Better understanding educational outcomes connected to the New Zealand Curriculum in Enviroschools

Final report

September 2010

Prepared for
The Director of the Enviroschools Foundation

By Faye Wilson-Hill
Summit Facilitation
Summary of the findings

A short term investigation into the link between literacy learning and action competence in three Enviroschools was undertaken from April to June of 2010. The guiding research question focused on the role of literacy in empowering students to be action competent and fulfill the vision of the New Zealand Curriculum (NZC) - that is, to become confident and connected, actively involved, lifelong learners. The findings show that the role of literacy is instrumental in supporting students to become action competent.

Some of the ways in which literacy developed student action competence in this project included:

- **Enhancing students vocabulary** development through hands-on learning experiences that helped students make connections to abstract ideas and concepts;
- Using thinking tools and strategies to critically **reflect on information read, heard, and viewed** through a variety of sources;
- **Making meaning** and **applying the key competency** of using language, symbols and texts as a means of students expressing their growing understanding and knowledge of sustainability issues;
- Becoming **respectful listeners and speakers** when working in groups to explore alternative ideas in creating a vision for a sustainable future;
- **Reading, viewing and analyzing information** from a range of sources to better understand issues and consider possible action for a sustainable future;
- Using materials from across the curriculum as authentic learning contexts to engage and **motivate students in their literacy learning**.

The deliberate acts of teaching observed in literacy learning provided vital skills, attitudes, values explorations and knowledge that students need to help develop action competence. In fact, the research suggests that action competence and its demands of experience rich, reflective learning that builds knowledge and understanding of sustainability issues to inform and empower students to take action, has a strongly reciprocal relationship with literacy learning. In this project the teaching and learning was experience laden and provided multiple opportunities for the social and cultural construction of **background knowledge** that is fundamental for supporting literacy learning (Ministry of Education 2007a, p. 27).

A key over-all finding is that literacy is essential for the development of action competence. There is however, an equally important finding that students know and understand the **purpose** for using their growing knowledge, skills and competences is to take action for a more sustainable future. In action competence and as outlined in the intent of the New Zealand Curriculum (NZC) it is not enough just for students to know things, they need to understand how they might use their knowledge and why that is important. Predominantly, students in this research didn’t appear to understand that they were part of an iterative process for learning. Instead, they considered that what they were learning might be used by them after they had left school. A few of the students recognized that they were participating in a process of learning whereby, what they were learning was informing an action that they would implement for a more sustainable future.

The need for making learning processes explicit was recognized by Alton-Lee (2003), in *Quality Teaching for Diverse Students in Schooling: Best Evidence Synthesis Iteration (BES)*. This report was a comprehensive review of national and international research into effective teaching and learning.
for New Zealand Schools. Therefore, a finding of this research aligns strongly with this view that students know and understand not only that they are part of a process to take action, but that they know what that process is.

All three schools in this project are well set up to achieve this as they use either the *action learning cycle* advocated as part of the Enviroschools process or an inquiry learning model. These are excellent processes which can be made explicit to students so that they recognize that their learning has purpose and meaning as they are engaged in it as well as when they leave school. Having visual prompts, talking about where students are in the process and constantly supporting students to make connections between lesson intentions and overall unit outcomes are possible ways to act on this finding.

**Research process**

As the timeframe for the research was short all findings and conclusions remain tentative and quantitative data showing shifts in students' academic levels of the curriculum cannot be claimed. However, qualitative data has enabled findings about teaching and learning in literacy and how it supports the development of action competence.

It is with this more qualitative view of teaching and learning therefore, that the focus of this report is to present a series of ‘stories’ that share the teaching and learning processes that developed both student literacy and action competence, and to provoke professional discussion and learning for Enviroschools and their facilitators. The structure of the ‘stories’ are based on the *Framework for Developing Action Competence in Education for Sustainability* (Eames, Barker, Wilson-Hill & Law, 2010). This framework includes six aspects for developing action competence: *experience, reflection, knowledge, vision for a sustainable future, action taking for sustainability and connectedness*. Each aspect was examined for the common practices across the schools that supported ideas advocated on the action competence framework and for any new ideas. There was also a focus on what can be learnt from the experiences of the teachers and classes with respect to literacy practices and how they supported developing action competence.

