foodservice rather than clashing with the current paradigm of foodservice and education thinking. A framework that integrates financial accountability and sustainability into the health and success of a business is the Triple Bottom Line framework.\textsuperscript{66} The framework includes price, planet, and
people as the major outcomes. ‘Price’ incorporates financial accountability and growth for a business, ‘planet’ means the business encompasses sustainable initiatives, and ‘people’ includes social justice and wellness for its employees. This framework could be the paradigm shift university foodservice needs in order to foster environmental education. This framework could be incorporated in professional learning directed at staff to teach them how to incorporate environmental education initiatives into their foodservice. University foodservice staff using the same framework could help establish a common language about environmental education.

Cortese et al call for a change in the paradigm of thinking about how environmental education should be taught in universities and Reid et al express the need for a common language about sustainability in order to successfully teach environmental education. All four factors expressed different perspectives about sustainability in terms of the foodservice. The Uncertain Contenders and Skeptics focused on a financially underpinned framework for their foodservice. This result is similar to what Shephard and Reid found with viewpoints of university teachers, where there was also a spectrum of different languages about sustainability.

### 6.3 Strengths and limitations

This study used a comprehensive two-phased Q and R study design. There is no perfect way to conduct a Q study and there are many ways of integrating Q and R together, which provides strengths and limitations to the study design.

#### 6.3.1 Strengths

Integrating Q and R enabled the data to reflect distinct differences between groups in a larger population, which added validity to the viewpoints. The survey was successful in reflecting major differences in the factors from Q in a larger population. The survey also enabled more depth of
perspective about the factors by integrating different scales in the survey. Rather than just finding information about how wide the viewpoints were held, the survey was able to explore other influences on the factor groups’ thinking. Other Q studies have not integrated the extra scales as part of their second phase. By including initiatives from the House of Lords Behaviour change table, the study was able to show that less invasive initiatives were seen as more feasible by university foodservice staff. These initiatives are useful in visualising what fostering environmental education could look like rather than just focusing on viewpoints. With the nature of Q (as mentioned in subsection 4.1), it could not incorporate both understandings and representations of the subject. The initiatives questionnaire helped to link representations with a factor, rather than conducting two Q studies resulting in two sets of factors with no means of connecting them both.

6.3.2 Limitations

This study design also comes with limitations. Firstly, there was a small participant response in the second phase of the study. However, low participant response to surveys is common in the literature. Baker et al who conducted a Q-R survey using the Q block technique also had a low response. In the current study, participants were sent email links via their managers. This meant the control to distribute surveys was in the manager’s hands rather than the researcher. Another limitation of the response rate was that most participants came from the University of Otago and were from residential college foodservices. In addition, because there was a low response rate from campus outlet staff, only residential college initiatives were explored. Therefore, recommendations to campus outlets can only be extrapolated from the residential college responses. Participants could also only choose one factor to identify with. In the Baker et al Q-R study, participants were able to identify with more than one factor. This source of confounding was adjusted for in the phase one Q study but not in phase two. Also, participants were not given the
option to not identify with any factor. This meant those who weakly identified with a specific viewpoint could confound the results. These participants’ scores on other scales may not have given a true representation of what a participant who had strongly identified with the factor may have selected. However, no participants had a score which indicated they disagreed or found their identified factor undesirable.

6.4 Areas for further research

Researching viewpoints about fostering environmental education in university foodservice should not stop with university foodservice staff. There are many other viewpoints that are vital in understanding the feasibility of fostering environmental education. A main concern for three of the four factors was how environmental education initiatives could affect customer service. Students are a reason for a university foodservice to introduce environmental education, so understanding their perspective could give new insights in two main ways. Firstly, student perspectives were important to three factors identified in this study, so understanding these would help to guide initiatives based on staff perspectives. Secondly, students could provide ideas on the best initiatives that would work best for them. Student focused research could reveal that the best initiatives for staff to implement conflict with what is preferred by students. Also, all of the initiatives in the phase two survey did not include any student led initiatives. All of the initiatives relied on staff implementation rather than student involvement. The Harvard Food literacy project involves many student led activities that include the foodservice rather than being led by the university foodservice. Perhaps research focusing on initiatives involving university foodservice in combination with other university sectors could provide another option for university foodservice to foster environmental education. A similar Q-R study design could be used to find the perspectives of both residential college and campus outlet consumers. This knowledge would assist
in identifying how foodservices could use initiatives to integrate both customer service and environmental education at the same time.

6.5 Conclusion

This study contributes to the understandings on how to integrate environmental education outside of curriculum-based learning. Although the Skeptic viewpoint was negative, they were represented as the smallest group in both the Q population and survey population. This gives hope that a common language can be shared amongst university foodservice staff to foster environmental education. More clarity about how to create a common language may lie in creating unity and collaboration not just within foodservice staff, but also with other stakeholder groups such as students. A solution to create unity across all factors could be through staff education about how to include initiatives via the ‘Triple Bottom Line’ framework.
7 Application to Dietetic Practice

This last section applies the research to how university foodservices could change to foster environmental education. The chapter focuses on how a common language of environmental education could develop across all factors, even Skeptics. To do this, the chapter includes three sections: firstly how professional development for staff could help them learn more about how to foster environmental education (7.1). Section 7.2 goes on to detail how staff could introduce a paradigm shift by implementing the Triple Bottom Line framework. Lastly, section 7.3 explores what student involvement could look like based on an example from Harvard University.

7.1 Creating a common language of environmental education: can the Skeptic join the conversation?

The following recommendations are all underpinned by the goal of creating a common language of environmental education among university foodservice staff.

7.1.1 Professional development:

Three of the four factors were positive about environmental education in their foodservice; the fourth factor, the Skeptics, thought their foodservice was not the right place to foster environmental education. Based on the results of the research, the goal of a professional development course should focus on teaching staff how to integrate initiatives that work with the outcomes of their foodservice. In order for Skeptics to join the conversation, they might need to learn more about the ‘environmental education language’. Perhaps, university foodservice staff need their own environmental education as part of professional development in order to foster this.
7.1.2 Professional development examples

Professional development could involve teaching staff about how environmental education initiatives could fit into their foodservice, without disrupting other important foodservice outcomes. This would involve communication between the teacher and managers about how their foodservice operates and what frameworks they use. A tailored approach may be needed, as there is a distinct difference between residential college foodservice and campus outlet foodservice. Foodservice staff sharing their own efforts in fostering environmental education could aid as an education tool. Believers have the potential to champion environmental education initiatives. The Believers could show the Skeptics how they were able to overcome barriers and so encourage Skeptics to implement similar initiatives. For example, Believers showing their residential hall had successfully substituted unsustainable Portion Control Units for a jar of spread without compromising hygiene or food allergies, they could convince Skeptics to also implement the initiative.

Another means of education could arise through foodservice staff meeting with university academic staff as a common language of sustainability should exist throughout the whole university. Communication between these two groups would allow consistency between what is taught within the curriculum and outside of it. A meeting between these two groups could increase support and also acknowledge foodservice staff in their important role as educators.
7.2 The paradigm shift: the Triple Bottom Line approach in action

Educating staff about a different paradigm of foodservice such as the Triple Bottom Line framework (price, planet and people) could be more beneficial. Initiatives that encompass the Triple Bottom Line framework will enable foodservice staff to integrate environmental education in a way that may not unbalance other foodservice outcomes. Three examples from the phase two initiative questionnaire could be used to do this. The initiative with the most positive scoring by all factors was apart of the category ‘use of social norms and salience’. An example of this type of initiative could be an informative poster about sustainable practices involved in a foodservice. This form of education would require the foodservice including sustainable initiatives themselves. This kind of initiative is cost effective. The initiative the poster is communicating would also be a cost effective one; for example, reducing animal-based protein portion sizes, using jars of spread instead of Portion Control Units and switching to energy saving lightbulbs.

