

Education for Sustainability (EfS) in the New Zealand Secondary School System: A Scoping Study

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Summary

Project and Client

Education is recognised by governments the world over as a key part of the solution to the global issues around sustainability that we face today. This project sets out to look at how Education for Sustainability (EfS) can be improved in the New Zealand secondary education system. This scoping study is part of a wider research project (Building Capacity for Sustainable Development – the Enabling Research, funded by the Foundation for Research, Science and Technology, contract C09X0310).

Objectives

- Undertake a literature review of the many ways that Education for Sustainability (EfS) manifests in schools.
- Gain an understanding of how the different elements of EfS are perceived by different actors in the wider New Zealand secondary school environment.
- Identify potential pathways that will help support the EfS agenda in New Zealand.

Methods

Literature review

The literature review helps provide the context for EfS in New Zealand schools, and the wider EfS context internationally. It has been used to guide and support the discussion that emerges from the interview results. The review has also informed the discussion of potential pathways that could help provide better integration and uptake of EfS principles within the secondary education system. An EfS literature guide has been compiled out of this work, and is set out in Appendix 1.

Interviews

We interviewed people from a variety of roles in the secondary school sector to identify a range of views around key elements of sustainability. We used a mix of purposeful interviewing and snowball sampling to identify participants that had some background connection with sustainability in education. The project proposal was assessed through the Landcare Research ethics peer review process before interviews commenced.

We undertook the interviews using a semi-structured approach. We began with an initial set of 13 interviewees from different positions in the secondary system and drawn from a variety of schools and organisations around New Zealand. These interviews were undertaken in early 2007 and recorded by telephone. A second group of 10 interviewees was contacted through their participation at the Teaching for Sustainability Conference in Wellington, November 2007. Most were secondary school teachers from different parts of the country, either active in or intending to become active in EfS. The questions were more targeted. These second group interviews were done face-to-face and noted in writing by the interviewer.

Context

From the literature (Section 3 and Appendix 1) it is clear that reviews of sustainability in education indicate that most schools first focus on one-off actions such as curriculum content changes or recycling as a first step before considering a bigger, more integrated approach to change. However, the literature on how organisations become more oriented towards sustainability suggests that to achieve longer-term institutionalised changes schools require a realignment that takes into account a number of linked elements. These include a systems-

based worldview that helps contextualise actions that support sustainability; an understanding of the social processes required to support constructive change; and a “monitor to manage” approach that creates the feedback and reflection necessary for constant improvement. For EfS we can also identify a number of important elements that underpin all of these actions such as: values, futures thinking, systems thinking, critical thinking, collaboration, participation, reflection/evaluation, action learning, facilitation, mentoring, and connected and continuous learning.

Results and discussion

Sustainability in general

Most respondents thought of sustainability as a concept that was about maintaining the natural environment for future generations. Only a few saw it as an approach to life that recognises that all things (including environmental, social, economic and cultural systems) are connected and that significant shifts in mindset and behaviour are involved in attaining a more sustainable world.

The main drivers behind EfS in New Zealand secondary education in the future were thought to be:

- The new National Curriculum
- EfS Achievement Standards (NCEA)
- Enviroschools

The main themes that were mentioned when discussing strengthening capability in EfS were:

- Teaching/learning practice, and assessment method
- Value of whole-school approaches (including wider community links)
- Better continuity/pathways from primary right through to tertiary education curriculum.

Drivers of sustainability initiatives

Keen teachers and students were seen by most as the main drivers behind any type of sustainability initiative (mostly environmental) in secondary schools be it curricular, operational or both. Within enviroschools, the development of school envirogroups was mentioned by all respondents as driving voluntary initiatives, but again most of these initiatives were environmental, and were not related to curriculum. The role of envirogroups was perceived as being a ground-up approach that allowed for continuity of initiatives from year to year. Most respondents thought that more principals were starting to come on board, and believed that when this happened the initiatives had a greater chance of success.

National Curriculum, assessment and guidelines

Most of the comments relating to drivers for education for sustainability ((EfS) at a national level related to the Environmental Education Guidelines, the new National Curriculum, and assessment within NCEA. This statement by one of the respondents “*The new curriculum and NCEA achievement standards will improve things greatly*” sums up the response of most of the interviewees. However, a number of participants noted that a more conscious approach to supporting change in education was needed. One participant expressed it this way, “*The key competencies in the curriculum suggest that teaching method needs to change, but there is no mandate for this around sustainability and it's easy for teachers to continue with business as usual.*”

Most respondents agreed that the introduction of the Environmental Education Guidelines (in 1999) was a critical step and was helped by the establishment of regional advisor posts, coordinated nationally. However, they also felt that these guidelines have not been able to achieve as much as they could have, due to their non-compulsory status.

Implementing curriculum activities in schools

There was a wide range of perspectives expressed about how sustainability is incorporated into the curriculum of individual schools, from it not being incorporated at all, to it being an underlying principle behind the school's philosophy. Most respondents thought sustainability was not a main focus of any particular class and that it generally depended on keen teachers rather than the school.

External education providers, usually in the role of an environmental education officer from a district or regional authority, play a part in the curriculum if they are invited into a school. However, the two respondents who work in these roles said the majority of their work is with primary schools and thus they had limited experience of secondary schools. They are normally invited in by a keen teacher and occasionally by a group of keen students.

Sustainability within everyday school operation

Recycling and tree planting were the most common action-initiatives talked about by the respondents, followed by energy efficiency, water-use efficiency, worm farms and social initiatives. Of the recycling initiatives, paper was thought to be the most successful, "*because it is easy*", although one teacher commented that new paper is still too cheap for recycling to be taken seriously. Respondents who talked about tree planting also talked about this being an activity that included charitable trusts and the wider community. There appears to be scope for good public relations and profile-building for schools, from their sustainability actions in the community.

Integrating curriculum and operation

On the whole, respondents did not believe that the everyday operation of a secondary school integrated well with the curriculum, especially in terms of supporting education for sustainability. However, most saw a need for the operation and curriculum to be linked in a strategic way, so that students' learning around sustainability is reinforced by what they see throughout the whole school.

Teaching practice

Only about a third of respondents talked about the need to change the way we teach, but those that raised it, saw it as being critical to enable the shifts in society needed for a more-sustainable future. An environmental education advisor put it like this: "*Teachers need to be less of a transmitter, to allow students to learn cooperatively and use a variety of different strategies.*" These respondents thought that teaching needed to change from being a directive role (i.e. standing at the front of the class and telling students what to do) to a facilitator or guide-type role, aimed at enabling students to think critically and become motivated, active learners.

Lifelong learning

The last theme that respondents talked about was the need to ensure greater continuity of learning around sustainability throughout the education system and into the wider community. More than half the respondents talked about the need for primary and secondary schools to work more closely, so that learning experiences gained at the primary level could be backed up and built on at the secondary level. One respondent offered an example of why this is important: "*Even when the school philosophy is around understanding that everything is connected, it is still difficult to make this part of students' decision-making, because they have*

not had the (preparatory) training at the primary level.” Another respondent talked about the need for strategy at a national level: *“There needs to be a national policy/strategy for EfS that links all learning centres – Government involvement needs to be more strategic.”*

Barriers

The main barriers which participants of this study reported were: lack of support from all parts of the system, funding, time, resources, and the negative perception of EfS by many students. However, the changes to the National Curriculum, the new EfS achievement standards, enviroschools’ growth into the secondary sector and continuation of the national coordinators for EfS were expected to help combat some of these barriers over the next few years.

Conclusions

- This study revealed that in general EfS is still ad hoc and individual-champion-driven in New Zealand secondary schools and it reconfirmed a checklist of barriers described elsewhere in the literature. This lack of change in barriers implies that there is an underlying unwillingness to change school organisational structures and public policy.
- However, there are emerging lessons from the literature on how organisations become more oriented towards sustainability that could be used to achieve a more integrated approach within schools. These organisational experiences suggest the need to develop an underpinning school philosophy and understanding of sustainability, to ensure a learning-by-doing approach is taken to support incremental change, and that attention is paid to the use of inclusive and collaborative social processes.
- Action research provides a means for professional and social development that can drive these changes. Initiatives that use this approach are often successful in bringing about lasting change, and a culture that supports the feedback and reflection necessary for constant improvement.
- Following on from the idea of a whole-system change is the notion of providing better continuity of learning from school entry to school leaving, so that learning experiences are connected and reinforced.
- This leads us to the influence of wider society and lifelong learning. Most of the respondents thought that public awareness of sustainability issues was increasing, partly due to climate change and this was driving some ad hoc change in schools, but that in general this awareness is not translating into behaviour change.
- National changes to support EfS need to simultaneously address the structure and aims of the wider education system, teacher training and curriculum.
- Current efforts to support EfS initiatives should aim to leverage off the United Nations Decade of Education for Sustainable Development (2005–2014).

1. Introduction

The idea that education and learning is about how we live our lives and shape our world is long lived. Taken in this wider context learning moves from the classroom to the wider world without boundaries as the following quotes from different reviewers illustrate:

"I have never let my schooling interfere with my education." Mark Twain

"Sustainability is better seen as a measure of the relationship between the community as learners and their environments, rather than an externally designed goal to be achieved."
Sriskandarajah et al, 1991

"Education for sustainable development enables people to develop the knowledge, values and skills to participate in decisions about the way we do things individually and collectively, both locally and globally, that will improve the quality of life now, without damaging the planet for the future." The English National Curriculum, QCA 1999

1.1 Overview

Young people have a large stake in the future. Indeed, some of them may live to see the 22nd century. We don't know what the future holds; only that it will be very different from today.

Some of the world's key mineral reserves will have been exhausted. A changing climate may have adversely affected agricultural production in some areas, and sparked the introduction of new production modes in others. The world's population may reach 9 billion, or have been slashed by a major pandemic. On the other hand, many people may benefit from dramatic improvements in medicine, and enjoy energy-efficient and emissions-free transportation modes that are quicker and more comfortable than are available today. Amid the potential dangers are fantastic opportunities. Indeed, tomorrow's solutions will likely be found by the children in our classrooms today. Moreover, the values, habits, and worldviews of individuals are often set and hard to change by the time that people become adults. Schools have an important part to play in changing society by equipping young people with the skills, knowledge and understanding for sustainable living.

Education is recognised by governments the world over as a key part of the solution to the global issues we face today. Sustainability has a broad interpretation and for schools it includes the collective weaving of environmental, socio-cultural, economic and governance aspects of their work. The 'hidden curricula' of schools convey the values that are really important to the school, even when they contradict the lessons of the classroom (e.g. a soft drink machine in the corridor can speak louder than any number of classes about nutrition). Schools are systems, and they are communities. They are themselves important nodes in the web of institutions that constitutes society. Whatever happens in schools will have profound effects on the rest of society.

A number of reviews of literature note the need for capacity building to support organizational and community responses to sustainability issues (Allen et al 2002 a&b). This study recognises that the formal education sector plays a fundamental role in capacity building for the sustainability 'jigsaw puzzle' (e.g. PCE 2004). Accordingly, this study sets out to explore the 'landscape' that exists in New Zealand around Education for Sustainability (EfS). It focuses on secondary education, and also seeks to site this within the wider field of building capacity and lifelong education.

This work is undertaken by researchers in the Social Learning Objective of the FRST-funded Building Capacity for Sustainable Development (C09X0310) programme.

1.2 Report structure

- The following section of this report begins by outlining the objectives and methodologies involved in the study.
- Section 3 outlines the background to Education for Sustainability in New Zealand.
- Section 4 provides the results from the interviews and sets these out according to the different ways that sustainability can be influenced within the education system.
- Section 5 discusses the interview results in the context of wider EfS literature.
- Section 6 looks at how an integrative organisational change framework and action research approach could help provide a more holistic pathway to achieve EfS in schools.
- Finally some concluding comments are made, and a set of recommendations that could help progress EfS initiatives are outlined.