Each aspect has been assigned a section in a separate pdf format, and presents ideas from national and international research, the findings from this project, suggestions for teaching and learning that can be used in classes to support education for sustainability. They are also planned as a catalyst for professional dialogue and discussion about teaching and learning in education for sustainability and Enviroschools. Their layout is deliberately framed with questions to promote such *inquiry*¹ and investigation.

Any questions or comments should be directed through the Enviroschools Foundation to the project manager Faye Wilson-Hill information@enviroschools.org.nz.

---

Section 1: The Research Project

1.1 Background

Showing educational outcomes directly linked to student learning and raising student achievement through education for sustainability is an area for potential investigation and learning to better inform teacher and facilitator practice in Enviroschools. Research on the impact of education for sustainability (EfS) and environmental education (EE) in schools internationally and locally, reports increased benefits for environmental outcomes such as resource management and efficiency, reduced consumption and increased biodiversity through gardens and plantings (see Tilbury and Wortman, 2005). The research is less clear on the impacts of EfS and EE for student learning. There are tentative findings that suggest students have improved knowledge acquisition and increased student participation across a range of situations, mostly though within the settings of action projects.

Nationally, two Teaching and Learning Research Initiative (TLRI)² projects have been undertaken to further explore and examine educational outcomes of EfS and EE. These projects defined student action competence as an educational goal for EfS and EE and investigated how to develop and recognise student action competence. This work was ground breaking in exploring the relationship between teaching practices that support student action competence linked to the development of the key competencies in the New Zealand Curriculum (NZC). One finding of the research was that teachers who engaged students in taking action for the environment and used the aspects of action competence (defined in the research) would most certainly be supporting students to develop and demonstrate the key competencies. A key feature of the research was the design of a Framework for developing action competence in education for sustainability. In this framework six aspects to support students to become action competent were identified and explored with each aspect including an explanation, a description for what might be expected of the learner and teacher and examples of possible evidence. The six aspects include experience, reflection, knowledge, vision for a sustainable future, action-taking for a sustainable future and connectedness. The framework provides suggestions for how the aspects might be developed many of which rely on literacy skills and strategies.

With the introduction of National Standards for student achievement in literacy and numeracy for students from year 1 to 8 in 2010, it was timely and relevant to develop research that investigates the role of literacy in education for sustainability. The debate surrounding national standards continues with some informed comment as to the potential benefits.³ This comment suggests that national standards must focus on growth in student learning rather than passing a test. They should be descriptive indicators of what a student can do and include the next steps for their learning (The New Zealand Assessment Academy, 2009). With the pressure on schools to understand and implement national standards in the coming year, there is a need in Enviroschools, to ensure teacher practice in education for sustainability

---

² The Teaching and Learning Research Initiative is administered by the New Zealand Council for Educational Research and is a contestable fund. For more information see www.tlri.org.nz
contributes positively to literacy and numeracy as well as maintaining the focus on better understanding student action competence.

1.2 Action competence

Action competence has been described by its original authors Jensen and Schnack, (1997) simply as the ability and commitment to act with respect to the environment. This is précised with the criteria that participants understand why their choice of action is appropriate and that it (the action) contributes to a sustainable future. For primary aged students (5 through to 13 years old) this can seem quite daunting as the definition above suggests that they will understand a wide range of causes of environmental problems and issues and have the skills and abilities to make change in their communities.

The Teaching and Learning Research Initiative (TLRI) project which developed *A framework for developing action competence in education for sustainability* (Eames, Barker, Wilson-Hill & Law, 2010) therefore, sought to provide a structure that would enable teachers and students to plan and implement learning in an achievable and coherent way and put into practice the intentions and purposes of the revised New Zealand Curriculum (Ministry of Education, 2007b). The research set up six aspects for the development of action competence: experience; reflection; knowledge; vision for a sustainable future; action taking for sustainability; and connectedness. Figure 1 summarises the aspects.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Facilitates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td>....understanding and development of knowledge, attitudes and values towards the environment and sustainability issues.</td>
</tr>
<tr>
<td>Reflection</td>
<td>.... understanding of learning – both what is learnt and how learning takes place. It helps to develop strategies for future experiences and actions.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>... understanding of the underlying causes of sustainability issues by exploring a range of perspectives and sources of information across time and place.</td>
</tr>
<tr>
<td>Vision for a sustainable future</td>
<td>.... exploring how others have experienced sustainability issues, considering alternatives and how to tackle concerns for the future.</td>
</tr>
<tr>
<td>Action taking for sustainability</td>
<td>.... planned, effective ways to change the current situation towards more sustainable practices, systems and ways of living.</td>
</tr>
<tr>
<td>Connectedness</td>
<td>... the connections between, to and across the environment, people, place, learning, decision making and actions.</td>
</tr>
</tbody>
</table>