A second similar initiative that had a neutral ranking by all factors was Persuasion: persuading individuals using argument. An example of this initiative included in the phase two survey was an emotive poster about an environmental issue. As the poster uses emotion, it would be a great way to incorporate affective learning (Figure 8). The most restrictive type of initiative such as a ‘Meatless Monday’ was voted as one of the least feasible initiatives by the all of the factors. So instead, an emotive poster could encourage students to have a ‘Meatless Monday’ rather than enforcing them to (Figure 8). The foodservice could make more vegetarian portions on a Monday, rather than limiting vegetarian meals to only those identifying as vegetarians.
Lastly, another initiative all factors ranked neutrally was under the category of ‘Non-fiscal incentives and disincentives: Policies, which reward or penalise certain behaviours’. An example could be another poster idea acknowledging students efforts in reducing waste by showing how much of their waste has been saved each day/week. A similar poster was used by Whitehair et al, which showed a significant decrease in food wastage in a university foodservice residential college setting (Figure 9). An education programme for foodservice staff could use this study to show how environmental education initiatives interweave with other foodservice outcomes.
All of these initiatives are good examples of the Triple Bottom Line framework in action. They are all cost effective; posters are inexpensive to produce and the kinds of behaviour changes they encourage also help the foodservice to save money. None of the initiatives would contradict hygiene regulations. Also, these initiatives encompass ‘people’, the social justice component of the Triple Bottom Line framework. Reducing portion sizes in a bid to reduce waste or choosing more plant-based options would increase the nutritional quality of student diets and also help students with maintaining a healthy weight.

7.3 A missing voice in the conversation: what do students say?

A missing piece of information needed to answer the question of whether Skeptics can join the environmental education conversation is the student perspective. As mentioned in section 6.4, the
Food Literacy programme from Harvard involves students taking an active role. One of the initiatives is the FoodBetter programme, as mentioned in section 2.2.2, where students enter a team challenge to create innovative sustainability initiatives. These initiatives however, tend to be on a larger scale than university foodservice. For example, one of the top initiatives called ‘FOCUS FOODS’ involved an urban aquaponic farm to support the local community. The FoodBetter programme could act as a case study for staff to modify it for a university foodservice setting. A similar challenge could engage students to create innovative ideas the university foodservice could incorporate to either make the foodservice more sustainable or teach students further about environmental education. This challenge has the possibility to interlink with the curriculum, as the project could help students actively participate in what they have learned in class.

A common language of sustainability amongst foodservice staff is feasible and it could be one the Skeptic may also speak. Education and group support can equip foodservice staff with the confidence and knowledge to introduce new initiatives into their foodservice. By using initiatives that were universally either positively/ neutrally ranked from the initiatives questionnaire, foodservice staff can realistically foster environmental education in a way that does not compromise the outcomes of their foodservice.
8. References


9. Appendices
Appendix I: behavioral change table

<table>
<thead>
<tr>
<th>Interventions Category</th>
<th>Examples (On-campus/food outlets)</th>
<th>Examples (Residential hall)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation of the individual</td>
<td>Eliminate choice</td>
<td>Meat less Monday: Only vegetarian options available. E.g only vegetarian food options available.</td>
</tr>
<tr>
<td>Fiscal measures directed at the individual</td>
<td>Restrict choice</td>
<td>Two vegetarian options at dinner instead of two meat and one vegetarian option,</td>
</tr>
<tr>
<td>Non-regulatory and non-fiscal measures with relation to the individual</td>
<td>Fiscal disincentives</td>
<td>Having less menu choice. E.g one carbohydrate option instead of two.</td>
</tr>
<tr>
<td>“Choice enablers”</td>
<td>Fiscal incentives</td>
<td>Students are charged for takeaway packaging used for packed lunches and late meals.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Guide and enable choice</th>
<th>Non-fiscal incentives and disincentives</th>
<th>Persuasion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provision of information</td>
<td>Normative Feedback: Positive feedback about efforts of reducing food waste</td>
<td>Affective learning: Showing a subjective poster about a sustainability issue.</td>
</tr>
<tr>
<td>Changes to physical environment</td>
<td>Knowledge based: An objective poster about food waste</td>
<td>Hidden curriculum: Reinforcing local food purchases by having local foods on the menu.</td>
</tr>
<tr>
<td>Changes to the default policy.</td>
<td>Knowledge based: Normative Feedback Information about your own progress in food waste.</td>
<td>Organic milk as a default option. Consumers must ask if they want regular milk in their drink of choice.</td>
</tr>
<tr>
<td>Use of Social norms and Salience.</td>
<td>Knowledge based: approach; Carbon footprint on menu.</td>
<td>Including students in an inter-department competition to reuse coffee cups.</td>
</tr>
</tbody>
</table>
Appendix II: Phase one ethics approval letter

D14/359

Academic Services
Manager, Academic Committees, Mr Gary Witte

12 November 2014

Dr M Mirosa
Food Science
Dept. of Food Science, Clothing
& Textile Sciences

Dear Dr Mirosa,

I am writing to confirm for you the status of your proposal entitled “Foodservice operations’ potential to foster environmental education”, which was originally received on October 23, 2014. The Human Ethics Committee’s reference number for this proposal is D14/359.

The above application was Category B and had therefore been considered within the Department or School. The outcome was subsequently reviewed by the University of Otago Human Ethics Committee. The outcome of that consideration was that the proposal was approved.

Approval is for up to three years from the date of HOD approval. If this project has not been completed within three years of this date, re-approval must be requested. If the nature, consent, location, procedures or personnel of your approved application change, please advise me in writing.

Yours sincerely,

[Signature]

Mr Gary Witte
Manager, Academic Committees
Tel: 479 8256
Email: gary.witte@otago.ac.nz
Appendix III: Phase two ethics approval letter

D15/295

Academic Services
Manager, Academic Committees, Mr Gary Witte

15 September 2015

Dr M Mirosa
Department of Human Nutrition
Division of Sciences

Dear Dr Mirosa,

I am writing to confirm for you the status of your proposal entitled “Fostering environmental education within a university foodservice”, which was originally received on August 27, 2015. The Human Ethics Committee’s reference number for this proposal is D15/295.

The above application was Category B and had therefore been considered within the Department or School. The outcome was subsequently reviewed by the University of Otago Human Ethics Committee. The outcome of that consideration was that the proposal was approved.

Approval is for up to three years from the date of HOD approval. If this project has not been completed within three years of this date, re-approval must be requested. If the nature, consent, location, procedures or personnel of your approved application change, please advise me in writing.

Yours sincerely,

[Signature]

Mr Gary Witte
Manager, Academic Committees
Tel: 479 8256
Email: gary.witte@otago.ac.nz
Appendix IV: Preliminary Q sort interview: information for participants

Fostering environmental education within university foodservice.

INFORMATION SHEET FOR PARTICIPANTS

Thank you for your interest in this project. I am Chelsea Slobbe, a Master of Dietetics student in the Department of Human Nutrition. My research interest is in foodservice and sustainability. Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate we thank you. If you decide not to take part there will be no disadvantage to you and we thank you for considering our request.

What is the Aim of the Project?

The aim of this research is to understand ways that a university foodservice operation could foster students’ environmental education. This project is being undertaken by as part of the requirements for my Master in Dietetics.

What Types of Participants are being sought?