2. Objectives and Methods

2.1 Objectives

Education and capacity building are recognised by governments the world over as a key part of the solution to the global issues we face today. These processes are vital to enhance people's abilities to find solutions to unsustainable practices. Education can play a major role in helping equip people with the capacities they need as members of communities, agencies and businesses. This project sets out to look at how Education for Sustainability (EfS) manifests and can be improved in the New Zealand secondary education system. Specifically we set out to achieve this by addressing the following objectives:

- Undertake a literature review of the many ways that EfS manifests in schools.
- Gain an understanding of how the different elements of EfS are perceived by different actors in the wider secondary school environment.
- Identify potential pathways that will help support the EfS agenda in New Zealand.

2.2 Methods

Literature review

Through the review of the education literature we have identified a number of elements that interlink to support sustainability. A literature guide has been compiled out of this work, and this is set out in Appendix 1.

Interviews

We have interviewed people from a variety of roles in the secondary school sector to identify a range of views around key elements within secondary school sustainability. This has been undertaken as an exploratory research exercise to provide some illumination across a very large landscape. A purposive sampling strategy was used to maximise representation of a range of perspectives around key elements within secondary school sustainability (Patton 1990; Fossey et al. 2002). The snowball method of finding interview participants was used to help identify the pool of people from which participants were able to be purposely selected (Neuman 2000; Polkinghorne 2005).

The proposed method was reviewed through the Landcare Research Social Research Ethics peer review process before interviews commenced. Interviewees that had some background connection with sustainability in education were chosen initially, rather than a random set. This was done because we were trying to gain a qualitative understanding of the perceived secondary school ‘educational landscape’ around sustainability, not a quantitative study looking at, for example, levels of understanding and behavioural change trends in the whole school system.

We undertook the interviews using a semi-structured approach (Fossey et al. 2002). We did these in a two-step approach. We began with an initial set of 13 interviewees who were from different positions in the secondary system and were drawn from a variety of schools and organisations around New Zealand. These interviews were undertaken in early 2007. Respondents included three teachers, two students, two principals, two board of trustees chairpersons, two environmental education officers from local government, one researcher from the Office of the Parliamentary Commissioner for the Environment, and one of the education for sustainability national coordinators. Three of the respondents were drawn from schools of special character, where the school system/philosophies were quite different from state schools. Stage-one interviews were recorded by telephone. The recordings were transcribed and sent back to the interviewee, to make sure they were comfortable with what they had said and to offer them an opportunity to change anything they wanted to. The tape recordings themselves were deleted after transcription.

The structure of each interview varied slightly depending on the knowledge and position of the interviewee, but was based on six common questions:

1. “When I mention the word ‘sustainability’ what do you think of?”
2. “Which of the elements you have just mentioned are present in your school’s curriculum or daily operation?”
3. “What indicators or criteria does your school use to measure change or success in these areas?”
4. “What has worked (met these criteria) and what has not, and in your view, why?”
5. “Who/what were the main drivers behind the curriculum or operational actions that you have described?”
6. “How do you think capability in this area can be strengthened?”

A second group of 10 interviewees was contacted through their participation at the Teaching for Sustainability Conference in Wellington, November 2007. Most were secondary school teachers from different parts of the country, either active in or intending to become active in education for sustainability. One was an environmental education regional advisor. Stage-two interviews built on the first ones. The questions changed slightly in that they were more targeted. They were done face-to-face and noted in writing by the interviewer and in some cases directly by the interviewee, which involved some paraphrasing of comments as well as direct quotes.

This report is limited to the combined perspectives of those who were interviewed; it is thus not intended to be a complete record of where education around sustainability currently sits in New Zealand.

3. The context for education for sustainability

This section briefly reviews the literature to identify the larger goals for EfS and how they fit within UN and other international efforts. It then offers a brief review of how the EfS movement in schools has happened in New Zealand. Finally we add a section on the different points where EfS elements can manifest themselves within the New Zealand school system. A fuller literature guide is provided in Appendix 1.

3.1 Global concern provides a context

The global context for environmental education's development in New Zealand has included the United Nations Earth Summit at Rio in 1992, and the World Summit on Sustainable Development in Johannesburg in 2002 both of which called for urgent education of both current and future generations of decision-makers. Because of the importance of education an additional resolve of the 2002 Summit was to recommend that the UN General Assembly to adopt a Decade of Education for Sustainable Development, starting in 2005.

In 2009, we are in the middle of the UN Decade of Education for Sustainable Development (DESD). The broader vision of this international effort outlined in DESD documents and website is very much one of quality education (Gough 2005). "The basic vision of the DESD is a world where everyone has the opportunity to benefit from education and learn the values, behaviour and lifestyles required for a sustainable future and lifestyles required for positive societal transformation" (UNESCO 2004). Education in this context refers to formal (e.g. schools) and lifelong (e.g. apprenticeships, adult education). To this end DESD offers national governments the opportunity to rethink and reorient various dimensions of education and skills training so that the learning process has real-life applications, encouraging learners to view the world through a lens of concern for sustainability, and consequently for sustainable development (UNESCO 2007c).

3.2 EfS and where it has come from

The field of environmental education (EE) was formalised in the mid-1970s through a series of UNESCO-sponsored international meetings (UNESCO-UNEP 1976, 1978). These meetings pointed to the need for education to be seen as transformative and to catalyse changed behaviour. In this regard calling for 'new patterns of behaviour of individuals, groups and society as a whole towards the environment' (UNESCO-UNEP 1978, p. 3) and emphasising the interdependence between the environment and human social, political and economic activity.

The term Education for Sustainability (EfS) – also referred to as Education for Sustainable Development (ESD) or Learning for Sustainability (LfS) – emerged in the late 1980s in response to concern about environmental impacts of development. It became clear that an educational approach to these problems would need to include more than education about the environment and that it would need to include an understanding of the connections between, and interdependence of social, economic, cultural and environmental systems (Tilbury 1995; Sterling 2001; PCE 2004; Tilbury & Cooke 2005; Gough 2006). As the PCE (2004) put it, education for sustainable development (ESD) has a broader focus than environmental education (EE) in that 'it recognises that human rights and social justice are just as essential to sustainable development as environmental sustainability'.

At its most sophisticated, this wider EfS approach aims to enable transformative change that moves society to a sustainable approach to living. To do this people need to be empowered to make decisions based on the understanding that all things are connected. Sterling (2001) puts it like this, “*Fundamentally, we need a changed educational paradigm, one that addresses and indicates positive directions beyond these crises, one that ‘takes us into the depth of things’. This is what I term ‘sustainable education’, a change of educational culture which both develops and embodies the theory and practice of sustainability in a way which is critically aware. This would be a transformative paradigm that values, sustains and realizes human potential in relation to the need to attain and sustain social, economic and ecological wellbeing, recognizing that they are deeply interdependent.*”

Despite the range of terms being used there is a growing acknowledgement that the aim of EE, EFS and ESD proponents can be seen to share similar outcomes. Indeed as Annette Gough (2006) points out, although the Belgrade Charter – a global framework for environmental education - was written 30 years ago (UNESCO-UNEP 1976) the statements could have been written as part of the framing for the current Decade of Sustainable Development. In both statements there is a concern with reforming educational processes and with balancing quality of human life, environmental protection and economic growth.

What is becoming clearer over the years is that to enable the type of transformation sought above, education needs to include a number of key components. In this context education is being increasingly recognised as needing to be more than the dissemination of knowledge or sustainability concepts. It is now understood that sustainability is a process of adaptive management and systems thinking, requiring creativity, flexibility and critical reflection (Srisikandarajah et al, 1991, Tilbury 2003, IUCN 2004). Through the use of dialogue and other multistakeholder processes different groups are able to learn from each other and develop collaborative responses as they consider options and the consequences of those options for the future (Buck et al. 2001, Tilbury 2004). Learning how to motivate and manage change towards sustainability within organisations and institutions is another critical aspect (Tilbury 2004). What does distinguish EfS from many traditional environmental education approaches is that it goes beyond addressing values and attitudes of individuals to building their capacity for constructively instigating and managing change towards more sustainable practices within organisations, communities, industries and even countries.

3.3 Milestones in development of EfS in New Zealand

- 1991 Resource Management Act included acknowledgement of education alongside regulation as a local government interest, particularly in regions
- 1994 Taking up the Challenge of Agenda 21 – a guide for local government (Ministry for the Environment)
- Mid-1990s Enviroschools concept developed, initially in Hamilton, Waikato (http://www.enviroschools.org.nz/how_it_works/)
- 1995 *Environment 2010 Strategy* (Ministry for the Environment)
- 1998 A National Strategy for Environmental Education: Learning to care for our environment
- 1999 Guidelines for Environmental Education introduced by the Ministry of Education (1999), related to seven areas of the school curriculum; also an *Environmental Education Directory*. Voluntary implementation and only sporadically taken up by schools
- 1999–2001 National coordination of environmental advisors/coordinators for schools started. Advisors hosted by colleges of education and universities
- 2001 Enviroschools spreads nationwide, following Sustainable Management Fund support for development since 1999. There were 50 enviroschools by 2004
- 2001 Sustainable Living Programme begins in eight council areas – community education for sustainability, with subsequent input to pilot Sustainable Futures courses in a few

secondary schools. By 2008 the programme had reached 26 council areas and was managed by a charitable Sustainable Living Education Trust

- 2003 Development of EE Achievement Standards started for levels 1–3, but later stopped by the Ministry of Education
- 2003 Bolstad et al. Critical stocktake of environmental education
- Some EE unit standards have been developed with other organisations, like the Department of Conservation, mainly on a practical skills rather than academic focus
- 2004 *See Change* published by Parliamentary Commissioner for the Environment, and subsequently reviewed by PCE in 2007
- 2006 *Draft National Curriculum*, published 2007 and to be implemented by 2009. (See Appendix 2 for some extracts)
- 2007 development of EfS Achievement Standards restarted for levels 2–3. Level 2 ready in 2008 and being tested in 2009
- 2008 (and ongoing) consultation for potential review of EE guidelines

3.4 Where EfS is found today

Government support for EE/EfS has grown slowly during the dozen or so years summarised above, to the point in March 2009 where 30 full-time-equivalent advisors to schools operate across New Zealand. The EnviroSchools Foundation supports 74 secondary enviroSchools, and enjoys commercial foundation sponsorship from Vodafone as well as Government support (www.enviroschools.org.nz/about_us). EE/EfS is still non-mandatory in 2009, but the new curriculum makes far more references to education for sustainability than its predecessor.

EfS in New Zealand is located principally within the formal school education system, particularly in the cross-curricular work that is most possible in primary and intermediate schools. It is slowly emerging within the secondary curriculum (which is where this study has focused its attention) and occasionally in whole-school application, including administration, facilities and wider links with school communities. It is also found in community education approaches such as the Sustainable Living programme (Taylor & Allen 2008) and some community-based research approaches looking at natural resource management issues (e.g. Allen & Kilvington 2005, Fenemor et al. 2008).

The next section focuses on the secondary school sector. It provides results from interviews with 23 interviewees who were from different positions in the secondary system and were drawn from a variety of schools and organisations around New Zealand.

4. Results from the School-based Interviews

As we asked people to talk about sustainability within their school curriculum or operation they indicated the different areas where we can expect to find initiatives designed to support sustainability. A synthesis of views provided within each of these main themes is set out in this section in the following order:

- Views on sustainability in general, and what the main drivers of sustainability are perceived as being
- The role of the curriculum. One perspective looks at national-level curriculum guidelines and policies, while the other concentrates on how curriculum activities are implemented in schools
- Sustainability initiatives that occur as part of the school day-to-day operation, this includes comments on issues such as recycling and energy efficiency

- How the curriculum and the school operation are integrated for sustainability
- The importance of teaching practice
- Lifelong learning

4.1 Sustainability in general

How sustainability was perceived

‘Sustainability’ is one of those words that can be used in many contexts and has many meanings and definitions. No definition was offered by the interviewees as a prompt. In this study we were interested in others’ perspectives and so did not use any preset definition or interpretation of sustainability.

The opening question: “*When I mention ‘sustainability’ - what do you think of?*”, raised many different responses. Most respondents thought of sustainability as a concept that was about maintaining the natural environment for future generations. Only a few saw it as an approach to life that recognises that all things (including environmental, social, economic and cultural systems) are connected and that significant shifts in mindset and behaviour are involved in attaining a more sustainable world. A few were concerned with the overuse of the word ‘sustainability’ and the accompanying ‘green wash’ and degradation of a deeper meaning that they see occurring.

