EDUCATION FOR SUSTAINABILITY IN CERTIFICATE AND VOCATIONAL EDUCATION AT A NEW ZEALAND POLYTECHNIC

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DECLARATION

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This Thesis entitled ‘Education for Sustainability in Certificate and Vocational Trade Level Courses in a New Zealand Polytechnic’ is submitted in partial fulfilment for the requirements for the Unitec degree of Master of Education.

CANDIDATE’S DECLARATION

I confirm that:

- This Thesis represents my own work;
- The contribution of supervisors and others to this work was consistent with the Unitec Regulations and Policies.
- Research for this work has been conducted in accordance with the Unitec Research Ethics Committee Policy and Procedures, and has fulfilled any requirements set for this project by the Unitec Research Ethics Committee. Research Ethics Committee Approval Number: 2007.778

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ABSTRACT

The years 2005-2014 have been declared by the United Nations as the Decade of Education for Sustainable Development (United Nations, 2002) in the hope that all levels of education around the world will work towards making changes in the curriculum to reflect concepts of sustainability (Parliamentary Commission for the Environment (PCE), 2004).

Literature reviewed on the topic has revealed that the concept of sustainability is inconsistently incorporated into education. Although sustainability concepts might be included in degree level studies at tertiary institutes (Stone & Baldoni, 2006), little progress was made towards implementing curricula change to reflect sustainability concepts into certificate and vocational education. As a result of this finding it was important to understand why the progress towards education for sustainability (EFS) was taking so long in the rapidly expanding fields of certificate and vocational education.

This research therefore set out to gain perspectives about education for sustainability from some of the main key players in the vocational and trade education sector: academics, industry personnel and students. A qualitative research method was selected and a case study was used as the method of inquiry which collected data through interviews conducted with academics and industry personnel and questionnaires distributed to students.

The analysis indicated that academics and industry personnel saw sustainability as being irrelevant to certificate and vocational education and also indicated that their awareness level about the concept is relatively low. Students on the other hand were more optimistic about the concept of sustainability and understood its relevance.

The practice of sustainability was also perceived as being an expensive process by all the three researched groups. There seemed to be immense negativity towards integrating sustainability concepts into certificate and
vocational education by academics and industry personnel but greater enthusiasm from students. This research establishes that the slow progress of education for sustainability into the vocational and trade curriculum is basically a result of lack of awareness in the industry and among academics. This thesis concludes with recommendations for addressing this problem.
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# ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>EfS</td>
<td>Education for Sustainability</td>
</tr>
<tr>
<td>PCE</td>
<td>Parliamentary Commission for the Environment</td>
</tr>
<tr>
<td>VET</td>
<td>Vocational Education and Training</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Educational Scientific and Cultural Organization</td>
</tr>
<tr>
<td>UNCED</td>
<td>United Nations Conference on Environment and Development</td>
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<tr>
<td>UNDESA</td>
<td>United Nations Department of Economic and Social Affairs</td>
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<tr>
<td>CSD</td>
<td>United Nations Commission for Sustainable Development</td>
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CHAPTER 1
INTRODUCTION

The purpose of this chapter is to describe and introduce this thesis. This chapter gives a background to the research and reasons why this study is important. The research objectives and the research questions are outlined with a brief description of the methodology, the research setting and a breakdown of how this thesis is structured.

1.1 BACKGROUND TO THE RESEARCH

The United Nations (2004) has declared a Decade of Education for Sustainable Development from 2005-2014. The decade of education was declared in the hope that all levels of education and all learning institutes around the world would work towards educating the population at large about sustainability (Parliamentary Commission for the Environment (PCE), 2004). We are now in the mid-years of this decade of education and still the concept of sustainability remains vague and non-existent from many educational programmes in New Zealand (Stone and Baldoni, 2006).

Sustainability in today’s society has varied meanings and is applied in many different contexts. Sustainability in this thesis is the aspiration of achieving sustainable development. Sustainable development in turn is defined by the Parliamentary Commission for the Environment (2004) as “an unending quest to improve the quality of people’s lives and surroundings, and to prosper without destroying the life-supporting systems that current and future generations of humans depend on” (p. 14). For the purposes of discussions in this thesis, sustainability is focusing on the environmental dimensions and ensuring all practices in society consider reducing the negative impacts on the environment.
To achieve sustainable development the society at large needs to be educated about sustainability. ‘Education for Sustainability’ (EfS) or ‘sustainability education’ are commonly used terms to include all educational systems and processes that aspire to promote and increase awareness about sustainability. Sustainability education is defined by Moore (2005) as “education that concentrates on the concept of sustainability in a manner that fits with the values of sustainability” (p. 78) and by the Parliamentary Commission for the Environment (2004) as education that “examines how people and groups in society can learn to live in sustainable ways” (p. 15).

Moore (2005) elaborates that sustainability education concentrates on sustainability concepts. Schianetz, Kavanagh and Lockington (2007) define a concept as an idea of how to achieve sustainability. Srinivas (n.d.) defines concepts as strategies, tools, ideas and models that can be used to achieve sustainability. According to him, “over the last few decades, a number of such sustainability concepts have been developed for different purposes, targeted at different stakeholders - but each eventually leading to a sustainable future” (para. 1). Some examples of sustainability concepts given by Srinivas (n.d.) are eco-efficiency, cleaner production, eco-labelling, ecological footprints, green productivity, zero emissions, sustainable consumption, and environmentally sound technologies. According to Schianetz, Kavanagh and Lockington (2007) in order to achieve sustainability it is necessary to integrate a range of sustainability concepts such as cleaner production and environmental management. These are just some examples of sustainability concepts that can be added into all curriculum levels to increase awareness of sustainability.

The New Zealand Parliamentary Commission (2004) recognises the importance of education for sustainability (EfS) in helping achieve a sustainable future where in addition to environmental sustainability, human rights and social justice will prevail. However education for sustainability’s implementation has been relatively slow and many New Zealand educational sectors have failed to incorporate sustainability concepts into the curriculum.
Research shows that one in five New Zealanders hold a certificate level qualification compared to one in eight holding degrees (Parliamentary Commission for the Environment (PCE), 2004) but by far sustainability concepts seem to be the focus of degree programmes but seem absent in certificates and vocational trade education. Vocational trade education- also known as vocational education and training (VET) – “prepares people for careers that are based in manual or practical activities. Vocational Education is traditionally non-academic and directly related to a trade, occupation, or vocation in which the learner participates” (Titus, 2008, para 1).

Certificate and vocational education runs for shorter duration compared to degree programmes and upon completion of their studies students usually join the industry or the workforce. If there is no defined curriculum that emphasises on sustainability concepts in certificate and vocational education it can be assumed that majority of New Zealand’s tertiary qualification holders are unaware of these concepts. A sustainable New Zealand starts from a sustainable workforce and if the future workers exit tertiary institutes without acquiring any education on the subject then a sustainable future remains bleak. This point is emphasised further in New Zealand’s Sustainable Development Programme of Action which states that people’s skills and knowledge is important for sustainable development as well-educated, highly-skilled and adaptable people in the labour force contribute more to long-term sustainable economic growth (Statistics New Zealand, 2002).

If the United Nations sees education for sustainability as an important concept and the New Zealand government has endorsed its commitment to implement changes in the education system then research needed to be conducted to determine why the concept of sustainability was taking so long to implement at all educational levels. This research was important to determine reasons behind the slow implementation of EfS at certificate and vocational trade education.
A change in curriculum is usually initiated if there is a need and to discover whether sustainability is an imperative concept to be included in the vocational curriculum the stakeholders had to be consulted to obtain their perspectives on the idea of incorporating sustainability concepts in vocational education. The main stakeholders at tertiary institutes are students, academics and personnel from industry. These stakeholders can give valuable insight into their opinions and perspectives on EfS at vocational educational institutes.

This leads us to section 1.2 that highlights the problem this research focused on, the research questions and the aims and objectives of the research.

1.2 RESEARCH OBJECTIVE

Based on the rationale given above the objective of this qualitative research was to determine the current perceptions for incorporating sustainability concepts into certificate and vocational education programmes in New Zealand.

1.3 RESEARCH QUESTIONS

The research objective outlined above determined the research questions given below. These questions guided this research.

Key Research Question

What are current perceptions for incorporating sustainability concepts into certificate and vocational education programmes in New Zealand?

Sub Research Questions

A. What are some perceptions industry personnel have about incorporating sustainability concepts into certificate and certificate and vocational education?
B. What are some perceptions academics have about incorporating sustainability concepts into certificate and certificate and vocational education?

C. What are some perceptions students have about incorporating sustainability concepts into certificate and certificate and vocational education?

1.4 JUSTIFICATION FOR THIS RESEARCH

Education for Sustainability is an important concept that needs to be incorporated at all levels of education (UNCED, 1992) to achieve sustainable development. If higher level education has elements of sustainability embedded in curriculum then vocational and trade education should follow suit. However the concept of sustainability has not been up taken by VET as easily as it has been taken up by other higher education sectors. Therefore this research will provide an insight as to why the concept of sustainability has been slow in being implemented at VET level in New Zealand from the perspective of industry, academics and students and hopefully will provide a starting ground for curriculum developers for future use.

The researcher’s interest in education for sustainability at VET level ensued after getting involved in the certificate and vocational education (VET) and degree programmes at a New Zealand technical institute in 2004. The researcher teaches sustainable technologies in the degree programme and soon discovered that there was no mention of sustainability concepts in the certificate and vocational education (VET) programme even though the programme attracted bigger student numbers compared to the degree programme. Since the researcher has a keen interest in education for sustainability it became important to investigate the reasons behind sustainability not becoming part of the certificate and vocational education (VET) programme. Upon further research, as part of the course based
component of this Masters degree, the researcher conducted interviews with academics involved in VET and discovered that they were unaware of any sustainability concepts existing in the New Zealand VET programmes. The researcher became genuinely curious in the differences that existed in the degree and VET programmes and decided to find answers behind the absence of the concept of sustainability in certificate and VET programmes. This Masters thesis presented the perfect opportunity to conduct research on the subject and find the answers.

1.5 METHODOLOGY

This research followed a qualitative approach as it intended to seek opinion and obtain an overview of perceptions on the incorporation of sustainability concepts at certificate and vocational education. Since values, opinions and perceptions cannot be measured using numbers and figures a qualitative rather than a quantitative approach was adopted. This methodology is explained in greater depth in Chapter Three of this thesis.

From the various methods available to conduct qualitative research it was decided after consultation of various sources of literature that a Case Study methodology was most suitable for this research. Case studies can show light on “participants’ lived experiences of, thoughts about and feelings for, a situation” (Cohen, Manion & Morrison, 2007) and can provide in-depth information on a selected issue. Since this research was focused on obtaining perceptions and opinion and aimed to collect in-depth information from participants on the given research problem, a case study approach appeared most suitable. To collect data for the case study research interviews and questionnaires were distributed to major stakeholders at the vocational and trade education system selected as the case. The justifications for the methodology and research methods are available in more detail in Chapter Three of this thesis.

1.6 RESEARCH SETTING
A New Zealand metropolitan based Polytechnic was chosen as the case for this research. The research required a venue that offered both degree and certificate and vocational education and had students that transited from the VET programme to the degree within the institute. This was a mandatory requirement as the research aimed to talk to degree programme students who had already been exposed to sustainability concepts but who were ex-VET programme students. The institute therefore selected as the research venue offered both degree and vocational level education and was a perfect location for the conduction of the research. Further details on the selection criteria can be seen in Chapter Three of this thesis.

1.7 OUTLINE OF THE THESIS

This thesis is presented in six main chapters which are summarised below.

Chapter One gives a brief background of the research, the research objective, research questions, methodology and research settings for this research.

Chapter Two presents the literature review and gives a comprehensive account of the major issues surrounding education for sustainability today.

Chapter Three, the Methodology and Data Collection Methods section justifies the research approach used for this thesis and the various data collection methods.

The Data analysis of the research can be found in Chapter Four where a thorough breakdown of the research findings has been supplied.

Finally Chapter Five presents the Discussions following the findings presented in Chapter Four.
Chapter Six concludes the research and makes some recommendations for future research with limitations of this research.
CHAPTER 2

LITERATURE REVIEW

Chapter one provided a general introduction and the main objectives of the thesis research. A brief background to the research was provided in Section 1.3 of Chapter One. This chapter aims to elaborate and build further on the information provided and aims to identify several research questions that this thesis is addressing through a detailed literature review. This chapter is organised around four major topics: education for sustainable development, worldwide tertiary education initiatives to date, challenges in higher education, and the relevant aspects of the New Zealand tertiary education system.

2.1 EDUCATION FOR SUSTAINABLE DEVELOPMENT

The natural environment is constantly under pressure and continually degraded through human activities. According to Thomas and Nicita (2002), since the 1970’s scientific evidence has indicated that human behaviours and activities are having significant impact on the environment. Strauss (1996) stated that the environmental impacts are lethal enough to cease sustaining life in the future. As a result of increased environmental degradation and growing concern for the state of the natural environment, the Earth Summit was held in Rio in 1992, where all participating countries from around the world agreed to take action to reduce the impact of human activities on the environment (UNCED, 1992).

It was during the Rio summit that Agenda 21 was derived which focused on sustainable development and outlines actions to be taken “globally, nationally and locally by organisations of the UN, governments, and major groups in every area in which humans impact on the environment” (United Nations Department of Economic and Social Affairs (UNDESA), 1992, para 1). Sustainable development in the above context is defined as “development
that meets the needs of the present without compromising future generations to meet their own needs” (Bruntland, 1987, p.43).

Therefore in order to help sustain the environment action was taken by everyone involved in the Rio Summit. Sustainability initially was very environmentally focused and the main idea behind the summit was to work collaboratively to sustain the environment. Sustainability since then has been defined in varied ways and used in different contexts. Chapter 36 of Agenda 21 focused on the need of promoting education, public awareness and training for sustainable development to become a reality (UNDESA, 1992). Education for sustainability thus was a term that was derived from this chapter and focuses mainly on the environmental dimension.

UNDESA (1992) emphasised on the importance of education for sustainability (EfS). The United Nations called on all countries to develop strategies for the implementation of sustainable education. The Earth Summit defined education for sustainability as “critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision making” (United Nations Department of Economic and Social Affairs, para 3).

Education for sustainability is an emerging concept, which “encompasses a new vision of education that seeks to empower people of all ages to assume responsibility for creating a sustainable future” (Parliamentary Commissioner for the Environment (PCE), 2004, p. 36). Moore (2005) defines education for sustainability as a “process of creating a space for inquiry, dialogue, reflection, and action about the concept and goals of sustainability” (p. 78). Therefore EfS is educational processes and systems that help to transform people’s mindset and motivate them to practice sustainability in all aspects of their lives.

Education has always been emphasised as a means of attaining environmental, social, cultural and economic sustainability and for maintaining the well-being of people living now and in the future. Education for sustainable
development is seen as a process of learning how to make decisions that consider the long-term future of the environment, economy and equity of all communities (United Nations, 2002).

It has been recommended that concepts of sustainability should be incorporated at all levels of education (United Nations (UN), 2002). Interestingly the UN provided no specific guidelines as to how sustainable education was to be promoted around the globe and how it was to be achieved. The UN failed to explain whether a special form of education was needed to be used for promoting sustainability as the concept is not as simple or welcoming as many other subjects. It is not clear whether education was enough to change people’s thinking and to increase the actions they take to be more environmentally aware. Eventually it became the responsibility of individual countries to implement plans of actions and with little incentives and resource shortages the concept of sustainable education remained in the pipelines till 2002 when the next Earth Summit was hosted.

In the 2002 Earth Summit it was noted that incorporation of sustainability education into the current education curricula had been relatively slow and for its promotion the years 2005 to 2014 was declared by United Nations Educational Scientific and Cultural Organization (UNESCO) as the Decade of Education for Sustainable Development (Parliamentary Commissioner for the Environment, 2004). During this decade, many countries aim to promote sustainable education at all levels of society on the basis that education can help achieve a sustainable future and provide equal opportunities for the present and future generations.

The United Nations Commission for Sustainable Development (CSD) Work Programme emphasises on reorientation of education policies and programmes to address sustainability concepts, increasing public awareness and development of specialised training programmes as the steps towards sustainable development. This will ensure that all sectors of society have the skills necessary to perform their work in a sustainable manner which is important for sustainable development as a whole (Rebello, 2003).
Incorporating sustainability education at all levels of society is a challenge that all countries are expected to address. Tertiary education falls within one of these levels and to take up responsibility for the vital role it plays in preparing graduates for entry into government, business and industry sectors, many institutes have taken initiatives for its implementation.

No guidelines on educational methodology was provided by United Nations and it was not until Sterling (2001) suggested that a systemic change of educational culture towards the realisation of human potential and the interdependence of social, economic and ecological wellbeing can lead to transformative learning. Sterling recommended that educational methods that transform students’ perspectives and viewpoints about sustainability will help create a sustainable future. Sterling’s thoughts are similar to transformative learning theorised by Mezirow in 2000.

Mezirow’s theory of transformative learning (Mezirow, 2000) states that teaching methods that allow learners to go through a process of critical reflection ensures a transformation or change in their thinking. Transformative learning occurs when individuals change their frames of reference by critically reflecting on their assumptions and beliefs and consciously making and implementing plans that bring about new ways of defining their worlds (Dover, 2005). O’Sullivan (1999) defines transformative learning as experiencing a deep, structural shift in an individuals thought, feelings, and actions which results in a shift of consciousness that dramatically and irreversibly alters our way of being in the world. Transformative learners can undergo change in their outlook on life and their relationship with others, the natural environment and analyse alternative approaches to living. It involves more critical and forward thinking.