For the interviews we are seeking 5-15 staff of the University Union foodservice (Managers, Supervisors, front/back of house staff) and Higher Education researchers 18 years and older who are likely to offer a broad range of opinions on sustainability and foodservice. Our recruitment method is by word of mouth.

What will Participants be asked to do?

Should you agree to take part in this project, you will participate in an interview with the researcher in a meeting room where I will conduct my interview. This will take approximately 30-45 minutes of your time. Please be aware that you may decide not to take part in the project without any disadvantage to yourself of any kind.

What Data or Information will be collected and what use will be made of it?

- Interviews will be audio taped and transcribed into writing
• Statements from the interview, or a modified version of these, may be used for future steps in the research project.
• Only those involved will have access to the data with participant identification on it; Chelsea Slobbe` (researcher) Miranda Mirosa and Carla Thomson (Supervisors) and a data transcriber.

You will be asked to discuss your attitudes and practices around environmental education. The interview sessions will be audio recorded to allow me to remember and accurately transcribe what was said during the session. Neither the audio recordings, nor the transcripts, will be shared with anyone outside the current research project.

The data collected will be securely stored in such a way that only those mentioned above will be able to gain access to it. Data obtained as a result of the research will be retained for at least 5 years in secure storage. Any personal information held on the participants such as contact details and audiotapes, after they have been transcribed may be destroyed at the completion of the research even though the data derived from the research will, in most cases, be kept for much longer or possibly indefinitely.

The results of the project may be published in which case they will be available in the University of Otago Library (Dunedin, New Zealand), but every attempt will be made to preserve your anonymity. You are most welcome to request a summary of the study results. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (phone 03 479 8256). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.

Can Participants change their mind and withdraw from the project?

You may withdraw from participation in the project at any time and without any disadvantage to yourself.

What if Participants have any Questions?
If you have any questions about our project, either now or in the future, please feel free to contact either:-
Chelsea Slobbe`  and  Miranda Mirosa
Department of Human Nutrition  Department of Food Science
Telephone: 03- 479 7953
Email: sloch711@student.otago.ac.nz  Email: Miranda.mirosa@otago.ac.nz

This study has been approved by the Department stated above. However, if you have any concerns about the ethical conduct of the research you may contact the University of Otago Human Ethics Committee through the Human Ethics Committee Administrator (phone 03 479-8256). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.
Appendix V: Interview protocol for phase one interviews: Preliminary Interviews and post Q sort interviews.

<table>
<thead>
<tr>
<th>Interview Protocol:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Greet participant.</td>
</tr>
<tr>
<td>2. Participant will be given time to get seated and comfortable.</td>
</tr>
<tr>
<td>3. Participant will be informed of what will happen throughout the interview.</td>
</tr>
<tr>
<td>4. Participant is informed that they can stop the interview at any time or choose not to answer any of the questions if they feel uncomfortable.</td>
</tr>
<tr>
<td>5. Participant is informed that an audio-recording will be made of the interview which will be stored for the duration of the study and then destroyed.</td>
</tr>
<tr>
<td>6. Consent form is signed if participant is happy with conditions of the interview.</td>
</tr>
<tr>
<td>7. Follow the Semi-structure Interview Guide for University Union management staff and front/back of house staff.</td>
</tr>
<tr>
<td>8. Participant will be given a coffee voucher. Participant will sign to declare that they have received the voucher.</td>
</tr>
<tr>
<td>9. Participant is thanked for their time and sharing their opinions and farewells said.</td>
</tr>
</tbody>
</table>
### Appendix VI: Concourse table (Q set statements in bold)