Environmental education (EE) versus Education for sustainability (EfS)

Of the respondents that saw a difference between environmental education (EE) and education for sustainability (EfS), most saw a need to move towards EfS. The main difference being that EfS also includes societal considerations, but most respondents also saw that most secondary schools are not even utilising EE yet. However, all respondents talked about seeing an increase in awareness among school staff and the wider public about the environment and human impact on it, and to a lesser extent awareness of how these impacts are related to financial and societal issues. One respondent put it: “*It is easy to say we are talking about changing behaviour and decision making, but it takes time for that to filter into peoples’ consciousness and then through into providing an appropriate learning space for students.*”

A couple of respondents said they try to promote the ‘four wellbeings’: social, environmental, economic and cultural (as now widely used in local government since passage of the Local Government Act 2002) as cornerstones of learning, when working with teachers and/or students. Despite this, they usually started with a specific environmental action (often focused around recycling or tree planting). From there they try to help teachers/students to see the bigger picture around the issue they are dealing with and encourage discussion and questioning. Both these respondents thought there was still a lot to do in this area. “*The assessment structure does not lead us to look at actions,*” said one respondent, adding that students need to study sustainability mostly through actions so they can learn to understand it through experience.

The need for understanding the bigger picture around an issue was highlighted by both of the students we interviewed. They both thought there was inadequate information and learning environments provided to stimulate critical thought about why they should, for example, recycle, and felt more could be done to help students understand why they need to make informed decisions about their personal behaviour and also how they can go about acting in a sustainable way. Both thought that if students had a better understanding, they might be more cooperative.

Measuring sustainability

When asked about how schools monitored their sustainability initiatives, most respondents thought that there was not much monitoring done, but they also said that influencing behaviour, which most saw as the ultimate goal, was a difficult thing to measure. One respondent expressed it like this: *“It (sustainability) could be measured around concepts and knowledge, but it is too complex, as you need to know what sustainability looks like to measure it.”* Initiatives that respondents provided as examples of measures of sustainability indicators included:

- Energy use
- Waste audits
- Annual reporting on waste and energy
- Parental feedback
- Student portfolios and group publishing projects
- Students taking action
- Engaged learners

The council environmental education officers commented that they measure the success of their programmes by using simple participant survey techniques and student presentations at the end of the programme.

Keeping motivated and up to date

Respondents had a range of groups and sources that they connected to in order to build networks of like-minded people and share experience and resources (see Appendix 3 for a list of networks mentioned by respondents).

Main drivers behind sustainability initiatives

Keen teachers and students were seen by most as the main drivers behind any type of sustainability initiative (mostly environmental) in secondary schools be it curricular, operational or both. One respondent provided a great example of students driving the process: Students moving from a primary school that has reached the Green-Gold level in the EnviroSchools Programme were dismayed when they got to high school about the lack of environmental awareness and initiatives and have managed to convince their new secondary school to join the EnviroSchools Programme.

School envirogroups were mentioned by all respondents as driving voluntary initiatives, but again most of these initiatives were environmental, and were not related to curriculum. The role of envirogroups was perceived as being a ground-up approach that allowed for continuity of initiatives from year to year. Envirogroups were involved in several initiatives, typically native tree planting, recycling, and also those that were involved in an EnviroSchools Programme were responsible for implementing this in their school. These groups usually had between 10 and 20 students, supported by one or two teachers and sometimes the principal. Some had a small operational budget, while others did not.

Most respondents thought that more principals were starting to come on board, and when this happened the initiatives had a greater chance of success. Respondents varied in their view on the role of boards of trustees with respect to the introduction of sustainability. These views ranged from the boards not being involved and not needing to be involved, to a view that their involvement is critical if a whole-school approach is to be achieved. Other drivers mentioned were parents, the curriculum, and external social influencers such as school neighbours.

4.2 National curriculum, assessment, guidelines and policies

Most of the comments at a national level were based on the Environmental Education Guidelines, the new National Curriculum, and assessment within NCEA.

Most respondents agreed that the introduction of the Environmental Education' Guidelines (1999) was a critical step and was helped by the establishment of regional advisor posts, coordinated nationally. However, they also felt that the Guidelines have not been able to achieve as much as they could have, due to 'only being guidelines' which were not built into any compulsory part of the curriculum. Although the guidelines are titled 'environmental' not 'sustainability', most respondents that talked about them thought that they did have an integrated approach, which was aligned with broader sustainability principles, especially in their references to 'education for the environment' and to action-based learning involving environmental projects.

Respondents thought the new National Curriculum statement was a step forward and were keen to see it implemented. However, they felt that the 'Education for a Sustainable Future' theme could still easily be ignored by schools and teachers if they chose to. Flexibility was seen by most as a key strength, providing an opportunity to change the local curriculum and teaching, and base it on sustainability principles and on working in a more integrated way. However, it was also thought that only the bravest schools would take up this opportunity, because change is not explicit in the statement, and most schools are too focused on assessment. A teacher put it like this *"The key competencies in the curriculum suggest that teaching methods needs to change, but there is no mandate for this around sustainability and it's easy for teachers to continue with business as usual."*

It was interesting to note that few of the second group of interviewees, whom we met soon after publication of the National Curriculum update, had yet studied the final document. Of those who had, social studies appeared to be an area where EfS action could be taken early. *"There is scope for work on decision-making and participatory activities, citizenship, perspectives and tolerance of difference, and cooperative action."* An advisor thought that *"sustainability would connect with learning about globalisation and enterprise: These fit with the curriculum and are not huge shifts for teachers to make."*

The majority of comments around assessment were based on the need for EfS to fit into the current assessment framework, because students, and their parents, most value gathering the credits that they need to get to the next level in their qualifications. Another common comment was that the EfS standards need to be easy for teachers to implement. A couple of respondents thought that the current NCEA achievement standards in some subjects, such as geography, were already flexible enough to include sustainability issues. However, they also thought that most teachers use NCEA as a replacement 'School Certificate' and only teach the information that will get the students through the system, as opposed to seeing NCEA's design intention of flexibility. To add to this, the following sheds some light on the discussions in 2007 around assessment. *"Some people say we should be getting away from assessment-driven learning and therefore creating an Achievement Standard on EfS is just perpetuating the problem. But others see having a Standard as legitimising EfS, and as providing an enormous opportunity for learning. Teachers that want to move beyond assessment can still do this with the new Standards. So I do see NCEA as an opportunity, but with the media backlash (about NCEA) at the moment (early 2007) it is a struggle to keep it there. There is now a lot of parental pressure, because of the way NCEA has been portrayed by the media."*

Most thought that for EfS to work it will need to fit into our current education system, rather than the system change. One respondent put it like this: *"We need to develop assessment components that teachers can easily include in their timetables."* Only a couple thought that

to strive for true sustainability the schooling system would need to change, mainly around teaching and assessment methods.

The main barriers respondents perceived with regard to NCEA and the National Curriculum were:

- Too much change over the last decade, many schools can't handle any more change
- Negative media portrayal of NCEA undermines school confidence to innovate
- Secondary education is assessment driven and therefore most of the learning is 'about' received and reproducible knowledge, instead of student directed, exploratory or action-learning projects
- Teachers have to up skill themselves and there are limited opportunities to do this – need more courses and funding to attend them
- Sustainability was not explicit enough in the Draft Curriculum, but better in the final version
- The new sustainability achievement standards need models that others can follow.

4.3 Implementing curriculum activities in schools

There was a wide range of perspectives expressed about how sustainability is incorporated into the curricula of individual schools, from it not being incorporated at all, to it being an underlying principle behind the school's philosophy.

Teachers

Most respondents thought sustainability was not a main focus of any class. Both the students interviewed thought that its occurrence was minimal. It appears that the majority of teachers do not explicitly incorporate a sustainability focus into any of their classes. Most respondents said it depended on keen teachers rather than the institution. It seems that there are a few teachers that - no matter what subject they taught - always incorporated sustainability into their classes. One respondent, a geography teacher, incorporates aspects of social justice and globalisation into classes and relates these to environmental issues. This teacher also challenges students to think critically about their own behaviour. Another teacher led a history class that looked at the way people used to deal with waste. A third has introduced concepts of ecological foot printing and measuring carbon impacts as a student project. One principal would like to incorporate sustainability into the school's curriculum, but in 2007 was waiting for the National Curriculum statement to be finalised as a context for its introduction.

Subjects

The subjects that sustainability was thought to occur most often within were mentioned in passing by most respondents. These were (in decreasing order of frequency mentioned):

- Social Studies
- Geography (but "*tends to be more theoretical than social action,*" said one)
- Biology
- Economics
- Media Studies
- Science and Technology¹

¹ We did not set out to interview teachers from any particular subject. For example we did not talk to any secondary Mathematics or English teachers. Accordingly our list of subjects is likely to under-represent the potential contribution of these core subjects to whole-school activity, given the cross-curricular nature of sustainability values in the revised National Curriculum.

Most respondents thought that sustainability needed to be a cross-curricular theme, to enable continuity and repetition of learning, but did not have many examples to illustrate the successful implementation of this. Their comments predominantly related to areas where they were trying to implement cross-curricular themes, and barriers found to this approach. One teacher was trying to get teachers in Economics, Social Studies and Environmental Studies to work in a more integrated way. Two respondents talked about running a school-wide environmental week, where all teachers are encouraged to include some aspect of the environment into their classes. Another respondent described a cross-curricular project on climate change, prompted by local screening of the Al Gore movie *An Inconvenient Truth*, as a highlight of the previous year. It was mentioned that this approach requires a lot of time, resources and some passionate people to make it happen.

One respondent (a principal) pointed to the need to recognise student skills and knowledge already gained at primary school and so have a cross-curricular approach at the junior secondary level to encourage continuity. Education for Sustainability coordinators try to encourage passionate teachers to integrate with other curriculum areas and teachers in the school to draw in new people to share their skills and knowledge.

External education providers

External education providers, usually in the role of an environmental education officer from a district or regional authority, play a part in the curriculum if they are invited into a school. However, the two respondents who work in these roles said the majority of their work is with primary schools and thus they had limited experience of secondary schools. They are normally invited in by a keen teacher and occasionally by a group of keen students.

Several respondents mentioned the value of enthusiastic guests visiting the school, whose endorsement of an event or topic builds credibility with students and school management. An education adviser described a school planning an NCEA-assessed sustainability course, for 2008, having success in using local environmental contexts and issues as the basis of the new course.

Local and regional authorities may have a number of action-based programmes on offer covering topics including air pollution, freshwater or marine life, waste management and public transport. These programmes are normally about a term in length and are often run jointly with other organisations such as the Department of Conservation. One of the local authority respondents said that she encourages teachers to challenge the students to think about their own behaviour and personal impact on the environment. They also offer help with individual classes and provide resources including professional help (e.g. talk to a scientist) for students who are researching particular areas.

Barriers

Collectively, respondents identified a number of barriers to incorporating sustainability issues into the curriculum at school level. These barriers apply more to environmental issues rather than social-cultural as the respondents generally focused on environmental issues:

- Students don't value environmental class options, partly because there had been no assessment, but also because they are seen as a subject choice "*for drop-outs from the academic stream*". There was one example where an activity of weeding out pest plants was used as punishment for low performance in an unrelated school activity. This perceived lack of value leads to a lack of numbers, so the EE classes don't get funded and can't run.
- Sustainability is not compulsory – so only enthusiasts take it up; teachers have good intentions, but due to other priorities/commitments these are not followed through.

- Even when the school philosophy understands that ‘everything is connected’, students still do not make sustainable choices. One respondent (a teacher) thought this was due to poor preparation at primary school, and noted that *“many students are able; but the challenge is finding them willing.”*
- Secondary schools are often very large, which means implementing anything across the whole school is very hard to organise, so most of the time initiatives are done on an ad hoc single-class basis, with little whole-school strategic planning.
- Secondary schools are bound by their tight/full timetables and structure – so it is difficult to make space for any new programmes. *‘Schools always add and never subtract jobs.’* *“For teachers to incorporate ‘stuff like sustainability’”* they need more resources and time, and, as it enters the curriculum, other items will have to leave?

