SCIENCE TEACHING FOR TRANSITION IN THE OUTDOOR CLASSROOM (STTOC)

Dr Karen Kerr

International Outdoor Learning Conference
Lessons from Near & Far: Research & Policy
Friday 3rd July 2015
University of East London, Stratford
THE NORTHERN IRELAND CONTEXT: CONNECTION TO NATURE

The mean Connection to Nature score from this study (n=2240) was 1.05

Northern Irish children scored lowest in their enjoyment of nature (mean=0.77)

(Kerr, 2015)
THE NORTHERN IRELAND CONTEXT: CONNECTION TO NATURE

The percentage scoring 1.5 or higher falls well below the RSPB’s realistic and achievable target.

(Kerr, 2015)
THE NORTHERN IRELAND CONTEXT: CONNECTION TO NATURE AND WELL-BEING

**GENDER AND SCHOOL LOCATION**

<table>
<thead>
<tr>
<th>Response option/comparative factor</th>
<th>N</th>
<th>SD</th>
<th>Mean CNI scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>1164</td>
<td>0.512</td>
<td>1.17</td>
</tr>
<tr>
<td>Boys</td>
<td>1072</td>
<td>0.610</td>
<td>0.92</td>
</tr>
<tr>
<td>School location (urban/rural)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>1540</td>
<td>0.582</td>
<td>1.03</td>
</tr>
<tr>
<td>Rural</td>
<td>694</td>
<td>0.558</td>
<td>1.08</td>
</tr>
</tbody>
</table>

Comparative descriptive data presented as mean CNI scores broken down by gender and school location.

**WELL-BEING**

A higher score on the KIDSCREEN measure was associated with:
- A higher overall CNI score.
- A higher score on the Sense of Oneness subscale
- A higher score on the Enjoyment of Nature subscale.

(Kerr, 2015)
THE NORTHERN IRELAND CONTEXT: CURRICULUM AND POLICY

The World Around Us
(focusing on the development of knowledge, skills and understanding in Geography, History and Science and Technology);

(CCEA, 2007)
Policy issues:
- Curriculum change – autonomy and a skills focus
- Lack of confidence and previous qualifications has resulted in less science teachers
- Science no longer compulsory at GCSE
- Continuing Professional Development (CPD) gap in Northern Ireland (ELBs amalgamated)
- Compounded by lack of legislation/policy on outdoor learning
- Transition issues from primary to post-primary: increasing number of scholars in the area citing both academic and social issues as having due weight in terms of impact for children and young people (Andrews and Bishop, 2012; Mackenzie, McMaugh and O’Sullivan, 2012).

A blended model for effective outdoor learning
1. Teachers who are enthusiastic in teaching science in an outdoor classroom to promote links between ‘transition’ teachers and their schools via coteaching.

2. Promotion of outdoor approaches to teaching science so that ‘transition’ teachers will enjoy science teaching more and see the benefits of teaching science in this way.

3. Increase in pupils’ engagement and enjoyment of science in the outdoor classroom and more positive attitudes to transition and secondary school science.

4. Long term and sustainable positive change to the practice of science teaching in the outdoors.

5. Development and piloting of classroom materials to support the teaching of science in the transition phase, in the outdoors.

6. Improved leadership and management of teaching science in the outdoors.
TYPES OF OUTCOMES

- Cognitive: academic outcomes to include knowledge and understanding
- Affective: attitudes, values, beliefs and self-perceptions
- Interpersonal/social: communication skills, leadership and teamwork
- Physical/behavioural: physical fitness, physical skills, personal behaviours and social actions

(Rickinson et al., 2004, p.15)
HOW WAS THE PROJECT DESIGNED?

