



Real
World
Learning



Science and Sustainability through Outdoor Learning

Conference Report

Real World Learning Network
Plancia Outdoor Centre
Slovenia
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1. Introduction to the Conference

The second Real World Learning Network conference took place at Planica in Slovenia, November 2013. More than ninety people gathered from fifteen countries to explore science and sustainability in outdoor learning.

Outdoor learning is widespread across Europe taking the form of science through to sensory based learning. The conference explored how to deliver successful outdoor education. Through keynote speakers, workshops and discussion we explored two key areas in outdoor education: effective teaching approaches and how to assess learning. In doing so we asked ourselves:

- Which teaching approaches are most effective?
- How can we provide better outdoor education?
- How do we know if we are being successful?
- What criteria should we measure ourselves by?
- Is assessment relevant?

Participants took part in workshops around the two key conference themes of: developing competencies for sustainable change; and understanding fundamental concepts of science and sustainability through outdoor learning. Keynote speakers added external views to challenge and inspire, and also to raise key questions during the workshop sessions. The workshops were delivered by the RWL Working Groups.

Conference participants were also encouraged to present their own workshops.

In this report you will find the detailed results of the workshops as well as keynote speakers and details of the participants.

What is the Real World Learning Network?

How do we learn about the world around us? Can we deliver better learning using the outdoors? How can science help to change behaviours towards a more sustainable world? These are just some of the questions that the Real World Learning Network is exploring.

The Real World Learning Network is a consortium of outdoor learning providers across Europe. Our goal is to explore and share successful approaches to outdoor learning that increase action for sustainable development. We believe that outdoor learning offers one of the best approaches for young people to engage with the world around them, and provide a stimulating context to explore how we can all contribute to a more sustainable present and future.



2. Pedagogical Approaches to Outdoor Learning

2.1 Introduction

The Real World Learning Working Group 3 is exploring pedagogical approaches to outdoor learning that support behaviour change for sustainability. Its work includes:

- investigating behavioural change models suitable for outdoor learning;
- exploring pedagogical approaches, methods and models and analysing them; and
- collecting best practise case studies from all countries focused on pedagogy.

The first day of the Planica conference was dedicated to the pedagogy of outdoor learning. The first keynote speaker Bruce Johnson introduced one pedagogical approach, Earth Education, which perfectly fits into the RWL topic. He analysed whether the approach works, discussed the main principles and also presented some evaluation data.

The second keynote speaker Dr. Barica Požarnik spoke more about the psychological background to learning and described what could be effective and why in order to develop environmental sensitivity, attitudes and values are important.

Several workshop sessions presented best practice from different countries. In accordance with the feedback from the Slunakov conference earlier in 2013 there was a stronger focus on practical workshops, providing space to share experiences of the participants. Each workshop introduced a different pedagogical approach to outdoor learning, worked with a particular science topic and explored competencies towards sustainability. A wide variety of approaches were presented by inspirational leaders from all countries associated with the project including one workshop run by Bruce Johnson from the USA.

2.2 What was learnt?

There was a focus on pedagogical approaches with an emphasis on being active. There were hands-on experiences in all of the workshops and there was a logical progression throughout the day. People were excited about the practical workshops. The participant feedback was good.

The workshops produced many ideas that could be used for Working Group 3. Key amongst these are:

- We cannot just take methods and say they will lead to a behavioural change; we need to look at the background theory to the approaches.
- It is OK to have a variety of pedagogical methods which can be used for different reasons at different times. These methods need to be linked to practical examples so that people can use them. We need to combine the practical examples as well as the theory behind them.
- The power of hands-on activities again has been proved. The participants were very excited about creating ecological footprints, shaking jars with washing soda and painting with plant ink...just like children. It also had a great impact on them. Never forget this when designing activities and programmes.

- We cannot separate methods from the facilitator/teacher/mentor working with the students. It is essential that this person stands behind it all and implements the values s/he wants to teach.
- Very simple activities can sometimes have much deeper meanings than are visible on the surface and this may not be immediately obvious to everyone, but they can nonetheless enhance very deep connections to nature.
- It is very important to run events like this and share experiences and support each other.

2.3 Programme Activities

2.3.1 Keynote speaker 1 Bruce Johnson, USA - How can we connect people to nature in ways that influences them to live in more sustainable ways? Magical Learning Adventures.

Bruce Johnson is Professor of Environmental Learning and Science Education and department head of Teaching, Learning and Sociocultural Studies at the University of Arizona. Dr. Johnson's current research includes the teaching and learning of ecological concepts, development of environmental perceptions and actions, curriculum development, and teacher preparation. He teaches in graduate programs in environmental learning and science education and teaches courses in research design and elementary science methods.

As International Program Coordinator for The Institute for Earth Education (IEE), Dr. Johnson oversees the development and implementation of these programs and leads sessions on Earth Education around the world. IEE is an international, not-for-profit, educational organization that develops and disseminates Earth Education programs that are designed to help people live more harmoniously and joyously with the natural world.

Disconnections. Bruce talked about personal disconnections and how these formed his professional connection to environmental education. When he was 6 years old, he had a lovely pond locally that he used to play in and around with turtles, frogs, salamanders in the pond. One day a bulldozer filled in the pond. Bruce realised that he couldn't stop the bulldozer killing the pond life. Bruce realised that not everyone understood what life might be in the pond or did not care.



The second example of disconnection happened when Bruce was 19 at a summer camp, he was taking part in all these activities in the natural environment. The camp had many activities, e.g. canoeing, but only one hour of nature activities. This nature hour was led by a very knowledgeable botanist with a PhD but very little understanding of teaching others. The result was just learning plant names on walks was really boring. This was something that turned kids off, rather than inspiring them about nature.

Bruce returned to this camp and was asked to teach canoeing as he was very experienced in canoeing. He had no previous teaching experience and just started talking at them, telling them how to canoe. The early sessions did not go well. He knew all about canoeing but nothing about teaching canoeing. Over the years he improved this teaching. Teaching is not something that is easy to do; knowing content is not enough.

The main thing that Bruce learnt from the disconnections were that teaching and learning are not the same thing. Knowledge does not always lead to action. Teaching takes time, planning and resources.

Key components of Earth Education are: helping learners understand ecological systems rather than the names of things, developing their feelings and emotive responses to the natural environment, and making choices about what they do with their life to lessen their impact on these natural systems. Earth Education follows a programmatic approach which is a holistic approach to an experience with specific outcomes in mind. The goal is to help people to live more joyously and harmoniously with the world and its life.

One of the major components of Earth Education is ecological understandings: these are about bigger picture understandings and how people are connected to them. The focus is conceptual understanding, bringing relevance back to our lives is key. There are four ecological concepts in Earth Education:

- Energy Flow
- Materials Cycling
- Interrelationships
- Change

It is also critical to help people build feelings about the natural world. This helps them start to care. Earth Education programs provide opportunities for participants to get to know the natural world. This happens through contact to the natural world in places where humans are not the dominate influence on the environment, where nature can do its thing, where there is at least a sense that humans are not controlling the natural world.

How does Earth Education help people have a really great experience outdoors? Just being in the environment does not mean they are truly experiencing the environment. There is a need to provide guidance and structure to the experience.

Finally, how do the learners make sense of this experience? How do they bring this back to their everyday lives? In Earth Education we ask people to make a commitment to consuming less and doing more, starting with the participants own actions. By starting with personal actions rather than big issues.

Bruce gave an example of one of the programmes - Earthkeepers. The programme begins with a three day springboard experience away from school immersed in a natural environment. The second part is at home and in the classroom. There are four KEYS: Knowledge, Experience, Yourself, Sharing. How do we know if it works? Bruce showed results from a two year study of the Earthkeepers

programme, in this case in Cyprus. The evaluation of the programme looked at ecological understandings, values and attitudes, and personal behaviour. There were significant changes in all of these areas.

Staff get better at learning and teaching the programmes over time, which is evidenced as results over the longitudinal study improved over time. Students who are 9/10 years old engage readily with the programme in terms of magical learning experience. For older students (13/14 years) it is not so easy. The Sunship III program was designed for these older learners and while it still is a 'magical learning adventure' it is harder to figure out how to engage the learners...but it works. The Earthkeepers programme is widespread all over the world, but it is not dense in terms of numbers.

2.3.2 WORKSHOP 1- Bruce Johnson, USA and Jan Činčera, Czech Republic

Immersing Children in the Outdoors: Developing Personal Connections to Nature through Purposeful Experiences

Bruce Johnson, one of the main creators of Earth Education which is widespread in Europe through both schools and environmental education centres, is the International Programme Coordinator of the Institute for Earth Education. He has international experience in researching education programme effectiveness and in the development of scientific literacy. Jan Činčera implements Earth Education in the Czech Republic. It was very interesting to see that Earth Education principles work anywhere and all the participants appreciated that Bruce offered an added dimension of experience to the conference, broadening the opportunities for participants to gain insight from beyond European borders.