<table>
<thead>
<tr>
<th>Financial</th>
<th>+ve</th>
<th>Neutral</th>
<th>-ve</th>
</tr>
</thead>
<tbody>
<tr>
<td>What the focus of the foodservice income should be targeted at</td>
<td>Environmental education will have a positive effect on consumer demand</td>
<td>Why can’t environmental education be parallel to the growth in customer service</td>
<td>I think my foodservice should focus on consumer demand rather than environmental education</td>
</tr>
<tr>
<td>Financial feasibility</td>
<td>A common misconception is that integrating environmental education costs more money</td>
<td>Financial accountability is of more importance than environmental education.</td>
<td>Environmental education in my foodservice would be too expensive.</td>
</tr>
<tr>
<td>The financial structure of university foodservice</td>
<td>Environmental education can be woven into my foodservice corporate side to help improve its finance</td>
<td></td>
<td>My foodservice is a business therefore it cannot educate when it is set up to make money</td>
</tr>
<tr>
<td>Staff income in relation to foodservice education role</td>
<td></td>
<td>Staff should be paid more if they are involved with environmental education as it takes more effort to be more environmentally friendly.</td>
<td>Staff should not be involved with environmental education, as their role is not a teaching job.</td>
</tr>
<tr>
<td>Meeting budgets</td>
<td>Lessening environmental impact can increase profit</td>
<td>Any extra costs Environmental education would create would be balanced by some of the savings it would create as well.</td>
<td>My foodservice will lose money if it fosters environmental education.</td>
</tr>
<tr>
<td>Promotion of foods at university foodservice</td>
<td>My foodservice should have strict guidelines for what food is sold as the selling of any food promotes it.</td>
<td>We should be allowed to have non-environmentally friendly foods; we just should not promote them.</td>
<td>My foodservice should be able to promote any food to students.</td>
</tr>
<tr>
<td>Social Responsibility</td>
<td>+ve</td>
<td>Neutral</td>
<td>-ve</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>The universities current progress with teaching environmental education</td>
<td>Our university needs to do more to teach environmental education</td>
<td>Our university does enough to foster environmental education</td>
<td>Our university should do less to foster environmental education.</td>
</tr>
<tr>
<td>University as a role model</td>
<td>We are a university foodservice. As such everything we do, whether it like it or not, acts as a role model for our students</td>
<td>Our university is supposed to be a place of academic excellence and environmental education through my foodservice will help reflect this</td>
<td>Students should not look to my foodservice as a role model for environmental education.</td>
</tr>
<tr>
<td>Foodservice reflection of university</td>
<td>It is hypocrisy for our university to advocate for environmental change when our foodservices don’t reflect this.</td>
<td>Our university is supposed to be a place of academic excellence and environmental education through my foodservice will help reflect this</td>
<td>Our foodservice cannot reflect everything that our university advocates for.</td>
</tr>
<tr>
<td>Creating awareness</td>
<td>It is the responsibility of my foodservice to make consumers aware about how the food they are buying affects the environment.</td>
<td>Our university has some responsibility in bringing awareness to the environmental impact of the food it sells on campus.</td>
<td>It is the responsibility of the consumer to be aware of how their food affects the environment.</td>
</tr>
<tr>
<td>Where sustainability is integrated into foodservice</td>
<td>Sustainability should underpin everything we do in my foodservice.</td>
<td>Sustainability should be one of a group of factors that underpins everything we do in my foodservice.</td>
<td>Customer service should underpin everything we do in my foodservice.</td>
</tr>
<tr>
<td>Responsibility to resolve problems</td>
<td>Everyone is responsible for environmental change, which includes the university and my foodservice.</td>
<td>People are only responsible for their own impact on the environment.</td>
<td>It is the responsibility of environmental scientists to resolve problems not the university or my foodservice.</td>
</tr>
<tr>
<td>Practicality</td>
<td>+ve</td>
<td>Neutral</td>
<td>-ve</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Foodservice current sustainable practices.</td>
<td>In order for my foodservice to foster environmental education it needs to integrate more sustainable practices than it already does.</td>
<td>My foodservice can foster environmental education with the current sustainable practices that it uses at present.</td>
<td>My foodservice cannot foster environmental education.</td>
</tr>
<tr>
<td>Environmental education working with other foodservice outcomes</td>
<td>Environmental education should be a top priority in the foodservice I work in.</td>
<td>There are ways of working around health and safety policies to make room for environmental education.</td>
<td>Environmental education would be limited in my foodservice as health and safety and financial income are greater priorities.</td>
</tr>
<tr>
<td>Barriers to environmental education in the foodservice.</td>
<td>There are some barriers to environmental education such as hygiene standards, but the two outcomes can actively play a part in the foodservice</td>
<td>Hygiene standards should play a larger role in the foodservice than environmental education.</td>
<td>Environmental education is of less priority than financial and hygiene outcomes.</td>
</tr>
<tr>
<td>Where environmental education should be targeted in the foodservice.</td>
<td>Major changes to need to be made to multiple areas of my foodservice</td>
<td>There is not one major aspect my foodservice needs to address but small changes gradually.</td>
<td>There are just a few small things my foodservice needs to change.</td>
</tr>
<tr>
<td>Environmental education and foodservice sustainable practice.</td>
<td>In order for my foodservice to foster environmental education it needs to 'practice what it preaches'.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method of teaching</td>
<td>Role of extracurricular environmental education</td>
<td>Universities involvement in initiating the education</td>
<td>Integrating university and community initiatives</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>---------------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>Environmental education through my foodservice could be used as an addition to curricular-based learning.</td>
<td>Environmental education should stay within environmental science.</td>
<td>Student led initiatives need to be involved in environmental education through my foodservice.</td>
<td>Student led initiatives could aid in the teaching of environmental education.</td>
</tr>
<tr>
<td>Universities involvement in initiating the education</td>
<td>Student led initiatives need to be involved in environmental education through my foodservice.</td>
<td>Students should not have to be involved in my foodservice efforts to foster environmental education.</td>
<td>Environmental education should be voluntary in my foodservice.</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>+ve</td>
<td>Neutral</td>
<td>-ve</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>Target audience of students who would benefit</td>
<td>My foodservice would help foster environmental education for all students.</td>
<td>My foodservice could help increase the environmental literacy of some students.</td>
<td>Environmental education through my foodservice would just appeal to those who are already well environmentally educated.</td>
</tr>
<tr>
<td>How effective environmental education could be</td>
<td>Fostering environmental education through my foodservice could be effective if the right people were behind it.</td>
<td>The effectiveness of Environmental education will be determined depending on how it is delivered.</td>
<td>Even if the right people were behind it, my foodservice would not be effective in fostering environmental education.</td>
</tr>
<tr>
<td>Student response</td>
<td>Most students will have a good response to my foodservice providing environmental education.</td>
<td>There will be a mixed bag of responses from students.</td>
<td>The majority of student response would be negative.</td>
</tr>
<tr>
<td>Environmental education effect on foodservice.</td>
<td>Environmental education could improve my foodservice quality of produce.</td>
<td>Some of the produce in my foodservice would be enhanced through environmental education.</td>
<td>Environmental education would decrease the quality of produce in my foodservice.</td>
</tr>
<tr>
<td>The ability of the university to facilitate long lasting change.</td>
<td>My foodservice has the capacity to facilitate long lasting change on the environmental literacy of our students.</td>
<td>My foodservice has some capacity to create a change on the environmental literacy of our students.</td>
<td>My foodservice has little capacity to only facilitate short lasting change on the environmental literacy of our students.</td>
</tr>
<tr>
<td>University/student culture</td>
<td>+ve</td>
<td>Neutral</td>
<td>-ve</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-----</td>
<td>---------</td>
<td>-----</td>
</tr>
<tr>
<td><strong>Food culture on campus</strong></td>
<td>University food culture needs to change to become more sustainable</td>
<td>There are some changes to university food culture that could be made to make it more sustainable.</td>
<td>The current foodservice system is too ingrained into university culture that it cannot be changed to foster environmental education.</td>
</tr>
<tr>
<td><strong>Māori culture on campus</strong></td>
<td>Environmental education through foodservice can help integrate Maori culture as students can learn about the whakapapa of their food.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Choice of foods on offer from foodservice</strong></td>
<td>Fostering environmental education means that students will be able to make more informed choices.</td>
<td>Fostering environmental education means that there will be less freedom of choice.</td>
<td></td>
</tr>
<tr>
<td><strong>Choice of receiving environmental education from foodservice</strong></td>
<td>Environmental education through the foodservice should be part of the university experience.</td>
<td>Students should be able to choose whether they want to receive environmental education from the foodservice or not.</td>
<td>Students should not have their education extended to recreational activities such as foodservice.</td>
</tr>
<tr>
<td><strong>Role foodservice as a media for environmental education has on the student population.</strong></td>
<td>Foodservice has a big role to play in environmental education as it caters for a large and diverse student population.</td>
<td>Foodservice has some role to play in environmental education, as it is a service used by students.</td>
<td>Foodservice has a small role to play in environmental education as students spend more time in class than having contact with the university foodservice.</td>
</tr>
<tr>
<td><strong>How environmental education is taught.</strong></td>
<td>We need to get back to basics with how foods were traditionally prepared and to teach this to students.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Student concern for environmental education.</strong></td>
<td>For the majority of students environmental impact of food is a major concern.</td>
<td>Students have a varied amount of concern about the environmental impact of food.</td>
<td>Students are more concerned with the price of food rather than the environmental impact it has.</td>
</tr>
</tbody>
</table>
Appendix VII: Q set statements

1) Why can’t environmental education be parallel to the growth in customer service?
2) Fostering environmental education through my foodservice will help reflect the university as a place of academic excellence.
3) I think my foodservice should focus on consumer demand rather than environmental education.
4) Our foodservice cannot reflect everything that our university advocates for.
5) A common misconception is that integrating environmental education costs more money.
6) Our university has some responsibility in bringing awareness to the environmental impact of the food it sells on campus.
7) Environmental education can be woven into my foodservice corporate side to help improve its finance.
8) Customer service should underpin everything we do in my foodservice.
9) Staff should be paid more if they are involved with environmental education as it takes more effort to be more environmentally friendly.
10) Environmental education should stay within environmental science.
11) My foodservice will lose money if it fosters environmental education.
12) Student led initiatives could aid in the teaching of environmental education.
13) We should be allowed to have non-environmentally friendly foods; we just should not promote them.
14) Environmental education through my foodservice should be used in conjunction with other community initiatives.
15) Everyone is responsible for environmental change, which includes our university and my foodservice.
16) Environmental education needs to be taught through my foodservice because it’s a part of everybody’s future.
17) We are a university foodservice. As such everything we do, whether it like it or not, acts as a role model for our students.
18) Environmental education is political correctness gone mad and I don’t think it we should foster it in my foodservice.
19) My foodservice can foster environmental education with the current sustainable practices that it uses at present.

20) My foodservice has a big role to play in environmental education as it caters for a large and diverse student population.

21) Environmental education should be a top priority in the foodservice I work in.

22) My foodservice has some role to play in environmental education, as it is a service used by students.

23) There are ways of working around health and safety policies to make room for environmental education.

24) For the majority of students, the environmental impact of food is a major concern.

25) Environmental education would be limited in my foodservice as health and safety and financial income are greater priorities.

26) Students have a varied amount of concern about the environmental impact of food.

27) Environmental education is of less priority than financial and hygiene outcomes.

28) Students are more concerned with the price of food rather than the environmental impact it has.

29) There is not one major aspect my foodservice needs to address environmental education but small changes gradually.

30) Environmental education through my foodservice would just appeal to those who are already well environmentally educated.

