Premier's Ausgrid Environmental Education Scholarships

Approaches to Education for Sustainability in Germany and Brisbane

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Sustainability is a cross curriculum priority in the new Australian Curriculum. The new curriculum will be underpinned by the Sustainability Curriculum Statement (2010) and supported in NSW by the DET Environmental Education Policy (2001),

The aim of Education for Sustainability (EFS) is to enable students to develop the knowledge, skills and positive environmental attitudes and values, to live more sustainably in their school and community.1 The Australian curriculum supports this aims by advocating a ‘whole school approach’ and cross curriculum integration of sustainability studies. Students should gain knowledge of ecological and human systems and consider world viewing and systems thinking (Sustainability Curriculum Statement 20I0)2.

PART A: How Is EFS Structured In Germany

During my study to Germany I investigated all of the successful approaches to EFS. I was able to visit four schools that had developed whole school approaches to sustainability and visited four environmental education centres to explore new methods for developing student enquiry and action for the environment. I also visited four government and non-government providers of EFS. One of the most significance differences that I noted between Australia and Germany was the increased emphasis on world viewing taught alongside studies of ecological systems and resources use. In every school, display or program I viewed there were discussions of fair trade and comparisons to life styles and impacts in the developing world. In NSW these concepts are covered in the Human Society and its Environment syllabus but they are often taught separately to EE and EFS programs.

**1. Recognition Programs**

EFS in Germany is co-ordinated at Federal, State and local levels with priorities aligned to international agreements and policies for EFS. At an international level

The Federal Ministry of Education and Research (BMBF) leads management for the UN Decade of Education for Sustainable Development. During my visit to the BMBF I was impressed with the successful integration of a national recognition system for ‘Official UN Decade Project’. Stakeholders submit an application addressing strict EFS criteria and then receive accreditation for a two-year period. The organisation or school receive permission to use the ‘Decade’ logo for promotion and advertising and are given a flag to display at their centre. All projects are outlined on a database website and case study reports are printed in a booklet format and distributed to participants and interested parties. All environment centres and schools that I visited had received this recognition.

At international and federal level there is also a recognition program specifically for schools known as The European Eco-School/ International Agenda 21 School. This program has been successful for the past 15 years but is particularly encouraged in Hamburg. Hamburg has also been recognised as “European Green Capital 2011’. Criteria for schools entering include cross curriculum learning, community partnerships and resource management3.

**2. Government and Non-Government support for EFS**

**a) UFU –The Independent Institute for Environmental Concerns**

The UFU is a federally funded scientific institute specialising in action research and public participation and climate protection projects. In Berlin I visited the UFU’s Climate Protection and Environmental Education department. Some of their programs are outlined below;

* 1. Solar Support Program: A program is to awaken ‘sleeping solar cells’ in schools and provide support for teachers to use them in education programs
  2. Young Reporters for the Environment: Berlin schools involved in 50/50 are trained to write reports and encouraged to publish them in student newspapers and local and national media. The 50/50 Network is based on the 50/50 scheme where schools save energy mainly with behavioral changes, such as switching off lights and electronic devices when are not needed, and they get in return an economic incentive from the manager of the building (e.g. City Council). These incentives are a result of the 50% savings on the electricity bill achieved with the reductions on energy use made in the school.
  3. Leuchtpol: An early child program focused on saving energy.
  4. Powerado: A booklet for independent learning on energy and power. It includes 20-30 activities that written step by step for students to follow.

**b) Climate Detectives**

Climate Detectives is a privately funded climate change education program for schools using cross curriculum learning. Studies of energy efficiency include web based school energy use graphs, thermo cameras, alternative energy demonstrations, solar cooking experiments, and ecological footprint analysis. Tilman, the co-ordinator of Climate Detectives, has also produced an efficient step –by step resource booklet for teachers and a ‘Sustainable Schools’ website. Schools employ Tilman to implement the program and in doing so are able to save money for the school in resources recovery.

Climate Detectives also supports international partnerships and are currently working with GIZ (German organisation that facilitates international partnership) to compare climate change learning in other countries.

**c) 50/50 Hamburg**

50/50 has been implemented in Hamburg since 1994 and funded by Hamburg’s Environment Department. Its main function is to encourage schools’ to reduce wastage of resources by analysing energy and water use. Monetary savings made from the change are split 50/50 with the school. Activities are cross curriculum based and include computerized reading and presentation of temperature and light intensity profiles, use of spread sheets and graphs for energy and water use. Over its implementation schools have managed to save 200,000 Euros with 50/50.