Earth Education is the process of helping people to live more harmoniously with the natural world by:

- Understanding how ecosystems work
- Developing a long lasting love and respect for the Earth and its life-forms
- Reducing their own impact on its natural resources

We started by talking about building up relationships with the environment, and how we need to encourage people to build up personal connections. One of the key aspects of delivering Earth Education is that children have items to illustrate the message the educator is delivering.

How we actually design activities:

- Avoid naming & labelling things. We do, however, stop to look at animals that present themselves or to look at plants. We do not get hung up on the names or ecological aspects in terms of labelling things. Students often find that long names act as barriers and can prevent any actual connection with the learning.
- Talk with a focal point rather than just waving your arms around. Use an item or a view.
- Avoid playing 20 questions - asking closed questions about the environment turns education into a guessing game with the teacher in a position in power.
- The 3 R's of Relate, Reinforce and Reward are what we focus on.

Then we went outdoors to try some activities in practice with Bruce and Jan. We started together with some Earthwalk activities: walking with mirrors to see the forest differently, preparing a special forest gallery and looking for treasure. These activities are designed to awaken the senses and it is an alternative to the traditional nature walk. These sensory Earthwalk activities provide exciting and engaging ways to involve people of all ages in exploring the natural world. And finally everybody had a taste of Magic Spots; these are about spending time alone experiencing the flow of nature and they provide the opportunity for each participant to develop an easy, quiet relationship with one particular natural space. At the end we went back indoors to share our experiences as outdoor leaders.



2.3.3 WORKSHOP 2 - Éva Neumayer, Hungary

Sustainable Consumption – some chapters from the Hungarian book “Consumers’ cure”

Éva Neumayer is originally an agricultural engineer and she worked at the University of Horticulture before she turned to outdoor learning and the field of education. She is one of the founders of field education in Hungary and has a great book on this topic. She is the founder and leader of the Magosfa Foundation dealing with environmental education and ecotourism. Magosfa runs an educational centre in the hills to the north of Budapest. She currently works in the Research Institute of the Ministry of Education in a working group dealing with Eco kindergartens and Ecoschool programmes.

After a round of introductions, Éva briefly introduced the Magosfa Foundation, their educational center and some of their activities (summer camps, canoeing, local trade markets) through a short slideshow.



She also introduced the book (Sustainable Consumption: Consumers' Cure, 2009): it was written in 2009 by eight experts from five Hungarian non-profit environmental organisations. The book contains 48 education modules with indoor and outdoor activities for 10-14 year old children arranged around 5 big topics: Systems of our Environment; Lifestyle; Food; Purchasing; Self-preservation (Do It Yourself). From these modules we picked three activities:

3.1 Ecological footprint. How much can we get from the cake? We played some games about using resources (here peanuts) in a fair way (or not). Participants choose a country and made slippers according to their ecological footprints and saw how they fit. We drew slippers on paper based on information from twenty countries, both wealthy and poor. The slippers, and size of our feet, were compared and discussed.



3.2 Washing. How did our great-grandmothers wash their clothes? And how do we do it now? Can we learn something from the past? What is the most environmentally friendly way to wash clothes? Let's check the advertisements! We took some rags outdoors to make them dirty and tried to clean them in different ways. In three groups we collected six different kinds of stains from the surroundings (dirt on shoes, on cars, marker pens, chocolate, grease, banana etc.). Adding one or a mix of four different kinds of detergents (washing powder, washing nuts, washing soda and washing soap) and water in a jar we replicated a washing machine by shaking the jars for several minutes. Then we rinsed and compared: washing nuts and soda showed surprisingly good results, but none of the four removed the worst stains.

3.3 Magic plants. Plants that we can find around us can be used in different ways. If we are lucky we can make paints and inks, dye wool, or make some tea. Also we learnt about edible plants.

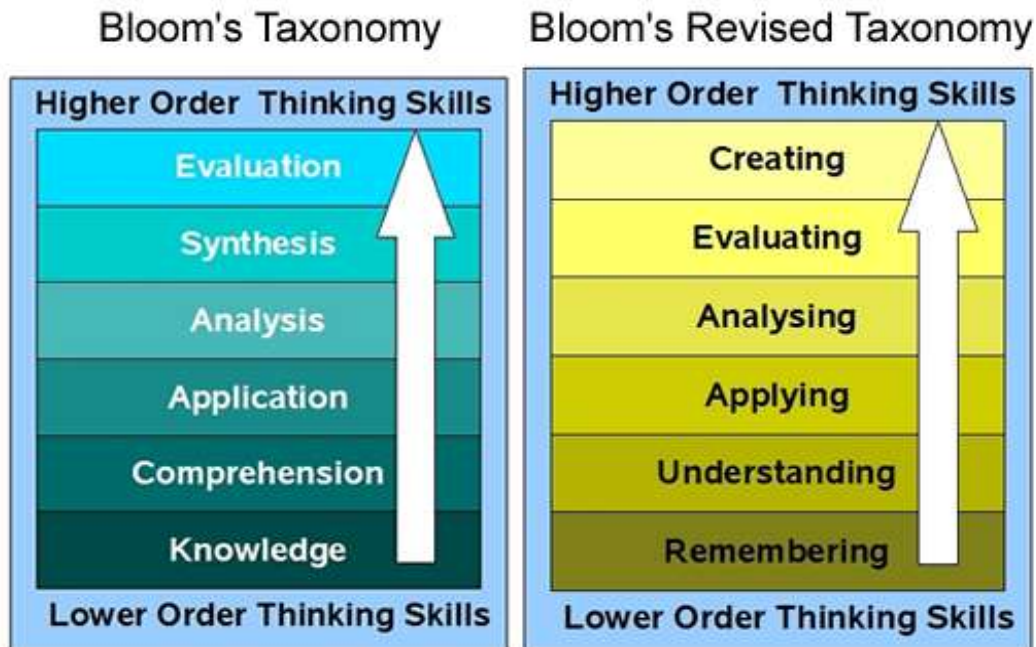


We made ink out of oak gall (dark blue), santal tree (reddish) and the roots of *Alkanna tinctoria* (purple) by heating, cooking and boiling them and then adding fixing compounds such as inkstone and gum arabicum. After filtering it all the ink was ready to paint on cards!

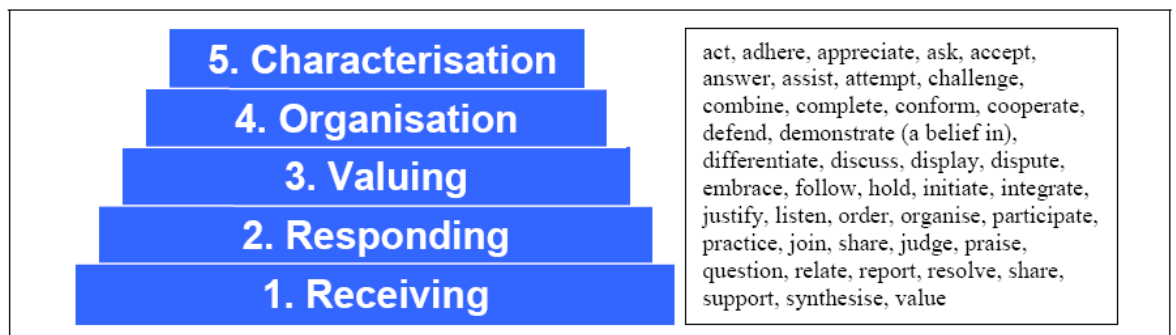
2.3.4 WORKSHOP 3- Andrej Šorgo, Slovenia

Setting learning outcomes for outdoor activities based on competences as a combination of knowledge, skills and values

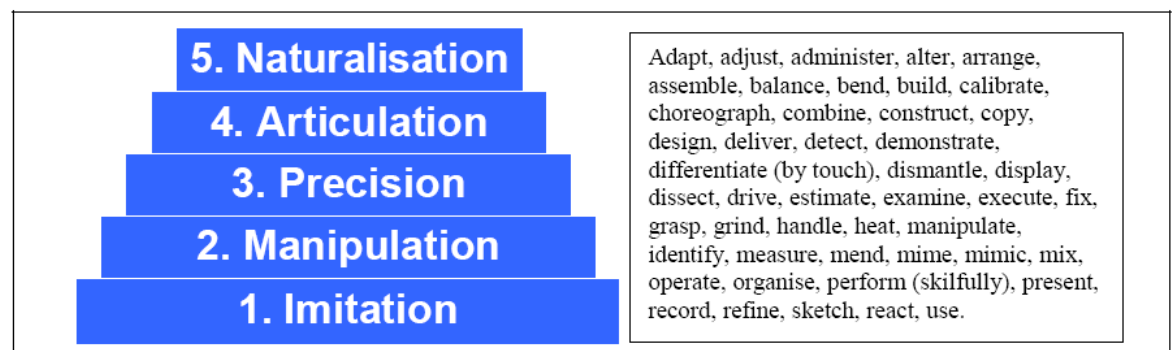
The main goal of the workshop was to teach participants how to transform learning objectives into learning outcomes by asking 'what are the most important things a student should know (cognitive), be able to do (skills), or value (affective) after completing an outdoor activity.'