31) In order for my foodservice to foster environmental education it needs to ‘practice what it preaches’.

32) Fostering environmental education through my foodservice could be effective if the right people were behind it.

33) The current foodservice system is too ingrained into our university culture that it cannot be changed to foster environmental education.

34) Even if the right people were behind it, my foodservice would not be effective in fostering environmental education.

35) I don’t think we should foster environmental education, as it would restrict freedom of choice.

36) Most students will have a good response to my foodservice providing environmental education.

37) Our University needs to do more to teach environmental education.
38) There is no need to teach environmental education at my foodservice.
39) Environmental education should be mandatory in my foodservice.
40) There will be a mixed bag of responses from students.
41) Environmental education would decrease the quality of produce in my foodservice.
42) My foodservice has some capacity to create a change on the environmental literacy of our students.
Appendix VIII: Q sort information sheet

Fostering environmental education within a university foodservice.

INFORMATION SHEET FOR INTERVIEW PARTICIPANTS

Thank you for showing an interest in this project. I am Chelsea Slobbe’, a Master of Dietetics student in the Department of Human Nutrition. My research interest is in foodservice and sustainability.

Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate, I thank you. If you decide not to take part there will be no disadvantage to you and we thank you for considering our request.

What is the Aim of the Project?
The aim of this research is to understand the perspectives of university foodservice staff about their foodservice fostering environmental education. This project is being undertaken by as part of the requirements for my Master in Dietetics.

What Type of Participants are being sought?
For the Q-sorting activity and interviews we are seeking 40 University foodservice staff (Managers, Supervisors, front/back of house staff) 18 years and older who are likely to offer a broad range of opinions on sustainability and foodservice. Our recruitment method is by word of mouth.

What will Participants be asked to do?
Should you agree to take part in this project, you will participate in a Q-sort activity with the researcher in the meeting room. This will take approximately 30-45 minutes of your time. In the activity you will be given a set of 40-50 statements with each card containing a statement about environmental education. You will then be asked to rank the statements according to your attitudes about environmental education according to the pattern shown below.
Once you have completed the Q-sort activity, the researcher will conduct an interview asking you questions about your manner of arranging the statements and ask you to complete a short survey. Please be aware that you may decide not to take part at any stage of the project without any disadvantage to yourself of any kind.
What Data or Information will be Collected and What Use will be made of it?

After you have sorted the statements according to the pattern above, you will be asked to explain why they sorted the statements as you did. The interview sessions will be audio recorded and the Qsorts will be photographed to allow the researcher to remember and accurately transcribe what was said during the session. Neither the audio recordings, nor the photographs, will be shared with anyone outside the current research project.

Nothing that you say during the course of the session will be disclosed to any person outside of the group session. After the interview, the audio file will be transcribed and your real name will be removed from the data and replaced with a pseudonym so that outsiders reading the final report cannot identify your real name.

Any personal information that you provide will only be used to assist in explaining the study results. Personal information will be published only as aggregate values. Responses will be collected and transferred onto a USB memory-stick that will be stored in a lockable filing cabinet in an office in the University of Otago Dunedin Centre. The data will only be accessible to Chelsea Slobbe` (researcher), Dr Miranda Mirosa and Carla Thomson (academic supervisors), as required by the University's research policy. Any raw data on which the results of the project depend will be retained in secure storage for five years, after which time they will be destroyed.

The results of the project may be published in which case they will be available in the University of Otago Library (Dunedin, New Zealand). Every attempt will be made to preserve your anonymity.

You are most welcome to request a summary of the study results. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics
Committee Administrator (phone 03 479 8256). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.

**Can Participants Change their Mind and Withdraw from the Project?**

You may withdraw from participation in the project at any time and without any disadvantage to yourself of any kind.

**What if Participants have any Questions?**

If you have any questions about our project, either now or in the future, please feel free to contact either:

Chelsea Slobbe` and/or Dr. Miranda Mirosa
Department of Human Nutrition Department of Food Science
Email: sloch711@student.otago.ac.nz Email: miranda.mirosa@otago.ac.nz

Telephone: 03- 479 7953

This study has been approved by the Department stated above. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (ph 03 479-8256). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.

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**Appendix IX: Q sort consent form**
Fostering environmental education within a university campus food outlet environment.

CONSENT FORM FOR PARTICIPANTS

I have read the Information Sheet concerning this project and understand what it is about. All my questions have been answered to my satisfaction. I understand that I am free to request further information at any step.

I know that:

1. My participation in the project is entirely voluntary;

2. I am free to withdraw from the project at any time without any disadvantage;

3. The data will be destroyed at the conclusion of the project but any raw data on which the results of the project depend will be retained in secure storage for at least five years;

4. This project involves a Q-sorting activity and an open-questioning technique. The general line of questioning includes “Why did you sort the statements in the manner you did?” The precise nature of the questions which will be asked have not been determined in advance, but will depend on the way in which the interview develops and that in the event that the line of questioning develops in such a way that I feel hesitant or uncomfortable I may decline to answer any particular question(s) and/or may withdraw from the project without any disadvantage of any kind.

5. The results of the project may be published and available in the University of Otago Library (Dunedin, New Zealand) but every attempt will be made to preserve my anonymity.

I agree to take part in this project.

.................................................................................................................................

Signature                                                                                             Date

Appendix X: Q sort instruction sheet
Q-methodology sorting activity
Participant instruction sheet

Material taken from: Doing Q Methodology,

Environmental education: ‘An approach to teaching and learning that provides people with experience and knowledge to care for our environment’
(Gruwenewald, 2004; Orr, 1994)

Thank you for agreeing to take part in our Q methodology Study. Please follow these instructions carefully, if however you have any problems or questions that arise during the completion of the Q sort activity, don’t hesitate to ask the researcher.

Step 1: Please read the research question carefully. The 42 statements all offer different viewpoints about the research question. The Q-sorting task requires you to allocate every one of these viewpoints on a ranking position within the sorting distribution provided, based on the strength of your agreement/disagreement with its content. The more you agree with an item, the higher the ranking you are likely to award it. The more you disagree, the lower the ranking. Please note, however, that the final pattern of item rankings you produce MUST BE THE SAME AS the shape of the sorting distribution provided.

Only ONE item can be given a ranking of +5, THREE can be given a ranking of +4, FOUR can be given a ranking of +2, and so on. Please stick to these rules. There are good reasons for the distribution, which we’ll happily explain, and we promise that there is a method in our madness! The system is being used because it is the most effective means of capturing your viewpoint for the purposes of our study.

Step 2: Take the pile of 42 statements. You now need to read each card, one at a time, and divide them into three provisional ranking categories. This should be done in relation to the research question, so it may be as well to remind yourself of this as you go along. Category 1 should include those statements, and hence those responses to the research question, with which you definitely AGREE. Put these statements in a single pile towards your right-hand side. Category 2 should include those statements with which you definitely DISAGREE. Put the statements in a single pile towards your left-hand side. Category three should include those statements about which you feel INDIFFERENT, UNSURE, or which otherwise leave you with MIXED FEELINGS. These statements should be placed in a single pile directly in front of you. There are no limits to the number of statements that can be placed in any of these categories. Just be faithful to your own feelings and viewpoint.
Helpful Hints for Sorting:

1) You may find it quite difficult to decide immediately which one item should be ranked at +5, particularly if you have a relatively large number of AGREE statements. If you do, a possible strategy is to read each item again and to gently slide the ones that generate the strongest feelings of agreement towards the right and those you feel slightly less strongly about towards the left. This process will physically spread the statements and it should also create a new sense of distribution within the group.