Therefore educational methods that help transform individual’s thoughts and perspectives are required if everyone is to be educated for sustainable development. The next section looks at the tertiary education system and the actions that have been taken globally to transform student thinking in all levels of education.
2.2 TERTIARY EDUCATION SYSTEM (WORLDVIEW)

We are now in the middle years in the Decade (2005-2014) of Education for Sustainable Development and yet the concept of sustainability still remains vague and neglected from the tertiary education sector. Even though many policy makers, researchers, and academics around the world recognise the importance of education for sustainable development and the vital role tertiary institutes play in this development, its implementation has been very slow at tertiary institutes. Tertiary institutes help prepare graduates for entry into government, business and industry sectors and if they are able to transform these graduates into sustainable citizens then a sustainable world will be more achievable. The New Zealand Parliamentary Commissioner for the Environment (2004), Thomas (2004) and Cortese (2003) state that higher education could play an important role in promotion of sustainability education and producing graduates that can help shape a sustainable future.

The Parliamentary Commissioner for the Environment (2004) highlights that the tertiary education sector plays an important role in achieving a sustainable future. The graduates design the systems where people, live, play and work. Graduates from tertiary institutes teach in schools, contribute to research and develop technologies and techniques for social and economic development (Parliamentary Commissioner for the Environment, 2004). Cortese (2003) emphasises that higher education institutions bear a profound, moral responsibility to increase the awareness, knowledge, skills, and values needed to create a just and sustainable future however, he states that people graduating from the best colleges and universities are leading the way to currently unhealthy, inequitable and unsustainable path. He makes this statement based on the fact that higher education encourages specialised education and is highly fragmented.

Higher education has unique academic freedom and can experiment with many innovative ways to educate its learners about sustainability education (Cortese, 2003). Tertiary education prepares graduates for entry into the
government, business and industry sectors, and many institutes have taken initiatives for its implementation. One such initiative was the 1990 Talloires Declaration of University Leaders for a Sustainable Future agreement which, over a 1000 universities from around the world signed, and have declared to commit their institutions to change towards sustainability (Thomas, 2004) so that greater awareness is achieved in all countries.

The 1990 Tallories Declaration of University Leaders for a Sustainable Future, 1991 Halifax Action Plan for Universities of the Conference on ‘Creating a Common Future’, and 1993 Kyoto Declaration of the International Association of Universities (Thomas and Nicita, 2002) are some examples of the commitment higher education institutes have taken to initiate sustainability education. However most of the global initiatives focus on universities as key players in sustainable development whereas the role of technical and vocational institutes is seriously undermined. The CSD elaborated that sustainability education should be incorporated not only at higher education institutes but technical and vocational institutes as well (Rebello, 2003).

If it is accepted that sustainability can be most widely achieved through education and if the current education curricula do not reflect concepts of sustainability then the hope of having a sustainable future looks bleak. A similar view is shared by Malhadas (2003) who states that a change in curricula is needed and the objective being “to infuse the notion of citizenship by inserting in the curricula clear proposals and directions to improve the quality of life and preserve the environment, with social justice and economic opportunity, balance of natural resources consumption, equity and education for all” (p. 3) and thus promoting sustainable development. But it is still unclear as to who has the responsibility to initiate change in curricula as the implementation is relatively slow.

The following pages focus on the New Zealand tertiary education system and looks at the scope for incorporating sustainability education into the vocation trade certificate curriculum.
2.3 NEW ZEALAND TERTIARY EDUCATION SYSTEM

The New Zealand Tertiary Education System is identified as making unique and invaluable contribution to the country’s national development. The system passes on skills needed in the workforce and gives people the opportunity to build careers (Ministry of Education, 2002).

Sustainability Education in the Tertiary Curriculum

As emphasised previously a sustainable workforce is needed for sustainable development and since the tertiary sector passes skills onto the workforce these skills need to reflect sustainability in all aspects. This idea is further reinforced when Statistics New Zealand (2002) states that “well-educated, highly skilled and adaptable people in the labour force are generally considered important to long-term sustainable economic growth.”

High levels of employment continue in areas of skill shortages. According to the Statistics New Zealand’s Education Counts (2005) report, for improved standard of living in New Zealand, an increase in productivity is needed which can be brought about by raising skills of people and ensuring that they are able to access work opportunities. For the improvement in standards of living the workforce needs to be trained and educated. Statistics New Zealand (2002) emphasises that further learning after completion of school studies is needed for success in the labour market and for a workforce that can contribute to sustainable economic growth. Since education and the workforce is identified as keys for increased development then for sustainable development the same workforce needs to be educated about sustainability. It is amazing that there is realisation that educating the workforce is essential but still not much is done to focus sustainability education at the level that majority of the workforce targets.

The New Zealand government designed a tertiary education strategy from the period of 2002 to 2007 for the tertiary sector, which had six national goals being “economic transformation, social development, Maori development,
environmental sustainability, infrastructure development and innovation (Ministry of Education, 2002). Environmental sustainability has been identified as one of the goals for New Zealand, which emphasises the importance of sustainability, however, its inclusion in the certificate and vocational education curriculum is progressing very slowly. In the fourth year of the strategy Stone and Baldoni (2006) conducted research and discovered that sustainability aspects were still absent from majority of tertiary programmes in New Zealand. It seems that not much effort has been exerted into the strategy and sustainability has not been given priority.

According to the New Zealand Ministry of Education (2005) between 1999 and 2005 most of the growth in tertiary institutes has been in enrolments at sub-degree certificate and diploma courses with the number of people enrolled in these courses more than doubling between 2000 and 2004. Student numbers at certificate and diploma levels grew by 116 percent from 2000 to 2004 while degree level education grew by only 6 percent (Mallard, 2005). If it is assumed that the students making this 116% entered the workforce after completion of their studies then there is a high possibility that they will be least concerned about sustainable practices as they are uninformed of its importance.

Stone and Baldoni’s (2006) research provided an overview of sustainability-specific programmes offered by tertiary institutes in New Zealand. They collected flyers and brochures from 8 universities, 20 polytechnics and institutes of technology, 4 colleges of education and 3 wanangas and looked for sustainability related titles. Their research showed that all eight universities (100%), eight of the 20 polytechnics and institutes of technology (40%), and two of the three wanangas offered programmes that focused specifically on sustainability. While none of the universities surveyed offered sustainability courses in certificate programmes, 9 polytechnics and institutes of technology did. It should be emphasised here that these certificate programmes were mainly specialised programmes such as sustainable agriculture.

Certificate and vocational education courses have the highest number of enrolments but it is astonishing to see that all universities and many
polytechnics and institutes of technology in New Zealand do not find it significant enough to incorporate sustainability concepts in their certificate and vocational education curriculum. Only 30% polytechnics and institutes of technology offer sustainability programmes. This suggests that sustainability may not be covered to a great extent in vocational education. Stone and Baldoni’s research highlights that vocational and trades related industry makes significant contribution to the New Zealand economy and could play a crucial role in sustainable development if students entering certificate and vocational education could be educated about sustainability.

A statement of intent for the New Zealand tertiary education issued for the period of 2007 to 2012 emphasizes that from 2008 industry and employers will have greater roles in defining the competencies that graduates need to have (Cullen, 2007). Institutes that provide industry and trade related qualifications are being encouraged to work closely with their industries so skills can be developed to gain a better understanding of workplace needs.

The Scope for Sustainability Education in Certificates and Vocational Education

Sterling (2001) outlined that the achievement of economic prosperity still dominates the education sector and predominantly in vocational education and trades which prepares students mainly for economic life and ways of meeting material needs. In such an environment the scope for implementing other areas of focus such as sustainability becomes secondary. The establishment of sustainability in the workplace culture requires vocational and trades to evolve and embrace globalisation and technological change and meet the needs of the workforce culture (UNCED, 1992). Fien and Wilson (2005) say that vocational and trades education has the potential to foster change in the workplace but can only be achieved through a revision of institutions and curriculum. Vocational and trades have the potential to address workforce needs, and incorporate sustainability principles into teaching and learning (Mazzotti, Murphy & Kent, 2007).
Fien and Wilson (2005) state that new roles and courses in vocational and trades that combine an understanding of sustainability concepts and technical knowledge can be brought about by education for sustainability. The vocational and trades sector could address the future needs of workplaces and meet the increasing demand for staff with skills in sustainability (Mazzotti, Murphy & Kent, 2007).

Mazzotti, Murphy and Kent (2007) indicate that effective education for sustainability in vocational and trades courses in Australia is dependent on “institutions ability to incorporate both conceptual and technical learning into courses, address the dynamicism of sustainable development and overcome current fragmented practices in education for sustainability” (p. 12). Like Australia similar challenges will have to be addressed in New Zealand as the vocational trade is markedly similar. Mazzotti, Murphy and Kent (2007) go on further to say that the vocational trade changes rapidly and continual innovation is needed but for the sustainability to be incorporated into vocational and trade courses support is needed from “government, industry and the community” (p. 12).

Newman, Wiseman, Pepper and Kelly (2004) recommend that a core capability unit in sustainability is mandatory which can be applied horizontally across a large range of vocational and trade courses and that sustainability needs to be integrated into all areas of curricula across all industry sectors.

“All units of competency need to have learning outcomes based on sustainability principles and practice. New learning materials must reflect information on: how sustainability relates to VET learner’s future roles in the community and the workforce; sustainable technologies; and possibilities for innovation” (para. 8).

It has to be emphasised here that vocational and trade industry make valuable contribution to any nation’s economic development and like university graduates technical graduates can make a big difference in the sustainable development of a nation. So far the concepts of sustainability have been neglected from vocational education in New Zealand curricula and changes
need to be made as suggested by Newman et al. (2004) in order for sustainable development to be a reality.

Even after so many agreements and consensus by higher education institutes to incorporate sustainability education in all levels of education the progress is very slow. There are many challenges and barriers in the path of sustainability. Literature was reviewed to identify the reasons why sustainability education was progressing so slowly in the education system and the main issues that need to be addressed. The challenges of incorporating sustainability education in the curriculum are presented below and provide insight on the influence of key players in the tertiary education system.

2.4 CHALLENGES IN HIGHER EDUCATION

Influence of Academics, Students and Management on Sustainability Curricula in Higher Education

Cortese (2003), Thomas (2004) and the NZ Parliamentary Commissioner (2004), all agree that tertiary institutes can play a vital role in advancing sustainable development by implementation of sustainability education in the tertiary curricula. Thomas (2004) takes a closer look at the research done by various researchers and tries to find out the reason why the implementation of sustainable education has been so slow to date. Thomas (2004) argues that many universities have signed the Talloires Declaration of University Leaders for a Sustainable Future agreement in 1990 but since then there has hardly been any sustainability curricula introduced at universities in Australia. There are specialised programmes being offered such as environmental sciences or engineering but options of introducing the concept of sustainability in other disciplines has not been encouraged.

Thomas (2004) suggests that one of the reasons sustainability education is slow in being incorporated in tertiary curriculum is because academics have limited knowledge of the concept and fail to understand why their engagement
with sustainability education is important. If academics see the importance of their contribution towards sustainability then only will they include these concepts into their courses. According to Reid and Petocz (2006) many academics from sustainability unrelated disciplines do not even understand sustainability jargon and do not see the relevance of it in their subjects. Thomas (2004) recommends that if all teachers are trained about sustainability concepts or are involved in some sustainability projects on campuses, they will implement the concepts into their courses. He bases this recommendation on his experience at Royal Melbourne Institute of Technology (RMIT) where academics involved at Waste Management Studies at the institute went on to implement sustainability concepts in their courses whereas staff who had no involvement with the project did not.

Many academics are reluctant in teaching something beyond their subject knowledge (Down, 2006). Sustainability is an easy concept but difficult to incorporate into a course if the academic is not familiar with the concept. Therefore it is a bit harsh to say that sustainability implementation depends primarily on the academics. It is equivalent to asking a biology teacher to teach some concepts of physics in their course. Thomas (2004) goes on further to saying that a lack of organisational and resources support for staff is another factor that hinders implementation of sustainability education. Thompson and Green (2005) state that strong leadership can be incomparably helpful in creating a commitment to sustainability and sustainability efforts are more successful when they enjoy executive level leadership and when it is coded in official policy (p. 9). If the top management have no knowledge of sustainability concepts and do not see the importance of education for a sustainable future then change will be relatively slow.

Contradicting Thompson and Green (2005) are Dahle and Neumayer (2001) who say that a change can only be implemented through a “Bottom-Up” approach. Unlike Thomas (2004) who suggests that academics bear the responsibility to change curricula, Dahle and Neumayer (2001) say that since tertiary leaders have not given any priority to sustainability education and change will only come about if students get involved in acting as advocates for
environmental change as students are customers and they have the power to demand change. Unlike Dahle and Neumayer, Thompson and Green (2005) also justify why tertiary leaders have not been able to give priority to sustainability education. They articulate that sustainability is a long term endeavour and leaders need to pursue agendas that will produce quick returns and leaders have short terms in office which does not give them very long to achieve the success needed to carry him or her to their next job. They also state that leaders have full plates and sustainability has to compete with other agendas such as budget cuts or upgrading facilities. Dahle and Neumayer (2001) did not justify any of these reasons but go on further to say that even though students have an advocacy role a “top-down” approach is needed as academics have the power to inspire students to follow their example. Students will not advocate for something they have no idea about.

Research conducted by Wehrmeyer and Chenoweth (2006) shows that when students have little or no idea about a subject they will be reluctant in taking it into their daily lives. Therefore it cannot be expected that students will act as drivers for sustainability initiation into curriculum when they are not aware about it. And this information can only be passed onto students through their academics. In addition academics then need to have a directive from the ‘top’ for sustainability implementation in the curricula. Thompson and Green (2005) say that staff and faculty have limited time to invest in any extra initiative and they have an “incentive to not participate until they see the clear likelihood of sufficient payoffs for their participation” (p. 9).

Similarly Down (2006) conducted research on major challenges faced in attempting to mainstream education for sustainability at the University of West Indies in Jamaica. Like Thomas (2004) she also suggests that a change in curriculum requires the cooperation of key stakeholders being the academic staff and students. Teachers have been identified as being critical for educating for sustainability. The research conducted was a participatory action research where the goal was to promote change that is consistent with the researcher’s beliefs (p. 390). It could be argued that this makes the research biased especially since the researcher was also a participant in the
project conducted and its reliability is challengeable. Down selected two courses for integrating concepts of sustainability. The idea was to interpret the expectations and thoughts of students and teaching staff to concepts different from the main objective of the courses. The feedback given from the modified course then helped to generate the major challenges that are faced in incorporating sustainability into today's curricula. The courses selected were a specialist course on “Caribbean literature” and the other was a basic “Introduction to computers” course.

Only two courses seem like a very small sample for a research. Having more sample courses would give better research results and improved comparison of feedbacks making the results more reliable. However the course modification to embed sustainability concepts would have taken a long time which explains such a small sample size. The “Caribbean literature” course looked at the issue of social sustainability in the form of violence and the urgent need to change violent attitudes and behaviour in the Caribbean’s (Down, 2006, p. 391). This required students to look up literature as well as conduct interviews and to get involved with conflict resolution workshops in order to understand the sustainability concepts. The basic “Introduction to computers” course required students to learn and practice computer skills using the UNESCO website “Teaching and Learning for a Sustainable Future”. The lecturer used the website as a base to integrate concepts of sustainability into the course. There is no indication as to how this was to be achieved as it was a beginner level computer course. Students are already under pressure in an introductory course let alone bombarding them with an issue irrelevant to the course.

According to Wright (n.d.) introductory courses are meant to provide sufficient exposure of the subject matter which will enable them to build a foundation for following new developments on their own (para. 8). These introductory courses can give students directions and help them make future decisions about a subject. Therefore making the right impression of the subject is a critical role of the teacher. In the case of this research, the introductory course
could not do justice to the course neither could it spread the message of sustainability effectively.

The Thessaloniki Declaration also indicated that all subject matters must address environmental and sustainability concepts (UNESCO, 1997). Thomas and Nicita (2002) say academics are “busy people and already have many calls on their time” (p. 488). Teachers and academics need all the relevant material and necessary support to teach sustainability especially if the subject is a new concept for him or her. These issues need to be addressed before sustainability becomes incorporated in every course in tertiary education. Not only for teachers but this practice will become too overwhelming for students and sustainability will just become an additional burden if it is incorporated in all subjects.

This point has been researched as well by Reid and Petocz (2006) who tried to determine university lecturers understanding of sustainability. In their research they interviewed university academics from various disciplines including psychology, geography and accounting. The academics were asked about their conceptions about sustainability and how they could embed the topic into their subjects. Majority of the academics stated that sustainability and their subject were total separate entities and was a bit of a nuisance and many had no idea of the common sustainability jargons. Reid and Petocz (2006) suggested that in order to incorporate sustainability in all subjects at university level “it would seem necessary to tackle the ways in which academics themselves – the teachers- understand the issue of sustainability” (p. 121).

Thomas and Nicita (2002) on the other hand suggest that these types of courses provide knowledge of sustainability and environmental issues but “being separated from the majority of the course’s curriculum, these subjects will be most unlikely to develop the understanding in all disciplines (p. 487). This statement can be challenged as it is possible to design general courses that can be offered to all students of various disciplines but focusing on individual students’ main discipline.
Monteiro and Sharma (2006) give example of a generic degree level course offered at Unitec New Zealand where the main focus is sustainability. In this course students are required to research cases within their own disciplines (automotive engineering, building technology, marine engineering, electro technology and interior decoration) where the main focus is sustainability. Students not only successfully generate case studies from their own disciplines but manage to identify sustainability aspects and its application. This gives an example of how sustainability can be integrated and taught in a generic course but at the same time be discipline specific as well.

According to Down (2006) another challenge for incorporating sustainability into syllabus is how to deal with aspects that are outside the lecturers’ area of expertise. If lecturers are responsible for teaching sustainability concepts than in addition to their own subject matters they also need to be abreast with these issues. Thomas and Nicita (2002) recommend that a clearer and easily understood concept of sustainability needs to be developed that academics can readily grasp and apply to their teaching. The question is how will this be achieved and who will provide the relevant course material for staff who have little knowledge about sustainability concepts. Does it also mean that as part of academics “professional development” they need to attend courses on sustainability and how they can apply this in their own disciplines? This leads on to another of Down’s suggestions.