AFFECTIVE DOMAIN



PSYCHOMOTOR DOMAIN



After the introduction the participants choose a topic to practice setting goals. The topic was making a fire. The participants divided into groups of two or three and started setting cognitive, affective and psychomotor outcomes for the activity and for cognitive and psychomotor outcomes also the indicators. The participants found a large number of outcomes for this simple activity.

During the discussion they talked about the use of setting such detailed outcomes. Everyone found the exercise useful but too time-consuming to be doing this for every activity we carry out. An organization would need a person employed for working on these if they wanted to have everything written down. However, the participants agreed that it is important to have all these outcomes in mind so that our teaching is more focussed and that we do not leave something out. A point that was also emphasised by the participants was that if two teachers focused on different outcomes, even a simple activity such as making a fire could be carried out very differently.

2.3.5 Keynote speaker 2 - Dr Barica Marentič Pozarnik

What makes education for sustainability more effective? Psychological background and pedagogical approaches.

Barica Marentič Požarnik is a leading environmental educator from Slovenia. She worked as the national coordinator for the OECD Environment and Schools Initiative and was professor at the Faculty of Arts in Ljubljana, teaching educational psychology, psychology for teachers and experiential learning.

Two psychologists, Gardner & Goleman, suggested that we need a particular type of intelligence to understand the natural world. Later Gardner decided to add another intelligence to his model - naturalistic intelligence. The second psychologist was Goleman (the author of the Emotional Intelligence and Why it Matters More Than IQ) suggested that we need emotional intelligence and social intelligence. He recently added ecological intelligence to his framework. This shows that natural and emotive intelligences are becoming more important.

There are three approaches to learning:

- About the environment
- In the environment
- For the environment

Which one of these is more fundamental or more important than the others? Usually 'for the environment' as affective education is the missing link. It is an essential part of education for sustainability in terms of care and action for the environment. Concern for the environment is based on emotions - affective learning.

In this case, which emotions are going to be useful for the education for sustainability? There are all kinds of emotions, which ones do we focus on? How do science teachers treat their student's emotions? What emotions do students link with the science teaching? Lots of answers, often fear and boredom, so not pleasant or productive emotions. In some cases there were more positive emotions, for example curiosity. It might be important for teachers to look at the types of emotions that they are arousing when they are teaching science.

Subjects taught in schools have emotions associated with the arts rather than the sciences in terms of subjective feelings and affective learning. Science has lost its emotional roots within its methodology and content. Science is often presented without emotion, just 'objective' facts. Science can be presented with emotion without affecting the scientific rigour, for example in the form of stories of scientific discoveries and their mis-use in everyday life.

Attitudes and values within education for sustainable development: we often see things from the position of our attitudes and values, this makes us reluctant to change them. Information does not always help us change our attitudes as we do not want to 'see' information that is contrary to our beliefs.



Example: There are many reasons for being vegetarian as there are complicated reasons behind decisions and actions. Some of the reasons that came up during discussion are:

- Biodiversity and animal welfare.
- Social acceptability and health.
- Opportunity and alternatives.
- Carbon footprint.

Where somebody 'stands' on a certain issue? There are some activities that can be done in workshops to see where people stand on particular issues and what their attitudes are. You line up next to people who have the same 'stand' (positive on one side, negative on the other) on the issue and can then find more information to clarify the attitudes, then start to connect to the environmental and economic issues.

Values in education: Students can be educated in the different types of values: egocentric, anthropocentric and eco-centric values. We would like people to have more ecocentric values (in a later discussion Michela Mayer expressed her viewpoint that our values are always anthropocentric, no matter what we do but they can still lead to sustainability). Values are impossible to teach and measure directly, so what can teachers do? They can expose students to significant experiences including activities for clarifying attitudes and values. One way to do this is via a decision making exercise in terms of pro and con discussions about environmentally relevant topics. Pupils who, for example, had also visited the environment had some creative solutions to the management of wetlands, together with a better solution of the competing conflicts on the land use (grassland for cows or a natural habitat of many species).

Taxonomy of the affective domain: this is similar to the cognitive domain.

- Receiving
- Responding
- Valuing
- Organisation of values
- Characterisations

This process of 'internalisation' is roughly related to age. Reference Blooms and Krathwohl (see also Šorgo).

Values and behavioural change: Not a simple relationship, the successful approach is related to age. In the early years, the focus is more on directing attention and the focus is on positive feedback and simple explanations. Next comes social learning; imitation and learning by modelling is then the primary driver for the individual. Later on peer groups become important so that learning comes from the joint actions with elements of risk taking in groups. Eventually, people will learn with a

cognitive approach and the development of eco-systemic thinking and moral judgement. This leads to planning actions in school and community.

Action competence in teachers and students is not just behaviour modification, its more about the transferable skills in terms of being able to solve problems in the future, using the learning that has been gained through other activities. Effective methods in education for sustainability combine a powerful experience in nature within group activities and community learning.

Changing role of the teachers is necessary, from a transmitter of knowledge to a supporter of significant learning experiences. Teachers need to establish connections within powerful learning experiences to provide for the affective learning which drives behavioural change. To enable teachers to do this we need to improve teacher education, to provide more integrative education for sustainability. Science teachers do not promote enough inter-disciplinary linkages within the content that they teach and there is not enough training in out of classroom and outdoor learning.

2.3.6 Workshop 4 - John Rhymer, UK

Earth Education

Earth Education is the process of helping people to live more harmoniously with the natural world by:

- Understanding how ecosystems work
- Developing a long lasting love and respect for the Earth and its life-forms
- Reducing their own impact on its natural resources

Designing purposeful activities is the key to Earth Education. We will be looking at the design criteria before we go and experience activities outside.

John started off by talking about building up relationships with the environment; we need to encourage people to build up personal connections. It is not enough to take young people out into the natural world; we need to do other things too. These other things are the key, which is about designing purposeful activities.



We want to make the natural world part of the in group, rather than part of the out group. This



means we want to make the natural world part of children's lives. The barriers to this are many. Some people are not comfortable with the environment or going out in natural environments, some perceive it as dirty. These barriers can be overcome, for example, by wearing old clothes or giving people overalls or waterproofs. Earth Education seeks to overcome whatever barriers there are to access.

One of the key aspects of delivering Earth Education is that children have items to illustrate the talk the educator uses. Many of these items are available naturally within the environment. Some are part of the preparation that needs to be done before the children arrive. John's example was of the 'giant leaf' in the food factory activity that is run at Bishops Wood Environment Centre in the UK. In the 'Food Factory' students crawl inside a giant leaf to discover how plants use the sun's energy to make sugar using water, carbon dioxide and light. Oxygen is of course a valuable waste product of the food factory, students discover this.

How we actually design activities:

- Avoid naming and labelling things, however, we do stop activities to look at animals that might present themselves or to look at plants. We do not get hung up on the names or ecological aspects in terms of labelling things. Students often feel that using long names can create a barrier to connecting with learning.
- Talk with a focal point rather than just waving your arms around. Use an item or a view.
- Avoid playing 20 questions - asking closed questions about the environment turns education into a guessing game with the teacher in a position in power.
- The 3 R's of Relate, Reinforce and Rewards are the things that we focus on.

Earthwalk is a light refreshing touch of nature. It is designed to awaken the senses and it is an alternative to the traditional nature walk. These sensory Earthwalk activities provide exciting and engaging ways to involve people of all ages in exploring the natural world. The activities you choose to include will depend upon the environment you set your walk in and the experience you wish your group to have. They are designed with 9 and 10 year olds. They can be adapted to younger age groups, as well as older groups. Ideally 15 participants. They should last under 2hrs.



Magic spots if you are alone in the natural world, you start to make connections. Magic spots are about spending time alone in nature experiencing the flow of nature. Magic Spot time provides the opportunity for each child to develop an easy, quiet relationship with one particular natural space.

2.3.7 Workshop 5 - Serena Dorigotti and Costantino Bonomi, Italy

The Inquire project and the IBSE method in outdoor education

The workshop introduced an Italian project using IBSE (inquiry based science education) method outdoors. Participants tried short activities from the programme and then learned more about the whole project.

This project puts children in a real life situation where plant conservation and economic development clash. In an alpine valley children play the part of citizens in a ski resort where new plans for ski slopes threaten an area rich in biodiversity. The question to answer is: "Will the new ski run badly affect the biodiversity and economy of the valley? Will it be sustainable in the long run?"