2) Don’t get hung up on the ranking of a specific item. For example, if you find two statements (instead of one) you’d like to rank at +5, don’t take 10 minutes to decide which one to relegate to +4. We just need to get a general sense of your likes and dislikes and we promise that this will happen whichever one you relegate.

3) Don’t worry if your AGREE statements cross over into the negative rankings. We won’t be assuming that this means you disagree with (or thoroughly dislike!) the item. The ranking system in Q methodology is relative. When you allocate a -2 ranking, therefore this indicates only that you probably agree with that item slightly less than the statements you ranked at -1, and slightly more than those you’re about to rank at -3. That’s all.

4) The order in which statements appear in a particular column or under a particular ranking value is irrelevant. In the diagram above, for example item 29 appears above item 47 in the +6 column, but it wouldn’t matter at all if this order were reversed. In other words, don’t try and order your columns!

Step 3: To continue sorting, you now need to follow the same procedure we used for Step 2, but this time focusing on the pile of the statements you definitely DISAGREE with. Spread them out so you can see them all at once. These statements will clearly be allocated ranking positions at the left-hand (or DISAGREE) end of the distribution provided. The lowest rankings should be
given to the statements that you disagree most strongly with. So, start at the left-hand pole of the distribution and award the ONE item you find most disagreeable -5 ranking. The next THREE most disagreeable statements would then be ranked -4, and so on. Remember to physically move (or sort) the appropriate item statements as you go. Keep going until ALL the statements you disagree with have been allocated an appropriate ranking. At the end of Step 3, your Q sort will probably look something like the diagram shown below, although the number of statements you’ve ranked and the statements you’ve allocated to the various ranking values will obviously be different!

Step 4: All that remains is to complete the Q sort using the pile of statements about which you feel INDIFFERENT. This is often the most difficult pile of statements to sort since, by definition, you probably won’t hold any strong opinions about them in either direction. In contrast, a larger number of statements can be allocated to these mid-range ranking values meaning there are comparatively few decisions to make. Again, spread the statements out so you can see all of them at once and simply allocate the highest available ranking to the statements with which you feel most agreement, and the lowest to those with which you feel most disagreement. Keep going until ALL your indifferent statements have been allocated an appropriate ranking.

Step 5: Congratulations! You’re finished sorting and you should now have a complete Q sort sitting in front of you. At this stage, have one final look at the whole thing and feel free to make any final adjustments you want to make. Check that all 42 statements appear in your Q sort and that the correct number of statements has been allocated to each ranking value. Your final Q sort should look something like the diagram shown below, although the statements you’ve allocated to the various ranking values will obviously be different!
Fostering environmental education within university foodservice.

Welcome to the survey!

This survey should take approximately 20 minutes of your time.

For every person that completes this survey, we will donate $1 to KidsCan.

This survey contains 5 sections:

Section 1: Will ask for your consent for participating in the research.
Section 2: Contains narratives of viewpoints about environmental education. Here you will be asked how strongly you identify with the viewpoints.
Section 3: Contains different examples of measures a university foodservice can implement to foster environmental education. You will be asked about how feasible you think each measure would be to implement in the foodservice you work in.
Section 4: Asks you questions on your environmental tendency and interest in sustainability issues.
Section 5: Gathers your socio-demographic information.

You can choose to not answer any questions and can withdraw from the survey at any time.

I have read the Information sheet and consent form concerning this project and understand what it is about. All my questions have been answered to my satisfaction. I understand that I am free to request further information at any time.

I agree to take part in this project
I do not agree to take part in this project
Section One:

This section contains four viewpoints about the desirability and realities of environmental education in foodservice. Please read each summary of each viewpoint and answer the following questions.

Viewpoint 1: The Believer:

The believer wants to play a part in initiating environmental education in their foodservice and feels that it is not only part of their responsibility but also everyone's responsibility to do so.

The Believer says:

“I strongly agree that when it comes to environmental change, everyone has a responsibility to play a part. So I think my foodservice should play a part also by providing environmental education to students. The University should definitely do more to teach environmental education, yet I am undecided whether it should be mandatory in my foodservice. Environmental education is not a political agenda; it is a fact of life that I think we should all take on board. I don’t think environmental education would restrict choice, although consumer demand cannot be ignored. I think we can educate so that the demand is in the environment's favor. I am happy to be a part of an educational program. “

How much do you agree or disagree with the believer viewpoint?

Strongly Agree
Agree
Neither Agree nor Disagree
Disagree
Strongly Disagree

How desirable is the believer viewpoint?
Many people in university foodservice think the way the believer thinks

Strongly Agree
Agree
Neither Agree nor Disagree
Disagree
Strongly Disagree

Are there any other thoughts you have about the believer viewpoint?

Viewpoint 2: The Relatively Positive Integrator (RPI)

The Relatively Positive Integrator believes that customer service is king, but environmental education could be integrated into the overall aims of the foodservice.

The RPI says:

“I strongly believe that in my foodservice our ultimate aim should be to meet customer needs. I think students will have a good response to environmental education in my foodservice, so I think there is a need for environmental education in my foodservice. As a university foodservice, we act as a role model for students. So, I also believe we are all responsible for environmental change. Yet, I am unsure about whether environmental education should be prioritized over financial and hygiene outcomes. I am also unsure whether my foodservice should focus on environmental education at the expense of
customer service. However, I am relatively positive that environmental education could be woven into the corporate side of my foodservice.

How much do you agree or disagree with the RPI viewpoint?

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

How desirable is the RPI viewpoint?

- Very desirable
- Somewhat desirable
- Neither desirable nor undesirable
- Somewhat undesirable
- Very undesirable

Many people in university foodservice think the way the RPI thinks

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Are there any other thoughts you have about the RPI viewpoint?
**Viewpoint 3: The Uncertain Contender (UC)**

*The uncertain contender thinks that environmental education is a good idea but in reality it seems difficult to both meet expectations from higher management and foster environmental education.*

The UC says:

“In my foodservice customer satisfaction, financial and hygiene outcomes need to be top priority because at the end of the day you are running a business. So environmental education could be limited in my foodservice. In saying that, environmental education should not just stay in environmental science; we do have a responsibility to care for our environment. I am unsure whether our foodservice should act as a role model for students. I don’t know much about the student response; I think there would be a mixed bag of responses. I think environmental education needs to be taught but I feel a sense of struggle between integrating it and also meeting demands from higher management. “

---

How much do you agree or disagree with the UC viewpoint?

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

---

How desirable is the UC viewpoint?

- Very desirable
- Somewhat desirable
- Neither desirable nor undesirable
- Somewhat undesirable
- Very undesirable
Many people in university foodservice think the way the UC thinks

Strongly Agree
Agree
Neither Agree nor Disagree
Disagree
Strongly Disagree

Are there any other thoughts you have about the UC viewpoint?

Viewpoint 4: The Sceptic

The skeptic is not opposed to the idea of environmental education but thinks that it will not integrate well into their foodservice model.

The Sceptic says:

"I firmly believe that there would be a mixed response from students. Customer demand should guide our decisions, and I don't see a large demand from students. It would only appeal to those who already are concerned about the environment. I strongly disagree about making environmental education mandatory in my foodservice, yet I am unsure whether there is a need for it in my foodservice. We are set up as a business and environmental education will most likely cost us more. Plus the way we keep to hygiene standards needs to come first. I don't feel like we are responsible for environmental change as a foodservice. We produce food and we are not educators, so I struggle to envisage how environmental education could be a top priority. I am not sure whether my foodservice is the best place for environmental education to occur."

How much do you agree or disagree with the Sceptic viewpoint?
Strongly agree
Agree
Neither Agree nor Disagree
Disagree
Strongly Disagree

How desirable is the Sceptic viewpoint?