4.4 Sustainability within everyday school operation

Recycling and tree planting were the most common action-initiatives talked about by the respondents, followed by energy efficiency, water-use efficiency, worm farms and social initiatives. Of the recycling initiatives, paper was thought to be the most successful, *“because it is easy”*, although one teacher commented that new paper is still too cheap for recycling to be taken seriously. Respondents who talked about tree planting also talked about this being an activity that included charitable trusts and the wider community. There appears to be scope for good public relations and profile-building for schools, from their sustainability actions in the community.

There was a general feeling that environmental awareness was increasing within schools. However, some respondents thought that most of these types of initiatives were not being integrated well into learning, were done on an ad hoc basis with little strategic planning, and rarely dealt with bigger issues of sustainability. One respondent phrased it like this: *“Most end up trying to recycle – can’t say they reduce waste to landfill however, as this is a bigger issue and learning curve – especially asking (and answering) why they are doing it.”*

Respondents talked about a variety of energy-efficiency initiatives at school premises: EECA energy audits, removing unnecessary lighting or replacing filament lighting with energy-efficient fluorescent lamps, designing new buildings with energy efficiency in mind, using solar photovoltaic panels, and converting coal-fired boilers over to cleaner-burning technology. Some respondents related adoption of these efficiencies to expected cost savings as well as environmental gains. Among the stage-one interviewees there were only a couple of comments about social initiatives that contribute to sustainability, a reflection that most respondents were thinking mostly about the environment when talking about sustainability, rather than social, economic or cultural aspects.

One respondent (a Catholic-school science teacher) found that the explicit values base to their school’s culture aided inclusion of value-driven behaviours and discussion on issues such as fair trade, in the school operation. Despite this the teacher commented: *“Our school is not ready to view education for sustainability as a big issue. It is being approached as a series of disconnected issues such as international equity or recycling, and the dots have not yet been joined between these initiatives. We need to define, as a school, what is important to us. And once we do we will be ready to adopt indicators of success in sustainability programmes.”* Another described current sustainability curriculum content in their school as *“accidental, not intentional”*. For several the *“perception and awareness of colleagues on this is very low”*.

A number of barriers were highlighted. These barriers fall into three main groupings: process related, recycling and waste related, and cost-efficiency related.

Process related:

- Some teachers are not supportive, making it difficult for initiatives to work – they see the environmental actions as too time consuming
- Lack of effort. Staff who model lazy habits, “who argue that recycling or reducing car use doesn't matter. So why should students do it?”
- In one school, students were not supportive although teachers were keen
- When keen staff leave, the EE or EfS programmes that they have personally implemented are lost, so it is important to have systems in place that enable continuity as staff change
- Sometimes it is hard to get caretakers or grounds managers involved in actions, so rely on students or teachers volunteering
- Schools not ‘walking the talk’ of sustainability in procurement decisions
- External social drivers, such as consumerism, override educational initiatives
- Lack of consultation when initiatives are being put in place, if principal- or board-led

Recycling and waste related:

- Council does not collect the recycling material, so the school is totally responsible for this
- Plastic more difficult as someone has to sort it, to select the recyclables
- Health and safety issues with sorting recyclables
- Sometimes council or firm won't take items for recycling, due to small New Zealand market etc.
- *‘School is in central city, therefore difficult to keep waste out as students go out to buy lunch and bring back waste. Have tried to work with local eateries, but have not been very successful.’*

Cost-efficiency related:

- Wanted to purchase recycled copier paper, but limited by finances, as it costs more
- Too expensive (in capital cost) to change from coal-fired burner to better system, even though coal is polluting
- There is funding to be had, but even for small amounts there is a lot of administration – often the time it takes to fund outweighs the benefit of the funding
- The Ministry of Education only provides money for buildings built to minimum standards, therefore there is no room to be innovative and sustainable

4.5 Integrating school operation and curriculum

On the whole, respondents did not see the everyday operation of the school and the curriculum learning linking together to support EfS goals. However, most saw a need for the operation and curriculum to be linked in a strategic way, so that students' learning around sustainability is reinforced by what they see throughout the whole school. One respondent talked about having a sustainability policy that included both operational and curricular areas, and another a Triple Bottom Line reporting at Board of Trustees level. But it was still a struggle in practice to have integration. Respondents from the special-character (including religious) schools felt that their schools' operations and curricula were integrated better than state schools, but admitted there was room for improvement. One said that they do have whole school discussions around topics like ecological foot printing, but students were still reluctant to take on any responsibility, for example when it came to waste minimisation through reduction and recycling. At another special character school, the board of trustees chairperson thought the whole school was run in a sustainable, no waste manner, but a teacher from that same school expressed frustration over lack of sustainable procurement.

The Enviroschools Programme was mentioned by most respondents as a move in the right direction towards an integrated approach. They felt that enviroschools offered a good step-by-

step, ground-up approach. However, they were also quick to mention that this programme, although successful in the primary school system (which it was initially designed for), is much more difficult for secondary schools to utilise due to the nature of the secondary system, which is subject and assessment focused. Some also thought that the EnviroSchools Programme was still very much focused on environmental aspects (EE) rather than a more integrated view of education for sustainability (EfS).

Although a whole-school approach was not an explicit part of the interview schedule, all respondents touched on aspects of it and many saw it as one of the ways forward. One interesting point that came out of the interviews, keeping in mind the small sample size, was that state-school respondents saw sustainability principles being more visible in the operation of their school than in the curriculum content. The reverse priority was raised by the special-character-school respondents. Both types of school thought that better integration of curriculum and operation was needed in the future. One respondent gave a good example with regard to the recent building of a new school (operation), but pointed out that the students did not gain any learning experiences about helping with decisions and seeing how a sustainable building is built: *“They are keen to set up in a good way and are keen to come on board – unfortunately they have made these environmentally friendly schools, but the students have had nothing to do with it.”* Yet, this would have been a great opportunity for the students to be involved in the operation and learn from it.

Most respondents felt that there needs to be more involvement of people throughout the school, from Board of Trustee members through to students and parents. They felt that there need to be strategies and policies to make sure this happens and that boards and principals need to take a stronger lead. Some schools already do this, but most don't. It was felt that enviroschools were trying to help schools with this approach, but for this to work in the future, enviroschools would need more funding and would need to further develop their programme to better-suit secondary schools.

A few of the respondents thought that decision-making was a key component of sustainability and hence should be a key part of students' experience at school. They felt students should be involved in decision-making throughout the school. The special character schools mentioned that they do this to a certain level already. One respondent put it like this: *“In state schools decision-making is remote. Students need to be involved in decision making at all levels, otherwise sustainability initiatives are just a band aid (sticking-plaster) to make you feel good.”*

The main barriers to better integration across the whole school were seen as:

- Staff need funding, time and resources, to enable a whole-school approach, as at the moment it is voluntary
- The assessment, subject and timetable focus of secondary schools is a barrier to better integration
- The demand for the EnviroSchools Programme outweighs the supply of trained facilitators
- EnviroSchools is cross-curricular, project-based and geared towards primary schools, therefore, it is difficult to implement in large secondary schools
- Not enough funding, in general, for the EnviroSchools Programme (some areas of New Zealand excluded)

Beyond these barriers, some respondents noted that it is difficult to teach sustainability to students as the wider societal system does not encourage practices that are sustainable. Even when the school philosophy is oriented towards sustainability, some respondents commented that students seem to be influenced by societal consumerism more than by what the school advocates.

4.6 Teaching practice change

Only about a third of respondents talked about the need to change the way we teach, but those that raised it saw it as being critical to enable the shifts in society needed for a more-sustainable future. As an EE advisor put it: *“Teachers need to be less of a transmitter, to allow students to learn cooperatively and use a variety of different strategies.”* These respondents thought that teaching needed to change from being a directive role (i.e. standing at the front of the class and telling students what to do) to a facilitator or guide-type role, aimed at enabling students to think critically and become motivated, active learners, which is more like adult community education practice. One thought that communication, facilitation and dialogue skills needed to be valued more in the education system. Another talked about challenging their students to be more questioning whilst encouraging teachers to back up what they teach with their own and the students’ suggested, actions. Yet another said: *“Teaching sustainability needs a more active learning approach.”* The school EE advisor thought that *“none of these (sustainability themes) would be hard if the teachers can first make the mental shift in how they relate to sustainability and can then facilitate those links for students.”*

Respondents from the special-character schools commented that the existing philosophies behind their schools are about social responsibility and providing better learning environments, which enable students to develop critical thinking. They considered this may help them to introduce education for sustainability.

The same group of respondents talked about the need for increased pre-service and in-service teacher training around sustainability, including training in participatory methods where students have more control over their learning. For example one respondent said: *“Mostly the courses (available in NZ) are around EE and outdoor education, and to a lesser extent around EfS. They are not compulsory, apart from one at Waikato, but this is for primary teachers. Christchurch College of Education has training courses around EfS and these include teaching practice, but again they are not compulsory.”* Another respondent put it like this: *“(one of the national coordinators for EfS) has rolled out introductory courses in EE for teachers around the country, but not enough of that is going on. There are pre-service courses at the Christchurch College of Education (part of University of Canterbury), but these are not compulsory and only get about 20 students each time, so most students won’t do anything on it. Training at the College of Education leaves a lot to be desired in terms of real transformative education. If we are actually going to fulfil the desired outcome of the draft Curriculum, education for teachers needs to be about transformative learning, and it is not standing at the front of a class telling them what to write down.”* The same respondent backed this up later in the interview by saying: *“We have a long way to go in New Zealand. The secondary system is probably in a bit of a crisis at the moment because we have had so many ad hoc changes, when what we really need is a change in the way we educate teachers. They (teachers) need to learn how to encourage critical thinking and problem solving in kids.”*

However, a number of barriers were mentioned as working against a change:

- Teachers have to be motivated to (want to) upskill themselves in new methods such as action learning
- Trainee teachers get motivated to change their teaching method and incorporate sustainability into their classrooms, but often do not get adequate support once at work and are (subsequently) under pressure from the school to cover its curriculum for assessment. *“EfS has to be assessed, for it to count.”*

- Not enough extra training is available: too few in-service courses to choose from and little funding to attend
- Lack of focus on students' needs
- Teacher training is still not about 'transformative learning' but transmission

Even those motivated to change their teaching style find it difficult to do so – it will take time and practice. *“For example practice working across departments, so that the same themes and issues could be studied from different learning areas and students get to see the bigger picture.”*

4.7 Lifelong learning

The last theme that respondents talked about was the need to ensure greater continuity of learning around sustainability throughout the education system and into the wider community. More than half the respondents talked about the need for primary and secondary schools to work more closely, so that learning experiences gained at the primary level could be backed up and built on at the secondary level. One respondent offered an example of why this is important: *“Even when the school philosophy is around understanding that everything is connected, it is still difficult to make this part of students' decision-making, because they have not had the (preparatory) training at the primary level.”* Another respondent talked about the need for strategy at a national level: *“There needs to be a national policy/strategy for EfS that links all learning centres – Government involvement needs to be more strategic.”*

Respondents talked about the need for continuity beyond school boundaries and into the wider community. The majority of the responses on this topic were about society influencing schools as opposed to the other way around, and about schools needing to be aware of the wider society. The following quotes summarise this discussion:

“External drivers need to be acknowledged and understood, such as social marketing – look at all the other messages students are getting outside school walls.”

“Kids' attitudes reflect the wider society of materialism and individualism – therefore, we need to change all these things, not just in school. Even in schools that teach in a holistic way, kids are more influenced by society in general.”

“There is a lot of conflicting information in the wider community and media. People are willing to do the right thing, but they need good information.”

“Enviroschools provide small steps that will eventually influence the wider community.”

5. Discussion

All respondents saw the need for sustainability to be incorporated into formal education, which we would expect given our process of locating interviewees. Most thought that there was already an element of sustainability in some schools, mainly based on the environment, but that the majority of schools were still a long way behind. They all mentioned a recent increase in public awareness about human impacts on the environment, but most felt that this had not, in general, filtered into action. They thought that the main drivers behind EfS in New Zealand secondary education would come from the implementation of the new curriculum statement, the EfS Achievement Standards (NCEA) and integrated initiatives such as enviroschools.