Students have to investigate the consequences of this development on the environment by collecting data on the species occurring in the different areas of the valley and browse through the supporting and reference material provided to find solid scientific and economic evidence to support or oppose the plans for the new ski slope.



Participants develop abilities to discuss complex problems, examine pros and cons, actively look for data and supporting evidence to back up their claims, and structure them in a consistent argument. This activity should improve the students' ability to resolve complex problems aiming to make them understand the complexities of a decision making process in a social community and accept that one often has to make compromises. It will teach them that extinction is a problem linked with human actions, but that humans can also help conserve and protect threatened species.

The activity addresses biodiversity and its conservation, allowing to consider also economic issues in a more complex real life situation connecting to personal, social, health and economic (PSHE) education.

The structure of this activity can be analysed according to the 5 E model:

- the ENGAGE STAGE is represented by the alpine outdoor setting and the different specific personal roles assigned to each student;
- the EXPLORE STAGE is the data collecting phase examining plant labels in the different zones and examining the reference material provided and/or searching for further material;
- in the ELABORATE STAGE the students decide their position on the ski run and prepare the supporting material and appropriate evidence to justify it;
- the EXPLAIN STAGE is represented by the posters, leaflets and speeches given during the public consultation; and
- the EVALUATION can be carried out in the Plenary



A final plenary is advisable where the students step out of their roles and can express their own opinion (no more the one of the character they played). The teacher/educator can lead a structured discussion or a two step discussion, first in small groups and then in a plenary to find out what whether the students' opinions differ from the one of the role they played and what they think of the outcome of the public confrontation will be and what they think of democracy and majority vote more in general, highlighting the link to personal, social, health and economic (PSHE) education.

2.3.8 Workshop 6 – Katharina Fichtner, Germany

Fire making with flint, steel and tinder bundle – a practical approach to wilderness education

The workshop took place outdoors with an introduction to the background of Wilderness Awareness and how it is connected to ‘simply making a fire.’ Wilderness Awareness/The Art of Mentoring is a holistic approach, it means working with the ancient knowledge of our ancestors and other nature-living people around the world. The knowledge about natural laws, how to make tools, how to raise young people and to be an active part of a community is still in our minds and souls.



Through making a fire in the way that people did thousands of years ago, students can learn a lot more than experiencing that fire is hot: it teaches personality and teamwork skills as well as sustainable thinking, e. g. when you do not cover your wood and it gets wet, the next day it will be much harder to make a fire. It teaches you knowledge of trees and plants which are useful for making a fire. And it enhances the student’s connection with nature.

After the introduction, the group split up into different smaller groups of up to five people with the task to gather wood for a fire that should first be lighted with one match. Every group piled up their small campfires and lit them in front of the others. Mostly it worked, in the cases it did not, Katharina asked what we can learn from it for the next time and a reflection in the group took place. The whole group also started to support the small groups with a fire-making-song, until everyone had a fire.

There was time to explore and discuss the insights from this experience and how we can connect this to sustainable actions of students. Some of the ideas were that fire can be used as a door opener in many ways, e.g. dealing with fear and personal limits, supporting implicit knowledge about nature and natural laws (e.g. when wood is good for burning, which trees are suitable) and working together in a team.



Practical example: How to make tinder yourself
You can burn your old cotton t-shirt – put it into a pot with a lid with a small hole and put the pot into fire. From the hole will come out white smoke, depending on the size of the fire, about 10 minutes. When it stops smoking, the tinder is ready and you can take the pot from the fire.

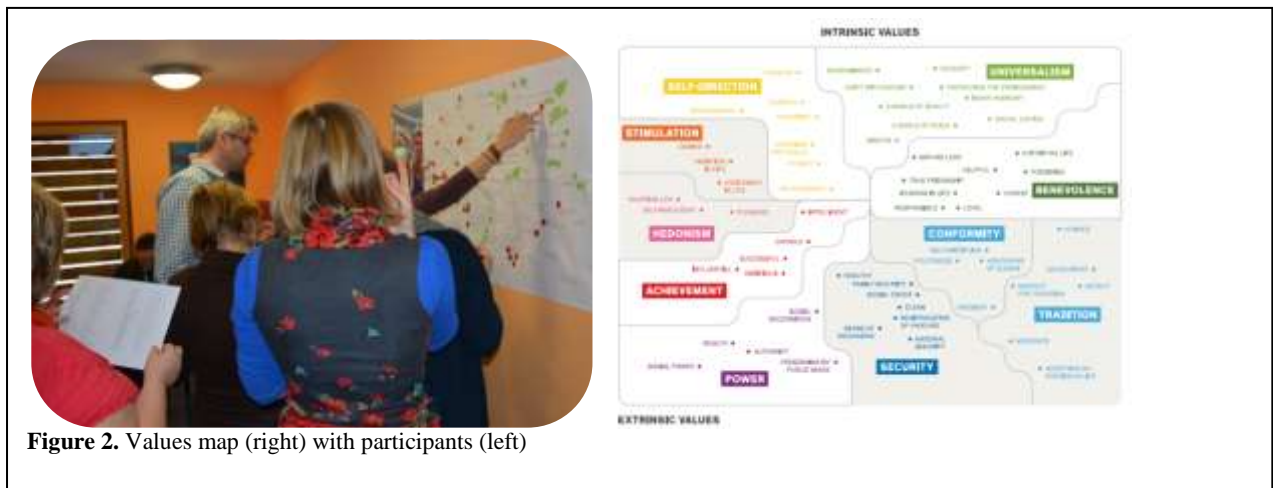
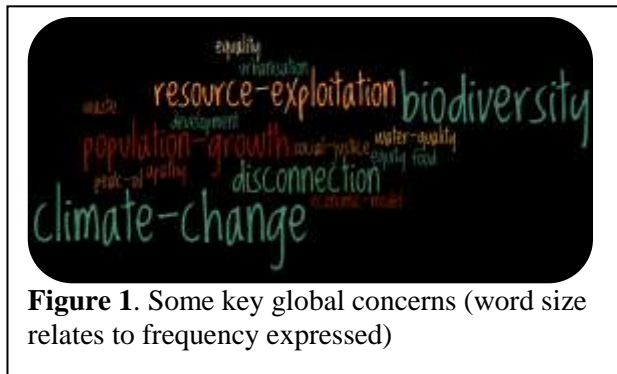
3. Conference Participant Presentations and Workshops

A key part of the conference was sharing and listening to the experiences of the participants. In addition to all the informal conversations, several participants gave formal presentations or lead workshops. These are described below in their own words.

3.1 A Common Cause for Real World Learning – Tom Deacon

Values represent our guiding principles; our broadest motivations, influencing the attitudes we hold and how we act¹. It is therefore imperative that we recognise the importance of values in our work as outdoor educators; that we are very mindful about which values we wish to support and develop through our work and how we ‘frame’ or embody and express them.

This workshop offered the chance for participants to further explore and discuss the topic of values that had been introduced in the morning Keynote on the Common Cause for Nature² given by Ralph Underhill of PIRC. In order to set the frame for a ‘sustainable’ and ‘unsustainable’ world, participants first considered what global issues currently concern them (Figure 1).



This was taken as the basis for an unsustainable world model, with an imagined sustainable world society having solved all these issues in order to live in environmental, social and economic equilibrium. Participants then used the 58 universal values outlined in the Common Cause¹ based on the findings of the research by Schwartz³ to reflect on which 5 would be core in the unsustainable model (red stickers), and which 5 would be core in the sustainable model (green stickers). These were then plotted by all participants onto the values map from the same research (Fig. 2). Although not explicitly asked as such, this data can be taken to represent the personal views of the individuals present relating to core values for sustainability. The data (Figures 3 and 4) will be added to data from previous workshops with outdoor learning professionals from across Europe to help inform the work of the Real World Learning Network.

1. Holmes T, Blackmore E *et al* (2011) *Common Cause Handbook*, Public Interest Research Centre (available at valuesandframes.org)
2. Blackmore E, Undershill R *et al* (2013) *Common Cause for Nature*, Public Interest Research Centre (available at valuesandframes.org)
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3.2 ICT and Outdoor Learning – Francisco Pavon, Cadiz University, Spain

In my contribution I intend to show how we can use ICT in the best way for outdoor learning and teaching.

I am teaching the subject Didactics of the Natural Environment in Primary Education degree. And Communication and ICT in the Faculty of Education.

I will speak about Cadiz and the environment where our university is located, its natural attractions. I will show some characteristics of our university. Our geographical situation can be a great motivation for outdoor learning.