Very desirable
Somewhat desirable
Neither desirable nor undesirable
Somewhat undesirable
Very undesirable

Many people in university foodservice think the way the Sceptic thinks

Strongly Agree
Agree
Neither Agree nor Disagree
Disagree
Strongly Disagree

Are there any other thoughts you have about the Sceptic viewpoint?

Which narrative do you most identify with?

The Believer
The Relatively Positive Integrator
The Uncertain Contender
Below is a range of different measures that potentially could be used to foster environmental education in the foodservice that you work in. These measures have been taken from a behavioural change table which gives a spectrum of measures ranging from eliminating choice to giving 'nudges' that can help promote behaviour change.

Below each method is an example of the measure. The examples are just there to illustrate the measure rather than asking your opinion on the example itself.

Please indicate for each question how feasible you think each type of initiative would be to implement in the foodservice you work in.

**A: Residential hall food service examples**
Restrict choice: Restriction of options available to individuals

For example, Replacing Portion Control Units (PCUs) with jars of spread and constructing new rules around food safety. Students who do not comply with new food safety rules will not be allowed to use spreads.

DeLinitely feasible
Probably feasible
Maybe feasible
Probably not feasible
DeLinitely not feasible

Fiscal incentives: Fiscal policies to make behaviours financially beneficial

For example, students receiving a discount off their fees if your hall uses ‘imperfect’ fruit and vegetables.

DeLinitely feasible
 Probably feasible
 Maybe feasible
Probably not feasible
DeLinitely not feasible

Financial disincentives: Fiscal policies to make behaviours more costly

For example, students are required to pay extra for packed lunch packaging and late-meal containers.

DeLinitely feasible
Probably feasible
Maybe feasible
Probably not feasible
Non-local incentives and disincentives: Policies which reward or penalise certain behaviours. For example, a poster acknowledging students’ efforts in reducing waste by showing how much of their food waste has been saved each day/week.

- Definitely feasible
- Probably feasible
- Maybe feasible
- Probably not feasible
- Definitely not feasible

Persuasion: Persuading individuals using argument.

For example, an emotive poster about an environmental issue displayed in the dining room.

- Definitely feasible
- Probably feasible
- Maybe feasible
- Probably not feasible
- Definitely not feasible

Provision of information: Providing information

For example, your foodservice displaying environmental information about the food it sells, e.g. displaying the carbon footprint of menu items.

- Definitely feasible
- Probably feasible
- Maybe feasible
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**Changes to physical environment: Altering the environment.**

For example, students plant a garden and then use produce from the garden to prepare a meal.

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**Changes to the default policy: Changing the default option**

For example, students receive a vegetarian meal for late dinners if they don’t specify what meal they would like.

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**Use of social norms and salience: Providing information about what others are doing.**

For example, informative posters displayed in the dining hall about sustainable practices your foodservice is implementing.

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Fiscal incentives: Fiscal policies to make behaviours financially beneficial.

For example, your food outlet selling 'imperfect' fruit and vegetables or products made with 'imperfect' fruit and vegetables with a discount.

- DeLintely feasible
- Probably feasible
- Maybe feasible
- Probably not feasible
- DeLintely not feasible

Financial disincentives: Fiscal policies to make behaviours more costly.

For example, consumers are required to pay extra for a plastic bag/ containers/ take-away plates and cutlery.

- DeLintely feasible
- Probably feasible
- Maybe feasible
- Probably not feasible
- DeLintely not feasible

Non-fiscal incentives and disincentives: Policies which reward or penalise certain behaviours

- For example, 'We compost Wednesday': where consumers bring in compostable food waste in return of an incentive from the university foodservice such as a free coffee or a discount off a meal. Your foodservice then uses the food waste to turn into compost/ donates to third party who will compost it.
DeLinitely feasible
    Probably feasible
    Maybe feasible
    Probably not feasible
    DeLinitely not feasible

Persuasion: Persuading individuals using argument.

For example, your outlet displaying an emotive poster about an environmental issue.

DeLinitely feasible
    Probably feasible
    Maybe feasible
    Probably not feasible
    DeLinitely not feasible

Provision of information: Providing information

For example, your foodservice displaying environmental information about the food it sells, e.g. displaying the carbon footprint of menu items.

DeLinitely feasible
    Probably feasible
    Maybe feasible
    Probably not feasible
    DeLinitely not feasible

Changes to physical environment: Altering the environment

For example, reinforcing local food purchases by having local foods labeled on the menu.
Changes to the default policy: Changing the default option

For example, organic milk as a default option. Consumers must ask if they want regular milk in their drink of choice.

Use of social norms and salience: Providing information about what others are doing.

For example, including students in an intra-department competition to use reusable coffee cups.

Has your foodservice implemented any strategies to foster environmental education? If yes, please describe below
Section three:

This section contains two scales:
1) The New Ecological Paradigm Scale which measures environmental worldview/ framework of thought.

2) Enduring Involvement Index: This scale measures long term interest or enthusiasm.

New Ecological Paradigm Scale

This scale contains 15 questions.

We are approaching the limit of the number of people the Earth can support

Strongly Agree
Agree
Neither Agree nor Disagree
Disagree
Strongly Disagree

Humans have the right to modify the natural environment to suit their needs.

Strongly Agree
Agree
Neither Agree nor Disagree
Disagree
When humans interfere with nature it often produces disastrous consequences

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Human ingenuity will ensure that we do not make the Earth unlivable.

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Humans are seriously abusing the environment.

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

The Earth has plenty of natural resources if we just learn how to develop them.

- Strongly Agree
- Agree
- Neither Agree nor Disagree
Plants and animals have as much right as humans to exist.

Strongly Agree
Agree
Neither Agree nor Disagree
Disagree
Strongly Disagree

The balance of nature is strong enough to cope with the impacts of modern industrial nations.

Strongly Agree
Agree
Neither Agree nor Disagree
Disagree
Strongly Disagree

Despite our special abilities, humans are still subject to the laws of nature.

Strongly Agree
Agree
Neither Agree nor Disagree
Disagree
Strongly Disagree

The so-called “ecological crisis” facing humankind has been greatly exaggerated

Strongly Agree
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<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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The Earth is like a spaceship with very limited room and resources.

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<th>Strongly Agree</th>
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<th>Neither Agree nor Disagree</th>
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Humans were meant to rule over the rest of nature

<table>
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<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
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The balance of nature is very delicate and easily upset.

<table>
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<th>Strongly Agree</th>
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<th>Neither Agree nor Disagree</th>
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Humans will eventually learn enough about how nature works to be able to control it.
The Earth is like a spaceship with very limited room and resources.

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Humans were meant to rule over the rest of nature

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

The balance of nature is very delicate and easily upset.

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Humans will eventually learn enough about how nature works to be able to control it.
If things continue on their present course, we will soon experience a major ecological catastrophe.

Enduring Involvement index Scale

Sustainability means 'capable of being maintained over the long term and meeting the needs of the present without compromising the ability of future generations to meet their needs'. (American Dietetic Association)

How important is sustainability to:

The quality of your social life

Extremely Important
Very Important
Somewhat important
Neither Important nor Unimportant
Somewhat Unimportant
Very Unimportant
Your present job or career?

- Extremely Important
- Very Important
- Somewhat Important
- Neither Important nor Unimportant
- Somewhat Unimportant
- Very Unimportant
- Not at all Important

Your future job or career plans?

- Extremely Important
- Very Important
- Somewhat Important
- Neither Important nor Unimportant
- Somewhat Unimportant
- Very Unimportant
- Not at all Important

How interested are you in the subject of sustainability?

