Silos, Systems and Circles: Education for Sustainability at a Primary School

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Outline

- Context
- Objectives
- Literature
- Methodology
- Major Findings
- Problems and Surprises
- Conclusions
- Recommendations

People … turtles, lizards and frogs … in silos, systems and circles
Context

- Independent primary school (3-12yrs)
- Education for Sustainability (EfS)
- Longitudinal study 1990-2009
- Joined Austn Sustainable Schools Initiative in WA (AuSSI-WA) in 2005

Students engaged in a biological survey in their local environment

Objectives

Impact of EfS Pre/Post AuSSI-WA

Pre 2005:
1) EfS elements in operation prior to AuSSI-WA?

Post 2005:
Outcomes in terms of
2) student attitudes & values,
knowledge & understandings,
skills & behaviours related to EfS
3) teacher perceptions of EfS … after 5yrs in AuSSI-WA?

Students installed a solar power system on the school roof
Key Concepts from Literature

Education for Sustainability:

Education in, about and for the environment; for the environment empowers people and provides learners with skills to take positive action and stresses the cultivation of environmental values (Fien, J., 2001; Gralton, Sinclair & Purnel, 2004; Tilbury, Coleman & Garlick, 2005)

Whole Systems Thinking:

Whole systems thinking is a framework for seeing the whole picture, for establishing interrelationships and understanding phenomena as an integrated whole (Tilbury et al., 2005; Sterling, 2003)
Key Concepts from Literature

Sense of Place:
Attachment to Place - foster strong close relationships with local environment to increase habitat connectivity (Evans et al., 2007; Miller, 2005)

Nature Deficit Disorder - trend in which children are so plugged into television and video games that they've lost their connection to the natural world (Louv, 2005)

Student Voice - students improve academically when student voice is valued (Mitra, 2004)

Methodology

Qualitative approach - constructivist, phenomenological, multiple socially constructed realities

Data collection - triangulated; multiple sources/timeframes: surveys, observation, student work samples and document searches

Data analysis - discourse analysis; overarching themes

(Work sample: ‘Worm farming’ by 5 year old student)
Conceptual Framework

**Mufflers**
- Individual or group interest
- Ad hoc, unsupportive leadership
- Ad hoc, interest-based only
- Ad hoc, silo approach, product based
- Ad hoc, action-based
- Token involvement
- Isolationist approach
- Silo approach, product based

**Key Concepts**
- Vision
- Governance
- Professional learning
- EIS activity
- Teaching & learning
- Curriculum
- Student voice
- School networks
- Community networks
- Recognition

**Zoomers**
- Whole school approach, EIS embedded
- Leadership community, champions supported
- All stakeholders
- Behaviour change, sense of place
- Whole systems thinking, collaborative inquiry
- Integrated, comprehensive
- Participation in key decisions
- Share resources, PI with local schools
- Community projects & partnerships
- Whole school, whole systems approaches

**Continuum**
- Least sustainable
- Most sustainable

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**Major Findings**

**Pre 2005:**
- Some elements of EIS operating
- EIS gaps - uncoordinated silo approach; no plan, policy or evaluation

**Post 2005 (2005-2007):**
- Enhanced student outcomes in 3yrs after AuSSI-WA
- Teacher perceptions of highly effective EIS in 3yrs after AuSSI-WA
- Progress in visioning, planning, integration, systems thinking & evaluation

**Post 2005 (2008-2009):**
- EIS priority diminished
- Returned to silo approach
- Needed leadership/funding support
- Needed professional learning at all levels
- Needed staff with designated responsibilities
Major Findings: Pre 2005

Some elements of EfS:
Student - ad hoc enviro lessons
Teacher - EfS talk; ad hoc enviro lessons & silo approach

Major Findings: Post 2005

2005-2007 Initial Success:
Enhanced student outcomes

Student 07 - co-ord EfS lessons
Example - Solar power project
Major Findings: Post 2005