The summary of my presentation is:

1. ICT. MODERN-DAY SOCIETY.
 2. YOUNGER GENERATIONS
 3. CRUCIAL EDUCATIONAL RESOURCE
 4. Our outdoor experiences using ICTs
1. NEW TECHNOLOGIES ARE PART OF EVERYDAY LIFE especially for younger generations, where computers, Internet, TV are used help to give students a better understanding of the society in which they are living. A society where they are digital natives and they need to have digital competence.
 2. **How do young people use ICT?**
 - Create a multiscreen environment and multi media.
 - Media used mostly for entertainment and communication.
 - They suffer cognitive hyperstimulation, with increasing multitasking.
 - They are always connected and thinking about their mobiles.
 - They attend class and have in front of them their computers connected to the Internet.
 3. CRUCIAL EDUCATIONAL RESOURCE
 - The use of new technologies as educational resources requires basic skills on the part of both teachers and students.
 - We are seeing new forms of teaching that take advantage of new technologies.

- Sharing information and opinions – will allow education to become a collective construction of knowledge and stop being a transmission of knowledge from the teacher to the students.

4. Our outdoor experiences using ICTs. TRAINING TEACHERS FOR PRIMARY EDUCATION

As a student if you liked to learn outdoors and with ICT, when you get to be a teacher you will teach the same way.

OUTDOOR CREATIVE LEARNING

1. Enviroments where students are active learners.
2. They can freely OBSERVING AND EXPERIMENTING.
3. Where teachers are coaches and promote cooperative learning methods, making learning relevant to life experiences.
4. Creativity and outdoor learning needs time, flow, interaction and risk-taking. All these being attitudes that go against traditional school institutional principles.

Strategies to invite learning

1. **Generate interest.** We have to connect the subject and each of the topics to modern times, to the spaces next to reasonable projects and hopes.
2. **Keep attention.** Through verbal and non-verbal, graphic illustrations, diagrams, examples, practical applications and, through stories of real or fictitious stories, decorated by imagination.
3. **Encourage curiosity.** Curiosity, with novelty search and openness to experience, represents the human desire to acquire knowledge and living experiences. Predisposes to search and experimentation of knowledge that enrich life.
4. **Provoking surprise.** By unexpected proposals, new solutions and unexpected departures.



Each working group will develop a blog that is updated WEEKLY and where events, new materials and overall contributions are developed and exposed.

All blogs will be connected to one central blog for the course (<http://dmninfantil.blogspot.com.es/>) for which I will be responsible. Our class organised a visit to the Toruños, a natural park located near our university (<http://www.juntadeandalucia.es/obraspublicasytransportes/epsa/parques/torunos/menu/Naturaleza/Flora.html>). In this journey, each group had to prepare some activities to do in the openfield.

BLOGGING

1. Blogging is an example of how youngsters are using technologies to express their creativity and to be innovative.
2. These applications demonstrate the variety of ways in which users “**learn how to learn**” which is a major component of blog creativity.
3. The example of blogging shows children how to link their work to other works, how to network with other bloggers.

METHODOLOGY

1. **PRE VISIT.** Each group prepares a post on the different blogs in order to know [the place where we are going](#) and possible activities to do there.
2. **DURING THE VISIT. Observation.** On the day of the field trip we collected images and ambient sounds and along the way we made.



We employed the technique of observation in the present study, it has always been one of the sources of human knowledge, but it is very recent systematic application to serve the educational situations. Observation provides information regarding integrating our mental representation of reality and process, and relate it to our accumulated knowledge obtained from this process, something that did not exist before for us.

3. When we stopped, we made a video representing the activity.
4. **POST VISIT.** Finally when we got back, we developed the material to put a new post.

CONCLUSIONS

Students become more dynamic and interactive. They can produce their own products and become an author, acting proactively.

They are surrounded by technology but sometimes don't know how to make good use of its resources.

We have experienced practical methods of teaching and learning based on the outdoor classroom.

3.3 Perceptions, emotions and outdoor environments, Caroline Carr



This presentation questioned the relationships that outdoor learning plays in children's knowledge about the environment? It examined what knowledge & understanding can be learnt through experiences that promote strong emotional connections to the natural environment. It questioned the role of perceptions in embedding knowledge and how we teach children about the natural world Firstly... open your minds to not what I think but to your own work and the potential you have to inspire and motivate the young peoples of tomorrow's future ... how do you own experiences from childhood impact on your values and beliefs?

On Day 2 of the Conference we heard of Bruce Johnson's disaffection from nature and the human relationships that destroy nature and the power those experiences can have in generating a desire to change our values and attitudes towards the natural world.

My relationship with nature started when I was very young... with a strong connection to the sea... my love of being on and around water is still strong.



Life is a journey ...Where do you want to go today?

After university I worked in Chile for an environmental education company called CEAL whose values set out to develop young people's environmental awareness. This was the cornerstone for the work I now do on connecting young people and adults to the natural environment through learning outdoors.

My research considered how outdoor learning can engage children's environmental awareness of the natural world. The methodology of grounded theory triangulated data collated through memoing, children's drawings & thoughts, questionnaires and informal interviews to form an emerging train of thought that linked to my final theory.

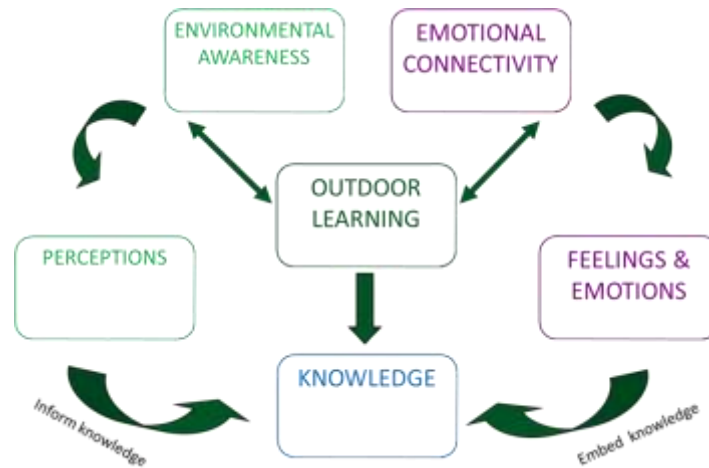
The why was based on my observations of children playing freely in nature and their questioning, knowledge and understanding of our nature world? The hypothesis of Biophilia underpinned this research and whether children do have an innate need for nature. These thoughts were supported by Richard Louv's work on today's nature deficit society and how modern day culture interacts with the outdoor environment. It questions if today's young teachers did not engage with the outdoors will they use the outdoors to teach the young people of tomorrow?

The research showed an emerging pattern that when 'memorable learning' occurred children recorded strong emotional responses. The full range of words used by children to describe their outdoor experiences can be seen in the following word cloud.

The larger the word the more frequent it occurred in children's responses.



The children displaying emotional responses also demonstrated a greater knowledge of the natural world.



The above model was generated from the connections I found between outdoor learning, children’s perceptions through sensory experiences and the knowledge they gained on the natural environment.

Summary of Research

Knowledge, understanding & perceptions

- All participants could demonstrate knowledge on the natural environment /nature at a basic level
- Participants that experienced teacher led outdoor learning demonstrated more ***in-depth knowledge and understanding about the natural environment/nature***
- A majority of participants showed an awareness of caring for our natural environment and/or the importance of natural resources

Emotional responses to natural environments

- A significant majority of participants who had experienced outdoor learning demonstrated an emotional response to their experiences in the natural environment

My research leads on to further questions on what the future impact of children’s environmental exposure will be and also how teachers today use the outdoors to educate children and to further foster a love of our natural world.

“Perplexity is the beginning of knowledge”

Khalil Gibran

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3.4 Tropical Nature Camp: integrating outdoor classroom with secondary school's science subject, Nurul Salmi Abdul Latip, School of Biological Sciences, Universiti Sains Malaysia, Penang, Malaysia

1.0 Outdoor learning and schoolchildren in Malaysia

Currently, many countries have a growing interest in and awareness of the outdoor environment as a valuable complement to traditional classroom teaching (Fägerstam, 2012). In Malaysia, various forms of formal and informal settings have been established by different groups utilizing the outdoor environment for diverse types of programs. However, outdoor learning as an extension to support classroom teaching especially in a specific subject such as Science is close to non-existent.

In Malaysia, nature-based activities and outdoor programs are not new. Informal environmental education has been conducted by non-governmental organisations (NGOs), private organisations, universities and government agencies. Examples include the Eco-schools programme by World Wide Fund for Nature (WWF), an international initiative designed to guide schools in implementing a whole-school approach towards environmental and sustainability education. The Malaysian Nature Society promotes the Nature Club which started as a group of 12 schools and today, its membership stands at 318 schools from all over Malaysia. The Nature Club programme aims to encourage interest, understanding and involvement in various environmental activities and conservation efforts amongst the school-going generation. Other NGOs such as Yayasan Anak Warisan Alam and Water Watch conduct independent paid programs for school children on environmental-related activities. The educational unit of several government agencies conduct occasional programs with schools in various states on outdoor activities and teambuilding, at times collaborating with a particular local university or NGO. The content of these programs includes nature-based activities and environmental education targeting majority of the time on recycling matters and related activities. In many situations, these programs occur inconsistently and sporadic, many of which depend on available funding and sponsorships.