- Very interested
- Moderately Interested
- Slightly Interested
- Not at all Interested

How frequently do you find yourself thinking about sustainability?
Section Four: Socio-demographic information

Which University do you work for?

- University of Otago
- Massey University
- Victoria University
- Canterbury University
- Auckland University
- Lincoln University
- Auckland University of Technology
- Waikato University

How long have you been working in the foodservice sector including other roles?

- Less than one year
  - 1-4 years
  - 5 -9 years
  - 10-14 years
  - 15 years or more

What type of contract are you currently on?

- Full time
- Part time
Casual
Temporary
Permanent
Other: Please state below

Please state your role in the foodservice you work in
Food service manager
Chef/cook
Kitchen hand
 Supervisor
Barista
Cleaning staff
Other: please state below

Please state the course of your highest level of education and the institute you studied at.

Have you had any formal environmental education as part of your training? If yes, please state below.
Yes
No

Are you currently studying yourself? If yes, please state the course you are involved in.
Yes
No
Please state your gender

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<th>Female</th>
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What ethnicity do you identify with?

- New Zealand European
- Maori
- Samoan
- Cook Island Maori
- Tongan
- Niuean
- Chinese
- Indian
- Other: Please state below

Which age range do you fit into?

- 18-24 years
- 25-34 years
- 35-44 years
- 45-54 years
- 55-64 years
- 65 years or over

Congratulations! You have completed the survey.
Many thanks for your participation and time.

$1 will be donated to KidsCan Childrens Charity

Powered by Qualtrics
Appendix XI: Phase two information sheet

Fostering environmental education within University foodservice.

INFORMATION SHEET FOR PARTICIPANTS

Environmental education is ‘an approach to teaching and learning that provides people with experience and knowledge to care for our environment.’ (Gruwenwald 2004; Orr, 1994)

Thank you for your interest in this project. I am Chelsea Slobbe’, a Master of Dietetics student in the Department of Human Nutrition. My research interest is in foodservice and sustainability. Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate we thank you. If you decide not to take part there will be no disadvantage to you and we thank you for considering our request.

What is the Aim of the Project?

The University of Otago graduate attributes include environmental literacy. Traditionally environmental education is taught within the curriculum, however this study seeks to find whether environmental education could be fostered in an extra-curricular way with a focus on foodservice. The aim of this research is to understand the attitudes and beliefs on the realities and desirability of university foodservice staff on fostering environmental education in the foodservice they work in. This project is being undertaken by as part of the requirements for my Master in Dietetics.

What Types of Participants are being sought?

We are seeking all university foodservice staff in New Zealand. Our recruitment method is through letters of invitation via email and word of mouth.

What will Participants be asked to do?

Should you agree to take part in this project, you will be sent a link to enable you to complete an online anonymous questionnaire or alternatively a printed copy of the survey. This should take up no more than 20 minutes of your time. The questionnaire will ask about socio-demographic information (such as your age, ethnicity, gender, and occupation), and your attitudes and beliefs about sustainability and also your attitudes and beliefs about
environmental education fostered in the foodservice you work in. For every completed survey $1 will be donated to Kidscan.

**What Data or Information will be collected and what use will be made of it?**
Should you agree to take part in this project the responses you make on the questionnaire will be entered into a computer programme for statistical analysis. Reasonable precautions will be taken to protect and destroy data gathered by email. However, the security of electronically transmitted information cannot be guaranteed. Caution is advised in the electronic transmission of sensitive material.
The data collected will be securely stored in such a way that only those mentioned above will be able to gain access to it. Data obtained as a result of the research will be retained for **at least 5 years** in secure storage. Any personal information held on the participants such as contact details, may be destroyed at the completion of the research even though the data derived from the research will, in most cases, be kept for much longer or possibly indefinitely.

The results of the project may be published in which case they will be available in the University of Otago Library (Dunedin, New Zealand), but every attempt will be made to preserve your anonymity. You are most welcome to request a summary of the study results. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (phone 03 479 8256). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.

**Can Participants change their mind and withdraw from the project?**
You may withdraw from participation in the project at any time and without any disadvantage to yourself.

**What if Participants have any Questions?** If you have any questions about our project, either now or in the future, please feel free to contact either:-

*Chelsea Slobbe*
Department of Human Nutrition
Email: sloch711@student.otago.ac.nz

*Dr. Miranda Mirosa*
Department of Food Science
Telephone: 03- 479 7953
Email: miranda.mirosa@otago.ac.nz

This study has been approved by the Department of Human Nutrition. However, if you have any concerns about the ethical conduct of the research you may contact the University of Otago Human Ethics Committee through the Human Ethics Committee Administrator (ph 03 479-8256). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.

**Appendix XII: Phase two consent form**
Fostering environmental education within university foodservice.

CONSENT FORM FOR PARTICIPANTS

I have read the information sheet concerning this project and understand what it is about. All my questions have been answered to my satisfaction. I understand that I am free to request further information at any stage.

I know that:

1. My participation in the project is entirely voluntary;

2. I am free to withdraw from the project at any time without any disadvantage;

3. Any raw data on which the results of the project depend will be retained in secure storage for at least five years;

4. This project involves an online questionnaire, the security of electronically transmitted information cannot be guaranteed. Caution is advised in the electronic transmission of sensitive material;

5. On completion of the questionnaire $1 will be donated to KidsCan;

6. The results of the project may be published and will be available in the University of Otago Library (Dunedin, New Zealand) but every attempt will be made to preserve my anonymity.
Appendix XIII: Factor narrative validation email

Validation Letter to high-ranking participant on the ‘Believer factor’.

Hi______

Thank you so much for participating in my research. The data from the card sorting activity was entered into a computer programme to generate 4 different perspectives surrounding the topic of environmental education.

Your viewpoints are closest to the: 'Believer' group

I was wondering if you could please read the narrative below and see if you can identify with it. Please keep in mind that participants almost never match up exactly with a perspective generated by the programme as multiple viewpoints are condensed by sharing a common theme to make the view point.

The narrative is as follows:

*The believer wants to play a part in initiating environmental education in their foodservice and feels that it is not only part of their responsibility but also everyone’s responsibility to do so.*

“I strongly agree that when it comes to environmental change, everyone has a responsibility to play a part. So I think my foodservice should play a part also by providing environmental education to students. The University should definitely do more to teach environmental education, yet I am undecided whether it should be mandatory in my foodservice. Environmental education is not a political agenda; it is a fact of life that I think we should all take on board. I don’t think environmental education would restrict choice, although consumer demand cannot be ignored. I think we can educate so that the demand is in the environments favor. I am happy to be a part of an educational program. “

Your feedback is very much appreciated,

Warm Regards,

Chelsea

Appendix XIV: Email to foodservice managers
Dear ______________

I am a Masters of Dietetics student currently conducting my research on “Foodservice operations’ potential to foster environmental education.”

A part of my study involves conducting a survey with foodservice managers/staff from different universities throughout New Zealand. The survey should take up no more than 20 minutes. The survey will ask participants’ information about personal information (such as their age, ethnicity, gender, current occupation and location) and their attitudes and beliefs about environmental education fostered in the foods outlets they are working in. Carla tells me that you are interested in participating and so I was wondering if you would also be interested in helping me by sending the survey to all of your staff.

The survey can be distributed in 2 ways:

1) Via an email that contains a link to the survey
2) A pack of printed copies of the surveys for staff to fill in.

Is there an option that you would prefer best?

Attached is an information sheet which gives more specific details about the survey.

I plan to conduct the survey in September 2015.
Please don’t hesitate to email me if you have any questions,

Warm Regards,

Chelsea Slobbe"