Down (2006) also discovered through the research that one of the challenges of incorporating sustainability into the curricula is to get staff involved in reorienting their course/programme to address sustainability. This showed that motivating educators to understand and accept the concepts of sustainability is the key factor in sustainability implementation in the curricula. This is a rather challenging task as lecturers are constantly changing their subject content to stay up to date with current information and implementing sustainability concepts into every course is additional responsibility for them and this can easily be forfeited in the process. Plus students have various expectations from a course and if that course fails to deliver what it promises
and focuses rather on other issues then students will lose motivation to learn. This point is emphasised by Down as well when she lists student expectations as a challenge for sustainability education.

Down (2006) discovered that students spent more time on sustainability concepts rather than on ordinary practice time with computers then student expectations of a course is not fulfilled. This practice could be a big discouragement for students and a big put off from sustainability concepts. According to Mitra and Sarabia (2005), introductory courses are as an initial orientation and source of information where students develop perceptions that have a long lasting impact where students walk away with an impression. When students do not get information they require they will be discouraged to learn more and this could have had a negative impact on students both on computing as well as sustainability concepts.

Where Thomas (2004) and Down (2006) suggest that academics have the responsibility to implement sustainability education, Dahle and Neumayer (2001) recommend a “bottom up” approach with responsibility on students. Little emphasis is placed on top management and tertiary leaders who can play an important role in directing and putting down policies in place that make it mandatory for sustainability education to be offered at some stage in all programmes at tertiary level.

Only Thompson and Green (2005) acknowledge the top management’s role but in addition they also suggest another option. Proponents of sustainability education should develop a focus group within university campuses that will aim to implement sustainability education within all tertiary activities. These proponents need to address the challenges that exist within the institute and work towards overcoming these. These proponents need to seek out creative ways to involve the rest of the tertiary community and give out rewards for their participation. However they do not give any guidelines as to how these proponents will be selected. Maybe it is voluntary.
Majority of the literature highlights the challenges experienced in higher education being considered only within the university context, many authors emphasise that sustainability will only be implemented in the curricula if either the academics, students or management initiate changes. It is often overlooked that industry plays a significant role in determining what materials are addressed in the curricula and this applies in both universities and vocational education. The following paragraphs review existing literature that highlight the crucial role industry plays when it comes to curricula change.

**Influence of Industry on Sustainability Curricula in Higher Education**

The industry sector is a key player when determining the curricula and making decisions on what goes in the course content for any subject. If a topic is not seen as relevant by the industry it usually is not recommended. Wright (2003) states that the time for incorporating sustainability into the architecture curriculum in the United States arrived when five collateral organisations that influence architectural education identified it as a core issue of architecture. Before that time sustainability’s incorporation into curriculum was not a priority. In other words industry can play a key role in dictating what is included in the curricula. Since no such information was found in the literature regarding sustainability education incorporation at trade level this research will contribute to understanding the trade industry’s perceptions of sustainability.

It can not be emphasised enough that trades do play an influential role in sustainable practice. A GreenPlumber program launched in Australia in 2004 educates plumbers on sustainable plumbing practices (Australian Plumbing Industry, 2006). As a result of this program green plumbers have taken up an active role in promoting the idea of using sustainable devices in water works around the house and since its commencement 2.1 million households have been encouraged into installing rain water tanks. “The plumbing industry has an important role in contributing to energy and water savings” (Australian Plumbing Industry, 2006, p. 6). This example simply shows sustainability can be easily achieved if everyone is introduced to the concept. Not only the
plumbing trade but all trades can contribute to promoting and achieving sustainability however they lack education and encouragement.

These skills need to be embedded in industry related courses so that education providers can respond to immediate market needs (Ministry of Education, 2005). This viewpoint is also expressed by Wright (2003) who identified sustainability as an initiative that can be implemented into education if it is supported by industry. It seems that sustainability has not yet been identified as a “market need” by industries in New Zealand which probably is the main reason it has been so slow in being implemented at trade certificate level.

2.5 SUMMARY

Sustainability is an integral part of any nation’s development and for it to become a reality educating everyone in the community is important. Tertiary education plays a crucial role in producing a skilled workforce that can practice sustainability in all aspects of their work life therefore all levels of tertiary education should reflect sustainability in the curricula. Thus far there have been many challenges in implementing sustainability into the curricula and its implementation has been relatively slow.

Sustainability is often the main focus of degree programmes and usually focused in universities. However there needs to be a change in the thinking that universities make a bigger contribution to sustainable development and all institutes and levels of education need to be treated equally. Certificate level programmes in New Zealand have the highest number of enrolments but these courses do not extensively cover sustainability-related issues. For sustainable development a workforce that is aware about sustainability is essential and if majority of students only complete certificate level courses to enter the job market then the tertiary sector is not making a very sustainable workforce.
Certificate and short courses are mainly focused at vocational and trade courses and this industry makes valuable contribution to the economic development of a nation. Currently vocational and trade courses in New Zealand have little of no mention of sustainability concepts and thus it can be assumed that students enrolled in these courses are oblivious of sustainability issues. It is recommended that sustainability education be implemented in vocational and trade courses (Newman, Wiseman, Pepper and Kelly, 2004) but as yet not much has been done. The key players that can initiate change into the implementation of sustainability concepts into the curricula have been identified as academics, students and the vocational trades industry.

It is imperative that students, industry personnel and academics opinions and perceptions of sustainability are obtained in order to determine whether they feel that sustainability should be incorporated at certificate and vocational education. This information is fundamental as it can be used to gauge the level of sustainability knowledge industry has and whether the industry considers sustainability as crucial. It will help understand the student’s knowledge and understanding of sustainability, which in turn can help design certificate courses that can be transformative and truly change students thinking so they are more focused in helping achieve sustainability. In addition gauging the understanding of sustainability and the perceptions of academics teaching at certificate and vocational education level will help determine whether sustainability education can be implemented at certificate and vocational education.

This case study research thus intends to contribute to two major gaps in the literature. Firstly, the research focuses entirely on sustainability education at certificate and vocational education which had previously not been done. Vocational technical institutes had not been selected for education for sustainability research before even though they have been identified as key contributors towards sustainability (UNCED (1992); Mazzotti, Murphy & Kent (2007)). Most of the literature that looked at academic and student perspectives was mainly focused at university and degree level studies. Secondly, the view on incorporating sustainability education into certificate
and vocational education curriculum is presented not only from academics viewpoints but also from industry and students viewpoints as well. Since industry had not been represented in education for sustainability research before, it was difficult to locate literature that looked at the perspectives of industry in incorporating sustainability concepts into curriculum.

A study of this nature has not been conducted previously either internationally or in New Zealand. There has been no study found to date that presents the perspectives of academics, students and industry together and focusing only on certificate and vocational education and this uniqueness is reflected in this thesis research.
Chapter Two presented some key ideas that exist around education for sustainability and the slow progress of incorporating the concepts of sustainability into certificate and vocational education in New Zealand. Some key research issues were also identified and this chapter will explain the methodologies this research followed to fulfil the research objectives highlighted in chapter Two. Chapter Three elaborates further on the methodologies explained in section 1.4 and explains why a qualitative approach was undertaken. In addition this chapter also justifies why a case study methodology was used for the purposes of this research.

3.1 QUALITATIVE RESEARCH

Research can be conducted from either a qualitative or a quantitative perspective. Qualitative research according to Creswell (2007) begins with “assumptions, a worldview, the possible use of a theoretical lens, and the study of research problems enquiring into the meaning individuals or groups ascribe to a social or human problem” (p. 37). Neill (2006) says that the qualitative approach is a way to gain insights through discovering meanings by improving our comprehension of the whole and explores the richness, depth, and complexity of phenomena (para.4). Placing empirical value, measuring variables and collecting data that is largely numerical in nature that can be interpreted to show a trend, an overall value or percentage is largely quantitative.

Quantitative research according to Creswell (2002) “employs strategies such as experiments and surveys, and collects data on predetermined instruments that yield statistical data” (p. 18). Qualitative research places weight on individual’s
opinions and feelings on issues that directly relate to or affects them. These feeling and opinions can not be designated numerical figures and can not be tested in a lab or measured using any scientific equipment.

This research aimed to gain insights, thoughts and opinions on the incorporation of sustainability concepts at certificate and vocational education in New Zealand. Since insights, meanings and depth of human emotions, feelings and values can not be evaluated quantitatively and can not be designated a numerical figure this research followed an interpretive perspective where the data was analysed qualitatively. Qualitative research according to Creswell (2007) should be used when a complex, detailed understanding of an issue is needed and this detail can only be established by directly talking to people and empowering them to share their stories and “allowing them to tell stories unencumbered by what we expect to find or what we have read in the literature” (p. 40).

Thus the research conducted followed a qualitative perspective in order to achieve its research objective and gather meaningful data because quantitative measures and the statistical analyses simply did not fit the problem (Creswell, 2007).

Qualitative research has been categorised as being either phenomenology, ethnography, grounded theory, narrative or case study research (Creswell, 2007). Johnson (n.d) states that ethnography focuses on describing cultural characteristics of a group of people but since this research does not specifically deal with a cultural group this method was not relevant for this research. Grounded theory is used to generate theory and commonly used to test or further develop previously grounded theories. This research was not testing any educational theories or making an attempt to generate new ones therefore it was not a useful methodology. Phenomenology’s main purpose is to describe individuals’ descriptions of a phenomenon but since this research was not dealing with a specific phenomenon or incident this methodology was not considered either. Case study researches “involve the study of an issue
explored through one or more cases within a bounded system” (Creswell, 2007, p. 73) with in-depth data collection and reports a case and has case-based themes. This research was focused on studying the perceptions of stakeholders about sustainability concepts (issue) within New Zealand. Since there are many academic institutes within New Zealand it would have been difficult to get perspectives from all and selecting one or a few cases seemed more appropriate. Hence a case study research methodology matched the descriptions of this research and seemed appropriate to address the research objective and the research problem.

**Case Study Research**

A case study is generally useful in making comparisons or drawing similarities between analogous education institutions (Johnson, n.d.). In this research the case may be used to make generalisations of what other vocational institutes in New Zealand experience. This is similar to descriptions given by Bassey (2003) who says that case studies can be a way of expressing conclusions of one context that might be applicable to other similar cases. A case study gives an opportunity to explore and at times to envisage what other educational institutes’ experience. The case study method seemed an ideal means to do an in-depth study and address the research questions and the interdisciplinary nature allows use of various concepts and theories and multiple research methods (Creswell, 2007).

A case study seemed suitable for this research as the research was focused on generating data in the hope that the findings will be applicable in the New Zealand context. Yin (2003) states that “case study method allows investigators to retain the holistic and meaningful characteristics of real-life events” (p. 2). Case studies accordingly allow exploration of research issues in the real context allowing researchers to investigate issues as they unfold in reality. Bassey (2003) elaborates case studies as “investigation in considerable depth into one or a few cases in naturally occurring social situations” (p. 115) and that there needs to be ‘naturalistic generalisation’ which requires full description in order to capture the
unique features of a case. Case studies thus can help make generalisations that can be applicable to a wider audience and on a wider context. In addition to using case studies to make generalisations Cohen, Manion and Morrison (2001) comment that case studies focuses on individuals and seeks to understand their perceptions of events.

A case study is the preferred strategy when the focus is on a contemporary phenomenon within a real life context (Burns, 1994). Case studies can show light on “participants’ lived experiences of, thoughts about and feelings for, a situation” (Cohen, Manion & Morrison, 2001). This is turn can help generate data that may be true in many other situations and cases and for many other institutions and as Bassey (2003) says case studies can be a great way for teachers and policy makers to relate their own context to that of the case study research. Cohen, Manion and Morrison (2001) elaborate that case studies provide unique example of real people in real situations allowing readers to better relate to the research than reading abstract theories.

Case study as a research strategy has been identified by Yin (2003) as being an all-encompassing method that includes design logic, various data collection methods and specific data analysis approaches making them a comprehensive research strategy rather than just a data collection tactic or a design fashion. What makes case studies an even more appealing form of research methodology is the great spectrum of quantitative and qualitative research methods for data collection and is not merely limited to one source of evidence.

Even though case studies can be a valuable tool in qualitative research it does have a few limitations that need to be considered. Firstly unless readers and researchers understand the applicability of the results they cannot be generalised into other similar cases (Cohen, Manion & Morrison, 2001; Yin, 2003). Secondly the difficulty in cross-checking makes case studies selective, biased, personal and subjective. Thirdly there are possibilities of researcher biasness. Yin (2003) adds on to this list and says case studies lack rigor and can take too long to complete resulting in massive, unreadable documents. The strengths of case study research
listed in preceding paragraphs outweigh the weaknesses of case study research but were important to highlight in this chapter.

Case studies have been classified widely by many authors. According to Creswell (2007) there are three types of case studies. An intrinsic case study is only interested in the particulars of the case itself, such as evaluating a program, because the case is unique. An instrumental case study focuses on an issue or concern and then focuses on a single case. A collective case study on the other hand compares multiple cases in a single research. Since this research is hoping to make general recommendations for sustainability education incorporation at vocational education at higher education institutes in New Zealand, an intrinsic case study will also not be appropriate as the problem is not unique to one institution but applicable throughout many academic institutions. The limited time frame and the scope of this research makes collective (multiple) case study unfavourable. Making general observations based on a single case study makes an instrumental case study more appropriate as the results of the research can be generalised on a wider scale among analogous institutions.

Creswell (2007) stated that case studies are perfect if the study involves an issue. The issue that this research is looking at is the relatively slow incorporation of sustainability concepts in certificate and vocational education and obtaining perceptions on this issue from the views of academics, industry personnel and students. Therefore a case study appeared appropriate for this research. A single case was selected for this research as it was sufficient to fulfil all the conditions of the research objective. The scope and timeline for the project also limited data collection and thus investigating more than one institute was impossible. This research was focused on obtaining the perceptions of stakeholders on the incorporation of sustainability education in vocational and trade studies in New Zealand therefore it would have been beyond the capacity of this research to evaluate what all vocational institutes experience. As case studies can be generalisations and applied in many contexts, focusing on a single institute would have generated many similarities and differences that could be applicable in many educational institutions in New Zealand.
3.2 RESEARCH DESIGN

The CASE: For the purposes of this research an institute was to be selected that offered vocational and trade education certificate courses. A second requirement for the case selection criteria was that the selected institute should also offer opportunities to certificate and vocational students so they could pursue degrees in their chosen field of study. Therefore a New Zealand metropolitan technical institute was chosen that offered both certificate and degree programmes. The selected technical institute offers wide range of industry-related education and training programmes designed for tradespeople and technologists. The institute offers certificates and vocational qualifications containing the following endorsements: Automotive Engineering, Carpentry, Electro Technology, Furniture and Joinery, Interior Décor, Plumbing & Gasfitting, Welding and Fabrication, Boat Building and Marine Engineering.

Until 2008 the certificate programme offered a total of 10 courses; nine technical courses in their respective area of study and one generic course where students learnt about health and safety, communication, study skills and computer skills. However from 2008 the institute is offering a reviewed programme where the content of the certificate is delivered through four programme specific technical courses with aspects of generic material integrated. There is no mention of sustainability concepts in these certificate programmes in the course descriptors.

After completion of the certificate programme students can pursue a Bachelors in Automotive Engineering, Building Technology, Electrotechnology, Interior Decoration & Spatial Concepts and Marine Technology which means that other discipline students may not have the opportunities for further studies. The Bachelors contains specialised courses in all the above disciplines as well as generic courses such as communication, sustainability, employment skills, and project management. Concepts of sustainability are embedded in almost all of the generic courses in the Bachelors programme therefore students get first hand experience of incorporating the concept into all levels of their degree. This
also ensures that students understand and can apply sustainability concepts within their own disciplines.

As part of the research, students who have proceeded into the Bachelors programme from the certificate were requested to participate voluntarily in the research by programme co-ordinators to avoid power issues as the researcher is also an academic teaching sustainability concepts in the degree programme. Student feedback and their perceptions of sustainability provided useful data for the research.

In addition to the students, the academics involved in the certificate programme were also asked to participate in the research. The academics chosen were the certificate level programme co-ordinators of the different specialisations at the institute. It is essential to get opinion and feedback from academics to gauge their understanding of sustainability and whether they think it is useful and valuable enough to be implemented at certificate and vocational education.

The industry plays a significant role in trade related education. The industry often determines or recommends content or skills that are needed in the workforce (Wright, 2003). The academic institutes liaise closely with industry to ensure that up-to-date education is delivered according to market demands. Therefore it was imperative that the opinion and insight of industry was also considered in order to determine the industry personnel’s perception on the idea of sustainability and its incorporation at the certificate and vocational education level.

The figure below gives an overview of the research design and the key aspects of the research.
Data collection forms the biggest part of any research and there are many types of data collection methods. Yin (2003) identifies six sources of evidence in case studies being documentation, archival records, interviews, direct observations, participant observation and physical artifacts. Documentation involves collating information from written sources or documents such as letters, memoranda, minutes of meeting, administrative documents, newspapers etc. Archival records involved data collection from service records, organisational records, survey data, personal records etc. Since the main focus of the research was gaining insight into participants own perspective on the research issue which would not have been found in any form of documentation, archival record or published elsewhere these options for data collection was not considered. Direct observations involve making site visits to the case study site for general observation but this was ruled out as well mainly because
perceptions of people can not be observed but expressed verbally. Participant-observation is when the research is not merely a passive observer but is actively involved in the events being studied. Unfortunately this technique for data collection was not suitable as the researchers opinion was not part of the research objective. Physical artifacts method where evidence is a physical or cultural artifact is observed as part of the research was also omitted as perceptions can only be obtained from living physical beings and not from objects.