The setbacks to some of these programs is that students would have to pay to get involved and limiting the numbers to privileged groups, hence, unable to equally provide for those from lower income groups. Another is that many of these organizations, government agencies and universities are located in the Klang Valley where Kuala Lumpur, the capital city is located. In other parts of Malaysia programs such as these are infrequent or rare and children continue to lack these activities. No doubt these programs are beneficial and should be developed and continued. However, these programs are able to serve a small percentage of the young in Malaysia.

In formal education, there is no specific subject that focuses on nature or environmental-related topics. These topics, related knowledge and facts can be found across the curriculum integrated in all subjects, such as Science, Geography, Moral Studies and Islamic Studies. In the Malaysian education system, students are introduced to environmental issues through a range of core subjects, depending on the level that they are in. At the primary level, which is the first six years of national education system in Malaysia, environmental-related knowledge are introduced as part of science, ecology and local studies curricula. When students reach the secondary level, environmental education takes

place through subjects like geography, biology, chemistry and language. Schools are also equipped with teaching materials relating to environmental issues.

However, its importance is not stressed in schools (The Star, 2003) and as a consequence environmental literacy among school children in Malaysia is still at the moderate and low level (Jannah *et al.*, 2013). Some main problems encountered in teaching Science and other subjects are exam-oriented teaching which sacrifices on practical and experimentation, teacher-centred which ignore the thinking skills as required by the curriculum and ineffective delivery in teaching abstract topics such as biodiversity, energy, motion and molecular structure, among others (myForesight, 2013). Although these topics are represented in the curriculum, the teaching of environment-related topics is not uniform among teachers of different subjects and entirely depends on the teacher's own efforts (Ahmad Shaari & Osman, 2011). In a study on mathematics outdoor camps in Malaysia, a country where students are rarely taught in outdoor settings, students valued learning mathematics outdoors and enjoyed the new learning environment (Noorani *et al.*, 2010). Hazura *et. al* (2013) revealed that presently the current curricula from all subject areas do not address the issue of children's connectedness to nature and that teacher's use very little of the outdoor environment for teaching Science, Geography or any other subjects. The authors concluded that teachers should bring their students for outdoor education and use nature as the focus of learning for Science subjects.

This paper discusses initial outcome of a pilot program, the Tropical Nature Camp, on implementing outdoor classroom in learning Science. The aim of this program was to obtain baseline information on the suitability and acceptability of using outdoor learning to conduct Science for the local schoolchildren and teachers.

2.0 Tropical Nature Camp - Integrating outdoor learning in Science education

This pilot work of Tropical Nature Camp (TNC), became a platform to incorporate Science curriculum topics as an outdoor learning experience for schoolchildren in a natural environment. TNC was conceptualized on the premise that with children's access to the outdoors and the natural world becoming increasingly limited or non-existent, schools, where children spend 40 to 50 hours per week, may be the last opportunity to reconnect children with the natural world and create a future generation that values and preserves nature (Herrington & Studtmann 1998, Malone & Tranter 2003).

The outdoor learning concept of TNC goes hand-in-hand with Malaysia's National Education Policy, which aims in developing the potential of individuals in a holistic and integrated manner to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious. This is further translated in the Malaysia's Science curriculum which aims to provide opportunities to engage students in scientific investigations through hands-on activities and experimentations. The curriculum integrates inquiry approach, incorporating thinking skills, thinking strategies and thoughtful learning throughout the learning process.

Guided by the Science curriculum, TNC spearheaded by three objectives:

- 1) to introduce the concept of biodiversity in the Science subject using different tropical ecosystems
- 2) to explore perceptions and feedbacks of students and teachers on outdoor learning approach in Science for lower secondary

- 3) to identify the strengths and gaps in outdoor learning approach in a natural setting for lower secondary

The program was designed to incorporate biodiversity concepts, and in the process, highlighting Malaysia as one of the megadiverse countries in the world. The biodiversity concept is identified as one of the learning area under the theme “Man and the variety of living things” from the Malaysian Integrated Curriculum for Secondary Schools (for lower secondary students, i.e., 13-15 year olds). Topics covered under this theme for Tropical Nature Camp were:

1. Understanding variety of living thing organisms and their classification
2. Analysing the interdependence among living organisms
3. Evaluating the interaction between living organisms
4. Synthesizing food web
5. Evaluating the importance of conservation and preservation of living organisms
6. Evaluating the role of man in maintaining the balance in nature

Three ecosystems, i.e., the rainforest, the intertidal and mangrove, were selected to represent the biodiversity concepts and topics above. The Camp runs for three consecutive days and was conducted in Penang National Park, predominantly a coastal rainforest ecosystem, hugged by the coastline and a mangrove ecosystem which became a suitable setting for the program. Based on the ecosystems, specific modules that integrate concepts related to the above topics were prepared to assist faculty in the teaching-learning process. Students were acquainted with the topics and ecosystems at the introductory level. The format TNC is that each ecosystem is accompanied with outdoor, direct, hands-on learning activities that encourage students and teachers alike to participate throughout the three days.

For this pilot program, four secondary schools were invited to participate independently at different periods in April, June, September and October 2013. The number of students totalled 160 comprising of a good balance of boys and girls. All schools were public (government) schools throughout Penang state, located in the northern part of peninsula Malaysia.

3.0 Findings and discussion

The following discusses collective responses of the baseline survey gathered from the four programs conducted on 160 lower secondary students from four different schools. The survey conducted was by no means statistically significant as it was not designed a qualitative or quantitative exercise in the beginning. The survey questions basic information on student perceptions of the program to get their impressions on its suitability and their acceptability in terms of its content, physical activities, duration, organisation, benefits and values, among others. Example of parts of the questions posed on learning Science is presented below.

Question: Do the activities conducted help you understand Science subject in school more?

Question: Do you think you will like Science more from activities conducted in TNC?

Question: Would you participate in another TNC program?

Question: What is the most impactful experience you have gained from TNC?

Question: What are benefits and values you have gained from TNC?

The responses gathered from students suggest that majority (99.9%) of them appreciate and value TNC’s outdoor teaching and learning experience. The responses showed that during TNC they acquired more detailed information on various Science topics learnt in school and hence, could help them understand better the Science lessons taught in school. A large number of students expressed

that they had learnt with TNC many new things on various ecosystems, fauna and flora which were not covered in textbooks. Several students indicated that learning Science in the national park environment was more fun and that it is “more interesting to learn about nature in nature than reading textbooks about nature in school”. Students also indicated that the direct hands-on field knowledge and experiences gained are special because majority of them have not had any form of contact with nature such as being in a forest or a beach before TNC. To some the forest walk was an adventure in itself. Many students had their first hand encounter of wildlife in the forest, learning about trees and their adaptations, and searching for crabs, starfishes, sand dollars and other intertidal fauna on the beach. The topics from TNC also extended across-subjects, i.e. Geography, for instance during sessions conducted on mangrove ecosystem.

Renewed interests in Science subject was evident in a number of students who expressed that prior to TNC they were less interested. Apart from these, those who liked the subject found that TNC increased their interests and encourage them to learn more about a particular animal or plant, or Science in general. This group found the outdoor learning experience greatly motivating, challenging and academically beneficial for them (99.9% of the students). There were a number of students who were less interested in the subject in the beginning which altered very little or none at all after they completed the program.

More than 90% of the students surveyed agreed that TNC improved their understanding of biodiversity and the ecosystems; the importance of fauna and flora ; interpersonal and intrapersonal skills e.g teamwork and consideration for others; boost their self-confidence; environmental awareness and stewardship ethics; physical, mental, and social health; and ability to learn and concentrate. Although no evaluation can be made on the students’ assertions, many past research have indicated that outdoor learning can promote such benefits and values (Examples: Godbey, 2009; Fagerstam, 2012). With more structured evaluation and assessment on Malaysian students the author believes that these findings can be revealed.

Informal discussions with teachers on their perceptions on outdoor learning and teaching revealed that there are significant potentials and advantages of such program with regards to Science subject. Teachers observed that the nature experience and exposure enhanced participants’ perception and understanding of the Science subject learnt in school on selected topics – the ecosystems, ecology, biodiversity, their importance and conservation. Teachers disclosed that there should be more programs such as TNC because in their schools and many others the capacity to conduct such programs is lacking. Factors such as not sufficient time and resources, inflexible curricula and increased administration duties are some of the limitations presented. Teachers commented that due to these and various other factors, it is very rare that students get opportunities to participate in outdoor field visits, what more of outdoor learning in a natural environment.