• A sound framework developed by a wealth of earlier CPD programmes (Kerr, 2010; Murphy and Beggs, 2010; Murphy and Scantlebury, 2010)
  - Co-planning/co-construction, coteaching and co-evaluating
  - Used a blended CPD approach of workshops and in-class support

• This programme addressed all the core criteria from a review of effective CPD (Kerr, 2010): active participation, focusing on the needs of specific teachers and pupils, working together, reflection, presentation of work and a long term/on-going element

• Distinctiveness of this project:
  - Addressed transition issues as well issues with teaching and learning in the outdoors
THE COTEACHING MODEL

An adaption of Murphy and Beggs’ (2010) coteaching model for a primary post-primary coteaching team.
A BLENDED CPD MODEL FOR COTEACHING AND LEARNING IN THE OUTDOORS

“The primary teacher was really out of her comfort zone because she’s from an English/drama background but said she would do this again next year and be able to do it on her own as well.” (post-primary teacher)

“It worked out well, she knew what she was at…for the outdoor science, whenever we were out, she was able to come up with ideas…we were both there so for the morning and the afternoon we could switch activities. Having the expertise there because she was science.” (primary teacher)

“We have a fence between the two schools and we had no contact before and it has opened up the gate with getting to know the P teacher and his class”. (post-primary teacher)
### Project outcomes

**Teachers who are enthusiastic** in teaching science in an outdoor classroom to **promote links between ‘transition’ teachers** and their schools via coteaching

- Promotion of outdoor approaches to teaching science so that ‘transition’ teachers will **enjoy science teaching** more and see the benefits of teaching science in this way.

- Increase in **pupils’ engagement and enjoyment** of science in the outdoor classroom and **more positive attitudes to transition** and secondary school science.

- **Long term and sustainable positive change** to the practice of science teaching in the outdoors.

- Development and piloting of **classroom materials** to support the teaching of science in the transition phase, in the outdoors.

- Improved **leadership and management** of teaching science in the outdoors.

### Sources of evaluation evidence

- **Attitude audit** (pre and post workshops and classroom trialling)
- **Reflective diaries** completed during classroom sessions
- **Teacher interviews**

- **Focus groups with children**
- **Children's Pre and post online questionnaire**

- **Teacher interviews** (Predicted impact)
- **Longer term impact** followed up with teachers in new school year

- **The production and piloting of new teaching materials** to be used in the implementation of the revised science curriculum
- **Video based evidence** of the piloting of new teaching materials in the classroom

- **Interviews with teachers**
- **School development documentation**
The children’s online questionnaire included the following sections, adapted from well-known work in the area:

- Children’s attitudes to school science (Kerr, 2008)
- Children’s perceptions of their independence and teamwork. This section was adapted from Amos and Reiss (2011) from their work on the London Challenge Residential Experience, LCRE).
- Children’s attitudes to learning science outside. This section was also adapted from Amos and Reiss (2011).
- Children’s attitudes towards transition – a newly developed measure based on a previous questionnaire in relation to attitudes towards the Northern Ireland Revised Curriculum (used for the NAPSTA, NASTA projects).
1. Enthusiastic about coteaching science in the outdoor classroom
   - promoted transition stage links between their schools

2. Raised their awareness of the level and content of science in the primary school and/or post-primary school
   - scaling back of science in the primary curriculum
   - this project bridged the gap and raised awareness

3. Able to share ideas and practice
   - confidence grew, access to resources and equipment
   - made use of the science expertise of the post-primary teacher

4. ‘Up-fronting’ outdoor learning as a vital part of teaching and learning
“You get to see things in real life and it makes you understand it more because inside they can only tell you what it looks like...you can see it, you can touch it, feel it and you understand more about it.” (primary student)

“I really enjoyed it because you get to be outside and you don’t have to move around with the teacher and it’s not really like the teacher showing you...it’s really fun, you’re exploring, you’re kind of like an investigator with trees.” (post-primary student)

“The outdoor science that we are doing the research for has interested me more in science because I didn’t know science could be that fun with your friends and finding out about new things” (primary student)
PUPIL ATTITUDES TO TRANSITION

“I was quite scared…it made me more confident, I have nothing to worry about, you might not be in the same class as your friends but you can make new friends.”
*(primary student)*

“I thought it would have been a bit scary because when you come to year 8 you have no one to talk to except for your friends from here but now I’ve realised that the year 8s are having a really good time and they are all talking with each other, they are all friends so it’s reassuring me a bit.”
*(primary student)*

“Especially cause we were telling them it…it’s not as if an adult was telling them it and they wouldn’t be listening cause it would have years ago they went through school.”
*(post-primary student)*

“Remember we didn’t do this last year and we didn’t know how many people would be in the school, we didn’t know if it would be a big crowd or whatever but they know it’s going to be a big crowd and how many people are in the corridors and that.”
*(post-primary student)*
WE NEED TO LOOK AFTER OUR ENVIRONMENT!!!!