Interviewing participants is a fantastic way of gaining an insight into their thoughts and perceptions about an issue of phenomenon and are an important source of case study information. During interviews respondents propose their own insights and opinions into issues. Interviews provide data that can describe exactly how the informant feels, perceives and how they behave (Burns, 1994) and to sample respondents’ opinions (Cohen, Manion & Morrison, 2001). This was ideal for this research which aimed at collecting different perspective respondents have on the concept of education for sustainability at tertiary institutes. Since perceptions and opinions are most easily obtained through face to face interviews, this became the main source of data collection for the research.

In addition to the data collection methods identified by Yin (2003), questionnaires were also selected as a data collection technique. This was mainly done because it seemed a better option to distribute questionnaires to 30 students to obtain their perspective on the research issue rather than interviewing 30 students or having more than 5 focus group interviews. Questionnaires also were more ethical as it ensured anonymity and many students find it intimidating to be interviewed and this would have placed too much stress on their work and they would have been obliged to say all positive things about the issue in question. Cohen, Manion and Morrison (2007) say that questionnaires can be administered without the presence of the researcher and are often straightforward to analyse. Doing questionnaires gave students the
flexibility to answer it at their convenience and honestly without any outside pressure.

Therefore in this research questionnaires and interviews were the main methods for data collection which are further elaborated below. The choice of research participants is discussed separately in Section 3.4.

**Interviews**

Since this research was focused on getting opinions on sustainability, interviews were the main method of data collection. Cohen, Manion and Morrison (2007) categorise interviews into four types being informal conversational interview, interview guide approach, standardised open-ended interviews and closed quantitative interviews. An informal conversational interview is very casual in nature and data is obtained in a conversational manner with no preplanning and questions are asked on the spur of the moment as the interview unfolds. Looking at the nature of the research this method was not considered as it would have created an inconsistent range of interview data that would have been difficult to analyse and generating common themes between interviewee responses would have been problematic.

Interview guide approach where topics and issues are prepared in outline form just as guidance was also not considered as “flexibility in sequencing and wording questions can result in substantially different responses, thus reducing the comparability of responses” (Cohen, Manion & Morrison, 2007, p. 271). Closed quantitative interviews have predetermined questions where interviews select responses from a number of choices. Since this research was based on getting opinions and views of interviews a pre-planned quantitative interview would have been a reflection of the interviewer’s ideas and not interviewees opinion thus this option was not considered for this research either.

Standardised open-ended interviews are pre-planned with exact wording and questions determined in advance. All interviewees are asked the same
questions and in the same order which increases comparability of responses and organisation and analysis of data is fairly simple. The later option seemed ideal for this interview as data between respondents could be easily compared with generalisations and themes easily drawn between responses. However “standardised wording of questions may constrain and limit naturalness and relevance of questions and answers” (Cohen, Manion & Morrison, 2007, p. 271) but a standardised interview was more suited for this research due to the potential of data comparability.

All the categories of interviewees (industry personnel and academics) thus participated in an hour long standardised open ended interview and answered the same questions as this increased comparability of responses and ensured uniformity in questions asked and ease of data analysis.

**Questionnaires**

In addition to interviews questionnaires were also a useful tool for data collection for this research. According to Cohen, Manion and Morrison (2007) there are three types of questionnaires; structured, semi-structured and unstructured. Questionnaires that intend to “generate frequencies of response amenable to statistical treatment and analysis” (p. 247) tend to be highly structured but since the research is not interested in statistics, the idea of a structured questionnaire had to be omitted. Cohen, Manion and Morrison (2007) says that “qualitative, less structured, word based and open-ended questionnaires may be more appropriate (for case studies) as they can capture the specificity of a particular situation” (p. 247-248).

Unstructured questionnaires compared to structured ones are open and allow the respondents to complete it to the best of their ability and to give as much information as they have on an issue. Having an unstructured questionnaire would be great if greater insight and perspective of a respondent is needed but these become time consuming and tedious for respondents to fill. Unstructured interviews do however give useful insights into a persons thought that can be
useful for qualitative research but will be very demanding to analyse for a researcher. As a result a semi-structured questionnaire was selected for this research so that respondents answered both closed ended structured questions and open ended qualitative questions. This semi-structured questionnaires allowed generation of statistical data for comparison purposes and also generated a good spectrum of student opinions and perceptions on the concept of sustainability.

Questionnaires allow the teacher researcher to collect large amounts of data in a relatively short period of time compared to interviewing the same number of students (Mills, 2003). Students in the Bachelors programme were requested to complete a mixture of open and closed ended questionnaires. The open ended questions gave students an opportunity to express their ideas and opinions openly and clearly. Jenkins (1999) stated that “well-phrased open-ended questions put the respondent at ease and encourages them to think carefully about the issue and to answer in depth” (p. 11). These questions generated data on some of the perceptions of students that probably would have been difficult to obtain from interviews. Students feel more comfortable filling up questionnaires to express their opinion on an issue and it makes it less intrusive for the participants.

Questionnaires are the safest way of obtaining useful data from students without pressurising them. The researcher requested a third-party to administer the questionnaires for ethical reasons. The third-party was given specific instructions that the questionnaires were to be filled up by previous certificate programme students. Students are more willing to participate in a questionnaire than in an interview or focus group particularly with a lecturer who teaches the subject the interview would be directed on. Therefore questionnaires were the safest way of obtaining meaningful data for the research. The closed ended questions that were asked in the questionnaires were mainly aimed at generating statistical quantitative data.

3.4 SAMPLING
The research participants / subjects in this study were students and academics and personnel from the trade industry. Questionnaires were only directed to students. Academics and Industry personnel were requested to participate in interviews. A breakdown of the sample size was based on this generalisation.

- **Students**: The Bachelors is a three year programme and the students targeted were previous certificate and vocational education programme students. The total sample size was 30 students from the Bachelors programme in 2008 and ranged from year 1 to year 3 enrolments. Students were only requested to fill questionnaires which were administered by a third party. These third parties were lecturers teaching in the Bachelors programme and participation in the research was voluntary with participants required to be ex-certificate students. The questionnaires were evenly distributed among the three degree years with each year being allocated 10 questionnaires. This ensured that the feedback generated represented the whole Bachelors programme.

```
<table>
<thead>
<tr>
<th>Year 1</th>
<th>10 students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2</td>
<td>10 students</td>
</tr>
<tr>
<td>Year 3</td>
<td>10 students</td>
</tr>
</tbody>
</table>
```

*Figure 3.2: Sampling Technique used to select the best representative student population.*

- **Academics**: The academics recruited for this study were certificate programme coordinators and were interviewed. The degree programme is offered only in Automotive Engineering, Building Technology, Electrotechnology, Interior Decoration and Spatial Concepts and Marine Technology therefore certificate programme
coordinators for these disciplines were requested for interviews. Therefore 4 interviews with programme coordinators were conducted. The programme coordinators were chosen as they have an overall knowledge of what the certificate programme in their discipline offers and were in a better position to identify whether sustainability is a decisive enough concept in today's world to be incorporated into the certificate and vocational education level.

- **Industry Personnel**: The industry makes invaluable contribution and recommendations for content in trade level education and are potential employers of the institute’s students therefore the opinion of industry personnel is central for this research. Industry personnel from all the disciplines that comprise the degree programme in the institute were requested to participate in interviews for this research. These disciplines were Automotive Engineering, Building Technology, Electrotechnology and Marine Technology. One personnel from each discipline was selected to get an overview from these disciplines. Therefore a total of 4 interviews were conducted.

### 3.5 DATA ANALYSIS METHODS

Most of the data collected in the research was obtained through interviews and questionnaires.

**Interview Analysis**

The entire interview data collected was first transcribed. The data was analysed through a process of thematic analysis. Thematic analysis is identification of themes through a process of careful reading and re-reading of the data. It is a form of pattern recognition within the data, where emerging themes become the categories for analysis (Fereday and Muir-Cochrane, 2006). The interview was then analysed using Somerville’s (2003) thematic analysis where ideas within transcripts are arranged in a numerical order or coded. Each new idea within the transcript was given a number/code and resulted in a numerical order. For
example, the first idea got a number/code 1.1 and when a new idea was mentioned it became 1.2 and so forth. If a similar idea was mentioned later on in the document as the idea in number/code 1.1, it was given the same number. After the numerical order was designated to the whole transcript, the similar ideas were clustered together into themes for further discussion.

**Questionnaire Analysis**

The questionnaire was designed to reflect the interview questions as closely as possible so that similar themes and ideas could be generated. The questionnaires were analysed by the process of thematic analysis as described above for open ended questions and looking for similar themes among student responses. The responses of closed ended questions were counted and plotted on Microsoft Excel to generate charts and figures. These charts were then used to support the themes that were generated through transcription of open ended questions.

**3.6 TRIANGULATION, RELIABILITY AND VALIDITY**

Triangulation is an important aspect in qualitative research. It is defined as the use of two or more methods of data collection where the richness and complexity of human behaviour is studied from more than one standpoint (Cohen, Manion & Morrison, 2007). Triangulation for this research was ensured by having three methods for data collection being literature analysis, interviews and questionnaires. Even though the interviews were targeted at academics and industry personnel and the questionnaires at the students the large sample size indicates that the results generated were reliable and opinion from various sources was sought. Creswell (1998) also supports the use of two different data collection methods to create reliable and valid data. Therefore the large sample size and the three methods for data collection increase the validity and reliability of this single case study.

However there are also some limitations of single case studies that may also be apparent in this research. According to Hayes (2006), case studies should
be intelligible and the ideas applicable in different situations and relatable to different cases elsewhere and are basically a means of informing others about a single case as a way of understanding others. Nisbet and Watt (1984) evaluated that case study results may not be generalisable unless other researchers see their application. Since this research focused on a single case study based on a single school of the selected Polytechnic the generalisability of this research may be limited. Opinions and perspectives of other schools in the polytechnic and other polytechnics in the country may vary and their attitude towards the research issue may be totally different.

Trustworthiness of this research is nonetheless enhanced by the different sources of information used and the views that were obtained are not limited to only one discipline or one industry but from a spectrum of trades. Keeves (1997) suggests that in single case investigations the research combines multiple sources of information, and the “different perspectives obtained provide confirmation and thus strength to the findings and relationships recorded” (p. 281). The students who filled out questionnaires were also selected from the different year of the degree programme so the results would give a true representation of the sample.

3.7 ETHICAL CONSIDERATIONS

Ethics is an important aspect in all forms of research but ethical consideration is “multiplied in education research, where people are studying people” (Wellington, 2000, p. 54). According to Wilkinson (2001) research offers benefits and imposes burdens on all parties involved in the research and therefore needs to be justified which is referred to as ethical reasoning. All ethical considerations were taken in the conduction of this research. Prior to the commencement of the research consent was sort and approved by the research institutions Ethics Committee.

Informed consent is part of any ethical research and requires subjects to be informed about all relevant information about the research project and
“researchers must disclose relevant information about the project whether or not subjects have asked for it” (Wilkinson, 2001, p. 16). Relationship between programme co-ordinators and the researcher is of work colleagues and between researcher and a student is of teacher-student. Based on the principle of informed consent all the participants were fully informed about the research and with their willingness to participate in the research, were requested to fill out consent forms. It was emphasised before the start of the research that it was purely for educational purposes and was not personally beneficial to the researcher or would not affect student results and work colleagues in any given way.

In ethics anonymity is a very important aspect. Cohen, Manion and Morrison (2001) explains that the “essence of anonymity is that information provided by participants should in no way reveal their identity” (p. 61). It should be ensured that the participant remains unidentifiable in any documents that are published after the conduction of the research. Confidentiality also remains an important part of maintaining the participants’ privacy although researchers know what information was provided by them, their identity cannot be made public. Also all information and participants details were kept anonymous and confidential thus minimising any conflict of interest.

The participants were requested to participate in the research through the intervention of another staff member. This allowed students not to take part if they so decided. After giving detailed information about the research to potential participants, the recruitment of actual participants was based on voluntary consent. It was entirely the participant’s willingness to partake in the research. Programme co-ordinators distributed questionnaires, consent forms and information sheets with no contact between researcher and students.

This research could have involved Maori participants through voluntary participation from Bachelors programme students, certificate programme co-ordinators and industry personnel. Therefore all ethical considerations were taken to adhere to the principles of the Treaty of Waitangi and the institutes
agreements and policies. Except for coincidental Maori participation the research did not have any direct focus on the Maori society.
3.8 SUMMARY

This chapter provided an overview of the methods and methodologies employed for data collection for the research. A qualitative approach was selected and a case study method was used to present this research. Data was collected via conduction of interviews to gain academics and industry personnel perspectives and questionnaires were used for gaining insights into student perspectives. The following chapter presents the data that was generated from conduction of interviews and questionnaires.
CHAPTER 4
RESEARCH FINDINGS AND ANALYSIS

Based on the methodologies described in Chapter Three, Chapter Four presents the findings compiled from interviews and questionnaires. The main focus of this case study research was to present an insight into current perspectives that exist in regards to incorporating sustainability concepts into certificate and vocational education at a New Zealand Polytechnic. These perspectives have been generated from three main stakeholders of courses delivered at polytechnics i.e. industry personnel, academics and students.

The findings are presented as themes which were derived by asking a series of questions about Education for Sustainability (EfS) in interviews with academics and industry personnel and from questionnaires completed by students. The interview schedules and the questionnaire can be found in Appendix A, Appendix B and Appendix C. After generating common themes each category has been further analysed into positive and negative perspectives towards incorporating sustainability concepts into certificate and vocational education at polytechnics.

One academic and one industry personnel were chosen from the five disciplines of Automotive, Marine, Building and Interior Decoration and Spatial Concepts or Electrotechnology. It should be noted that the scope of the case study limited conduction of multiple interviews from each mentioned discipline that formed the focus of this research. Hence the views expressed in this chapter are not necessarily representative of the whole disciplines at large and a limitation of this research that will be further considered in the final chapter of this thesis.

The chapter concludes with a comparative summary of the findings from each stakeholder group.
4.1 PERSPECTIVES OF ACADEMICS

The Academics that participated were Programme Coordinators from Automotive (Academic A), Building (Academic B), Marine (Academic C) and Interior Décor and Spatial Concepts (Academic D). All the four participants in this case study were well qualified males aged between mid 30’s to late 40’s and had been in their position as coordinators for two or more years and had more than 15 years of experience in their respective trades.

After analysing the interviews of these academics at the Metropolitan based Polytechnic, eight common themes were identified. These themes are presented below in two categories being Positive Perspectives and Negative Perspectives. Some of the themes that are presented in the Positive and Negative perspectives are:

<table>
<thead>
<tr>
<th>Positive Perspective Themes</th>
<th>Negative Perspective Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Sustainability Awareness</td>
<td>A. Relevance of Sustainable Practice</td>
</tr>
<tr>
<td>B. Implementation Strategy for EfS</td>
<td>B. Economic Boundaries</td>
</tr>
<tr>
<td></td>
<td>C. Industry Receptiveness</td>
</tr>
<tr>
<td></td>
<td>D. Pre-existing concepts</td>
</tr>
<tr>
<td></td>
<td>E. Educational Compliance</td>
</tr>
<tr>
<td></td>
<td>F. Workload Issues</td>
</tr>
</tbody>
</table>

Analyses showed that academics had few positive perspectives about EfS and many negative perspectives with the Marine academics perspectives weighing heavier on the negative side then the rest. Interior Decoration and Spatial Concepts, Building and Automotive seemed much more positive.

All academics felt that the length of the certificate programme is short and the curriculum coverage very intensive which means that many important technical concepts cannot always be delivered. Overall they prefer to concentrate on these technical concepts rather than secondary issues, amongst which they classified sustainability. Another general inference that could be drawn from the interviews was that sustainability was a rather new
concept and academics were not fully aware of its relevance to their trade and how it could be implemented within their courses. In some instances the interviewer had to explain to participants what sustainability meant and the implications it may have in the future.

**POSITIVE PERSPECTIVES**

There were very few positive points generated about sustainability. Academics agreed that awareness generally promotes change therefore if people are educated about sustainability a change will result in the overall society. Many academics also felt that if sustainability was to be introduced into certificate programmes it needed to show that it will be beneficial to students and industry and there were economic gains to be achieved. The perspectives are discussed in more detail in the following section.

**A. Sustainability Awareness**

Most academics interviewed agreed that incorporating sustainability concepts into the vocational and trades curriculum will definitely increase awareness which in turn will promote sustainability through the trades sector. Academic B suggested that if students are shown or educated about the drawbacks of being unsustainable they will take note and try to bring about change.

**Academic B:** Yes definitely. It’s all about awareness. If students were aware of the percentage of waste generated from houses, the resources it consumes and the effects and how the house is built in different manners then they will be aware of it. They will definitely take more note of it.

Academic C suggested that if students are not made aware of social issues like sustainability then the workforce will remain oblivious of the issues which will result in slower progress for a nation.

**Academic C:** In our course which is higher education course or in any course if you do not create awareness the number of people who will go into the workforce you generally slow down the progress of a nation.
An interesting comment was made by Academic A, who commented about age differences in society which could be a reason for lack of awareness. He suggests that if the younger generation are made aware of the issues at polytechnics then they might be able to influence change later on. He also mentioned that older generations are more reluctant to implement change so educating at a younger age is a smarter option. He mentions a rippling effect which can be interpreted as the younger generation also educating other senior members of society or their own future workplace.

B. Implementation Strategy for EfS

A few academics indicated that the inclusion of sustainability education into certificate programmes was a good idea and should definitely be implemented. However they suggested that implementation be in a subtle, inconspicuous manner as many academics and students may not recognise the importance of the concept in their trade-specific study unless it has some relevance to industry or the workforce. They believe that the importance of sustainability will not be appreciated if there is no economical gain or benefit from the implementation.

Academic C: *If it was immersed anywhere in the vocational studies it needs to be pinpointing something in the industry.*

Academic A reckons that implementation is a good idea but a lecturer’s initiative is not sufficient to implement change and that higher management should give directives for EfS at certificate courses.