This baseline survey demonstrates that students acquired various kinds of contact with nature, direct and indirect, and that the Camp experience has had a range of benefits such as physical, mental, emotional, intellectual, cognitive, moral and social benefits. Emotional and aesthetic experiences in nature are valuable aids for students to develop a sense of belonging or connectedness to nature. Experiencing nature is an aim in itself and a significant factor in developing, for example, environmental concerns. There is a wide acceptance amongst outdoor education researchers on the role of outdoor and nature experience for children, i.e., the role of direct and indirect experience in promoting a sense of belonging, knowledge, ethics and values that promote behaviours leading to environmental feeling or motives. According to Chawla (2006) childhood play in nature was an essential source of environmental feeling and motives for activism for environmentalists. Regardless of race, ethnicity, and socioeconomic status, early childhood experiences in nature significantly influence the development of lifelong environmental attitudes and values.

4.0 Conclusion and final remarks

Students and teachers feedbacks demonstrated that there is demand for outdoor learning and engaging secondary school students in Penang, Malaysia to natural field experiences. From this initial baseline survey TNC demonstrated that out-of-school nature experiences is a strong factor that could promote interest in Science for secondary students in biodiversity, ecology, ecosystems, conservation including other subjects. It indicated that at present, frequent contact with nature for schoolchildren was rare and that schools have an important role in facilitating nature experiences for children. Several gaps and weaknesses have been identified which should be considered in planning and developing TNC further including for research purposes. Despite TNC being a baseline survey and not an official research or evaluative, it gave an insight into the significance and enormous benefits of teaching and learning not only Science but other subjects using the natural outdoor environment as a backdrop.

In the last 50 years, Malaysia has become one of the most rapidly developing and urbanised country in Asia which resulted in losses in natural vegetation and green spaces in many areas. In a biodiversity hotspot country like Malaysia environmental literacy and nature education is essential to promote awareness, understanding, respect and reconnection to the natural world amongst the young and adults alike.

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3.5 Trans-Alp Project: experiential learning on an educational expedition, Lorenz Schmilinsky

Trans-Alp is a project for secondary pupils from 14 to 16 years of age. The objective of the project is to plan, prepare for, and undertake a ten-day trans-alpine expedition and to engage in activities documenting the experience afterwards. The design of the expedition is highly place-related and serves to develop pupils' mental maps and to turn space into place by endowing it with values.

Project phases

During the first phase of the project, the pupils prepare for their expedition. They choose a topic from Sciences or Humanities that is related to the Alps, preferably to the specific region of the expedition, to write a scientific paper and give a presentation about it in class. They also plan the stages of the expedition, book accommodations, get fit for the tour and do spare time work to contribute to the cost of the expedition.

The second phase of the project is the expedition. Ideally, it takes place in September and early October. It leads from Thusis in the Rhine valley (Grisons, Switzerland) to Poschiavo near the Italian border. It's divided into seven stages and involves hiking a distance of 120 kilometres (75 miles) and an accumulated ascent of 4800 metres (14,500ft.). The longest stage is a distance of 25 kilometres, the highest point of the expedition is at an altitude of about 2500 metres (7500ft). The kids are accompanied by three adults.

During the third phase the pupils process the material, data, and experiences they have gathered during the expedition. This may involve writing books, preparing and giving public talks, producing photo documentaries and exhibitions, or films.

Project Purposes

The project has a variety of pedagogical purposes. The most obvious is to provide a group of pupils with the opportunity to work for a common goal over an extended period of time, and to take on and master a challenge in a group of.

Another purpose is to introduce pupils to scientific research and to make them familiar with writing scientific papers. For that purpose they are shown how to narrow down broad topics to a manageable size, how to find, use, and quote from sources, how to take notes etc. Also, a set of formal requirements, such as a title page, a well-structured table of contents and a bibliography, are agreed on.

The Alps, though seemingly virgin landscape, are in fact an area that has been shaped by thousands of years of human activity. Accordingly, there are many potential fields of study, from both natural



and cultural sciences, the participants can choose from (the topics marked* can be experienced/seen during the expedition):

- The formation of the Alps
- River systems and divides in the Alps*
- Climate change and the vanishing of glaciers*
- Population by man/Cultural history of the Alps
- The history of traffic routes in the Alps*
- Agriculture in the Alps*
- Ground plan and typical elements of farm houses in the Engadin Valley*
- Churches along the route*
- The Albula railway*
- The Bernina railway*
- The history of tourism in the Alps, with special reference to St. Moritz*
- Rhaeto-Romanic – origin, features and perspectives of a minority language*

The third phase is crucial to the success of the whole project, because in its course, pupils reflect and re-assess all they have studied and experienced in the previous phases of the project. In doing so, the pupils change their role in the educational process. From asking questions in the first phase, via experiencing hands-on (or “feet-on” for that matter) during the expedition what they’ve studied before, they become experts who share their knowledge with others during the third phase. A group of secondary pupils who crossed the Alps in September/October 2011 actually earned € 500 by giving talks about their expedition at other schools. They realized that personal experience can be processed into information and knowledge which can be sold to others – in other words: to apply cultural techniques is to generate value.

The most important purpose of the trans-alp expedition, though (and maybe that of any educational expedition), is to show that travelling is a means of relating, both physically and intellectually, to an area. Increasingly, the Alps are seen as an arena for adventure sports and a setting for the consumption of landscape. The project seeks to juxtapose this limited view with offering pupils to participate in the cultural riches of the region. It aims to create a feeling of relatedness to the world and to the people who lived in it before us, thus enabling pupils to experience themselves as participants in the continuously evolving process of human civilisation.

The route

It starts at Thusis, a small town on the River Rhine in Grisons, Switzerland, and ends in Poschiavo near the border to Italy. It follows the tracks of the Albula and Bernina railway, a narrow-gauge line that was included in the UNESCO world heritage list in July 2008 (this railway line also offers extra security in case of accidents or bad weather). The route covers a distance of 120 kilometres and crosses two main continental divides; the Rhine-Danube divide at the Albula Pass, and the Danube-Po divide at Bernina Pass.

Within seven days, the hikers cross three different language areas; German in the Rhine valley, Rhaeto-Romanic in the Engadin valley, and Italian in the valley of Poschiavo. They travel on paths that have been used for the exchange of goods and ideas for around two thousand years. They get from the Calvinist town of Thusis to the Catholic Poschiavo Valley, which is reflected in the style of the churches along the route.

They start their expedition in an area of relief rainfall at the northern edge of the Alps, cross a dry central-alpine valley, and end their journey in an area blessed with Mediterranean climate. In St. Moritz they hit the birth place of modern alpine tourism. For accommodation, the hikers mainly use self-catering places, which offer a further field of learning: logistics and the preparation of food for the group.

The first expedition set out in September 2011. The second expedition in September 2013 was accompanied by a student from the department of physical education at the University of Munich and one on the master's course of outdoor education at the University of Edinburgh, who both wrote their bachelor and master's papers, respectively, about the trans-alp project.

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teaches English and Mathematics on a secondary level at a Montessori-school near Munich, Germany. He has designed a number of place-related educational expeditions to use at both secondary and primary schools.

3.6 Experience of Nature on School Farms, Hanna Schirm

General information about the workshop:

- Participants of this workshop were from Sweden, the Czech Republic, Slovenia, Italy
- The workshop had two elements: First, a power point presentation was held to give an overview of firstly educational work on farms in Germany and secondly of the master thesis by Hanna Schirm. Afterwards, all participants took part in a discussion concerning certain statements/questions and own questions that arose during the presentation.

Contents of the workshop:

1. Power point presentation

1.1 Overview on educational work on farms in Germany

There are different kinds of educational farms. They can broadly be divided into two groups:

1.) Farms that are primarily focussing on producing food and 2.) Farms that are primarily designed for educational work (SCHOCKEMÖHLE 2012:11).

It has to be seen as a continuum – each farm with individual offers. The offers can vary from farms that offer stays to school classes on the farm for a whole week with a programme that is especially designed for the target group, to offers such as the occasional guided tour of the farm that is lead by the farmer.

Financially, the farms mostly get no public funds for their work and are basically open-market extracurricular educational offers. The clients have to pay for the farm stay directly (e.g. children → their parents). Nevertheless, there is an example of a network in Lower Saxony and Bremen (north-west Germany) which gets public funding. It is called 'Creating Transparency' and it connects educational providers of environmental education and farming. The educational programmes take place on farms, places of food processing, schools, Regional Environmental Centres, etc. The funds come from the European Union and the regional governments which support the ideas of the project. For information check out the website: <http://www.transparenz-schaffen.de/>.

An umbrella organisation, the so called 'Bundesarbeitsgemeinschaft Lernort Bauernhof' (BAGLOB) which can be translated as 'Federal Association of farms as places of learning' was founded in 2002, functioning as a network throughout Germany that connects school farms and organisations that are related to the context. The BAGLOB has more than 80 members (MEYER ZUM FELDE 2011). Annual conferences are organised by this organisation. A group of the members is dealing with quality criteria for educational work on school farms. The BAGLOB is also supporting science and research in the field of farm education and therefore is networking with other organisations across Europe (BAGLOB 2013).

