Congress Theme

Ways of learning towards environmental justice

Sustainable development in a district of Bordeaux: when children become the main link between a botanical garden and their neighbourhood

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The aim of this presentation is to explain how the new botanical garden of Bordeaux was established in a working-class district; and to demonstrate the actions of its team towards people, and especially towards children, the aim of which was to make them to understand what biodiversity and sustainable development are.

Situation

The city of Bordeaux has 250,000 inhabitants. The river Garonne flows through the city. On the left bank, you can count eleven districts, whereas on the right bank there is only one district, called Bordeaux-Bastide.

The situation in this district before 1999 was a follows:

- First of all, the Garonne river was a geographic barrier, rather like a border.
- This district was an isolated part of the city. It included a lot of industrial wasteland.
- It was a combination of municipal housing and old workshops,
- And finally, it was essentially a working class district.

In short, it was very isolated and a district of ill-repute. At the time, its inhabitants were self-sufficient and did not consider themselves to be Bordeaux people.

After 1999, the city of Bordeaux decided to start a new urban project in this district. As a consequence, this idea involved new constructions such as:

- banks and offices,
- a university for management and business,
- luxury homes.
- and a new botanical garden.

But all these changes were not what the inhabitants of this area needed or expected.

The establishment of the Botanical Garden in this district

Before construction of the Botanic Garden started, we started to work in close collaboration with local people, with the aim of:

- letting them get used to the idea of the botanical garden.
- making them understand biodiversity and sustainable development.

In order to achieve these aims, we have:

- developed the stages of the project and the partnerships.
- played an important role in local life.

Developing project stages and partnerships

First example: project with the schools of the district

Today, we are working with the five schools of the District. This is the result of a long association and fruitful relationship with the teachers for the last several years:

- in 1999, there were just one-off projects with some schools.
- in 2003, there were one-off projects with all the schools.
- and since 2005, there has been an annual communal project with all the schools in the area.

What is an annual communal project?

- Five demonstrations for each class in the Botanical Garden. There is one class per school and about 30 children per class.
- Children do research and carry out project work in class.
- At the end of the project, the children present an exhibition in the Botanical Garden over a two-month period.

Some examples of different projects:

- 2005/2006: Medicinal plants.
- 2006/2007: Food plants.
- 2007/2008: How do plants adapt themselves?
- 2008/2009: Trees – identification keys.
- 2009/2010: Invasive species and biodiversity.

Second example:

The second example concerns the setting up of a project with the area's social centre. (A social centre is a place that welcomes and helps the people of the area. For example, children can come on the Wednesday when there is no school, and when mothers can take courses to learn how to speak and write French. The social centre can help families with all kinds of problems.)

For these children who come on Wednesday, we can say that:

- in 1999 there were just selective talks, but not a project.
- in 2003, a plot of land in the Garden was set aside to be managed by a children's group.
- Since 2008, these children and their educators at the social centre have become independent in their management of their part of the Garden.

This Garden plot is called the 'Robin Crusoé Garden' (after the famous fictional castaway Robinson Crusoe described in Daniel Defoe's novel.) The children have created their own version of his story. 'Robin Crusoé' left London in 1651. His ship was wrecked and he found shelter on an island which was in reality a wonderful garden. He decided to call it 'Botanique'. And on this island Robin grew plants for food and medicinal purposes. The role of the children is very simple: to help Robin to grew these plants on his island.

Consequences

For the project partners:

- Generating a positive dynamic.
- These environmental projects are completely integrated with the annual projects of partner organisations.
- Relevance to the teaching process. Often, teachers and children learn together at the same time.
- The project themes become more and more complex, as requested by teachers and project partners.
- The professional partners become more and more self-sufficient.

For the children:

- The enhanced value of their work (because exhibited in the Garden.)
- The have realised the usefulness of the Garden.
- They can pass on their knowledge.

For the parents

- Removal of the idea of the botanical garden as an inaccessible scientific organisation.
- They came into the Garden with a view to seeing their children's work.
- They acquire increased knowledge, thanks to their children.

Fitting our work into the life of the neighbourhood

Even if it's not exactly the function of a botanical garden, we try to play an important part in local life. For example, we are:

- running events for the social centre and the medical centre.
- doing work for the old people of the area.
- participating in events organised by the local associations.
- opening the Garden for the schools carnival.

Conclusion

In conclusion, all these actions in the district:

- Have generated a positive dynamic for professionals.

- The inhabitants now feel that the Garden belongs to them.
- And the general behaviour of people towards the environment has changed for the better.