Figure 1 – *Summary of aspects of action competence*

The six aspects are interdependent and the development of individual aspects will always be specific to the current context they are being applied in, for example if a class is focused on better understanding waste issues they will be developing knowledge and understanding about concepts such as resource use, interdependence around decomposition processes and product life cycles. As they grow that understanding through reflecting on teaching and learning experiences, their vision for a sustainable future about waste will be informing their choices and decisions of what is appropriate action to take. The aspect of connectedness brings together the whole process
including what students learn and how they are learning this. This includes ways of being as well as knowing, for example if students are in an outdoor environment, what does this mean for the way children will need to manage the way that they behave and participate in activities, particularly if they require cooperation and collaboration?


The six aspects therefore, from the framework and the information within them provided much of the rationale behind many of the choices and directions made by facilitators, teachers and students as they undertook their teaching and learning processes from March to June 2010.

### 1.3 Research Methodology

Three schools were approached to be involved with the project. All schools have been Enviroschools for more than three years. Each school had a facilitator who was also a researcher as part of the project. All researchers/facilitators have been involved in Enviroschools for more than five years. Ethical approval to work in the schools from Principals, teachers, parents/caregivers and students was obtained.

Facilitator/researchers then worked with teachers to plan a unit of work and interview students on their experience of the teaching and learning. Teachers were also asked to reflect on how they perceived action competence and literacy learning was happening for their class. For action competence, teachers reflected on each of the six aspects of action competence. For literacy they provided comment on the dimensions of effective practice: expectations, instructional strategies, engaging learners with texts, partnerships, knowledge of the learner and knowledge of literacy learning. There were also informal observations of how literacy practice occurred in each of the classes, document analysis of planning and student work. Because of the short time frame for data gathering (8 weeks) there was no quantitative data related to student learning outcomes as it would have been very difficult to claim that any shifts in achievement could be solely linked to this research. Instead the focus of data gathering was more qualitative with a view to informing areas for more in-depth analysis in the future – thus the research was exploratory in nature.

### 1.3.1 Participants

**Schools**

School 1 is a contributing urban South Island school with a role of approximately 110 students and 5 teachers. It has a designated special character and is reasonably ethnically diverse consisting of New Zealand European/Pākehā 19%, Māori 14%, Samoan 65%, Other ethnicities 2%. Four teachers from this school participated in the project.

School 2 is a year 1-8 urban South Island school with a role of approximately 230 students and 11 teachers. It is an integrated state school and its student ethnicity base consists of New Zealand European/Pākehā 95%; Māori 1%; Asian 2%; Other 2%. Two teachers from this school participated in the project.
School 3 is a contributing rural North Island school with a role of approximately 120 and 6 teachers. Its student ethnic base is NZ European/Pākehā 81%, NZ Māori, 15%, Other Ethnic Groups 4%. Five teachers from this school participated in the project.

The teachers including a range of teaching experience and were all female.