1.2 Master thesis by Hanna Schirm “Nature experiences on school farms”

This thesis had the aims of 1. to survey the arrangement of educational work concerning experiences of nature on school farms, 2. to gain empirical findings regarding current educational work and conditions for it and 3. to give a tool for educational work on school farms to the practitioners. The leading questions were: 1. How can 'experiences of nature on school farms' be defined? 2. How can such experiences be made possible for children and young persons? 3. What are conditions for this process?

The discussed results of the empirical study were presented in the 'Handout for school farms'. This tool/instrument is supposed to function as a source of inspiration to educators on school farms. The handout can be found on the BAGLOB website or requested directly from the author (hanna.schirm@posteo.de).

2. Discussion about the topic

All participants took part in the discussion that followed the presentation. Statements, ideas, questions of the participants are resumed in note form, to give an image of what the discussion was about.

Continuity: It would be great to come with the same group to a school farm several years in a row; to really get a connection to 1. this particular farm and 2. to the topic (where does our food come from?...)

- Integrating projects: Can (more to science / society related) topics like preserving older breeds of farm animals and plants be realised on a school farm? Could that even be an additional source of income? An idea: work on such topics with older children/young people
- Finances: In the different countries there are different systems: e.g. in Sweden, the visit of a school farm is free for the children; the government pays, as they have the principle that everything related to school education has to be free for everybody! In Germany the parents

have to pay for it and the school farms are therefore much more offering themselves open-market.

- Organisations in the different countries: it seems like Germany is a step ahead in that, as there is an umbrella organisation for school farms. In Sweden, the Czech Republic and in Italy there are rather private local networks of farms that offer educational programmes.
- Real world experiences: The experiences that are specific for a farm don't necessarily have to be outside and 'nature experiences' – the uniqueness of what a school farm can offer are rather 'real world experiences' including experiences of nature as well as indoor- or science- or material-related experiences.

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3.7 Chem-Tracking: GPS leads the way to chemistry, Philipp Spitzer, Martin Gröger, Didactics of Chemistry, University of Siegen

For most people a walk through nature seems to have nothing to do with chemistry. But if you take a closer look you will see that chemical processes are the groundwork of nearly everything in nature. So, why should we not make these interesting processes to a subject for teaching chemistry? In contrast to biological phenomena, the chemical ones are not directly visible. The working group of Chemical Education at the University of Siegen exactly deals with this problem and wants to point out ways of teaching chemistry outdoors.

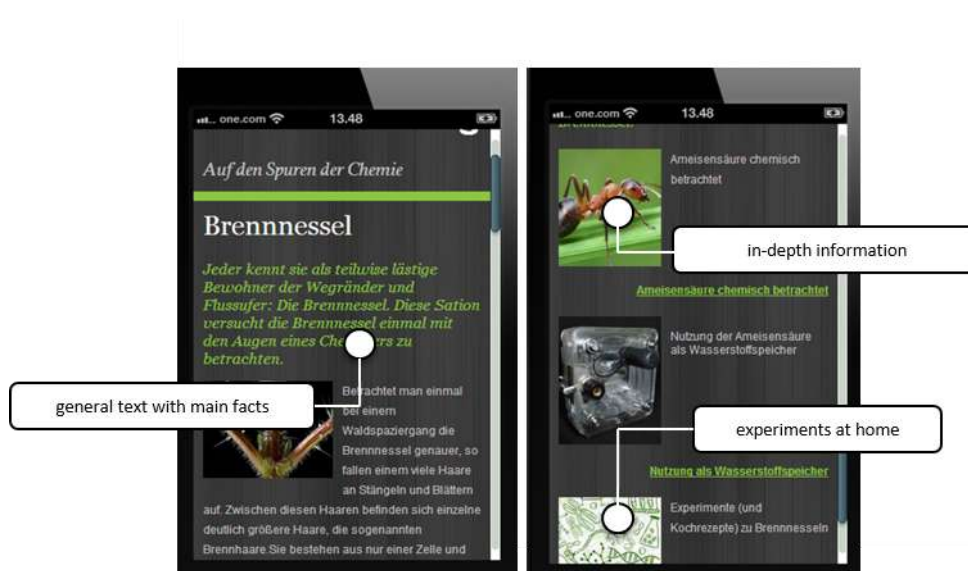
In this article the chem-tracking-project will be introduced and described in more detail. In cooperation with the regional forestry office we like to point out a new possibility to teach chemistry in the woods. At the end of the text the new chem-tracking-project and possible links will be introduced.

According to Peter Borrows' (1989 & 2004) chemistry trails a GPS trail is developed to focus the attention of young people and hikers on chemical processes in the wood. In contrast to classical nature trails there are no information boards but QR-Codes leading to a smartphone optimized website. Each station is tagged with GPS-coordinates and - as part of a geocaching adventure - these stations are connected to a track. Without the common fixed information boards it is possible to add and remove single stations during the course of a year. Thus seasonal characteristics such as

woodruff in spring or mushrooms in autumn can be considered. The trail can be used throughout the whole year. All you need in order to walk the nature trail is a smartphone and a GPS device. Some smartphones are even able to calculate a sufficient exact location so you can do the trail by just using your phone.

The trail follows a part of the German premium hiking trail “Rothaarsteig” near Hilchenbach in North Rhine-Westphalia. For a distance of 2.3 kilometers there are built up six to eight stations, depending on seasonal conditions. Target groups are hikers and especially young pupils from eighth grade upwards. The QR-Codes of the independent seasonal stations are fixed on wooden pegs. Seasonal QR-Codes are hidden and can only be found by following the GPS-coordinates. To enhance the motivation of the participants, the whole nature trail is embedded in a geocaching adventure with a treasure at the aim. To get to the next station there are hints on the mobile optimized website. At some stations you have to solve short-time quizzes to get the new coordinates.

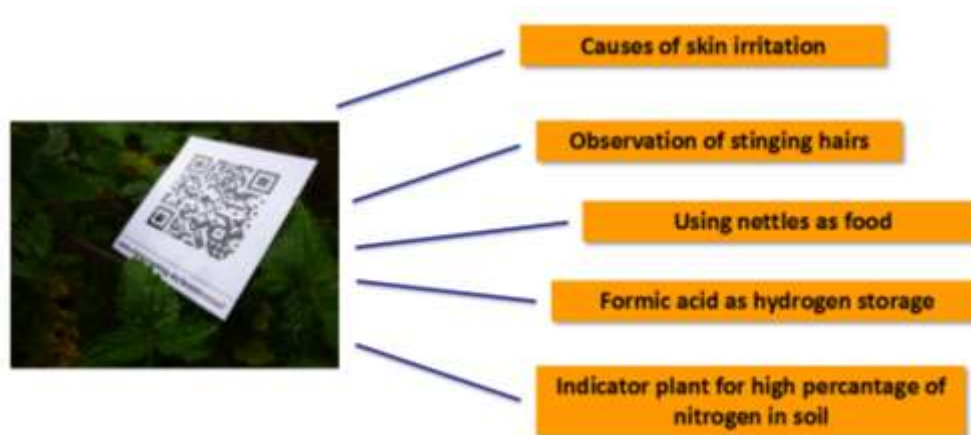
The website is the most important element of the trail. It provides access to information and helps leading through the trail. Picture 1 shows the website of the nettle-station¹. On the main site you can find a general text with the most important facts. If you want to find out more about the station’s subject you find additional links to in-depth information. On the website of each station you can also find experiments to carry out at home. If a risk-free experimentation in the forest is possible, all required chemicals and materials are described on the website in order to take them with you.



Picture 1: Structure of website

Through the connection of outdoor learning and mobile learning (the provision of all required information on a website) dealing with complex topics is possible. Integration of digital contents also allows a differentiation for students of various ages and levels of knowledge. As an example of contents of a station the nettle-station is shown in picture 2.

¹ For a closer look at the website please visit: <http://www.chem-tracking.de/nettle>



Picture 2: Contents of the nettle-station

In addition to the established outdoor laboratory FLEX (Gröger et al 2012) which is funded by the German Environmental Foundation (DBU) there is a new project: chem-tracking, funded by the Ministry of Education and Research of North Rhine Westphalia and HUK Umweltlabor. Similar to the chem-tracking-project, we like to give students the opportunity to do chemistry in real situations and places. Chem-tracking is a mobile unit with a lot of environmental analytics equipment to carry out water and soil analysis outside the classroom. Through the cooperation with a regional environmental analytics laboratory we like to interest students in environmental analyses. This topic becomes more important in student's real life (increasing nitrate in water, medical waste in rivers, effect of nano silver, PFC in outdoor clothing). In the future we are going to combine both projects, for example by treating the topic of soil and liming in the woods.

¹ For a closer look at the website please visit: <http://www.chem-tracking.de/nettle>

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