How the Cambridge University Botanic Garden Schools' Learning Programme keeps active learning, environmental sensitivity and social justice in mind

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Introduction

Cambridge University Botanic Garden (CUBG) has a living collection of over 8000 species of plants from around the world, sixteen hectares of landscaped ground and a large glasshouse range which houses plants from environmentally sensitive regions such as arid lands, tropical regions, volcanic islands and mountainous areas. It provides a resource for the students and tutors at the University, for teaching and research. It is a place for amenity and education for the wider public. Annual visitor numbers exceed 150,000.

The Schools' Learning Programme is a part of the Education Programme at the Botanic Garden. A table of activities for the Schools' Learning Programme is shown in Appendix 1. This paper describes some aspects of this Programme.

Initiatives in the United Kingdom and how CUBG has responded to them

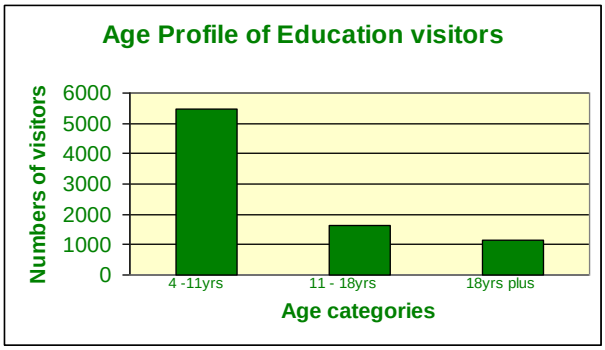
In the United Kingdom there is concern that children are so alienated from the natural world that they do not make the connection between the food they eat and how it is grown (UK Dept for Environment Food and Rural Affairs, 2008). There is also widespread concern about children's general 'well being' and how to achieve and maintain it; one of the key five targets in achieving this is for children to 'be active' (New Economics Foundation, 2008). It is clear from the recent review of the primary curriculum in England (Rose, 2009) that for primary-aged children the curriculum must reflect the ways they learn and develop: a major aspect of this includes the challenge of being engaged in practical activities.

The charity Farming and Countryside Education (FACE) runs the website 'Growing Schools' in partnership with the UK government Department for Children, Schools and Families (DCSF) to encourage teachers to use outdoor spaces for learning (FACE, 2001). FACE has also worked to raise the profile of food and farming within education by running a year-long programme devoted to food and farming. This 'Year of Food and Farming', from September 2007 to July 2008, was supported by various government departments (the DCSF, the UK Department for Environment, Food and Rural Affairs (DEFRA), the Department of Health), as well as the Royal Agricultural Society of England and many other organisations. A programme was developed for the year to give 1.5 million children first-hand experience of growing and cooking, with visits to outdoor learning environments. CUBG collaborated with the National Institute for Agricultural Botany (NIAB), (based in Cambridge) to take part in this programme.

The recent UK Government initiative to promote learning outside the classroom 'Learning Outside the Classroom' (UK Dept. of Education, 2006) provides impetus to schools to visit sites such as CUBG to promote this learning. There is now a 'badging' system in place to encourage sites to give evidence of the quality of their educational provision (UK Dept. of Education, 2009). CUBG is applying for this quality badge and has developed a programme to encourage children in their learning about food, how it grows, where it grows and why it is so important for us all.

School visitors to the Botanic Garden

The number of school visitors to the Botanic Garden now stands at over 8,000 per school year. The majority of visitors are in the primary age range and the majority come from schools within the City boundaries. Cambridge City has a multi-cultural British population while the majority of school pupils countywide are Caucasian British. These are our school visitors.



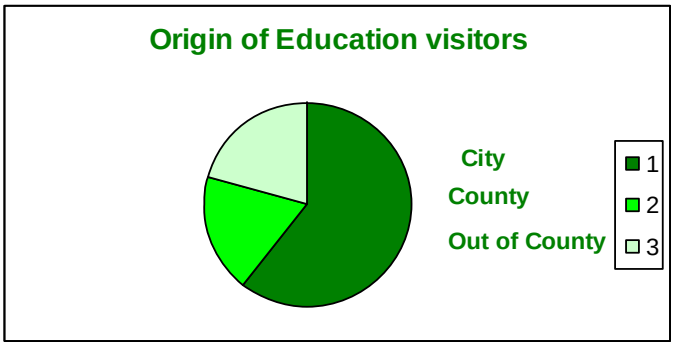


Fig.1 Education visitor statistics

Many City children live in homes without gardens and without access to outside spaces. The visits they make to the Botanic Garden provide a valuable link with the growing world. By linking up with NIAB, workshops for primary and secondary-aged pupils have been developed at the Botanic Garden. For the primary-aged pupils, the workshop relates to growing, cultivating and harvesting vegetables. The workshop for secondary-aged pupils is about the history of agriculture and how modern methods of plant breeding are vital to today's requirements for food security worldwide.