Academic A: *Some lecturers take initiative to do new things but change will come if these concepts are embedded in the programme and there is direction from higher level and they see it as a big issue than it will probably be implemented.*

A very interesting comment was made by Academic B. He suggested that implementation is welcomed but there should be no written outcomes in courses about it but sustainability should just be a topic that lecturer’s can talk about.
**Academic B:** If it was put in topics in courses and not written outcomes and tutors would be more aware of it and they will make more effort to make students aware of it.

Therefore it seems that sustainability as a concept can be mentioned in certificate programmes as long as students can see some form of gain from the concept and do not see it as a waste of time. A topic of sustainability is more favourable than a learning outcome about the concept.

**NEGATIVE PERSPECTIVES**

The negative perspectives on the topic of sustainability education in vocational education outweighed the positive perspectives. Even though most academics agreed that it was important to spread awareness about sustainability it had to be done elsewhere but not in certificate and vocational education. They all agreed that the main function of certificate and vocational education was to promote trade skills and social skills like sustainability was a secondary factor that did not concern them greatly. Listed below are some common themes that were generated from the interviewees.

**A. Relevance of Sustainable Practice**

Most academics did not see the relevance of sustainability concepts at vocational education. For the majority of them, trade and technical skills were much more important to be taught at Level 4 of vocational education. Generic skills such as literacy skills, project scoping, communication, working out timelines, material costs, writing and computer skills, organisation and analytical skills, creativity and presentation skills were far more important than teaching students to be sustainable practitioners. Academic D suggests that students cannot do much about sustainability and management should have the responsibility to bring about change.

**Academic A:** Industry just needs people who have the skills…people who can do the job…end of story.

**Academic D:** It’s not for certificate students to deal with these issues [sustainability] but the management. It’s no good being sustainable here (trade studies) but it’s much more a global thing.
Academic B felt that there was no need to have sustainability concepts in certificate programme as it was offered later on in further studies. He did not seem concerned about students who did not make it to higher studies and exited the programme after completing certificates. What mattered was that it was offered by another programme so there is no point of having it in certificates.

**Academic B:** At certificate level probably it is important for them to be introduced to it but realistically they really get into it at diploma level.

Academic C indicated that industry does not care about sustainability. A person will be employed as long as he has general skills that are required to perform the job. According to him students usually start at the bottom of the ladder at work and do not have the power to implement changes so educating about sustainability in the hope that he or she will bring about change is unrealistic.

**Academic C:** Whether those people are highly educated people or not....it doesn’t matter. They start at the bottom of the ladder they don’t get any say. I don’t think at level 4 we can afford to put too much into them.

**B. Economic Boundaries.**

Two of the academics emphasised that being sustainable can be very expensive and there are many economical boundaries and barriers that exist in industry that can prevent the acceptance of the concept readily. According to them the industry is there to provide a service and sustainable products are generally expensive thus are never utilised in reality.

**Academic C:** Sustainability in our industry very much becomes...umm...its double edged sword. Often in the start a company needing to bend to the will of common good find it difficult because it can be expensive to set up, to be sustainable.

Academic D in addition to emphasising that sustainability was an expensive concept mentioned that political motivation was needed to push the concept
forward. Political motivation in this context can be analysed to mean management and higher authorities.

**Academic D:** Industry is working on it [sustainability]....maybe not enough but that’s mainly because of the money aspect as well I think being sustainable is not financially attractive but with political motivation much more can be done.

According to the academics, industry seems to be reluctant to use sustainable products which are relatively expensive compared to standard items hence sustainable products are never emphasised on in polytechnics.

### C. Industry Receptiveness

All the academics felt that the industry has yet not recognised the importance of sustainability and therefore it continues to practice what it has been doing for years.

**Academic A:** The industry is changing slowly and there are companies that need other skills. They might need people who can contribute to issues like sustainability but it isn’t very popular.

Since industry has been unreceptive to sustainability there have been no demands placed on educators to implement concepts of sustainability into certificate studies. Since there has been no expectations from industry in that arena no educational modifications have been done.

**Academic C:** So in short no there is no expectation from industry that certificate graduates have awareness of sustainability issues.

Academic D further mentioned that he thinks industry does not see the relevance of sustainability in trades. He feels that if it was an important concept for them it would have been implemented but it is evidently not.

**Academic D:** I think industry does not see it as their task to educate people about a concept that is not relevant to trades. They do not see themselves as educators in literacy or sustainability.
D. Pre-existing Concept

Two academics claimed that sustainability concepts are already taught in their certificate programmes even though it is not a topic or a learning outcome in the course but generally through lecturers’ initiative. Academic C mentioned a term ‘osmosis’ associated with learning and teaching about concepts that were not part of written outcomes but talked about in class.

**Academic C:** In the process of practical work we inform students about small practices we can use in form of mini lecture sessions where we tell students better work practices and sustainable practices. This is not part of the course content but a part of their industry which I call “osmosis”.

Academic D also claimed that he talked about sustainability in his courses because he is aware of the concept and thus mentions about it in class.

**Academic D:** It’s just the matter of each individual lecturer to make it his or her content. We do a lot of sustainability in our certificate programme.

The analysis suggests that lecturers’ who are aware about the concept of sustainability make efforts to talk about it in any way possible and academics having little knowledge of the concept do not.

E. Educational Compliance

Some academics felt that making sustainability concepts part of all courses at vocational education was a form of compliance which will not necessarily promote sustainability in the long run. They believe that compliance would make academics and students rebellious and thus will refuse to teach or study the concept of sustainability altogether. They suggest that it should basically be a matter of choice and something optional that lecturers could opt for.

**Academic C:** I much prefer being part of something rather than complying with a decision someone else has made. It’s a waste of time when people say “Why the heck do I have to do this for?”
Academic D emphasised that if the industry demands a concept or skill to be taught at polytechnic then it will be readily accepted but not if it is a suggestion that is been made by higher management.

**Academic D:** If the workforce is asking for sustainable practices and it’s not being forced down from the top it’s more likely to happen as there is general tendency to rebel instructions that come from top down.

Educational compliance appears to be unfavourable with academics’ in relation to sustainability education and will only be accepted if there are industry expectations to educate students on the concept.

**F. Workload Issues**

All academics felt that incorporating sustainability concepts into certificate courses would create more workload for students and academics. They believe that the timeframe given for vocational certificate is already rather limited and they usually miss out some important concepts that should be introduced at vocational education. They would rather incorporate the more important technical aspects than social aspects like sustainability that can be covered elsewhere.

**Academic B:** We shouldn’t focus on content but ways of learning correctly or research info and educating students on how to learn and already in their first year students are bombarded with information.

**Academic C:** It will put a lot of inefficiency, doubt and extra work for people who will therefore resent them.

According to Academic D sustainability was a non-specific subject that does not need coverage in certificate courses and have no relevance in that level.

**Academic D:** There is no need for it (sustainability) in vocational studies and if we include all these social aspects in our unit standard it will make the course much longer or much more expensive and less attractive for a person if it is cluttered with non-specific subjects.

It seems that academics are more concerned about their workloads that will be significantly affected then making an attempt to introduce the concept of sustainability that has been identified as a need for the future.
The main perspectives that were generated from the interview analyses have been summarised in the table below and will be further discussed in the discussion chapter.

**Table 4.1. Academic Perspectives on Education for Sustainability.**

<table>
<thead>
<tr>
<th>Overall Academic Perspectives</th>
<th>Academic Perspectives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Awareness will promote sustainability.</td>
</tr>
<tr>
<td></td>
<td>Sustainable practice irrelevant for trades</td>
</tr>
<tr>
<td></td>
<td>Sustainability has economic boundaries.</td>
</tr>
<tr>
<td></td>
<td>Industry unreceptive to sustainable practice.</td>
</tr>
<tr>
<td></td>
<td>Sustainability is a pre-existing concept in trade education.</td>
</tr>
<tr>
<td></td>
<td>Educational compliance is not the answer to sustainability.</td>
</tr>
<tr>
<td></td>
<td>Sustainability education in trades will increase workload.</td>
</tr>
<tr>
<td></td>
<td>Subtle curriculum embedding for sustainability education.</td>
</tr>
</tbody>
</table>

### 4.2 PERSPECTIVES OF VOCATIONAL INDUSTRY PERSONNEL

The Industry Personnel that participated in this case study research were from Marine (Industry Personnel A), Building (Industry Personnel B), Automotive (Industry Personnel C), and Electrotechnology (Industry Personnel D). All the four (4) participants were well qualified males aged between mid 30’s to early 70’s, had been in the industry for more than 15 years and are highly experienced tradesmen.

After analysing the interviews of the industry personnel, seven common themes were identified. These themes are presented below in two categories being Positive Perspectives and Negative Perspectives. Some of the themes that are presented in the following section are:

**Positive Perspective Themes**
- A. Sustainability Awareness
- B. Implementation Strategy for EfS

**Negative Perspective Themes**
- A. Relevance of Sustainable Practice
- B. Economic Boundaries
- C. Industry Receptiveness
- D. Responsibility for EfS
- E. Future
There were few positive perspectives and more negative perspectives from industry personnel. Overall the personnel from Automotive, Marine and Electrotechnology seemed far more positive than the Building personnel in their comments. Even though the negative perspectives clearly outweighed the positive ones the above mentioned disciplines with positive views always felt that there was a chance for sustainability in the near future and they seemed more compassionate about the concept. Generally after the analyses of all interviews the industry personnel appeared a bit more enthusiastic than academics.

POSITIVE PERSPECTIVES

There were two positive points that came out strongly from the interviews. All industry personnel felt that awareness was needed to promote sustainability in all fields and there was a place for sustainability in curriculum provided it was embedded in a subtle manner that showed economic gains from its practice. A similar idea was identified in the analyses of Academics interviews which have been mentioned in the previous section. These points are analysed in more detail below.

A. Sustainability Awareness

Industry personnel like academics emphasised that increasing awareness on the topic of sustainability will bring about change in future that will be for the common good. They commented that awareness was identified as a means of bringing about change not only in students but it was seen as a means of educating others when the same students join industry.

Industry Personnel B: *If people are schooled and are aware of sustainability and how they can minimise the waste of these materials and utilise them effectively and efficiently then almost everybody will sort of be in tune*

Industry personnel A however implied that even though awareness was a positive approach, students entering industry are at the bottom level and do not have the power to make changes or recommendations.
Industry Personnel A: If certificate students were educated about sustainability they will go into industry nothing will change for a while because they are at the bottom and get listened too but eventually they do filter themselves to the top. And if they have had the seed of thought put into their mind then hopefully it will make a difference.

Industry personnel C & D went on further to add that younger generation if introduced to concepts of sustainability early on in the education system can bring about change by influencing a change in thought of older people in industry. In addition the younger generation can show the advantages of being sustainable to their employers who in turn can dictate change in the workforce.

B. Implementation Strategy for EfS

According to the industry personnel everything in industry is driven by economics and the financial factor. Therefore if sustainability concepts are embedded at certificate and vocational education it would have to be done in a way that everyone sees an economical gain for the industry. If there is no economical gain the concept will not be appreciated or taken seriously.

Industry Personnel A: The best way to teach it is to teach it on saving money. If you can get through to people who are stuck in their ways and show them that they can make and save money by introducing sustainability then I think they will start doing it.

Industry Personnel C also suggested that the concept needs to be implemented in a manner that shows a gain so people willingly participate rather than feel pushed to uptake the idea.

Industry Personnel C: Sustainability is something that needs to be implemented very slowly and very subtly so people don’t feel pushed. People need to be cajoled into doing things so they feel that they are doing it out of their own free will.

Personnel D suggested that courses need to be designed that shows the students that there are economical benefits in any new concept.
NEGATIVE PERSPECTIVES

As with academics the industry personnel also had more negative perspectives than positive ones. The personnel felt that sustainability is not a current requirement in industry and nor an expectation. Sustainability education according to them is the responsibility of polytechnics and the government (higher management) then industry which have no influence on curriculum. They felt that sustainability is too futuristic and out of industries league and too expensive to focus on as the industry works on economical gains. The main themes that were generated are presented in the following pages. Most of the themes are similar to academics themes except themes D and E which are very different to issues identified by academics.

A. Relevance of Sustainable Practice

Like academics industry personnel also highlighted that currently sustainable practice has no influence on their work and the main focus of the industry is meeting the demand of the market and produce goods that are required. They implied that there is no place for sustainability or requirement for sustainable practice in the markets and graduates or any new entrant into the industry is not expected to know about the concept.

When asked to name skills that are preferred from new entrants the common skills identified were computer literacy, sound technical skills (in whatever field the entrant belonged to), ability to take own initiative, understanding of materials used in industry, problem solving, administration skills, presentation skills, communication skills and good customer service skills.

B. Economic Boundaries

According to most industry personnel sustainability has an economical boundary which is discouraging. They emphasised that focus is more on immediate economic gain as that is what drives the industry. Sustainability is
considered a secondary concept that will not be financially beneficial to industry.

**Industry Personnel C:** ... a lot of people out there are just worried about the dollars. If they can’t see an instant payment back and offers to people to make processes more economical in the long run, they are only worried about what the product will cost today.

There were only one industry personnel who considered sustainability not to be expensive. He identified poor industry practices as being the leading factor in making sustainable practice sound like an economical burden.

**Industry Personnel A:** The best way to approach industry and make them see the benefits of being sustainable is by convincing them that they will save money. Because if they save money they make more money. And with the intention of saving money they help the environment whether they like it or not... I don’t think that being sustainable is expensive.

**C. Industry Receptiveness**

Industry seems unreceptive to the idea of sustainability and believe that it is not its responsibility. Some industry personnel believe that industry only provides a service to the society and it is the responsibility of people manufacturing products that are used by the industry that should have more accountability towards sustainability. Generally the inference that can be drawn is that educating and promoting about sustainability is always someone else’s responsibility.

**Industry Personnel B:** The people who supply materials or produce it or manufacture, those are the sectors that where sustainability should be preached to and focused on.

Industry personnel C even commented that industry does not consider sustainability as an important enough concept to warrant action and it is reflected in their practices.
Industry Personnel C: I think SD is very important but I have my doubts about the automobile industry… mechanics just fix vehicles they may or may not have any interest in sustainability.

Industry personnel A commented that industry just needs the skills to get a job done and there are no extra points for anyone who practices sustainably.

Industry Personnel A: Industry has no concern about resources and the amount of wastage that occurs on a daily basis. There is definitely a place for sustainability in the industry but the problem is no one is practicing it.

According to Industry Personnel D the only requirement from workers is to get the job done and no one has expectations to practice sustainability even though it probably is the right thing to do.

D. Responsibility for EfS

The industry personnel felt that industry has no control over curriculum dictation at polytechnics and if sustainability education was to be implemented it would be the call of people in higher authorities and the government. They commented that industry takes no responsibility of curriculum not reflecting sustainable practices. Industry Personnel A, B and C all suggested that government should take responsibility to educate about sustainability. Personnel D added that the expectation in industry is to get students to acquire basic grounding and everything else becomes polytechnics initiative.

Industry Personnel D: … polytechs are governed by what the registration boards want to have done. So driving to push the boards to take on new information and new ideas into the polytech it doesn’t work particularly well because the board would say we just want a basic grounding and everything else they get on top is up to the person to receive on the job or through the polytechs.

E. Future

Some industry personnel went on further to comment that sustainability practice is too futuristic and something that will suit the future but not the present. According to the majority, sustainability will be a very important part
of the future and action will only be taken when the need arises and when it impacts lifestyles.

**Industry Personnel B:** It is inevitable that sustainability will become a need for the future. But not now it is very futuristic and beyond the horizon.

Personnel D made EfS’s comparison with NZ’s Health & Safety in Employment Act 1992 which was condemned when it was made legislation and then slowly welcomed. He believes that sustainability will have a similar faith.

**Industry Personnel D:** I think sustainability etc will come through at some stage when people will realise that it’s a viable option. It might come along later that everything needs to be working, safe, correct and sustainable but currently it’s not a requirement.

The main perspectives that were generated from the interview analyses have been summarised in the table below and will be further discussed in the discussion chapter.

**Table 4.2. Industry Personnels perspectives on Education for Sustainability.**

<table>
<thead>
<tr>
<th>Industry Personnel Perspectives</th>
<th>Awareness will promote sustainability.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sustainable practice irrelevant for trades</td>
</tr>
<tr>
<td></td>
<td>Sustainability has economic boundaries.</td>
</tr>
<tr>
<td></td>
<td>Industry unreceptive to sustainable practice.</td>
</tr>
<tr>
<td></td>
<td>Polytechnics/Management responsible for sustainability education.</td>
</tr>
<tr>
<td></td>
<td>Sustainability will be important for the future but not present.</td>
</tr>
<tr>
<td></td>
<td>Subtle curriculum embedding for sustainability education.</td>
</tr>
</tbody>
</table>

**4.3 PERSPECTIVES OF VOCATIONAL STUDENTS**

To generate perspectives of vocational students 30 questionnaires were distributed. Out of these 30, ten questionnaires were given to degree level students from Year 1, ten questionnaires to Year 2 and ten questionnaires to Year 3. The students participating in this case study were from a mixed group
and could have been either from Electrotechnology or Automotive or Marine or Interior Decoration and Spatial Concepts.

Out of the 30 questionnaires that were distributed, 28 were returned providing a response rate of 93%. The questions were designed to reflect the interview questions that were directed at the industry personnel and academics so that the ideas generated would be similar and therefore add credibility to the research. The analyses of these questions thus generated eight common themes and are presented below in two categories being Positive Perspectives and Negative Perspectives. The themes are:

<table>
<thead>
<tr>
<th>Positive Perspective Themes</th>
<th>Negative Perspective Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Sustainability Awareness</td>
<td>A. Economic Boundaries</td>
</tr>
<tr>
<td>B. Relevance of Sustainable Practice</td>
<td>B. Industry Receptiveness</td>
</tr>
<tr>
<td>C. Future</td>
<td>C. Certificates for Trade Skills</td>
</tr>
<tr>
<td>D. Trades and Sustainability</td>
<td>D. Educational Compliance</td>
</tr>
</tbody>
</table>

The questions are analysed under these specific themes and are not necessarily presented in a sequential order. For example Question 3 is part of Positive Theme C and is therefore mentioned much later than other questions from the questionnaire.