2005-2007 Initial Success:
Positive teacher perceptions
Progress in visioning, planning, integration & systems thinking
Teacher 07 - co-ord, model, policy, evaluation
Example - Solar power project

2005-2007 Initial Success:
Enhanced student outcomes
Student 07 - co-ord Efs lessons
Example - Planting native reeds and sedges:
Student concern about water quality; all primary students, parents & staff involved; partnerships with DEC & NGOs
Major Findings: Post 2005 Initial Success

Student Engagement in Learning Behaviours re Planting Native Reeds:

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Frequency of Engagement</th>
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<tbody>
<tr>
<td></td>
<td>Pre-primary</td>
</tr>
<tr>
<td>Sharing learning with peers and experts</td>
<td>4</td>
</tr>
<tr>
<td>Making links and transferring ideas and skills</td>
<td>1</td>
</tr>
<tr>
<td>Initiating/showing responsibility for learning</td>
<td>2</td>
</tr>
<tr>
<td>Purposefully manipulating objects and ideas</td>
<td>4</td>
</tr>
<tr>
<td>Showing confidence in own learning abilities</td>
<td>2</td>
</tr>
<tr>
<td>Actively involved in learning</td>
<td>4</td>
</tr>
<tr>
<td>Responding to new information or evidence</td>
<td>2</td>
</tr>
<tr>
<td>Disengagement</td>
<td>1</td>
</tr>
</tbody>
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Frequency codes:
1 = rarely; 2 = sometimes; 3 = most of the time; 4 = all of the time.

Environmental Learning Outcomes Survey – Student Observation Schedule (Ballantyne, Packer, & Everett, 2005)

Major Findings: Post 2005 Initial Success

Environmental Learning Outcomes interview re Planting Native Reeds:

How have your feelings changed?
“... remembering how dirty the water was last year and how clean it is this year ... I found more creatures in the lake and saw the water was cleaner” (Yr 3 student)

Mind map of ‘everything I know about sustainability’ by a Yr 3 student:
Major Findings: Post 2005 Initial Success

Example - Planting native reeds: effective partnerships & environmental outcomes

Students replanted reeds removed by Swamp Hens

Fencing to protect reeds

Environment before …

Environment after 2 months …

Environment after 1 year …

Major Findings: Post 2005 Initial Success

Enhanced student outcomes

Example - Turtle nestwatch project: Students and community members expressed concern about the local turtles; effective partnerships & environmental outcomes

Students, parents, staff and wider community members participated in turtle nest hunts … 31 predated nests
Major Findings: Post 2005 Initial Success

Environmental Learning Outcomes interview re Turtle Nestwatch:

“My attitude to this environment has changed seeing the impact of predation, of rubbish, and weeds, at the site ... It is sad to see how much rubbish is about; I’m more conscientious about walking to the bin and about my dog when walking” (Yr 7 student).

Mind map of ‘everything I know about sustainability’ by a Yr 5 student …

Major Findings: Post 2005 Initial Success

Enhanced student outcomes

Example - Installation of owl nest boxes:
Students constructed and painted bird nest boxes and assisted with installation at a local park; effective partnerships & environmental outcomes

(Lewis & Baudains, 2007a; b; Lewis, Mansfield, & Baudains, 2008; Lewis, Baudains, & Mansfield, 2009)
Major Findings: Post 2005 Initial Success

Positive teacher perceptions
Progress in visioning, planning, integration, systems thinking & evaluation

Teacher 07 - AUSSI-WA planning & evaluation rubric;
4 levels of achievement – Starting, Establishing, Achieving & Excelling;
12 elements for assessment

(DET, 2010b)
Major Findings: Post 2005 Setback

2008-2009:

- EfS priority diminished – whole school planning & evaluation ceased
- Return to silo approach
- Need leadership/funding support
- Need professional learning at all levels
- Need staff with designated responsibilities