<table>
<thead>
<tr>
<th>Teacher/Class</th>
<th>Context of unit</th>
<th>Focus/Vision/Purpose for unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Year 5 and 6</td>
<td>Native Bush</td>
<td>How can we develop places that nurture native animals and native plants in our school environment?</td>
</tr>
<tr>
<td>2 Year 4 and 5</td>
<td>Native Bush</td>
<td>How can we develop and use our knowledge about living things to create a place that nurtures nature in our school community? How can we design and develop the school bush?</td>
</tr>
<tr>
<td>3 Year 3 and 4</td>
<td>Exploring plants</td>
<td>How can we cultivate food to help our community? Learning ways of growing food that nurtures the environment.</td>
</tr>
<tr>
<td>4 Year 1 and 2</td>
<td>A Bottle House</td>
<td>Room x wants to complete the bottle house to start growing plants for our school and wider community</td>
</tr>
<tr>
<td>5 New Entrants</td>
<td>Caring for living things</td>
<td>What lives in our environment?</td>
</tr>
<tr>
<td>6 Year 5 and 6</td>
<td>A healthy soil, a healthy garden a healthy me!</td>
<td>Change – We are learning how change affects us and the community we live in</td>
</tr>
<tr>
<td>7 Year 3 and 4</td>
<td>A healthy soil, a healthy garden a healthy me!</td>
<td>Change - We are learning how change affects us and the community we live in</td>
</tr>
<tr>
<td>8 Year 1</td>
<td>Seasons</td>
<td>Change - We are learning how change affects us and the community we live in</td>
</tr>
<tr>
<td>9 New Entrants</td>
<td>Seasons</td>
<td>Change - We are learning how change affects us and the community we live in</td>
</tr>
<tr>
<td>10 Year 5</td>
<td>Coastal animals and their environment</td>
<td>To recognise that all living things have certain requirements to stay alive and are suited to particular habitats</td>
</tr>
<tr>
<td>11 Year 4</td>
<td>Unique Aotearoa</td>
<td>Direct link to environment and sustainability – our (NZ) environment local animals, local places. People and their impact.</td>
</tr>
</tbody>
</table>
1.4 Findings

The project initially sought to explore the following key research question:

_What is the role of literacy in empowering students to be action competent and fulfill the vision of the NZC (that is, to become confident, connected, actively involved, lifelong learners)?_

This question is supported by these supplementary research questions:

- What processes and pedagogies used in education for sustainability enable literacy development in students?
- In what ways is student learning in literacy developed through education for sustainability? (structure, duration, more willing etc)?
- In what ways is literacy a tool to explore an environmental sustainability context?
- In what ways do teachers create opportunities for literacy to emerge in the teaching and learning processes, both planned and responding to opportunities as they arise during learning?
- In what ways can critical literacy support...
  - ...understanding environmental issues?
  - ...participatory decision making?
  - ...students taking action?
  - ...communicating ideas?
  - ...students working together?

In response to the key research question literacy is crucial and using literacy strategies across the curriculum is central in the development of student action competence. There are many examples of the ways in which literacy skills were applied in order to support student’s knowledge and understanding of sustainability issues, to process learning experiences and to scaffold learning through reflection. Due to the short timeframe for the research however, no class completed an action project in the term that data was gathered.

However, the data gathered gave rise to the need to capture the richness of the ways literacy was used across the eleven classrooms to develop action competence and examine how literacy is an integral part of this. These findings are explored in sections two to four of this report as separate pdf documents. At the current time there no funding is available to complete all sections. Sections two, three and four detailing findings on the impact of literacy to develop the aspects of experience, reflection and knowledge in action competence have been completed.
1.4.1 Findings in the impact of literacy in the development of experience in action competence

Section two on experience in action competence documents the following key findings:

1. Providing a range of experiences in the environment were pivotal for developing authentic learning experiences in the environment;
2. The experiences in the environment were instrumental in enhancing student’s vocabulary and connecting important abstract ideas and concepts; and
3. The experience rich teaching and learning took place across the curriculum through authentic contexts to engage literacy teaching and learning.

1.4.2 Findings in the impact of literacy in the development of reflection in action competence

Section three on reflection in action competence documents the following key findings:

1. Reflective experiences to enhance learning were grounded in literacy. Thinking tools and strategies were used extensively to critically reflect on information read, heard, and viewed through a variety of sources;
2. The most common form of reflection observed was to make connections for knowledge and understanding about sustainability issues;
3. In action competence there are a range of foci required for reflection including emotional responses, students participating and understanding the processes for learning they are engaged in (learning how to learn), using reflection to inform next steps for learning and personal and collaborative reflection on taking action.