When discussing strengthening capability in EfS there were two main themes. The first was the need to place less emphasis on getting the student to learn facts, and to move the emphasis on developing the student as a learner – able to work with others to co-create new knowledge. And the second was to move towards more integration at all levels. In particular the need for a whole-school approach was mentioned, the need to better link schools within the wider community, and the need to provide for better continuity of education and curricula from primary levels right through to tertiary.

There were a number of issues mentioned less often, but regarded as no less important. These included the need for good school models and resources that other schools can see and use. Finding funding for initiatives is often inflexible and takes as much money to administer as the funding provides. Other respondents noted that it is hard to get the time to do ongoing in-service training. Finally some respondents reminded us that it is important to make EfS activities fun and ‘cool’. There is a need to emphasise the positive things people can do, instead of focusing just on the negative impacts of society.

5.1 Perspectives on the current situation

When discussing sustainability in the secondary school system, most respondents talked about sustainability in the context of being an ‘add-on’ rather than infused throughout the school system. In the same vein, most reported that environmental project and curriculum initiatives were ad hoc and individual-champion-driven. This majority response is not surprising, and has been documented elsewhere (PCE 2004; Bolstad et al. 2008). This suggests that little had changed ‘on the ground’ in the years since the release of *See Change – learning and education for sustainability* (PCE 2004) which observed: “*most environmental education to date has focused on green topics... (such as) tree planting and nature conservation.*” Therefore, it seems that in the context of the above description of EfS goals, practice on the ground in New Zealand secondary schools still has a long way to go to match the theory (e.g. Chapman & Eames 2007).

Most respondents thought that, in general, sustainability was neither the main underlying principle of the curriculum nor of the operation of their school. When and where sustainability was part of these activities it was driven by individual champions (mainly teachers), and examples of integration across curricular and operational activities was even rarer.

5.2 Context of increased public awareness

All respondents thought that there has been a recent increase in public awareness of climate change and sustainability issues in New Zealand, and that this awareness was increasing school staff, board and principals’ demand for sustainability initiatives in their schools. Most respondents talked about this demand being manifested in specific-project-based initiatives, like waste reduction, or within a single subject area of the curriculum. They saw a need for EfS to fit into the current system through links between the local curriculum, NCEA-approved assessment (such as new Level 2 Achievement Standards on education for sustainability) and the daily operational practice of the schools. However, there still seems to be a rather large gap between the increase in available information resources and awareness, and a change on the ground towards more sustainable behaviour.

5.3 Integrated approach

The few respondents who talked about an integrated approach (in line with the goals of EfS) mainly did so in the context of their hopes for the future. The Enviroschools Programme was used as an example, but with awareness that its progress has mostly been made in primary

schools. Whole-school approaches, such as the Enviroschools Programme, are advocated as an example of changing the system within the school and overcoming some barriers, but this approach struggles at the secondary level, both in New Zealand and elsewhere (Henderson & Tilbury 2004).

When discussed in relation to secondary schooling, barriers to successful integration were highlighted. Other researchers have discussed this (Sterling 2001; Fien 2004). The assessment focus, subject separation and timetabling of the secondary system limits cross-curricular activity and stakeholder participation in whole school decision making (Eames et al. 2008). The lack of examples of a whole-school approach at secondary level is also apparent in the literature (Gough 2005; Environmental Protection Division: Ministry of Education 2008). Henderson & Tilbury (2004) reviewed a variety of whole-school approaches to sustainability from different countries and found that uptake of this approach in secondary schools was limited compared to primary schools, for the same reasons.

Our respondents from special-character schools felt they were better able to infuse sustainability principles into the school, as their school structure and values were more compatible with EfS. However, they also thought there was still much room for improvement.

5.4 Lifelong learning

Within schools

Most respondents indicated a need for better integration between EfS initiatives at primary, intermediate and secondary schools, so that the learning developed in the earlier schooling years are not undermined or lost when students enter the secondary system. This requires a more strategic approach where all levels work closely together. This strategic integration, the interviewees told us, would go some way to removing the ad hoc nature of most current EfS initiatives. One school principal explained the benefits of having cross-curricular themes operating in the lower secondary years, so that there were better opportunities for continuity from the primary system. Students themselves may be driving this approach. One example provided by a respondent was that when students from a primary enviroschool started at secondary, they successfully campaigned for their new school to become an enviroschool.

A couple of respondents talked about examples where this more strategic integration already happens. One example of an education system that already takes a continuous approach is Rudolf Steiner education (<http://www.nn.steiner.school.nz/why.html>), where students start in kindergarten or primary and can stay in the same school to the end of secondary. The curriculum in this system is structured so that subjects are linked by themes to enable a continuous and holistic learning experience.

Reflection and evaluation

Another factor thought to be a key for successful EfS is developing skills in reflection and evaluation (Fien 2001; Sterling 2001; PCE 2004; Tilbury & Cooke 2005; Jensen & Schnack 2006). The survey respondents felt that there was little reflection practiced in their schools on the successes and failures of sustainability initiatives. The council-based environmental education officers talked about evaluating their programmes through small surveys and the outputs of student projects. On a wider scale the Education Review Office (ERO) school reviews/evaluations are a key driver behind the direction that schools value and could help in any reflection process. These reports have the potential to give EfS a more valued role. However, ERO reports reinforce school undervaluing of EfS by not giving it much exposure (Bolstad et al. 2008). Broad reviews have been undertaken in the past (Bolstad & Baker 2004; Bolstad et al. 2004; PCE 2004), but the more holistic idea of reflection that includes all

stakeholders seems to happen vary rarely. However, respondents commented that there are education oriented networks in New Zealand where issues could be raised and reflected on, such as the New Zealand Association for Environmental Education (NZAEE).

Beyond schools

One area that was touched on by respondents was the role of the wider society beyond the school gates. Students are influenced by many sources and the respondents who discussed this thought that New Zealand needs to be a lot more strategic about the information and influences that are in society. One of the main barriers to behaviour change is conflicting and often poorly presented information (Sterling 2001). Schools need to be aware of the messages their students are getting from wider society if they want to be a catalyst for change, as opposed to just a reflection of society's status quo (Tilbury 1995; Sterling 2001).

Most of the respondents thought that public awareness of sustainability issues was increasing, partly due to climate change and this was driving some ad hoc change in schools, but that in general this awareness is not translating into behaviour change. Underlying this problem is peoples' lack of confidence that anything they do will make a difference, which leads us back to the importance of learning in a new way that enables confidence to act (Fien 2004). The other problem, respondents felt is holding people back, is that information in the wider community is often conflicting, misleading or false and therefore they do not have confidence in the information that would guide any action.

Of course schools also set out to provide the framework which people will use to find out about their world, do their jobs, and be good citizens. This inquiry process builds on the skills we first develop at school and carries on during our whole life. People are spending more and more time learning, not just in classrooms or during work, but also at home, after work and on weekends. Surfing the Internet, participating in on-line discussions, watching television documentaries, and reading newspapers are all experiences that contribute to what is known as lifelong learning. Getting involved in local environmental initiatives such as clean streams, and participating in public debates around the emergence of new technologies are all examples of how this learning impacts the sustainability debate. This is essential for sustainable development and helping to avoid unsustainable practices as it provides a valuable mechanism for helping people engage with new ways of seeing the world and supports constructive change. As Martins et al. (2006) point out, anecdotal evidence shows that the likelihood of this happening depends largely on the ability of school teachers, parents and the media to communicate the pleasure of "finding things out".

Futures thinking

While it is important to learn from the past, education for sustainability is by its very nature future focussed. As Tilbury (1995) points out, "*this involves learners in an examination of probable and possible futures this exercise is crucially linked to the development of hope, empowerment and action.*" In this regard it is important to maintain a long-term perspective as the choices that our institutions, industries, and cities make today can have large implications for the future.

Having a future generations focus is thus a key part of EfS. One such project in New Zealand is called 'Secondary Futures' and was set up to "*encourage discussion and debate about the role and purpose of secondary education in New Zealand, twenty years from now – creating a mandate for change*" (Durie 2005). However, it seems that some obvious links are not being made. Hicks & Holden (1995) ask the question: "*If one of the key roles of education is to prepare young people for the future, why is the future a missing dimension in education?*"

Support networks

Support networks for EfS were considered important by respondents (see Appendix 3 for a list of networks mentioned). These have strengthened over the last decade with the development of a national EfS coordination team, the NZAEE, Enviroschools Foundation and local government involvement through Resource Management Act (Wilson-Hill & van Rossem 2001) and Local Government Act 2002 obligations. Other networks that people mentioned included:

- New Zealand Association for Environmental Education (NZAEE) as a network <http://www.nzaee.org.nz/>
- National and regional EfS coordinators <http://www.e4s.org.nz/efs/about>. As part of their responsibilities to the Ministry of education, one objective is to create a learning community
- Enviroschools Foundation (for member schools) <http://www.enviroschools.org.nz/>
- Links with local and regional Government
- Links with Central Government (DOC was mentioned most often, then MfE)
- Links with NGOs such as environmental trusts and environment centres <http://www.mfe.govt.nz/withyou/funding/centres.html>
- Links with scientists at Crown Research Institutes and the Royal Society of New Zealand
- Links overseas – by searching the World Wide Web and magazines

5.5 Where participating respondents want to head

When discussing strengthening capability and capacity in EfS in secondary schools, the respondents thought that five key areas for action in New Zealand were:

- Curriculum development and new supporting materials
- Achievement standards in EfS from NCEA, with worked examples to aid adoption
- Teaching/learning practice changes, backed by accessible in-service training
- Better continuity from primary through secondary and on to tertiary/community education (discussed above)
- Whole-school approach to allow demonstration by ‘walking the talk’ (discussed above)

Most of the respondents believed that EfS would be driven faster in the future by the revised New Zealand Curriculum (Ministry of Education 2007b), and new EfS NCEA achievement standards. They believed that these would enable adoption of EfS and would substantially address some current barriers, such as lack of cross-curricular themes and low student voluntary participation in EfS course options due to previous lack of assessment in the area. Compared to the old curriculum, the new one does explicitly talk about sustainability in a number of areas (see Appendix 2) and provides flexibility so that each school can respond in their own way depending on their student needs (Chapman & Eames 2007; Ministry of Education 2007b). This flexibility will allow schools that are interested in an EfS approach much more scope to explore, but it also means that some schools may be able to ignore a more sustainable approach. A consultation process has recently been undertaken as a step towards updating the EE guidelines (Chapman & Eames 2007). It will be interesting in a few years time to see what impact the new curriculum, achievement standards and guidelines have had on the EfS landscape in New Zealand.

Secondary education system change

A few respondents felt that although the curriculum, guidelines and achievement standards would help, what actually is needed is a whole system change, as is suggested by Sterling (2001, p. 21) who writes: “*Yet most education daily reinforces unsustainable values and*

practices in society. We are educated, by and large, to compete and consume rather than to care and conserve.”

This idea is built on by Fien (2004, p. 6) who writes “...*there is a need for a major philosophical reorientation of secondary education.*” This theme is echoed by Bolstad and Gilbert (2008) who argue that it is not enough for our schools to produce people who are knowledgeable; we need to develop adaptable, technologically and socially adept people who can use and create knowledge. The perception that there needs to be a change in the system itself to achieve sustainability is by no means restricted to education. A similar debate is happening around current economic paradigms since the global financial turbulence of 2008–09 (e.g. Speth 2008).

Teaching practice changes

If changing the system that teachers operate under is needed, then teacher practice will require a redesign (Fien & Corcoran 1996; Sterling 2001). A few of our respondents talked about the importance of changing teaching practice, indicating that the way we learn is fundamental to enabling creative and critical thought. They thought that this was occurring in a small minority of schools, but that most teachers still use a transmissive approach as opposed to a transformative approach. They noted that teacher training in New Zealand, in general, was not directed towards enabling critical thinking and reflection by students.