There seemed to be a balance between positive and negative perspectives among researched students in comparison with interviewed academics and industry personnel. Finally students in the last year of their degree programme seemed much more aware of sustainability concepts and more receptive to the idea compared to year one and year two students.

**POSITIVE PERSPECTIVES**

There are many more positive perspectives from students compared with industry personnel and academics. Students seemed more receptive to the idea of sustainability in many aspects.
A. **Sustainability Awareness.**

Question 1, Question 2 and Question 4 of the questionnaire were designed to gauge students’ awareness of sustainability and establish where they first heard about the concept. The idea behind these questions was to discover whether awareness promotes sustainability.

Question 1 simply asked students whether they had heard about the term sustainability and 100% were aware of the term. Question 2 enquired about the source from where they had heard about this concept and from the 5 options given, the introductory degree course came out most strongly.

![Figure 4.1: Source where students’ first heard about sustainability.](image)

This analysis shows that students became aware of the term sustainability when they commenced degree level studies.

Question 4 of the questionnaire was directed at gauging students understanding of the term sustainability and whether the introductory level degree course managed to achieve the goal of promoting the concept. When asked what sustainability meant, students emphasised
on being environmentally friendly and maintaining the resource base and saving for the future. Some of their comments are presented in Table 4.1 below.

**Table 4.3: Students and their views on ‘sustainability’**

<table>
<thead>
<tr>
<th>Year of Study</th>
<th>Comments</th>
</tr>
</thead>
</table>
| 1             | Using materials and resources wisely.  
|               | Keeping nature as it is.  
|               | Protecting out environment.  
|               | Maintaining our resources.  
|               | Using environmentally friendly technology.  |
| 2             | …save lots of resources for the future.  
|               | …recycling, environmental friendly.  
|               | …being green.  |
| 3             | …environmentally friendly procedures and practices, recycling and reusing.  
|               | …using resources wisely.  
|               | …meet the needs of present without compromising the needs of future generations.  
|               | …coexisting with environment.  
|               | …keeping environmental supply and demand in equilibrium.  |

It can be noticed that as students spend more time on the degree programme their awareness on sustainability becomes more comprehensive.

**B. Relevance of Sustainability Education**

Question 5, 6 and 7 of the questionnaire was directed at determining whether students found sustainability a relevant concept for trades and whether awareness about the concept has prompted them to consider being sustainable practitioners.
When asked in Question 5 whether they had considered being more sustainable at work, 80% from year 1, 100% from year 2 and 100% from year 3 ticked ‘Yes’.

Question 6 was a follow on of Question 5 and aimed at students who answered ‘No’ for that question. When asked why they did not wish to practice sustainability at work they responded by ticking the box that said ‘Don't see the Need’.

Most respondents felt that sustainability was highly relevant for trades and their studies which was the focus of Question 7.

![Figure 4.2. Students’ perception on the relevance of sustainability in certificate and vocational education.](image)

C. Future.

Question 3 of the questionnaire enquired about students’ perception about the importance of sustainability in the present and the future. They were given 6 options to choose from which are presented in the figure below. Majority of respondents agreed that sustainability was an important part of the future and needed to be given more emphasis than currently is given in education. Only one respondent thought that sustainability was unimportant.
Figure 4.3: Students’ opinion on sustainability being an important part our future.

D. Trades and Sustainability

Students were more optimistic about sustainability education for trades academics and industry personnel. When asked in Question 11 whether sustainability education should be emphasised at all level of trade education there seemed to be some conformity between all years of students. Students in the third year of their studies seemed highly positive about the concept. The table below shows some of the comments that the question generated.

Table 4.4: Students’ thoughts on incorporating sustainability concepts at all levels of certificate and vocational education.

<table>
<thead>
<tr>
<th>Year of Study</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>Yes. It’ll certainly improve in the future since the current methods and materials are running out. Yes, because trade studies is the way to create new products so it’s good to relate.</td>
</tr>
</tbody>
</table>
| Year 2 | Yes, I think vocational and trade students should emphasise on sustainability because it’s good to know and it will be good for the future.  
Yes, but everyone should be taught about sustainability at university and at work. |
| Year 3 | Sustainability should be introduced at entry level of any trade related course.  
Yes I think it should be integrated into all papers as well as specific papers. The first sustainability paper I took sparked a real urgency. |

When asked in Question 12 whether sustainability should be introduced earlier in their studies most students agreed that it would be welcomed. When questioned as to where the concept should be introduced first, majority of them suggested at level 4 (which is certificate level studies).

**NEGATIVE PERSPECTIVES**

As with academics and industry personnel, there were some negative perspectives generated from students’ questionnaires on the concept of sustainability. However there were fewer negative perspectives which are presented below.

A. Economic Boundaries.

A few students felt that sustainability has financial boundaries and economical implications for businesses. There was no question specifically designed around this perspective but it emerged in answers to other questions. Some of the ideas students emphasised on included; that sustainability will financially cripple industry, will make getting jobs difficult, make materials expensive, and reduce working speeds. Some students mentioned that sustainability was much more a part of the future and would become important later.
B. Industry Receptiveness.

A few students emphasised that industry is unreceptive and in most cases unaware of sustainability concepts. This viewpoint was expressed when asked in question 10 whether ‘sustainability’ had a potential of becoming a market skill. Students highlighted that industry and workplace seemed to be unaware about this concept and there was no possibility of it accepting the concept anytime soon.

Table 4.5: Students’ Opinion on the Possibility of Sustainability Becoming a Current Market Skill.

<table>
<thead>
<tr>
<th>Year of Study</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2</td>
<td>In my current workplace sustainability is unheard of and ignorance is often the attitude. People don’t know where the planet is heading and they are ignoring it.</td>
</tr>
<tr>
<td>Year 3</td>
<td>In my opinion the automotive industry seems to be the most unsustainable industry. Industry likes it or not, sustainability is the only way for the future so I think it will be a big selling point for industry employing graduates.</td>
</tr>
</tbody>
</table>

C. Certificates for Trade Skills.

There seemed to be some contradiction in student opinion between question 11 and 12. On one hand when some students agreed in question 11 that sustainability should be emphasised more in trade education the same went on an opposite tangent when asked in question 12 whether the concept should be introduced earlier than degree level. Some students felt that trade education should focus on skills rather than secondary issues like sustainability. It should be noted that only two students gave these contradictory statements.
Table 4.6: Students’ perceptions on the introduction of sustainability concepts in certificate and vocational education.

<table>
<thead>
<tr>
<th>Year of Study</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td><em>Once a full grasp of studies has been achieved then learn how to be more sustainable.</em></td>
</tr>
<tr>
<td>Year 3</td>
<td><em>I think the basics should be taught first before sub issues such as sustainability be taught.</em></td>
</tr>
</tbody>
</table>

D. Educational Compliance

There were mixed responses when asked in question nine whether sustainability should be made compulsory in all trades. However, majority of the students were against the idea of the concept being made mandatory. Most students felt that making sustainability compliance would decrease the working speed of the industry and restrict business and innovation. The table below presents a few of the viewpoints given by students.

Table 4.7: Student opinion on sustainability being made compliance.

<table>
<thead>
<tr>
<th>Year of Study</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td><em>No, it should not be forced upon somebody.</em></td>
</tr>
<tr>
<td></td>
<td><em>It would be hard to create proper regulation. It would easily restrict businesses and prevent innovative ideas.</em></td>
</tr>
<tr>
<td>Year 2</td>
<td><em>I feel it should not be mandatory; it should be a personal choice.</em></td>
</tr>
<tr>
<td></td>
<td><em>There will be limitation of selecting materials and building methods.</em></td>
</tr>
</tbody>
</table>
Year 3

*It would seem that NZ is moving forward but the greenie image may be pushed too far.*

*I think it will be great but however the government have a long way to go before they can start pointing a finger.*

The main perspectives that were generated from the questionnaire analyses have been summarised in the table below and will be further discussed in the discussion chapter.

**Table 4.8: Students’ Perspectives on Education for Sustainability.**

<table>
<thead>
<tr>
<th>Students’ Perspectives</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Awareness will promote sustainability.</td>
<td></td>
</tr>
<tr>
<td>• Sustainable practice relevant for trades</td>
<td></td>
</tr>
<tr>
<td>• Sustainability has economic boundaries.</td>
<td></td>
</tr>
<tr>
<td>• Industry unreceptive to sustainable practice.</td>
<td></td>
</tr>
<tr>
<td>• Trade skills should be thought first before sustainability.</td>
<td></td>
</tr>
<tr>
<td>• Sustainability is important now and the future.</td>
<td></td>
</tr>
<tr>
<td>• Sustainability education should be implemented in all levels of education.</td>
<td></td>
</tr>
<tr>
<td>• Educational compliance not the answer for sustainability.</td>
<td></td>
</tr>
</tbody>
</table>

**4.4 SUMMARY**

This chapter presented a comprehensive overview of the perceptions that were generated by this case study research and is summarised in the following tables. Table 4.9 shows the overall perceptions of academics, industry personnel and students and highlights the positive and negative perspectives.
Table 4.9. Overall Research Participants’ Perceptions of ‘Education for Sustainability’ in certificate and vocational education.

<table>
<thead>
<tr>
<th>Perspectives</th>
<th>Academics</th>
<th>Industry Personnel</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive</strong></td>
<td>Awareness will promote sustainability.</td>
<td>Awareness will promote sustainability.</td>
<td>Awareness will promote sustainability.</td>
</tr>
<tr>
<td></td>
<td>Subtle curriculum embedding is the key to sustainability education. EIS needs to focus on economic gains.</td>
<td>Subtle curriculum embedding is the key to sustainability education. EIS needs to focus on economic gains.</td>
<td>Sustainability is highly relevant for trades.</td>
</tr>
<tr>
<td></td>
<td>Sustainability is highly relevant for trades.</td>
<td>Sustainability is important for the present and the future.</td>
<td>Sustainability concepts should be part of all levels of education.</td>
</tr>
<tr>
<td><strong>Negative</strong></td>
<td>Sustainable practice irrelevant for trades and only general trade skills are required by industry.</td>
<td>Sustainable practice irrelevant for trades and only general trade skills are required by industry.</td>
<td>Education should focus on trade skills above sustainability.</td>
</tr>
<tr>
<td></td>
<td>Sustainability has economic boundaries and is expensive to practice.</td>
<td>Sustainability has economic boundaries and is expensive to practice.</td>
<td>Sustainability has economic boundaries and is expensive to practice.</td>
</tr>
<tr>
<td></td>
<td>Industry unreceptive to sustainable practice. No expectation from academics to teach the concept.</td>
<td>Industry unreceptive to sustainable practice and does not consider it urgent enough to warrant action.</td>
<td>Industry unreceptive and unaware of sustainable practice.</td>
</tr>
<tr>
<td></td>
<td>Educational compliance not answer to sustainability and will discourage students and academics.</td>
<td>Industry has no influence on curriculum and sustainability is not its responsibility.</td>
<td>Compliance not the answer.</td>
</tr>
<tr>
<td></td>
<td>Sustainability already a pre-existing concept in trades and mentioned by academics who are aware of the concept.</td>
<td>Sustainability is too ‘futuristic’.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sustainability education will create extra work for everyone.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Perspectives common between research participants’.
Chapter Four presented the findings that were assembled from this case study research undertaken at a Metropolitan based New Zealand institute. The findings were presented in three sections being industry perspectives, academic perspectives and student perspectives. In this chapter these findings will be discussed in detail with similarities and disparities drawn from the literature.

The following section discusses the overall perspectives of academics, industry personnel and students on the prospects of incorporating sustainability concepts into certificate and vocational education curriculum.

5.1 Sustainability in Certificate and Vocational Education

All the three stakeholders that were involved in the research felt that certificate and vocational education was the place only for trade skills. Skills such as literacy, communication, analytical skills, computer skills and creativity were rated highly by all. This in turn reflects Sterling’s (2001) observation that vocational education and trades prepared students for economic life and did not instil into students social values such as sustainability. According to one academic, ‘industry just needs people who have the skills…..people who can do the job…end of story’. The three stakeholders did not recognise or identify sustainability as a need for the present and felt that it was a need for the future. Some students commented that ‘once a full grasp of studies has been achieved then learn how to be more sustainable’. This indicates that majority of people involved in the vocational education feel that it is the place only for trade skills.

UNCED (1992) recommends that the establishment of sustainability in the workplace culture requires vocational and trades to evolve and embrace
globalisation and technological change. However, it seems that the adoption of globalisation and global demands such as sustainability are not on VET’s agenda. Sustainability may not be established in the workplace any time soon as there seems to be lack of awareness on the concept and reluctance on the part of many involved in the industry to evolve with global needs.

With this overall perspective of the academics, industry and students opinion of sustainability in the certificate and vocational education, the following sections will discuss perceptions of each of the mentioned stakeholders.

5.2 Perceptions of Academics and Industry Personnel

The findings chapter highlighted the vast similarity between academics and industry personnel’s views and their immense differences in opinion with students. Therefore for the purposes of this discussion the academics and industry personnel’s views are discussed together and then comparisons made with student views.

There was little literature available on views available in the trades industry about education for sustainability (EfS) and most looked at EfS from the views of academics (Thomas, 2004; Reid & Petocz, 2006; Down, 2004). Since there is limited body of literature available on the perceptions of industry on the topic of EfS the perceptions compiled in this research will complement and contribute new information on the topic.

Relevance of Sustainability

The most notable finding on this research was that Academics and Industry personnel saw no relevance of sustainability in certificate and vocational education. They all felt that trade skills were distinctively separate to social skills like sustainability. One academic said:
It’s not for certificate students to deal with these issues [sustainability] but the management. It’s no good being sustainable here (trade studies) but it’s much more a global thing.

This suggests that academics were unaware of the importance of sustainability in the future and did not consider it important enough to warrant action. This mainly could be a result of lack of knowledge on the concept or reluctance to bring about change. Thomas (2004) states that academics fail to implement sustainability concepts into their courses because they have limited knowledge about it and fail to understand the importance of their engagement. The fact that the researcher had to explain about the concept of sustainability to some academics proves that many are unaware of the concept themselves thus will not be able to implement these concepts into their courses. Reid and Petocz (2006) mentioned a similar point about university academics not understanding concepts of sustainability thus are unable to see the relevance of it in their subjects.

Like academics, Industry personnel elaborated that sustainability was irrelevant to industry and current market needs. There is however conflict of opinion between their perception of sustainability’s relevance in the workforce and their view of promoting sustainability for greater awareness. Where on one hand both groups agreed that sustainability was important, clear conflict was evident when they rejected the notion of implementing sustainability into curriculum and industry practices. This conflict is probably a result of both groups being hesitant towards the extra work commitments that may be generated. Thus they instead highlighted that industry was there to provide a service and meet the needs of the market and the workforce has no expectation from students to have knowledge about sustainability. Sustainability, according to industry, has no financial benefit and will not provide any immediate payback.

… a lot of people out there are just worried about the dollars. If they can’t see an instant payment back and offers to people to make processes more economical in the long run, they are only worried about what the product will cost today.
This reflects the views expressed by Sterling (2001) who identified direct economic prosperity to be dominating the education and trades sector. However short-term economic gains are overshadowing long-term sustainable development. To what extent these short-term gains will shape our future is questionable. Since industry has yet not realised the importance and significance of sustainability in all levels of trades and the workforce there has been no demand placed on an educational curriculum to reflect the concept.

With academics and industry personnel both agreeing on the irrelevance of sustainability in certificate and vocational education it appears that sustainability may not be well received in the educational arena in the near future.

**Graduates in Workplaces: Bottom up Transformation**

Industry personnel echoed the views of academics when they commented that there was no point in promoting a concept in education to students as they will not have any power to make recommendations in the workplace. According to them, students start at the ‘bottom of the ladder’ and if they will not be making any groundbreaking changes in society there was no need to educate about sustainability.

*If certificate students were educated about sustainability they will go into industry nothing will change for a while because they are at the bottom and don't get listened to…*

Like academics they failed to comprehend that awareness in the present with motivate change in the future. This outcome from the research contradicts Dahl and Neumayer (2001) who believe that students were advocates for environmental change and could bring about change in society. Students in this research also contradicted academics and industry personnel perspectives and did not completely share their views considering themselves as candidates for bringing about changes in their future workplaces. This point will be discussed in the later section.
On one hand industry sees no relevance of having graduates with knowledge of sustainability and academics on the other hand also see no point of teaching about the concept. Academics are unreceptive to the possibility that if they started educating the students about sustainability they would be able to suggest changes when they join industry which may start a process of ‘bottom up’ transformation. 

Even if students are educated about sustainable practice at school they will not utilise these skills at the workplace. They start at the bottom of the ladder they don’t get any say. I don’t think at level 4 we can afford to put too much into them.

Dahle and Neumayer (2001) talk about students acting as advocates for environmental change and the ‘bottom up’ approach where students play profound roles in bringing about change. If current students joining the workforce are educated about sustainability then chances are that they will be able to bring about change in the workforce culture and making their future more sustainable. This point is emphasised on by the Parliamentary Commissioner for the Environment (2004) highlighting the point that tertiary graduates help in achieving a sustainable future, designing new systems where people live, play and work. Educating students now will bring about change in the future but academics at vocational education seem highly ignorant of this fact and are keen only in meeting current curricula demands.