1.4.3 Findings in the impact of literacy in the development of knowledge in action competence

Section four on knowledge in action competence documents the following key findings:

1. Teaching and learning from the dimensions of knowledge (Jensen 20002) for action competence had a large emphasis on the effects or science based ideas and concepts. There weren’t as many planned learning experiences to help students develop knowledge of a wide range of perspectives of an issue including the causes (this can also be expressed as social, cultural and economic ideas), how to go about making change and exploring alternatives and visions.
2. Literacy was instrumental for students to make and create meaning (Ministry of Education 2007, p. 18) from the knowledge learning experiences. Literacy approaches were used in multiple ways and included using all strands of the English curriculum with thought provoking examples of using language, symbols and texts as a way for students to show their increasing knowledge and understanding of sustainability issues.

The findings for the three remaining aspects of action competence have not been written at this time and the tentative findings from the researcher’s analysis are summarized here.
1.4.4 Vision for a sustainable future

Common themes:

- The Enviroschools vision map provided a connecting point for potential action.
- Visits to other projects like a predator proof fence are examples of alternatives students can consider.
- Recommendations would be for this aspect to be part of unit planning and consider how the learner roles in the framework can be developed.
- Using future focused questions in the planning and choices of teacher language are important in developing literacy in this aspect.

1.4.5 Action taking for a sustainable future

Common themes:

- A number of important criteria for action taking emerged, with each piece of criteria appearing to have a range of stages that could be considered on a continuum. The criteria included: Is the issue being addressed? How will the action be sustained? What do student’s abilities and attitudes/willingness bring to the action? Who is making the decision? How is the action going to be communicated? (in-direct), reflecting on the action.
- The need for a visual prompt to show that the process of learning students are engaged in is going to include action. For example, the action learning cycle.
- There is a need to make the purpose for learning connected to taking action very clear.

1.4.6 Connectedness

Common themes:

- The need to make connections explicit.
- Using learning intentions, unit outcomes that are developed with students, in student language to support students in learning processes and making connections between knowledge learning outcomes and learning how to learn.
- Multiple levels/layers of connections including the process of taking action, the process of learning and personal expressions of learning need to be clarified.

1.5 Recommendations

1.5.1 Sections Two to Four

Sections two to four have recommendations for teaching and learning related to literacy and the development of action competence included.
1.5.2 Overall Finding – making learning processes explicit

With respect to the overall finding that learning processes be made explicit it would seem that there is a need for a range of strategies to be applied so that students recognize that their learning is for an immediate purpose and function. For example:

- Several of the classes used their learning contexts to support students in the literacy outcome of writing a report. There were deliberate acts of teaching that examined the function and literacy features of a report. A further addition to such lessons would be to discuss how the function of a report might be important for students in their process of taking action. That is, they might write a report to the Board of Trustees on the state of the biodiversity in the school in support of a request to re-develop an area, or to accompany a funding application.

- Students’ growing ideas and understanding of the overall unit outcome (which should be linked to a sustainability issue) is regularly re-visited and discussed including ideas for change and taking action as they emerge. In Enviroschools language this is making the puna mātauranga, pool of knowledge come alive. In one school shared class journals were trialed as a means of doing this. Other classes used classroom wall space as a means of gathering students learning.

- All three schools in this project use either the action learning cycle advocated as part of the Enviroschools process or an inquiry learning model. Having a visual outline of the process for learning and referring to it regularly (as for the puna mātauranga) so that students can see where they are in the learning process and where they are headed next.

It is recommended that these stories be given as wide a circulation as possible within the Enviroschools network as drafts with a view to obtaining feedback as to their usefulness and suggestions for change before publishing in their final version and completing the remaining three stories of vision for a sustainable future, action-taking for a sustainable future and connectedness.
Acknowledgement

I would like to thank the schools most sincerely for their willingness and openness to be involved and contribute to further learning in Enviroschools and education for sustainability. I hope that there have been some enlightening moments for you in the project as there have been for me.

Thanks also to Hilary and Marianne for agreeing to be part of the project and for your insights and contributions to the research.

Thanks to the Enviroschools Foundation for funding the project and continuing to seek ways to support schools and the wider goal of sustainability in New Zealand.

Many thanks Faye