The base line data initially collected for the school is used to calculate the savings each year. This means schools can make money each successive year even after they are completely energy efficient. The base line data only changes if there is a significant change in infrastructure e.g. insulation installed. To encourage schools an award is given to the highest achieving schools called the ‘Climate Bear’. Students in the senior years are encouraged to train the younger students so the process can be repeated.

During my research trip I visited a nearby 50/50 vocational school (G- SECHS) that has recently been renovated and fitted with energy saving features and sustainable design. Students were actively involved in this design process. Features included a roof that was completely covered in pre-fabricated solar roofing panels (with a computer display screen for energy produced), remote control awnings to block sunlight and adjustable thermostats (which is not always a feature of older style German school buildings).

**d) Okoproject-MobilSpiel (Munich)**

Okoproject is a non-profit Environmental Education Centre focussed on building a network of Environmental Education Providers and projects. Its activities are varied but all focussed on creating a sustainable living environment. These include organising sustainable food gardens, encouraging students to ride to school and learning how to maintain bikes, organisation of family walks in nature, students info projects on effects of mobile phones usage and waste and drama activities focussed on sustainability issues. Another main aim is to provide teacher professional learning. Courses are offered to teachers on weekends and in blocks over the year. Trainee teachers are also offered practical lessons in the environment.

During my tour I observed two centres that were directly involved with Okoproject. These were the OBZ Centre and the Junge garden. An integral feature of both these venues was the emphasis on sustainable food choices. Students were involved in cooking and eating a sustainable meal. At the OBZ Students can learn how bread and butter are made and use traditional cooking practices. A demonstration site of crops allows students to investigate new and sustainable ways of producing products such as clothing and food. At the Junge garden they can harvest vegetables from the food gardens, learn how to grow vegetables, taste fruit and vegetables produced from other countries and understand the importance of reducing food miles

**3. Environmental Ed Centres and Field Work**

**a) HAMBURG ZSU**

The ZSU is an environmental education centre that operates very similarly to the DEC EEC’s in NSW. Teachers are employed by the Education Department to offer lessons in Sustainability and Science and Physics however the centre is funded by government environmental agencies. The centre conducts water testing, invertebrate, biology and provides marine and freshwater biology tanks. A Climate Lab is also established with solar powered drivable buggies and alternative energy experiments.

Another aim of the centre is to connect students with animals and allow them to understand their requirements. Many of them live in the city and don’t have the opportunity. A loan system for pets is available from the centre and includes animals such as Guinea Pigs, mice, rats and chickens. Students are encouraged to conserve biodiversity by providing insect shelters and bat boxes for the endangered Fielder Mouse Bat.

**b) IWWS – International Wadden Sea School.**

The Wadden Sea is a unique tidal landscape that is an important nursery for North Sea fish and habitat for migratory bird species. The IWWS is a network of Environmental Education Centres along the Dutch, Danish and German North Coast. The three countries have had a “Trilateral Cooperation on the Protection of the Wadden Sea” since 1978. At Wilhelmsahaven I participated in programs at the Wattenmeer Haus which is an environmental education centre funded by the Wadden Sea National Park.

The network of education centres in the area is supported by a Junior Ranger Passport activity. Any child that participates in an outdoor activity, completes a guided walk or participates in a positive environmental action receives a stamp for their passport. Locations for the passport stamping are located on a website. After they complete 3 events they are given a badge and a new badge with a higher status level for the next completion stage. Once all twelve events are completed they get to go on a junior ranger camp (for 9 years and over).

The program at the Wattenmeer Haus focuses on mudflat ecology and includes netting for crabs and shell fish and dipnetting in the shallow waters. Students are actively encouraged to immerse their hands in the dark mud. After the mudflat excursion students can visit the microscope room. Ten stations are set up in the each with a separate activity e.g. crab biology, identifying fish, introduced species. Additionally there is science experiment lab next to investigate water quality and conduct physics experiments e.g. effect of Climate Change and ocean acidity on shells.

The IWWS also offers a sustainable fishing boat tour. During the tour a seine net is cast out with the catch loaded into tanks for students to observe. The catch is classified and recorded for future monitoring data. Students are also able to observe whales and Sea lions and migratory birds on the tour. The tour is backed up by an interesting and vast exhibition on birds and whales back in the Wattenmeer Haus. A web based monitoring program with student input is currently under development.