The percentage of positive responses for the ‘sustainability’ items (‘Human Exemptionalism’ and ‘Rights of Nature’)

- People are clever enough to keep from ruining the Earth completely: Pre 53%, Post 57% (43% agreement)
- Nature is strong enough to handle the damage caused by our modern lifestyles: Pre 32%, Post 35% (29% agreement)
- Plants and animals are mainly on Earth to be used by people: Pre 29%, Post 28% (23% agreement)
- People were created to rule over nature: Pre 28%, Post 23% (23% agreement)

*represents a significant difference at p<0.05

...there is a lot of litter which shouldn’t be there. Obviously people throw it over the wall and don’t think about what is happening but there is a lot of creature dying from it.”

(Primary student)
TEAMWORK

Responses to the 'independence and teamwork' items on the children's questionnaire

The percentage of positive responses for the 'independence and teamwork' items

- I am able to work well by myself in school: Pre 91, Post 94
- I prefer to make my own decisions: Pre 74, Post 82
- I accept help when I need it: Pre 90, Post 91
- I am confident at working with new people: Pre 73, Post 82

% agreement

Responses to the 'independence and team work' items on the children's questionnaire
LONG TERM AND SUSTAINABLE CHANGE

- PGCE course
- Developed network, established collaborations, outdoor experts, local government, media interest, further projects
- Interest and enthusiasm – transition project continuing
- Changes to teaching and learning practices, whole school science curriculum, development of the outdoor science/learning throughout schools.
CLASSEAD MATERIALS - RECORDING IN THE ENVIRONMENT

Teacher workshops
A bug project...

1. **Design and make Bug traps**
2. **Set Bug traps**
3. **Collect Bugs**
4. **Look at Bugs**

**CLASSROOM MATERIALS - RECORDING IN THE ENVIRONMENT**

Queen's University Belfast

SCHOOL OF Education
A bug project…

Look at Bugs

Tree beating
A bug project…

Make Bug hotels!
A tree project…

- **Plant a tree**
- **Make an ancient tree**
- **‘Ancient tree’ spotting**
- **Young and old! Meaning of ‘Ancient’**

**CLASSROOM MATERIALS - RECORDING IN THE ENVIRONMENT**
A pond project…

- Intro to Creatures who live in ponds
- Practice with nets during play
- Pond dipping
- Look at the creatures

CLASSROOM MATERIALS - RECORDING IN THE ENVIRONMENT

Queen's University Belfast
School of Education
Conclusions:
• The project achieved all six outcomes and, therefore, evidenced a real proof of concept for the approach of using a coteaching model and a blended CPD approach to effectively improve and develop teaching and learning in the outdoor classroom.
• Teachers and children were excited, enthusiastic and motivated by the benefits to their learning and to easing transition between primary and post-primary school.
• Importance of ‘up-fronting’ outdoor learning and the wide and varied benefits for children by learning in this way!

Children’s recommendations:
• More time, more days to get to know each other
• More activities in the outdoors as part of this project again – more time
• Going outside more during the school year, as part of the normal curriculum, to learn science
• Doing more of their practical work outside during the school year
• Separate outdoor learning lessons in their timetables
• An after school club for learning science outdoors
WHERE NOW?

Continued funding from the Primary Science Teaching Trust (PSTT) as part of the NI Hub to expand the transition project:
- Nursery primary transition
- Primary post-primary transition
- Development of area based clusters
- A closer look at well-being and connection to nature

Large grant to expand the work of the Open Air Laboratories (OPAL) to Northern Ireland:
- Observing and recording in the environment with schools
- Teacher/community worker training
- National committee
- Accredited courses
WHERE NOW?

• Report on Northern Ireland Children’s connection to nature on the Kids Life and Times survey
• Follow up publicity and dissemination

• Follow up to giving evidence to the Education Committee (local government)
REFERENCES

Dr Karen Kerr
School of Education
Queen’s University Belfast
k.kerr@qub.ac.uk
Twitter: @karenkerr80