Student 08 - ad hoc EfS lessons
Teacher 08 - ad hoc approach

Mind map of ‘Everything I know about sustainability’ by Year 5 student

Major Findings: Post 2005 Setback

Example: Biological Survey

Student 08 - Wanted:
- ‘More pit traps’
- ‘Looking for the turtles and the pit traps’
- ‘More stuff in the garden’

Favourite lessons:
- ‘Pit traps, coes it was fun and a new learning experience, with my class I checked the pit traps to see if there were any frogs so we could tell which frog lived around our school and if the environment was good for them to live in, we found 2 of 10 species of frog around our area so then we planted more native plants to create a better environment for them so we then could find all 10 species’
### Problems and Surprises

**Problems:**
- Lack of understanding about EIS
- Impact of leadership and staff changes
- Lack of funding support
- Changes in EIS priority: silos, systems & circles

**Surprises:**
- Whole systems thinking & Eagle Eye model
- Developments: AuSSI-WA toolkit & National Plan
- Students remembered EIS project many years later
- High level of student enthusiasm & commitment

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### Problems

Lack of EIS understanding & support

Critical success factors for whole school sustainability programs:

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<tbody>
<tr>
<td>Alignment with national government priorities</td>
<td>√</td>
<td>x</td>
</tr>
<tr>
<td>Access to expertise in EIS during program design &amp; implementation</td>
<td>√</td>
<td>x</td>
</tr>
<tr>
<td>Significant &amp; continuous funding</td>
<td>x?</td>
<td>x</td>
</tr>
<tr>
<td>Alignment with EIS approaches</td>
<td>√</td>
<td>x</td>
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<tr>
<td>Investment in PL of program team &amp; school partners</td>
<td>√</td>
<td>x</td>
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<tr>
<td>Creating links with EIS initiatives already in operation</td>
<td>√</td>
<td>x</td>
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<tr>
<td>Establishment of multi-stakeholder partnerships</td>
<td>√</td>
<td>x</td>
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(Henderson & Tilbury, 2004)
Surprises

Developments in the field:
2009 National Action Plan for EfS 7 principles:

- Transformation and change
- Education for all and life long learning
- Systems thinking
- Envisioning a better future
- Critical thinking and reflection
- Participation
- Partnerships for change

Curriculum - Eagle Eye Model:
… to use in the classroom to enact whole systems thinking …

Surprises: Eagle Eye Model

Teaching EfS from whole systems thinking perspective:

1. Flying over
2. Swoop in
3. Swoop out and over again

Flying over to view the big picture …
swoop in to focus on a narrow aspect and investigate details in context (outcomes) …
swoop out and over to make explicit links between systems and understand interrelationships and interdependence between other systems
Conclusions

Pre 2005:
- Elements of EfS in operation prior to AuSSI-WA

Post 2005:
Initial success (2005-7)
- AuSSI-WA provided framework & support
- Students: Enhanced knowledge, skills & behaviours; enacted values; engaged; empowered
- Teachers: Valued & supported EfS

Setback (2008-9)
- Students: wanted more…
- Teachers: PL & leadership support needed

Silos, systems, silos … in a circle

Conclusions:
Silos, Systems and Circles …

1990-2004
Silos approach dominant

2005 School joined AuSSI-WA

2008/2009
Silos approach dominant

Active engagement in AuSSI-WA ceased

2009 School re-connected with AuSSI-WA

2005-2007
Whole systems approach dominant

2010
Whole systems approach dominant?

Sleeping Beauty Syndrome (McNaughton, 2007);
AuSSI initiatives folding (Ferreira, Ryan & Tilbury (2006))
Recommendations

- Whole systems thinking
- PL for all stakeholders
- Ongoing funding at all levels
- School administration
- Curriculum integration
- Pre-service education
- Student voice ...

Mind map by 10 year old student

Thank You

Open hands, open minds, open hearts ...

Questions Please
References