**c) Klimahaus Bremerhaven**

Klimahaus is a hands-on exhibition centre for cultural diversity and climate change issues. The exhibition displays eight different climatic zones that are all on the 8 degree of longitude. The climate zones are authentically depicted and the climates simulated e.g. feel ice in the Swiss Alps, the heat of the desert and the humidity of the rainforest. Another focus is the cultural differences of the people that live in these environments and how their lives are profoundly affected by climate and the impacts of climate change. Multimedia exhibits, aquariums and hand on activities enhance the experience.

On completion of the journey around the world, participants can then explore another thematic area called ‘Elements’ with the focus on fire, water, earth and air. This features presentations and science shows by qualified educators. The final room encourages us to take action for climate change. It focuses on local and international actions. Participants can calculate their ecological foot print and send a message to the United Nations and government leaders in a computer room.

**d) Falkenstein Wilderness Camp**

The Falkenstein Wilderness Camp is a part of the Bavarian Forest National Park and borders with the Czech Republic. The camp offers two sites and themes for schools. The country cabins are replicas of the traditional dwellings of indigenous peoples from around the world (Mongolia, Venezuela, Vietnam, Chile, Africa, Brazil and Siberia). The cabins were built with partners from these countries to ensure they are authentic. There is no running water or electricity and bedding is traditional e.g. hammocks or straw on wooden decks. A resource box for each hut is also provided and includes traditional clothes, tools, instruments and information on each country. During their stay students research their country and come up with their own presentation on the last day of the camp. This must include ecological foot print analysis and lessons on how indigenous people reduce impacts on the environment and can be affected by Climate Change.

The second theme for the camp is focussed on the natural environment. These include the Forest Tent, House of Light, Earth Cave, Tree House and Water Hut (built over the creek). Students on this camp are encouraged to work independently and connect with nature. Each hut works with an adult guide to design their own project to complete during their stay. During my visit projects observed were construction of temporary bridges, dams, rafts, a dug out shelter and a litter awareness program. Students are provided with tools such as saws, axes, knives and hammers to complete their projects but remain under the watchful eye of their supervisor. Students also participate on an eight hour hike to the top of Mount Falkenstein. Here they learn the values of the National Park, explore biodiversity and work on team skills and resilience. Forest games are played to provide awareness of native wolves, lynx and birds.

**4. Whole School Approach and Cross Curriculum Integration**

During my research trip I investigated Education for Sustainability at four schools in Germany. At each of these schools I found that a major key to success was a supportive Principal, a Sustainability Team Leader and successful curriculum integration. An outline of these structures is discussed below.

**Gymnasium Burgerwiese (Dresden)**

Burgerwiese is a new school in Dresden catering for classes 5-8. Since the opening of the school in 2008 staff have been actively involved in shaping learning. This working process resulted in a focus on Education for Sustainable Development, healthy school program and an emphasis on community participation and partnerships with local government agencies and business. Pedagogy in the school is also focussed on independent learning.

On the day that I visited the school was running a week focussed on EFS. Students were responsible for their own learning paths by choosing from a range of subject choices. Each teacher in the school planned and promoted a unit of work with an ESF theme for one session each day, to three groups of students. Some of these units include alternative technologies, food miles, biodiversity, fair trade, internet research, historical investigation of the Elbe River and weather and climate studies. Each project included a practical activity (e.g. an experiment or model construction) and a field trip (e.g. botanic gardens and water testing in the Elbe River).

Student leaning for this special week is monitored through a contract system. Six sessions need to be completed with strategic planning. Stages included forming an idea, collect info, discussion with teacher, implementation, presentation to other students and a feed back stage.

ESD is also encouraged at Burgerweise through a student environment group and student led environmental activities. These include collection and sorting of recyclable materials in the school. Germany has a very efficient container deposit scheme and at this school students are able to get refunds for their bottles at the school canteen. (25 cents per bottle).

Students at this school are also part of “Plant for the Planet’ -an idea initiated by an eleven year old South German school boy. His aim was to plant 1 million trees in Germany and with this goal now achieved (after just 2 years) he's gone global; and is inspiring students with his message all over the world.

The schools ESD profile is recognised annually through a ‘Golden Book’ prize to students who are outstanding in environmental activities.

**Alexander-von-Humboldt** is a Gymnasium school catering for approx. 800 students from classes 9-12. The school has been recognised as European Eco School of the year and is an official project Un Decade Project. Staff embed ESD in the curriculum and new ideas are discussed at staff meetings. The school has a Sustainability Team Leader that is allocated 2 hours each week and a budget. The school is able to fund many of its sustainability projects through 'fifty fifty'. Money saved through efficient use of resources will enable the school to expand their solar power to 22kw

In 2011 the school is also trialing a new elective sustainability course for 2 hours each week. Students enrolled in this course (and other interested environment group members) contribute to sustainability projects such as energy audits, recycling, transport and mobility surveys, recycling and ‘Plant for the Planet’.