Some of the respondents and many education researchers believe a redesign of teacher training is critical for the success of EfS (Tilbury 1992; Fien & Tilbury 1996; UNESCO 2005; Ferreira et al. 2006, 2007a or b?). Tilbury (2005) reminds us “...*that the overall aim of ESD is to empower citizens to act for positive change, point to a process oriented, participatory and action-oriented learning approach. This has implications for not only what we learn but also how we learn – something that ESD researchers have been arguing for some time.*”

There is some evidence that students would respond favourably to a transformative approach. Taylor (2005) found that secondary students encouraged to participate in classroom discussions around sustainability reported a heightened sense of personal empowerment in the face of environmental problems. An interviewed teacher referred to the value of “*involvement and taking action by students so that the doing provides learning*”. This heightened sense of confidence and empowerment felt by students involved in a learning experience, which included participation, decision-making and acting on those decisions, was also found in surveys completed by other researchers (Fien 2004; Eames et al. 2008).

Providing better learning experiences requires changes in teacher practice. EfS is not an endpoint, it is a process – this makes teaching practice critical to transformative education. Some respondents talked about the need for more extensive pre-service and in-service teacher training. In a review of EfS in New Zealand, Bolstad et al. (2008) concludes “...*there is no teacher education institution in New Zealand that guarantees that every teacher graduate has had access to EE/EfS during their study.*” This problem is not restricted to New Zealand, and is highlighted as a key issue in international forums. For example back in 1990 the United Nations Educational, Scientific and Cultural Organization (UNESCO) identified teacher training towards EfS as ‘the priority of priorities’ (UNESCO-UNEP 1990). Although there is a wealth of literature and information about this need and guides on how to reorient teacher education, a number of reviewers note a lack of governmental and institutional willingness to change (Tilbury 1992; Fien & Tilbury 1996; UNESCO 2005; Ferreira et al. 2006, 2007a, b).

Whole-of-Government approach required

For EfS to really work in all New Zealand schools and to align curriculum, assessment, teacher training, school evaluations, whole-school approaches, and better continuity of learning – a strategic whole-of-government approach is needed (Chapman 2004; Law 2005;

Bolstad et al. 2008). Historically, sustainability and environmental aspects of education have been referred to, but have not been given priority in New Zealand policy (Chapman 2004; Law 2005; Chapman et al. 2006). Even when the New Zealand government did attempt to put in place a whole-of-government approach to sustainable development with the Sustainable Development Programme of Action (SDPOA) (Department of the Prime Minister and Cabinet 2003) it failed to make EfS a priority (Law 2005; Chapman et al. 2006). Education is referred to throughout the document, both implicitly and explicitly, but it falls short of a clear strategy that would foster EfS principles in formal education.

5.6 Halfway through a decade of opportunity

The international community has given New Zealand an opportunity to realise the importance of education in the agenda of sustainable development, and a framework for action. This opportunity is the UN Decade of Education for Sustainable Development (DESD) 2005–2014. In the first few years New Zealand’s response was minimal (Chapman et al. 2006). The DESD was hardly mentioned by respondents in this study, which is a reflection of the low profile it has had in New Zealand. However, in 2007 a strategy for the Decade was released by non-governmental body Sustainable Aotearoa New Zealand Inc. (SANZ 2007). How SANZ will achieve the strategy goals without significant funding or the support of a governmental strategy is hard to imagine. Other countries, such as England and Finland, have national strategic frameworks for EfS (Department for Education and Skills 2006; Finnish National Commission on Sustainable Development 2006). Tilbury (2005) challenged Australia to use the DESD as lever or opportunity to put in place a national strategy for EfS. It would seem to be strategic for New Zealand to consider doing the same, as without political and governmental support, EfS will continue to be, as Gough (in Greenall 1987) and Chapman (2004) put it a “*game of Snakes and Ladders.*”

What does stand out is the need for a reflective, yet more integrated approach. As we point out in the previous section, schools require a major realignment that works to link a number of complementary activities to achieve larger-scale and longer-term institutionalised changes. These activities work together to provide understanding around sustainability, the initiation of a number of actions within a learning-by-doing framework, and a supportive environment for participation and collaboration.

6. Frameworks for Understanding Elements of Sustainability

The main objective of this study was for the authors (as sustainable development researchers) to gain a better understanding about where EfS is in New Zealand secondary schools today. As we go about our work we are often involved in capacity building initiatives with community members and organizational staff to strengthen the skills required for them to fully engage in a range of sustainability initiatives. These skills are those that reviewers in this area look for as evidence of EfS such as adaptive management, systems thinking, collaboration and a desire for lifelong learning. This study has let us engage with how our education system supports the building of those capacities. As we have engaged with schools in this way we see many similar challenges to those we are involved in as part of catchment management, pest management and biodiversity protection initiatives.

In this next section we highlight some areas where we may be able to join in the discussion around EfS, and in so doing broaden the network of researchers in this area by linking across the education and natural resource management sectors. This section outlines two frameworks which take into account the different ‘actions’ and elements that are required for an

organisation, in this case schools, to change from a business as usual approach to an EfS approach. The first of these is a framework for integrating across a number of areas crucial to sustainability. The second indicates how an action research approach can strengthen efforts in any of these areas.

6.1 A framework for integration

The results of studies looking at sustainability in education, including this one, paint a common picture which indicates that most schools first focus on one-off ideas and actions such as curriculum content changes or recycling as a first step. However, it seems that many of these initiatives are driven by one or two passionate individuals – be they teachers, students, parents or school staff. Most case studies writing up these initiatives point to the barriers that face the spread and uptake of these ideas. There are few cases where we can see how individual initiatives ramp up into a whole school, integrated approach.

However, the literature on how organisations become more oriented towards sustainability suggests that there are guides to how a whole-school, integrated approach can be fostered. To achieve larger-scale and longer-term institutionalised changes an organisation (e.g. a school) requires a realignment that works to link a number of complementary activities (e.g. Robert et al. 2002; Horn et al. 2003). These activities work together to provide understanding around sustainability, the initiation of a number of actions within a learning-by-doing framework, and a supportive environment for participation and collaboration. More specifically these activities help in developing a systems-based worldview; application of a philosophy (e.g. sustainability) that helps contextualise the actions taken; an understanding of the social processes required in an organisation to support constructive change; and a “monitor to manage” approach that creates the feedback and reflection necessary for constant improvement. For EfS we can also identify a number of important elements that underpin all of these actions. Each of these elements supports the others (see Fig. 1 and explanation of it below).

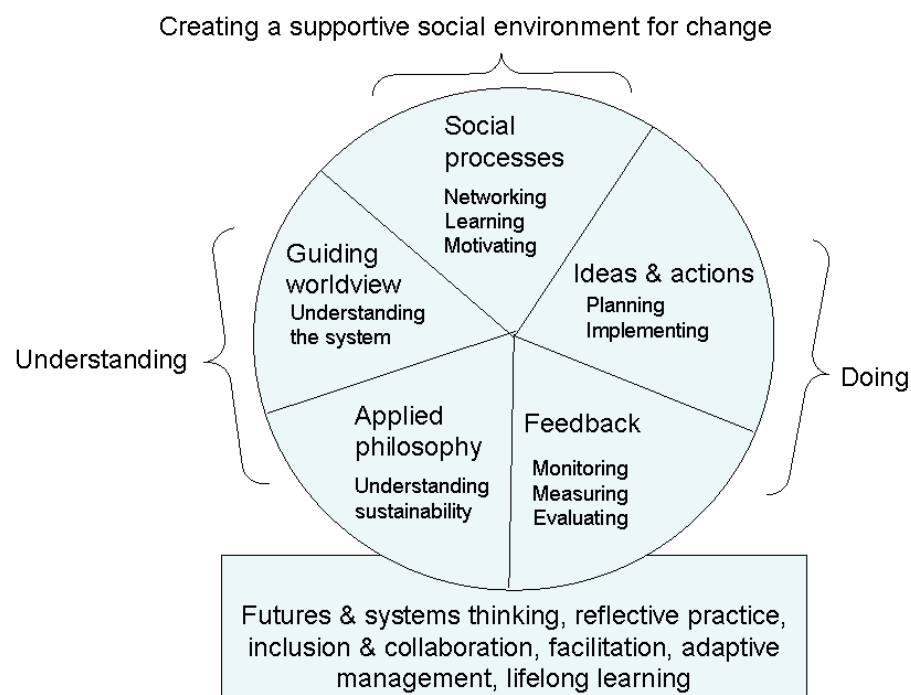


Fig. 1 Circle showing the five key activities required for supporting education for sustainability. These are underpinned by a number of important elements.

Understanding – a system view and applied philosophy

A systems view requires us to see schools as part of a wider network of players influenced by the social, economic and ecological environments in which they exist. For Robert et al. (2002) understanding the system means understanding the ecological and social processes on which we rely for our physical and psychological well-being. For schools the point of this is to be able to apply this knowledge of the system to thinking about their own operation and activities.

An applied philosophy is important to help bring principles of philosophy into the everyday practice of an organisation. Examples of such philosophies or frameworks that support sustainability are triple or quadruple bottom lines, and programmes such as The Natural Step or Enviroschools. All schools have an inherent philosophy although it may not be clearly articulated. This philosophy may emphasise embracing or resisting change, learning and innovation, social conscience or many other possibilities. These are also spelt out to some extent through special charters, or even the overall curriculum. The philosophy influences both the organisation's interest in taking up the challenge of being more sustainable and the fit that various change programmes may have with the organisation or school.

Doing activities and evaluating

Single actions taken by individual teachers or school staff are most often mentioned as the starting point, or even the evidence of sustainability. These are often based around tasks such as delivering the curriculum, or taking a class trip, or recycling. Actions are an important component as they are visible and provide a sense of achievement. Ideally though, as this framework points out these individual actions will be undertaken within the wider framing of sustainability that is acknowledged at a school level.

This in turn means that there is more likelihood of those individual actions being held up as islands of success that more activities should be seeking to emulate. Schools also need to learn how to evaluate the effects of their actions on the environment and on the students and people they influence (staff, students, families, suppliers, etc.). Measuring to manage is a key tenet of most teaching practice and business philosophy. Generating and interpreting feedback is also a fundamental ingredient in improving performance and is also a key process for learning to effect change.

It is also important to be able to point to evidence of success in these actions as a way of maintaining the momentum put in by motivated individuals. Celebrating these successes is also invaluable for creating a wider culture of change.

Creating a supportive social environment

What is learnt through undertaking activities and evaluating the results is usually that to help change current practices and thinking means helping people (be they students or staff) to 'learn' and change their behaviour. Thus the basis of change rests on some fundamental understanding of the social processes of learning and change.

Some underpinning social processes for successful change (Allen et al. 2002; Robert et al. 2002) include:

- Building capacity for students and people within the school to learn about and reflect on the results of their own actions
- Engaging with others involved in similar processes through building and joining in appropriate networks
- Developing fair and transparent change processes
- Agreeing on indicators that support task and process.

Underpinning elements

To achieve longer-term institutionalised changes schools require a realignment that takes into account a number of linked elements. **Futures thinking** is important because we need to know the general direction to be aiming for. **Systems thinking** reminds us that education, its subjects and the world are all connected and the lines we draw to demarcate subjects and institutions are just arbitrary and not in fact absolute.

Education for sustainability challenges people to **reflect on** why they undertake the **practices** they do, to ask questions and to challenge underlying assumptions. **Inclusion and collaboration** are important to let people have a say in the future world that they and future generations will live in. We have to be mindful that sometimes we marginalise important voices from the planning conversations that we have. **Facilitation** is important to manage the process of communication between all the stakeholders involved, and to help identify issues where power and other biases exclude some from joining in the conversation. It is also important that we manage adaptively - **learning** incrementally and from our **actions**. And finally we should strive to **learn for life**.

6.2 An action learning approach

Action research offers a practical method for capturing learning in order to develop good practice that can be shared. It is based on self reflective research, usually cyclic, conducted by practitioners that follow a process of examining existing practices, implementing new practices, and evaluating the results, leading to an improvement cycle. This is done in order to improve practice through understanding practice and the situations in which they are carried out. As Ferreira et al (2007) note this model commonly targets teacher educators and tends to result in curriculum and some institutional innovation. However, an action research-based model is by no means just restricted to this audience and may be used in a wide range of situations.