Responsibility of Education for Sustainability

Academics and industry alike did not see their role in curriculum design at polytechnics. Academics said that they only teach skills that are required in the industry and sustainability in not a demand. They suggested that industry is unreceptive to sustainability and had not recognised it as being an important concept. They mentioned that since there was no demand placed on academics by industry to teach about sustainability they have not bothered.
So in short no there is no expectation from industry that certificate graduates have awareness of sustainability issues.

I think industry does not see it as their task to educate people about a concept that is not relevant to trades. They do not see themselves as educators in literacy or sustainability.

This indicates that academics only elaborate on concepts at certificate and vocational education that they feel can better equip a student to practice in the industry. They also emphasised that sustainability was offered in the degree programmes and there was no need to have these in certificates. They overlooked the fact that not all students make it to degree level studies and this leaves the bulk of the population uneducated about the concept. It seems that as long as the academics do not have to teach the concept it does not matter whether the society is made aware of sustainability.

As identified previously, academics emphasised that there had been no expectation from industry for them to execute change in curriculum to reflect sustainability concepts thus it has not been implemented. Academics kept elaborating that they teach what industry demands but industry personnel refused to take any responsibility of the curricula. Where on one hand academics are adamant that they teach what the industry wants, the industry on the other denies any control over curriculum. Industry Personnel commented that they need just basic grounding from students and everything else that is taught is the polytechnics initiative.

.... the board would say we just want a basic grounding and everything else they get on top is up to the person to receive on the job or through the polytechs.

Cullen (2007) emphasised that from 2008 the New Zealand trade industry and employers will have greater say in the curriculum and if industry places no value on sustainability then it can be expected that it will not be becoming part of the curriculum in the near future. Fien and Wilson (2005) highlighted that change in the Australian workplaces can be brought about if the vocational and trade education curricula was revised and this
observation is also applicable to the New Zealand workplaces. With no empathy from industry on EfS it can be assumed that the change will not be made in the foreseeable future.

Industry Personnel also indicated that EfS was either the polytechnics or the government’s responsibility. Thompson and Green (2005) made analogous comments stating that strong leadership can be the driving force for sustainability education and highly successful when sustainability is coded in official policy. There seemed to be no consensus reached as to whose responsibility educating about sustainability was and the academics and industry seemed to be playing the ‘blame game’. As long as it was not ‘their’ responsibility no one cared how and who implemented changes in curriculum. Mazzotti, Murphy & Kent (2007) suggested that for sustainability to be incorporated into the curriculum support was needed from government, industry and the community. This research showed that industry was very unsupportive of sustainability and therefore a change in curriculum to reflect the concept will be a very complicated process. The similarity in opinion between academics and industry personnel and their refusal to have any control of curriculum seems to be the drawback of incorporating sustainability in the current vocational education sector.

**Sustainability Awareness**

On the positive note the industry personnel and academics did agree that awareness about the concept of sustainability would promote greater acceptance of the concept by everyone in the country. However with the negative attitude of the industry towards sustainability that has been highlighted by the research, prompts the thought whether the industry should be the first place where awareness needs to be increased. The denial of sustainability is indicated by comments made by one industry personnel who said:

*The people who supply materials or produce it or manufacture, those are the sectors that where sustainability should be preached to and focused on.*
The academics and industry personnel also agreed that awareness about any subject increases awareness and the same principle applies to sustainability.

If people are schooled and are aware of sustainability and how they can minimise the waste of these materials and utilise them effectively and efficiently then almost everybody will sort of be in tune.

It was highlighted by an academic in the previous section that if sustainability awareness is absent from certificate and vocational education courses it may result in slower progress of a nation. Cortese (2003) had similar views stating that higher education institutions have moral responsibility to increase awareness and if this is not achieved then an unhealthy, inequitable and unsustainable path is inevitable.

Another interesting point was highlighted by some academics and industry personnel who mentioned that when students are educated about sustainability they will educate the ‘older generation’ when they enter the workforce and influence change later.

The young guys coming around now know about it [sustainability] they will use it. Educating the younger guys should educate the older guys. So the information will get around.

They are emphasising on the fact that education about the concept will have a rippling effect and if the students are made aware of the concepts then they will definitely help makes changes in society in the future. The Parliamentary Commissioner for the Environment (2004) used the term ‘education that seeks to empower people of all ages’ (p.36) to define education for sustainability and a similar idea had been generated by academics and industry personnel.

Those academics that are aware about concepts of sustainability do make efforts to engage students with the concept. Some academics did have some knowledge of sustainability and according to them they mentioned this
to students’ even though it was not a written outcome for their course. They did this purely because they were aware of the concept and highlighted the significance of sustainability whenever it was appropriate.

In the process of practical work we inform students about small practices we can use in form of mini lecture sessions where we tell students better work practices and sustainable practices.

This indicates that academics will definitely embed concepts of sustainability into their course if they are aware of it. This falls along similar lines as Thomas’s (2004) research where university academics who were involved in the waste management studies at RMIT, Australia went on later to implement changes in their courses to reflect on sustainability concepts whereas academics who were not involved made no such changes. The findings of this thesis research has reinforced Thomas’s work and demonstrated the similarity in the New Zealand context where academics aware of the concept of sustainability made efforts to mention the concept in their courses. Down (2006) suggested that motivating educators to understand and accept sustainability principles is the key factor in sustainability implementation in the curricula. This highlights the fact that if academics are aware about the concept of sustainability and shown the relevance of it in their courses they are more likely to teach it.

Cost of Sustainability

Academics and Industry personnel felt that being sustainable was expensive. To academics it appeared to them that industry seems reluctant to use sustainable products as standard items are cheaper. As a result of additional costs generated with buying and teaching about sustainable products they do not elaborate greatly on being sustainable or using sustainable products. Since sustainable products seem to be so unaffordable and impracticable it is not preached about at polytechnics.

Industry is working on it [sustainability]….maybe not enough but that’s mainly because of the money aspect as well I think being sustainable is not financially attractive but with political motivation much more can be done.
This theme is similar to the findings of Sterling (2001) who identified economic prosperity as being predominant in vocational education and trades which prepares students mainly for economic life and ways of meeting material needs. Sustainability does not seem to be on the trades’ radar. This can also be deduced here that Industry seems to play an important role in what is taught in polytechnics as academics teach what is expected from the industry. In other words, Academics only teach about affordable materials that are used by industry and fail to mention sustainable products as there seems to be no point of doing so.

Industry personnel recommended that if sustainability was incorporated into the curriculum it needed to show that there were economical gains and monetary benefits to be obtained from it.

*The best way to teach it is to teach it on saving money.*

*The best way to approach industry and make them see the benefits of being sustainable is by convincing them that they will save money.*

This view was also expressed by academics who believed that showing students economic benefits streaming from being sustainable was the way forward. This supports Sterling (2001) views that economic prosperity is overpowering in all sectors and it is the need to prosper that is being the drawback for being sustainable.

**Workload Issues**

The reluctance to incorporate sustainability concepts into certificate and vocational education can be the fear of increased workload that academics emphasised on in the interviews. Sustainability was seen as an additional burden and extra work for everyone.

*It will put a lot of inefficiency, doubt and extra work for people who will therefore resent them.*

Thomas and Nicita (2002) made comparable comments suggesting that academics are busy people with demanding schedules and if sustainability
in not appropriately incorporated, it may become a burden. Academics felt that the timeframe for vocational certificates was limited and they have to often omit some trade skills and they rather teach about these important omitted concepts than sustainability.

...all these social aspects in our unit standard will make the course much longer or much more expensive and less attractive for a person if it is cluttered with non-specific subjects.

This suggests that sustainability still remains a foreign concept for many academics and its implementation into curricula remains a challenge as academics continue to remain oblivious about the concept and fail to understand its relevance. This leads on to another very important point that has been highlighted in this section. Academics prefer to keep their courses separate from sustainability concepts. They do not wish to integrate the concept into their courses. This is discussed in greater detail in the following section.

**Integration versus Segregation**

The academics generally appeared defensive towards the idea of embedding sustainability concepts into trade education. The common thought that came out strongly was that sustainability was a separate entity and not needed at certificate and vocational education. They suggested that the concept of sustainability should be taught elsewhere. They seemed happy to have the concept segregated from the current certificate and vocational education.

*It’s not for certificate students to deal with these issues [sustainability] ... it’s no good being sustainable here [trade studies].*

*I don’t think at level 4 we can afford to put too much into them.*

This follows to the debate of whether sustainability concepts should be integrated into all areas of curricula or kept as separate entities and delivered via a sustainability course. Thomas and Nicita (2002) support the
embedding of sustainability in all courses because according to them if the concept is separated from the majority of the curriculum, then it was unlikely that an understanding on sustainability will be made possible across all disciplines. If the concept is mentioned, even if it is just for a few minutes, in all courses it will be able to show students the correlation between their trade and sustainability. Academics also mentioned that if sustainability was embedded in curriculum it needed to demonstrate to students that it will be beneficial to the industry and useful to them in the workforce.

*If it was immersed anywhere in the vocational studies it needs to be pinpointing something in the industry.*

However, according to Down (2006), for incorporating sustainability into all syllabus presents the difficulty of dealing with aspects that are outside the lecturers’ area of expertise. If lecturers are responsible for teaching sustainability concepts then in addition to their own subject matters they also need to be abreast with these concepts. Therefore it creates additional work for academics and as a result they would retaliate and not incorporate the concept into their courses.

*It will put a lot of inefficiency, doubt and extra work for people who will therefore resent them.*

*…if we include all these social aspects in our unit standard it will make the course much longer or much more expensive and less attractive for a person if it is cluttered with non-specific subjects.*

Therefore it appears that integration may be the best way forward for sustainability and it needs to be integrated into all areas of curricula across all industry sectors as suggested by Newman, Wiseman, Pepper and Kelly (2004) but academics feel that integration will make their courses non-specific subjects and cluttered with social skills that are irrelevant. Academics prefer that either trade skills be focused at vocational education or students studying the concept of sustainability separately. They did mention that if sustainability became mandatory and had to be included in curriculum they preferred it being just a topic and not written learning outcomes which they have to teach about. It is appropriate to mention here
that if teachers are expected to teach concepts of sustainability they need to be trained about these (Thomas and Nicita, 2002).

**Learning Outcomes versus Topics**

Even though the academics did not see a place for sustainability in certificate and vocational education they suggested that if it was made part of the programme then it should not be made written learning outcomes.

*If it was put in topics in courses and not written outcomes and tutors would be more aware of it and they will make more effort to make students aware of it.*

At the researched institute, any given course that is delivered has defined learning outcomes that give an overview of what is compulsory and must be covered during the duration of the course. However, within the course descriptors there are various topics that are listed that can be of relevance to the course but are not specified in the learning outcomes but may be used as a means of addressing the learning outcomes. The detailed nature of these topics is optional and do not have to addressed as they are not part of the written learning outcomes, but as examples.

Academics propose that sustainability should only be one of the topics in the courses and not set written learning outcomes that academics may talk about if they can fit it in. In short they recommend that sustainability should be made part of all courses but only as topics. This contradicts university academics views in Reid and Petocz’s (2006) research who said that their subject and sustainability were totally different entities and troublesome to have it embedded in all courses.

Newman, Wiseman, Pepper and Kelly (2004) on the other hand recommended that sustainability should be a learning outcome in all units of competency but this has been identified by the academics as being cumbersome. If sustainability is only a topic in courses then the possibility of it not being addressed is very likely and it gives academics the flexibility of
disregarding it if the time factor is limited. It appears that the academics suggestion to make sustainability just a topic seems to be an alibi and an escape route that can be used so they do not have to teach the concept.

**Summary**

There were many similarities between academics and industry personnel perspectives on education for sustainability in certificate and vocational education. Both groups agreed that sustainability was irrelevant to the vocational and trades sector. Industry saw sustainability as impractical and graduates having no power to implement change in the workplace and academics saw no need to teach about a concept that industry saw as being unimportant. Both groups agreed that educating for sustainability was not their responsibility. Industry stated that academics and government were responsible for curriculum and academics felt that industry had the reins in its hands. There was consensus that awareness about sustainability may bring about change in New Zealand workplaces. Academics and Industry personnel also elaborated that being sustainable is an expensive affair and it usually is cheaper to use standard products both in teaching and in the industry.

There were additional perspectives that were unique to academics and focused on teaching about sustainability. Academics stated that incorporating sustainability into trade courses will increase work load for them hence the reluctance to teach the concept. Academics were generally against the idea of integration but preferred sustainability to be made a topic instead of a written learning outcome in courses. Academics prefer that the concept of sustainability not to be taught at vocational education level.

**5.3 Perceptions of Students**

Degree level students who participated in this research after having studied about concepts of sustainability appeared more optimistic about the
concept. There were many positive perspectives and few negative ones but the differences with academics and industry personnel perspectives are immediately obvious. The differences in opinion are probably the result of greater awareness about the current global situation and the need to be more sustainable. In this section the perspectives of students are presented and comparisons made with academics and industry personnel views wherever appropriate.

**Relevance of Sustainability**

In comparison with academics and industry personnel, students felt that sustainability was highly relevant to trades education. The graph presented in Figure 4.2 in Chapter Four clearly indicates that more than 85% students agreed that sustainability was a very important part of their future and relevant to trades. This difference in opinion probably is a result of greater awareness about the concept in the student population and their understanding of sustainability. Since students have been educated about the concept and recognise the relevance of sustainability in today’s society they consider it to be highly relevant. Comments such as ‘Yes, because trade studies are the way to create new products so it’s good to relate [to sustainability]’ and ‘Yes, but everyone should be taught about sustainability at university and at work’ are reflections of students’ views on the relevance of sustainability at all levels of society.

Today’s students are tomorrow’s future and can help reshape society into a more sustainable one. Cortese (2003) stated that higher education can produce graduates that can help shape a sustainable future and make the world a better place to live. It has been highlighted by this research that with greater awareness about sustainability in the student population creates a mind shift, making them more optimistic towards the concept and increases the possibility of them practicing it in their future workforce. Therefore one of the probable reasons that academics and industry personnel find sustainability irrelevant, compared to students, could be lack of knowledge
or lack of awareness about the concept. Since they are unfamiliar with the concept they are reluctant to practice or to perceive the relevance of sustainability in today’s society.

However, according to figure 4.2, year 1 and year 3 students were more positive about sustainability’s relevance in their studies compared to year 2 students. The main reason behind the drop in the student percentages in year 2 is because there is no mention of sustainability concepts in year 2 studies and students are isolated from the concept and focus mainly on technical papers. This indicates that students are more aware of the concept when they have continual reinforcement about it. However it also indicates that once students are isolated from studying sustainability concepts in their studies they totally forget about the concept and start focusing on technical issues.

This then brings up the question whether the concepts taught at technical institutes are as transformative as Sterling (2001) recommends in bringing about a change in student perceptions. If students forget about the concept when they are isolated from it as shown in this case study research then their studies have not been transformative enough and thus it can be expected that they will not practice sustainability when they enter the workforce which expects them to practice technical issues rather than being sustainable. This ties in with the comments academics and industry personnel made about students starting at the bottom of the ladder and having no say in the day to day running of a business.

**Awareness Promotes Sustainability**

It is evident through this research that awareness about the concept is the key to promoting sustainability as indicated by Sterling (2001) who suggested that educational methods that transform students’ perspectives and viewpoints about sustainability will help create a sustainable future. This is apparent in this research where in comparison with industry personnel
and academics, students were more aware about sustainability concepts and more receptive to the idea presenting more positive perspectives as shown in Table 4.6 in Chapter Four. This is mainly a result of awareness where students study the concept at degree level and are able to understand the importance of sustainability in the present and the future.

Yes. It’ll certainly improve in the future since the current methods and materials are running out.

As the awareness of the concept increases students are more willing to make changes in their lifestyles and working towards a sustainable future. As students advanced from year 1 to year 3 in the degree programme their understanding of the concept became more comprehensive as indicated in Table 4.1 of Chapter Four. This suggests that if students are educated about the concept, awareness increases significantly. This is evident when the definition of sustainability by students changes in essence from year one to year 3.

Year 1: Using materials and resources wisely.
Year 2: recycling, environmental friendly.
Year 3: keeping environmental supply and demand in equilibrium.

Hence with greater awareness about sustainability it can be envisaged that graduates entering the workforce will be ‘sustainability savvy’.

**Graduates in Workplaces: Bottom up Transformation**

The analysis indicated that academics and industry personnel saw students starting at the bottom of the ladder in the workplace and thus they will be unable to practice sustainability in the workplace. Students on the other hand indicated that sustainability was a vital part of the future and they could help bring about change in the workforce with increased awareness about the concept.

*Industry likes it or not, sustainability is the only way for the future so I think it will be a big selling point for industry employing graduates.*
Students emphasised that industry is unreceptive to sustainability echoing the view of academics and industry personnel. They elaborated that industry’s unreceptiveness towards sustainability was because of a lack of awareness about the concept.

*In my current workplace sustainability is unheard of and ignorance is often the attitude.*

With the increased optimism from students about their ability to bring about change in the future the ‘bottom-up transformation’ suggested by Dahle and Neumayer (2001) appears to be achievable. They highlighted that change will only come about if students get involved in acting as advocates for environmental change. Therefore for a change in attitude towards sustainability in industry, future graduates need to be educated so they can act as agents for change.

**Integration versus Segregation**

There was definite dissimilarity in perspectives between academics and industry personnel and students views on the possibility of incorporating sustainability into vocational education. Students suggested that sustainability should be taught at all levels of education and should be taught much earlier than at degree level.

*Yes I think it should be integrated into all papers as well as specific papers. The first sustainability paper I took sparked a real urgency.*

*Sustainability should be introduced at entry level of any trade related course.*

This contradicts academics and industry personnel views who adamantly stated that certificate and vocational education was too content intensive and had no place for sustainability. This difference in opinion could be a result of more awareness among students about the concept and their understanding of the concept as has been discussed earlier. With greater awareness about sustainability, students perceive it a very important part of the future and believe that it should be incorporated in all levels of studies.
whereas academics and industry personnel seem unaware of the concept and do not see it as a part of vocational education.