The school has been actively involved in the restoration of a local creek since 2005. Instructed by a hydraulic engineer students have been trying to slow the flow of the river and recreate its previous meandering state. Students monitor the water quality in Biology with results displayed on the school website.

As part of their ESD learning the school has established a partnership with a school in Tanzania. Student’s exchanges occur annually between the two schools with funding provided by ENSA, a German development policy exchange program. Schools exchange ideas on solar energy, economical water use and fair trade products.

**Emmy Noether** is a Gymnasium school for Years 5-13 in Berlin Kopenick. The school has been an International Agenda 21 school since 2009 and just recently they were awarded Eco School In Europe 2012 and are recognised as a Berlin Climate School. The school ethos encourages students to make sustainable life style choices in balance with global social justice issues. Sustainability education is successfully integrated into Geography, Science, Art and English Lessons.

The school develops international relationships and through the Comenuis project that is supported by the European Union.Schools presently involved are Germany, Finland and Northern Ireland. A curriculum and unit of work has been designed and is followed by the three schools. **Students are involved in independent research, exchange ideas in sustainability topics and compare everyday perspectives of a sustainable lifestyle. An exchange visit also occurs between each of the schools. The products created in workshops and during the exchange visits are documented on a website and through wikis, on DVD and in print.**

Another interesting feature of the schools was thelive reptile house with animals from Germany and all over the world. Student volunteers maintain the exhibits and feed animals.

PART B: Brisbane Environmental Education Centres

While in Brisbane I visited two EEC’s run by Queensland Education, O’Reillys Rainforest Retreat, Botanic Gardens Education Centre and Wildlife Queensland.

**Pullenvale EEC**

Pullenvale EEC is a centre that specialised in using stories, drama and attentiveness as an approach to gaining deeper understanding of sustainability issues. The centre employs specialist drama teachers to enhance the learning experience. Students and teachers are both the audience and participants in the unfolding story and can help characters to make difficult decisions about a sustainability issue. Students observe, inquire, investigate, predict, influence, and subsequently reflect upon their own lives and experiences in order to **shape future knowledge,** **attitudes, values and actions.**

**Jacobs Well EEC**

Jacobs Well EEC is located on Moreton Bay and specialises in studies of mangroves, salt marshes and sustainable fishing. The centre owns a boat large enough to seat 45 students and during my visit I participated in some fieldwork on the boat. Students were given an outline of sustainable fishing methods and then a shown a demonstration of a beam trawl (a beam trawl is a cone shaped net hanging from a beam on the boat that retains the catch). They tested the water quality and then participated in retrieval, sorting and identification of the catch. Students also investigated a mangrove ecosystem focusing on biodiversity and adaptations of the organisms living in the hostile intertidal environment.

The centre is situated near a state forest and is able to demonstrate animal trapping surveys and discuss biodiversity monitoring and management. Other programs include school visits to help develop environmental management plans and recently they obtained funding to establish vegetable gardens in schools.

**Botanic Gardens – Mt Coot-tha**

The Botanic gardens offer over 20 different varieties of cross curriculum programs. During my visit I participated in a rainforest ecology lesson. The lesson examined the structure of the forest, identified Aboriginal use of plants and discussed the role of invertebrates in rainforest recycling. Students were able to catch and classify invertebrates and taste some bush tucker.

**Wildlife Qld**

Wildlife Queensland is a conservation organisation helping to protect biodiversity and reduce habitat destruction. They run a variety of programs to increase awareness of animals such as Platypus, Quolls, Gliders and endangered butterflies. During my visit I investigated their nest box monitoring program as a potential activity for students in their schools and local bushland. The monitoring program uses small infrared cameras on 5m poles to investigate nest boxes while limiting disturbance to nesting animals. In Queensland the program has been particularly beneficial in increasing habitat for gliders.

**O’Reillys Rainforest Retreat**

O’Reillys is located in the world heritage listed Lamington National Park. The highlight of the area is a 30m high suspension bridge tree top walk through the rainforest canopy including a 30m high deck on a strangler fig. Interpretive signage describes the plants at each level of the rainforest. Local biodiversity is discussed during guided walks and a live bird show discusses the life of owls and eagles. Visitors and students have the opportunity to attend an early morning board walk which provides the opportunity to see over 160 varieties of sub-tropical birds.

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