Action research provides educators with a systematic process to reflect on issues, consider options, implement solutions and evaluate results. Action researchers focus on constructing a detailed, coherent, useful understanding of what was intended, and of what actually happened and why. This type of initiative offers an opportunity to model the engagement and reflection that we will need to find our way to avoid unsustainable practices. In particular it encourages practitioners to:

- observe and analyze how the initiative is managed
- continually revise their thinking about the paths to achieving the results they want
- actively engage the various stakeholders to test the robustness of the initiative.

Action research is a valuable form of inquiry for teachers, students and others because it is:

- practical - the focus is on realistic, concrete improvements
- participative - teachers, assistants, students, parents and other school staff can all be involved in meaningful ways
- empowering - all participants can contribute to and benefit from the process
- interpretive - meaning is constructed using participants' multiple realities in the situation
- tentative - there are not always right or wrong answers; rather, there are a variety of possible solutions based on multiple viewpoints

Importantly, while action research is most commonly thought of as a research method, it can also be used as a process of professional development for students, teachers and staff alike. As Ferreira et al (2007) point out, initiatives that use the action research model are often

successful in bringing about change in organizations, curriculum and even pedagogy, and these changes persist even after the closure of the projects. One reason they suggest for this may be the strong support network that can develop between research participants when they engage through such a model. By undertaking an action research, or reflective project, as part of a wider group or network, participants are able to form into a community of practice. In the initiatives reviewed by Ferreira et al (2007) this facilitates ongoing collaboration and peer support.

Collectively the two frameworks discussed here offer a practical means for supporting school-wide change, while providing the ability to ensure that actions undertaken are best fitted to each individual context. It has to be acknowledged that approaches such as these do not offer a quick fix, but instead require ongoing commitment from participants across a wide range of institutional and social settings. Used within a school this combined approach takes a contextual approach to change and offers opportunities to align the efforts of a wide range of stakeholders in working collaboratively towards improving EfS efforts.

7. Conclusions

- This study revealed that in general EfS is still ad hoc and individual-champion-driven in New Zealand secondary schools and it reconfirmed a checklist of barriers described elsewhere in the literature (Bolstad et al. 2004; Brown 2004; Henderson & Tilbury 2004; Gough 2005; Law 2005; Pappill 2005; Taylor 2005; Chapman et al. 2006; PCE 2007; Eames et al. 2008) This lack of change in barriers implies that there is an underlying unwillingness to change school organisational structures and public policy.
- The main barriers which participants of this study reported were: lack of support from all parts of the system, funding, time, resources, and the negative perception of EfS by many students. The assessment, subject and timetable focus of the secondary system limits cross-curricular activity and stakeholder participation in decision making (Eames et al. 2008). However, the changes to the National Curriculum, the new EfS achievement standards, enviroschools' growth into the secondary sector and continuation of the national coordinators for EfS were expected to help combat some of these barriers over the next few years.
- Whole-school approaches, such as the Enviroschools Programme, are advocated as an example of changing the system within the school and overcoming some barriers, but this approach struggles at the secondary level, both in New Zealand and elsewhere (Henderson & Tilbury 2004). Moreover, it is seen by some as still concentrating on environmental education.
- However, there are emerging lessons from the literature on how organisations become more oriented towards sustainability that could be used to achieve a more integrated approach within schools. These organisational experiences suggest the need to develop an underpinning school philosophy and understanding of sustainability, to ensure a learning-by-doing approach is taken to support incremental change, and that attention is paid to the use of inclusive and collaborative social processes.
- Action research provides a means for professional and social development that can drive these changes. Initiatives that use this approach are often successful in bringing about lasting change, and a culture that supports the feedback and reflection necessary for constant improvement.

- Following on from the idea of a whole-system change is the notion of providing and encouraging better lifelong learning experiences. At the school level this would encompass continuity of learning from school entry to school leaving, so that learning experiences are connected and reinforced. Beyond schools we need to maintain and encourage learning skills, which can translate into increased public participation in environmental and social initiatives and active involvement in societal decision-making.
- National changes to support EfS need to simultaneously address the structure and aims of the wider education systems, teacher training and curriculum. Thinking in this area can take advantage of the international spotlight on EfS through the United Nations Decade for Education for Sustainable Development.
- EfS networks need to be strengthened and broadened to support those individuals and organisations that are working, often on their own, to pioneer new ways forward that support EfS.

8. Recommendations for Future Research

- Recognizing the many initiatives that are underway in this area there is a need to draw the lessons across them, particularly in the context of how initiatives can be integrated in a whole school approach. The use of learning networks based on an action research approach could support these in practice.
- There is a need to develop and agree on a range of indicators that let us reflect on how we are managing across the wide-ranging goals of EfS in our schools. By focusing on how these indicators change over time we will be in a better position to learn our way towards sustainability.
- We believe there is much to be learnt from enabling different sectors (e.g. secondary education, business, community education, conservation) learn from each other. It is likely that there will be many common paths that can support the transition to more sustainable practices. It may be possible to merge different sets of experiences to encourage and foster new creative solutions. This thinking could be enhanced with the introduction of innovative mixes of media using film, mind maps and diagrams, as well as narrative.
- It would be interesting to research education systems that take not just a whole-school approach, but also a continuous learning approach from school entry level to school leaving level and beyond, in terms of EfS.
- In an interlinked world it is likely that networking and new networks can play an ever-increasing role. Research is needed into the ways these networks can best be harnessed to provide support, ideas and motivation. They may be able to play a major role in supporting transition pathways. (the Royal Society Teacher Fellowships provide a simple example of this – e.g. Charlotte Baldwin's (Royal Society Fellow in 2008 based with Lincoln University and Landcare Research) project on environmental footprinting is one example of such collaborative development (although aimed at pre-secondary pupils) (Baldwin et al. 2008).

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Appendix 1: Brief guide to EfS literature

This literature guide is a tool to help the reader who wishes to do further reading. It gives brief details about each reference under different headings (see reference section of report for full reference details):

International history

- (Tilbury 1995) – Early discussion paper on EfS, provides some historical context
- (Fien & Corcoran 1996) – Teacher education networks in Asia-Pacific region
- (Tilbury 2005) – The 10 year challenge of UNDESD
- (Tilbury & Goldstein 2003) – Support for the decade from Australia, before it happened by IUCN
- (UNESCO 2007a) – Highlights of the decade so far
- (UNESCO 2005) – Guidelines for teacher education, culmination of many member states experience and views (NZ, Law 2005, p. 36)
- (Gough 2006) – Good historical paper from 1960 onward
- (Tilbury 1992) – Early reference on the importance of teacher training also good source of early history references. Shows that not much has changed between then and now, in New Zealand

New Zealand history

- (Law 2004) – on policy, but not practice, plus initiatives in New Zealand
- (Law 2005) – on history, policy and needs for UNDESD
- (Eames et al. 2006) – Covers a bit of history
- (New Zealand UNDESD Advisory Committee 2008) – New Zealand journey 2002–2009
- (SANZ 2007) – UNDESD New Zealand strategic plan
- (UNESCO 2007b) – Asia–Pacific progress towards UNDESD monitoring systems. New Zealand average in progress, Philippines doing best
- See Secondary Futures website: <http://www.secondaryfutures.co.nz/>
- (Durie 2005) – Secondary Futures project – demographic change in the future and ageing population being issues schools will face
- (PCE 2004) – *See Change* – review of EfS in New Zealand
- (PCE 2007) – ‘See Change evaluation’ notes a lot of progress, but more help needed at Secondary level
- (Barry 2006) – WWF response to draft curriculum
- (Bolstad et al. 2004) – Research into New Zealand EE practice, plus literature review.
- (Wilson-Hill & van Rossem 2001) – political restructuring in late 80s early 90s and local govt EE being driven by Resource Management Act and introduction of Tomorrows Schools – huge changes took place
- (Chapman et al. 2006) – Has good table of EE in New Zealand against political background. And talks about New Zealand ability (or not, as the case seems to be) to respond proactively to UNDESD
- (Ministry of Education 1999) – EE guidelines – Only small reference to ‘How to teach EE’ (pp. 19 and 74). EE in New Zealand schools does not reflect wider EfS principles (p. 15)
- (Williams 2005, pers. comm.) – Present status of ESD-related activities: documents status of ESD in New Zealand formal education in 2005. Good historical source
- (Chapman & Eames 2007) – Positioning paper for new guidelines, has a bit about history

EE/EfS theory and practice

- (Huckle 1993) – This is a theoretical paper and delves into capitalism and critical theory
- (Sterling 2001) – ‘sustainable education’ (one step on from EfS) – transformative education and how education has many contradictions to deal with

- (Kearins & Sringett 2003) – Use critical theory to develop skills in EfS in business schools
- (Saul 2000) – To tackle environmental issues we need to think critically and culturally and accept conflicts that arise from different cultural standpoints
- (Tilbury & Cooke 2005) – A national (Australian) review of EfS. Good source of definitions
- (Tilbury 1995) – EE versus EfS early discussion paper
- (Tilbury & Wartman 2004) – Critical thinking and EE vs EfS
- (Jickling 2000) – Criticises the use of the term ‘sustainability’ and EfS as limited, deterministic, exclusive, etc.
- (Law 2005) – Good summary of initiatives in New Zealand to that date
- (Tilbury et al. 2005) – Current landscape in Australia, similar issues to New Zealand, some success stories
- (PCE 2004) – *See Change*. Review of EfS in New Zealand schools and community
- (Tilbury 2005) – The 10-year challenge of UNDESD, provides definitions
- See WWF China for environmental educators initiative (Tilbury & Wartman 2004) http://www.wwfchina.org/english/sub_loca.php?loca=14
- (Scott 2002) – Need to be careful when using EfS as social lever as important to understand learners’ context and be careful to not exaggerate problems. Sustainability needs to be learnt in context of decision making. Outlines teacher responsibilities
- (Fien 2004) – surveyed youth attitudes and behaviours about sustainability across Asia–Pacific with implications for curriculum and system shifts and pedagogy shifts especially in secondary. Also discusses government goals for education being contradictory and why
- (Jenkins & Jenkins 2005) – Looks at the difference between EE and ESD (Pacific focus)
- (Chapman 2004) – Suggests that more needs to be done to develop political support, as without it, it will always be a game of snakes and ladders. He is also critical of the Bolstad, Cowie & Eames (2004) report in not addressing this, and points to the education priorities government report as rhetoric.
- (Bolstad & Gilbert 2008) – Good reference for New Zealand updated secondary curriculum. About rethinking the senior secondary years to suit the 21st century
- (Bolstad et al. 2004) – Research into New Zealand EE practice, plus literature review.
- (Wilson-Hill et al. 2008) – Action competence in New Zealand schools
- (Jensen & Schnack 2006) – republished paper from 1997. Original paper on ‘action competence’
- (Ministry of Education 1999) – New Zealand environmental education guidelines
- (Gough 2005) – Evaluation of whole-school approach in six schools (one secondary) in Australia. Also looks at differences between EE and EfS
- (Papprill 2006) – EE and the move to EfS and that EfS is fundamentally about values and ethics
- (Chapman & Eames 2007) – Positioning paper for new guidelines – talk about new term of EEfS and theory not matching practice

Teaching practice/training

Professional development

- (Bolstad et al. 2008) – WWF funded report on the state of EE in New Zealand
- (Bolstad et al. 2004) – Research into New Zealand EE practice

Pre-service training of teachers

- (Tilbury 1992) – Early reference on the importance of teacher training also good source of early references. Shows that not much has changed between then and now in New Zealand anyway
- (Bolstad et al. 2008) – WWF-funded report on the state of EE in New Zealand

- (Ferreira et al. 2007a) – Reviews three models of teacher training used internationally and recommends using a new model which incorporates success factors to mainstream teacher education in Australia
- (Ferreira et al. 2006) – Reports on importance of whole-school approach and pre-service teacher training
- (Ferreira et al. 2007b) – Discusses six factors that aid successful pre-service teacher education