_Yes, I think vocational and trade studies should emphasise on sustainability because it’s good to know and it will be good for the future._

The majority of the students first heard about the concept of sustainability in the degree programme which is formal education as presented in Figure 4.1 in Chapter Four. If formal education is the avenue for presenting the idea to students then sustainability should be implemented in all levels of education so that there is greater awareness in society as recommended by the United Nations (2002). The literature showed that sustainability was the focus of mainly degree level programmes in New Zealand (Stone and Baldoni, 2006) and this research as proven that they do a great job at increasing awareness thus as Rebello (2003) suggested sustainability education should be incorporated not only at higher education but technical and vocational education as well. If it is made a part of vocational certificate programmes then we can be assured that greater awareness will be achieved.

**Summary**

Students appeared more receptive to the concept of sustainability compared to academics and industry personnel. This positive attitude is probably a result of an increase in awareness towards the concept. Majority of students felt that sustainability should be incorporated at all levels of education and was highly relevant to trades. They elaborated that sustainability was not well received by industry but students have the potential of bringing about change in the future as graduates.

**5.4 SUMMARY**

In conclusion, there seems to be great reluctance to incorporate sustainability concepts into certificates and vocational trade education. Sustainability is seen by the main key players as irrelevant, additional work, financially unviable and part of the future and not the present- a belief that
probably has been brought about due to lack of awareness about sustainability concepts.

Academics and industry find sustainability irrelevant in today’s education system. Students on the other hand with increased awareness of sustainability, feel it is immensely important for all levels of education.

Academics tend to teach concepts and skills that the industry demands from graduates and as yet sustainability as not been recommended by industry. Industry fails to recognise sustainability as being an important part of the present. Academics suggested that if sustainability was incorporated into the curriculum it should be only a topic, and not a learning outcome, that academics may teach if time permits.

Students were more optimistic about the concept of sustainability in comparison with academics and industry personnel due to heightened awareness about the concept and felt that they could bring about change in the future starting a bottom-up transformation.

Another issue that came out strongly from the research was the question of whether to integrate sustainability concepts into all courses that are taught at certificate and vocational education or to keep it separated. Where on one hand Newman, Wiseman, Pepper and Kelly (2004) suggested that all courses should have written learning outcomes this research contradicts this view where academics felt that it will just create additional work. Students in comparison with academics felt that sustainability should be incorporated in all levels of education.

Industry takes no responsibility of what the curricula includes at VET whereas academics identify industry as being highly influential. Industry also pinpoints management for being responsible for sustainability concepts to be incorporated in the curricula. There seems to be no consensus on who is responsible for incorporating sustainability concepts in certificate and
vocational education curriculum. There was general disapproval about making sustainability mandatory in curricula therefore management intervention in bringing changes in the education system is also highly fraught.

These differences will be explored in more detail in the final chapter.
Chapter Six summarises this thesis. Firstly, broad conclusions that can be drawn from this case study research are presented based on the research objectives that were specified in Chapter One. Secondly, the limitations of this research are highlighted. Thirdly, recommendations are presented that have been compiled through this research and that will help direct actions towards education for sustainability in vocational education for trades (VET). Finally the possibilities of further research are outlined.

This research aimed to determine current perceptions about incorporating sustainability concepts into certificate and vocational education for trades (VET) in New Zealand. The perceptions were sought from three of the main players of VET being academics, industry personnel and students. The broad research question that formed the focus of this research was: what are current perceptions for incorporating sustainability concepts into certificate and vocational education programmes in New Zealand? This research question has been answered and the findings are presented and discussed in Chapters Four and Five of this thesis. The following section highlights the most significant findings of this research that may play an influential part in VET curriculum design in the future.

6.1 EDUCATION FOR SUSTAINABILITY IN THE VET CURRICULUM

Education for sustainability appears to be a very sensitive issue for vocational education. There were many negative perspectives on the subject and very few positive ones. After analysing the findings of this research there were five points that came out fairly strongly which have been discussed in detail in Chapter Five and are highlighted below. These significant findings that are presented in this concluding chapter emphasise the importance of these issues to education for sustainability at certificate and vocational education.
Awareness for Sustainability

The most overwhelming finding of this research was the overall difference in opinion between students and academics & industry personnel perspectives about sustainability. Where on one hand academics and industry personnel saw no relevance of sustainability in trades, students on the hand were more optimistic about sustainability and understood the relevance of it in the present and the future. This optimism can be attributed to heightened awareness about the concept through the degree programme at the researched institute. With greater awareness about the concept students were more enthusiastic to practice sustainability in their future workplaces. Age could also be a factor in differences in opinion between academics & industry personnel and students. There was significant gap in the ages between students and academics and industry personnel which could be a sign of generational differences. The younger generation are more confident to try new ideas and concepts but the older generation appears to be reluctant to uptake the same concepts.

This positive attitude of students is a encouraging outcome for education for sustainability because students are the future and if education is able to transform these graduates into sustainable citizens then a sustainable world will be more achievable (New Zealand Parliamentary Commissioner for the Environment, 2004). Thus if awareness at the degree level can initiate a transformation in student perceptions about sustainability imagine the difference it can make if all levels of the education system was educated. As mentioned in Chapter Two, student numbers at New Zealand certificate and diploma levels grew by 116 percent from 2000 to 2004 while degree level education grew by only 6 percent (Mallard, 2005). If sustainability concepts are incorporated in certificate and vocational education it will create a much greater awareness about the concept as more people aspire to achieve certificates and vocational education. It has been highlighted by this research that awareness is the key for sustainability.
Integration or Segregation

The concept of integrating sustainability concepts into all levels of education and into all courses is widely supported (Thomas & Nicita, 2002; Newman, Wiseman, Pepper & Kelly, 2004). Integration is a concept where sustainability is incorporated into the course descriptors and related in all ways possible with the content of the given course or trade. However, it was clearly evident in this research that participants felt that sustainability and certificate and vocational education were separate entities. Academics at polytechnics felt that integration will make their courses non-specific subjects by focusing on issues that are irrelevant to the course and cluttered with social skills (e.g. sustainability) that are irrelevant. Academics had strong viewpoints against incorporating sustainability into all courses and emphasised that vocational education was mainly for trade skills. Academics prefer that either trade skills be focused at vocational education or students study the concept of sustainability separately.

Academics highlighted that if sustainability became a mandatory part of curriculum it will increase workload for them and as a result other more important trade concepts that need to be covered will have to be omitted. The increase in workload is also a factor that was addressed by Down (2006) who emphasised that if lecturers are responsible for teaching sustainability concepts then in addition to their own subject matters they also need to be aware of these concepts. Therefore integration would mean educating the academics about sustainability and demonstrating academics of how it relates to their subject areas.

Learning Outcomes versus Topics

The idea of integrating sustainability concepts into VET curricula was highly criticised however, the participants felt that if in future it was made a mandatory concept in all courses, they hoped that it will be made only a course topic and not a learning outcome. A learning outcome is compulsory and must be covered during the duration of the course whereas a topic is optional and
added just as an example of what might be taught and does not need to be addressed.

This is completely different to the suggestions made by Newman, Wiseman, Pepper and Kelly (2004) who recommended that sustainability should be a learning outcome in all units of competency but this has been identified by the academics as being cumbersome. Academics already were highly apprehensive about the concept of sustainability and it appears, with it only as a topic saw it as an easy way of ignoring the subject.

**Cost of Sustainability**

Sustainability was perceived as an expensive affair by all the researched groups. Academics and Industry personnel saw sustainability as a cost that needed to be reduced. The general perception was that sustainable products seem to be very unaffordable and impractical that it is not taught about at polytechnics. Industry personnel on the other hand recommended that if sustainability was incorporated into the curriculum it needed to show that there were economical gains and monetary benefits to be obtained from it.

All sectors of the trade industry see little value of sustainability and regard it only as an additional expense. This point was highlighted as well by Sterling (2001) who identified economic prosperity as being predominant in vocational education and trades which prepares students mainly for economic life and ways of meeting material needs. According to this research it appears that the general viewpoint is that if a concept is not economically viable than it is best to be ignored.

**Management Influence in EfS**

Mazzotti, Murphy & Kent (2007) suggested that for sustainability to be incorporated into the curriculum support was needed from government, industry and the community. It is apparent by this research that academics and industry also consign curriculum responsibility on the management of
polytechnics. There seemed to be no consensus reached on whose responsibility it was to incorporate sustainability concepts into the curriculum. Academics elaborated that industry determined the vocational education curriculum and management had responsibility to implement changes. Industry personnel suggested that it was the responsibility of management or polytechnics.

Thompson and Green (2005) made analogous comments stating that strong leadership can be the driving force for starting the incorporation of sustainability concepts into the curriculum. Therefore it has been highlighted by this research that action towards implementing sustainability concepts into curriculum is relatively slow because the key players of vocational education are yet to realise their role in initialising change. Lack of management involvement at New Zealand polytechnics to incorporate sustainability concepts into curriculum seems to be the reason for slow implementation of education for sustainability.

6.2. LIMITATIONS

There were various limitations of this research which are presented below and may perhaps have influenced the research findings.

- Only one academic and industry personnel from each trade discipline at the researched institute was selected and therefore perspectives that were compiled could not be representative of the whole disciplines. This was mainly due to the timeframe for the research but can very easily be overcome by selecting more than two participants from each discipline.

- The research involved academics and students from a single school of the researched polytechnic narrowing the validity of the research and hence presenting some limitations on the reliability of the study and its applicability across all polytechnics. Therefore it is possible that the
findings of this study will not be similar in other polytechnics or higher education institutes.

- All academics and industry personnel interviewed were males and a true representation of both genders opinion is not reflected in this research.

6.3 RECOMMENDATIONS

Presented in this section are some recommendations that may be used for the implementation of sustainability education at certificate and vocational education at polytechnics.

Integration

Sustainability concepts should be integrated into all levels of education at polytechnics. When sustainability is integrated into trade education students will be able to see the relation between the concept and their trade. Based on the principle of integration a core sustainability course can be designed that will be applicable across all disciplines and give students the flexibility of relating the concept to their own trades. With this approach the issue of increased workload on academics will also be addressed.

If on the other hand, sustainability is integrated in all courses delivered at polytechnics then a ‘train the trainer’ course is recommended that should be designed for academics which informs and educates them about the basics of sustainability and how the concept can be embedded into the academics’ area of expertise. This course could be part of academics professional development plan.

Increase Awareness in Industry
Education for sustainability should also be directed at industry and actions should be taken to increase awareness of sustainability in industry. Industry may be in denial about their influence on curriculum but their contribution towards sustainability education is reflected in the current education system.

**Involve Polytechnic Management**

Management has been identified in this research as been highly influential in curriculum design. Therefore it is recommended that Management at polytechnics be encouraged to initiate changes and motivate academics to implement sustainability concepts into curriculum. This encouragement could be fostered by relevant government bodies with an interest in education for sustainability.

**6.4 FUTURE RESEARCH**

Future research conducted in the field of education for sustainability at polytechnics could focus on the points presented below.

**Perspectives of Polytechnic Management**

This thesis did not address the perspectives of polytechnic management on the prospects of incorporating sustainability concepts into curriculum. Future research could address polytechnics management perspectives.

**The Cost of Sustainability**

The cost of Sustainability has been highlighted extensively in this research and future research could focus on the cost-benefit of sustainable technologies and the true value of environmental services involved in the technology be assessed.
6.5. SUMMARY

This chapter summarised the findings of this case study research and the conclusions that can be drawn. Educating for sustainability is pertinent for future sustainable development and this research highlighted that the education process is relatively slow in New Zealand. This slow process is mainly a result of lack of awareness on the future importance of sustainability by some of the main stakeholders of the education system. There is great reluctance to accept that sustainability is the way forwards and is basically seen as a financial burden by most involved in the education system at polytechnics. This reluctance can be reduced with greater awareness and management support towards education for sustainability.

Students, in comparison to academics and industry personnel, are highly optimistic about the concept of sustainability which can be accredited to increased awareness about the concept. This case study research has elaborated that awareness about the concept of sustainability if implemented at all levels of education can be highly beneficial to sustainable development of any nation. Students are our future and it is indeed a great achievement if their mindset is transformed through education and they understand the importance sustainability holds for everyone and the difference they can make in society. This chapter concludes with a quote from the New Zealand Parliamentary Commissioner for the Environment’s (2004) book ‘See Change’ which clearly summarises the importance of educating all tertiary students about sustainability.

“…if tertiary graduates do not have a core understanding of sustainability then the pathway to a sustainable future will remain a side road for far longer than necessary” (p. 135).
REFERENCES


# APPENDIX A

## INTERVIEW SCHEDULE - Academics Version

<table>
<thead>
<tr>
<th>Question field</th>
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</thead>
<tbody>
<tr>
<td><strong>Professional experience</strong></td>
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<tr>
<td>What is your role here?</td>
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<tr>
<td>What are some of your main responsibilities?</td>
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<tr>
<td><strong>Graduate skills</strong></td>
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<tr>
<td>By the end of their studies what are the most significant skills you would expect a certificate graduate to possess?</td>
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<tr>
<td>How does New Zealand trade education compare with other countries in terms of accepting to teach new concepts or implementing changes in curriculum to incorporate current market needs?</td>
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<tr>
<td><strong>Education for Sustainability</strong></td>
<td></td>
</tr>
<tr>
<td>Currently “sustainable development” is a very hot topic in all fields in New Zealand and around the world. Are you aware of this term and according to you what does it mean?</td>
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<tr>
<td>The industry often dictates the skills they require of graduates. Do you see “sustainability” as a current market need?</td>
<td></td>
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<tr>
<td>Sustainability is emphasised more in higher education rather than in vocational studies. How do you think this will affect the vocational or trades industry in the long run?</td>
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<tr>
<td>Do you think vocational and trade education should incorporate sustainability concepts to educate students in this field?</td>
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<tr>
<td>Would the incorporation of sustainability concepts into vocational studies, promote sustainable development in New Zealand?</td>
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<tr>
<td><strong>World View</strong></td>
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<tr>
<td>Australia has already drafted guidelines for sustainability education incorporation in its VET courses. Why do you think NZ is lagging behind?</td>
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<tr>
<td><strong>Do you have anything else you would like to add?</strong></td>
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**APPENDIX B**

**INTERVIEW SCHEDULE- Industry Version**

<table>
<thead>
<tr>
<th>Question field</th>
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<tbody>
<tr>
<td><strong>Professional experience</strong></td>
<td>What is your role within your organization?</td>
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<td></td>
<td>What are some of your main responsibilities?</td>
</tr>
<tr>
<td><strong>Graduate skills</strong></td>
<td>If someone joined your industry after attaining professional qualifications what are the most significant skills you would expect this graduate to possess? (This could be technical or generic skills)</td>
</tr>
<tr>
<td></td>
<td>How do the New Zealand vocational industries (your own industry) compare with other countries in terms of accepting new technology and skills?</td>
</tr>
<tr>
<td><strong>Education for Sustainability</strong></td>
<td>Currently “sustainable development” is a very hot topic in all fields in New Zealand and around the world. Are you aware of this term and do you think that New Zealanders are doing enough to be more sustainable?</td>
</tr>
<tr>
<td></td>
<td>The industry often dictates the skills they require of graduates. Do you see “sustainability” as a current market need?</td>
</tr>
<tr>
<td></td>
<td>Sustainability is emphasised more in higher education (degrees, masters, PHD) rather than in vocational studies. How do you think this will affect the vocational industry in the long run?</td>
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<tr>
<td></td>
<td>Do you think vocational education should incorporate sustainability concepts to educate students in this field?</td>
</tr>
<tr>
<td></td>
<td>Would the incorporation of sustainability concepts into vocational studies, promote sustainable development in New Zealand?</td>
</tr>
<tr>
<td><strong>World View</strong></td>
<td>Australia has already drafted guidelines for sustainability education incorporation in its vocational courses. Why do you think NZ is lagging behind?</td>
</tr>
<tr>
<td></td>
<td><strong>Do you have anything else you would like to add?</strong></td>
</tr>
</tbody>
</table>
APPENDIX C

Student Questionnaire

All information you provide on this questionnaire will be kept confidential. Please do not give any personal information on this sheet unless you wish to be identified.

1. Have you ever heard of the term ‘sustainability’?

[ ] Yes  [ ] No

2. Under what circumstances did you first hear the term ‘Sustainability’?

[ ] At Work  [ ] In Newspapers

[ ] On Television  [ ] In the Degree programme

[ ] Other (please specify) __________________________________________________________

3. I think sustainability is a very important part of our present and our future.

[ ] Absolutely Disagree  [ ] Strongly Disagree  [ ] Disagree  [ ] Agree  [ ] Strongly Agree  [ ] Absolutely Agree

4. What does “sustainability” mean to you?

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5. After studying concepts of sustainability in your degree programme have you considered being more sustainable (environmentally friendly) at work or onsite?

[ ] Yes  [ ] No

6. If you answered “No” to Question 5 please explain what restricts you from using sustainable practices at work? You may select one of the listed options or choose “other” and give your own explanation.

[ ] Don’t see the need.  [ ] Lack of freedom to implement changes at work.

[ ] People at work don’t know about sustainability  [ ] Other
7. How relevant is sustainable practice in your field?

8. If you were given an opportunity to make your current or future workplace environmentally sustainable, what are the main changes you would implement?
   A. ………………………………………………………………………
   B. ………………………………………………………………………
   C. ………………………………………………………………………
   D. ………………………………………………………………………

9. If the New Zealand government makes it mandatory for all trade sectors to employ sustainable practices, how would you feel?

10. The industry often dictates the skills they require of graduates. Do you think “sustainability” has the potential to become a current market skill?

11. Do you think vocational/trade studies should emphasise on sustainability education much more than it currently does? Why?

12. Do you think the concept of sustainability should be introduced earlier in trade studies? If so, when and where?

Thank you very much for your participation.