General

- (Hicks & Holden 1995) – Why we need to teach for tomorrow – Future thinking
- (Eames et al. 2008) – Evaluation of EE practice in New Zealand
- (Law 2005) – Good summary of initiatives in New Zealand to that date
- (Fien & Corcoran 1996) – Teacher education networks in Asia–Pacific region
- (Fien & Tilbury 1996) – UNESCO report for teacher education in Asia–Pacific
- (Kennelly et al. 2008) – Teacher interviews on sustainable schools programme in Australia
- (Fien 2001) – Provides recommendations to reorient education to sustainability
- (Eames et al. 2006) – Promotion of action competence in students
- (UNESCO 2005) – Guidelines for teacher education, culmination of many member states experience and views (NZ, Law 2005, p. 36)
- (Scott 2002) – Need to be careful when using EfS as social lever as important to understand learners context and be careful to not exaggerate problems. Sustainability needs to be learnt in context of decision-making. Outlines teacher responsibilities
- (Jensen & Schnack 2006) – Republished paper from 1997. Original paper on ‘action competence’

Whole-school approach

- (Bolstad et al. 2008) – WWF-funded report on the state of EE in New Zealand
- (Eames et al. 2008) – Evaluation of EE practice in New Zealand
- See Taiwan sustainable campus programme: http://140.135.10.174/esdtaiwan_english/
- (Law 2005) – Good summary of initiatives in New Zealand
- (Kennelly et al. 2008) – Teacher interviews on sustainable schools programme in Australia. Hard to do in secondary
- (Henderson & Tilbury 2004) – International review of whole-school approaches. Lack of evaluation, but provides critical success factors
- (Ferreira et al. 2006) – Reports on importance of whole-school approach and pre-service teacher training
- (Bolstad et al. 2004) – Research into New Zealand EE practice – found support for whole-school approach, but not a lot doing it
- (Gough 2005) – Evaluation of whole-school approach in six schools (one secondary) in Australia
- (Robertson et al. 2006) – Evaluation of enviroschools (primary only) – good for enviroschool history
- See EnviroSchools website: <http://www.enviroschools.org.nz/>

Curriculum

- (Bolstad et al. 2008) – WWF-funded report on the state of EE in New Zealand
- (Bolstad & Gilbert 2008) – Good reference for New Zealand secondary curriculum. About rethinking the senior secondary years to suit the 21st century
- (Eames et al. 2008) – Evaluation of EE practice in New Zealand
- (Law 2005) – Good summary of initiatives in New Zealand to that date
- (Fien 2001) – Provides recommendations to reorient education to sustainability
- (Scott 2002) – Argues against cross-curricular and for within-subject learning

- (Barry 2006) – WWF response to draft curriculum. Recommends changes some of which are in the New Zealand Curriculum (Ministry of Education 2007b)
- (Fien 2004) – Surveyed youth attitudes and behaviours about sustainability across Asia–Pacific with implications for curriculum and system shifts and pedagogy shifts especially in secondary
- (Ministry of Education 2007b) – The New Zealand Curriculum
- (Ministry of Education 2006) – Draft curriculum
- (Bolstad et al. 2004) – Research into New Zealand EE practice – recommend integrating EE in curriculum
- (Ministry of Education 1999) – New Zealand EE guidelines
- (Papprill 2005) – Surveyed secondary teachers and students, most thought EfS should be part of learning, but not sure how
- (Chapman & Eames 2007) – Positioning paper for new guidelines

School operation

- (Eames et al. 2008) – Evaluation of EE practice in New Zealand
- (Taylor 2005) – Outcomes of envirogroups
- (Bolstad et al. 2004) – Research into New Zealand EE practice – similar findings to our study
- (Papprill 2005) – school policies and how they are reflected in teaching and how environmental issues are not visible in most secondary schools

Wider community involvement incl. NGOs and councils

- (Bolstad et al. 2008) – WWF report on the state of EE in New Zealand
- (Eames et al. 2008) – Evaluation of EE practice in New Zealand
- (Law 2005) – Good summary of initiatives in New Zealand
- (Delgado et al. 2007) – On mentoring Local Government in EfS
- (PCE 2007) – See change evaluation notes a lot of progress, but more help needed at Secondary level
- (Henderson & Tilbury 2004) – International review of whole-school approaches. Lack of evaluation, critical success factors, helps wider community
- (Kearins & Sringett 2003) – Use critical theory to develop skills in EfS in business schools
- (Wilson-Hill & van Rossem 2001) – From a local govt perspective. Talks about political restructuring in late 80s early 90s and RMA has impacted in EE. EE by local govt driven by RMA and introduction of Tomorrows Schools – huge changes took place
- (Papprill 2006) – teachers not knowing about wider community initiatives

Policy

- (Kennelly et al. 2008) – Teacher interviews on sustainable schools programme in Australia and policy underpinning it
- (Law 2004) – Talks about policy, but not practice plus initiatives in New Zealand
- (PCE 2004) – *See Change* – review of EfS in New Zealand
- (Tilbury 2005) – The 10-year challenge of UNDESD
- (Tilbury & Cooke 2005) – Shaping policy in Australia
- (Fien 2001) – Provides recommendations to reorient education to sustainability
- (Law 2005) – Talks about history, policy and needs for UNDESD
- (Department for Education and Skills 2006) – UK Government response to consultation on Sustainable schools strategy (aim: all UK schools to be sustainable by 2020). See also <http://www.teachernet.gov.uk/sustainableschools/>
- (New Zealand Government 2003) – Education priorities for New Zealand, pays sustainability lip service
- (Chapman 2004) – Suggests that more needs to be done to develop political support, as without it, it will always be a game of snakes and ladders. He is also critical of the

Bolstad report in not addressing this, and points to the education priorities government report as rhetoric

- (Chapman et al. 2006) – Is critical of New Zealand policy as being rhetorical with environmental statements
- (Department of the Prime Minister and Cabinet 2003) – Sustainable development – Programme of action (SDPOA)
- (Ministry for the Environment 1998) – Learning to care for our environment – strategy for EE
- (Papprill 2006) – significance of Local Government Act
- (Wilson-Hill & van Rossem 2001) – political restructuring in late 80s early 90s and RMA has impacted in EE. EE by local govt driven by RMA and introduction of Tomorrows Schools – huge changes took place
- (Finnish National Commission on Sustainable Development 2006) – Strategy on education and training. This is a top level strategy to implement EfS – Good model
- (Maciejowski et al. 2006) Baltic 21 – good example of top-level collaboration filtering down to school level in the Baltic region
- (Chapman & Eames 2007) – Positioning paper for new guidelines
- (Ministry of Education 2007a) – Statement of intent 2007–2012 – see Chapman and Eames (2007) for summary
- (Greenall 1987) – Politics in Australia

Success and barriers

- (Eames et al. 2008) – Evaluation of EE practice in New Zealand
- (Law 2005) – Talks about constraints and needs for New Zealand to respond to UNDESD
- (Kennelly et al. 2008) – Teacher interviews on sustainable schools programme in Australia
- (Fien 2001) – Provides recommendations to reorient education to sustainability
- (Taylor 2005) – Success factors and barriers in a course at a Christchurch school
- (PCE 2007) – ‘See change’ evaluation notes a lot of progress, but more help needed at secondary level
- (Henderson & Tilbury 2004) – International review of whole-school approaches. Lack of evaluation, critical success factors
- (Fien 2004) – Education system as a barrier – founded in colonial times and pushed by governments to achieve goals
- (Taylor 2006) – Conference presentation on barriers
- (Buchan 2004) – For an EfS programme to be successful you need to understand the ‘habitat’ (learning environment) it is going into. This paper offers adaptive management approach as a way of doing this
- (Bolstad et al. 2004) – Research into New Zealand EE practice – similar barriers to our study
- (Chapman et al. 2006) – Has good table of EE in New Zealand against political background. And talks about New Zealand ability (or not as the case seems to be) to respond proactively to UNDESD
- (Gough 2005) – Evaluation of whole school approach in six schools (one secondary) in Australia. Good list of success and limiting factors
- (Brown 2004) – (conference talk) Talks about barriers to EfS in New Zealand secondary schools
- (Maciejowski et al. 2006) – Baltic 21 – good example of top level collaboration filtering down to school level in the Baltic region

Measuring sustainability

- (Bolstad et al. 2008) – WWF-funded report. Talks about ERO giving EfS more importance
- (Scott 2002) – What is sustainability – how can you measure it?
- (Gough 2005) – Evaluation of whole-school approach in six schools (one secondary) in Australia

Resources

- ‘Linking thinking’ (Sterling 2005) is for teachers and students on basing decisions using learning through systems thinking etc.
- Early EfS resource – ‘What We Consume’ see (Tilbury & Wartman 2004)
- Achievement Standards (NCEA 2007a, 2007b, 2007c, 2007d, 2007e, 2007f)
- (Chapman et al. 2006) Has a section that talks about resources available to educators in New Zealand with regard to EfS.
- (Ministry of Education 1999) EE guidelines
- <http://www.aries.mq.edu.au/portal/index.htm>
- <http://www.teachernet.gov.uk/CaseStudies/> – has good case studies.
- <http://www.sustainableliving.com.au/>
- <http://www.sustainableschools.com.au/sustainableschools/default.asp>
- For DESD organisers: (UNESCO 2007b) guide to developing ESD indicators.
- <http://www.biotechlearn.org.nz/>
- <http://www.sciencelearn.org.nz/>
- www.secondaryfutures.co.nz
- (Baldwin et al. 2008) – Footprinting tool for New Zealand schools
- <http://www.sustainableliving.org.nz/> – The sustainable living programme has recently been adapted for use in secondary schools to prepare students for the level 2 NCEA achievement standards on sustainability themes.

Appendix 2: References to sustainability in *The New Zealand Curriculum*

(These are illustrative quotes, which may not be a comprehensive list)

- The New Zealand Curriculum published in November 2007 ‘sets the direction... is a framework rather than a detailed plan’ so schools will be expected to ‘align with the intent, but have considerable flexibility when determining the detail’ (p. 37)
- Young people who will...seize the opportunities offered by new knowledge and technologies to secure a sustainable social, cultural, economic and environmental future for our country. (one of five initial points made in VISION on p. 8)
- Connected to the land and environment (p. 8)
- Actively involved participants...contributors to the well-being of New Zealand – social, cultural, economic and environmental. (p. 8)
- The curriculum encourages students to look to the future by exploring such significant future focused issues as sustainability, citizenship, enterprise and globalisation. (PRINCIPLES, p. 9) ‘Schools should be able to clearly demonstrate their commitment to the principles and to articulate how they are given effect in teaching and learning.’ (p. 37)
- Students will be encouraged to value...ecological sustainability, which includes care for the environment (one of seven points in ‘VALUES to be encouraged and modelled and to be explored by students’, alongside equity and community participation. P. 10)
- ‘Real life situations are rarely confined to one part of the curriculum... Wherever possible, schools should aim to design their curriculum so that learning crosses apparent boundaries.’ (p. 38)
- The five KEY COMPETENCIES (or capabilities) include 'Participating and Contributing' in which reference is made to: ...the importance of balancing rights, roles and responsibilities and of contributing to the quality and sustainability of social, cultural, physical and economic environments. (p. 13)
- In Health and Physical Education, attitudes and values include concern for other people and the environment. (p. 22) Healthy communities and environments is one of four main themes at all Levels.
- In Home Economics, students develop an understanding of the factors that influence the well-being of individuals and families within the homes and community and of the actions people take to enhance and sustain those environments (p. 23)
- In Science, ‘Material World’ strand...they are better able to understand science-related challenges, such as environmental sustainability ... (p. 28)
- Students in years 11–13 are able to specialise in one or more science disciplines... conceptual strand-based, but a wider range is possible, for example...education for sustainability. (p. 28)
- In Social Sciences conceptual strand ‘Place and Environment’ (one of four at levels 1–5) students learn about how people perceive, represent, interpret and interact with places and environments. They come to understand the relationships that exist between people and the environment. (p. 30; This leads into Geography at level 6 and above.)
- In Technology's ‘Technological Practice’ strand, one of three, students learn to consider ethics, legal requirements, protocols, codes of practice, and the needs of and potential impacts on stakeholders and the environment. (p. 32)
- Future focused issues are a rich source of learning opportunities...They include sustainability – ‘exploring the long-term impact of social, cultural, scientific, technological, economic or political practices on society and the environment.’ (p. 39)