The primary workshop consists of an introduction to seeds, their structure, where they develop in a plant, how they differ depending on the type of plant and how they germinate. The children are asked to consider

Fig.2 Making newspaper pots

what seeds they know about already and what seeds they eat. Then the children make pots out of newspaper and plant seeds to take back to school with them. The small pots are either kept in school where the seeds germinate so that everyone can study the young plants, or are taken home to the delight of the children to watch their own plants grow. There are several learning points to be made from making these newspaper pots: not the least is its importance to the topic of sustainability by re-using and re-cycling materials. The children appreciate the economical way this small pot then becomes a bio-degradable unit from which the immature plant can then be planted out to grow on to maturity, leaving no trace of the pot behind after harvesting, because the paper pot rots in the ground.

The Schools' Garden at CUBG

A discrete area of the Botanic Garden has been set aside specifically to create a space for children to come and learn about growing fruit, vegetables and herbs. With the help of a teacher and primary-aged pupils from a local school, a design for a Schools' Garden was begun. Some of the children's ideas were wonderfully inventive. All their gardens contained a watery element, with one having the added option to freeze the water in winter to convert it to a skating rink. The children wanted to grow things, to have specific areas for wildlife, and to be able to sit and contemplate as well as be busy and 'doing'. They took as their brief the idea that the space should be very multi-purpose, and whilst the growing element was the strongest feature for the adults, it remained important within the children's design ideas that a major part of learning involved play and creativity.

A landscape architect was employed to draw up a plan for the Schools' Garden, trying to incorporate as many of the children's ideas as possible (Appendix 2). The staff at the Botanic Garden then set about fund-raising and calling upon volunteer help to build the Schools' Garden. Money was raised from Cambridge City Council's 'Sustainable City' fund; we were also given a private donation to go towards fencing and hard landscaping. A firm of local solicitors wanted to contribute in two ways, both with a financial contribution and also by providing approximately 30 helpers for a day of volunteering to help make the Garden.

The Garden has now been in use for three growing seasons. Increasingly, school visitors use the space as part of their visit to the Garden. Also, a small dedicated group comes to the Gardening Club once a week for as

Fig.3 Garden Club members growing vegetables in the Schools' Garden

many weeks of the year as are productive for growing and the light allows them to garden after school. The 20–25 regular Gardening Club members get to do all-year-round tasks to maintain a growing plot, including the very rewarding harvesting of crops.

Future developments in this area of the Botanic Garden include the provision of a gate along with the fencing to make this discrete working area a 'private space' for schools to use on their visits to the Schools' Garden. Children will also leave their ideas about why and how we must all look after our planet on a board that was set up inside the gate to enable them to share their ideas.

It is considered important that the interpretation and signage for the Schools Garden is written largely by, and certainly for, the children who use it. This is so that the message or stories that relate to growing food are readily accessible by this young audience.

Fair Trade

One of the highlights of school visits to the Botanic Garden is a tour around the hothouses, and especially, the tropical houses. Many children learn about tropical rainforest as part of their primary geography curriculum; they learn that it is the source of the greatest plant diversity and also that it is under threat of destruction by mankind. In the hothouses, for the first time, many children have some sensory experience of another climate and the dramatically different vegetation growing there, compared with the part of the world they live in and know about. The learning programme at the Botanic Garden places great emphasis on the tropical parts of the world and the way we rely on them for many of the products that form the fabric of our existence: rubber, cotton, tea, coffee, bamboo and the many tropical fruits.

Fig. 4 Fair trade logos

Story telling has a big impact on helping children understand some complex issues. The idea of 'fairness' is easily grasped by even the youngest child – he or she understands immediately how a cake is divided or sweets are shared out amongst a group. So that whilst the idea of 'trade' and how this works may be a concept too far removed from young children's experiences the idea of 'fair trade' can make perfect sense. At CUBG a workshop on how bananas are grown and distributed has been prepared in a simple way to encourage children to think about equity and how to achieve it. The focus is on the bananas grown in the Caribbean.

In February 2009 the Fairtrade organisation held its Fairtrade Fortnight on bananas (Fairtrade Foundation, 2009a, b). The organisation Oxfam also has material available to present to schools about the whole process of growing bananas, with many personal stories of small growers and how their lives have been altered by joining the Fairtrade co-operatives (Oxfam, 2009). The workshops at CUBG were successfully received by school visitors. We intend to prepare other similar workshops based on chocolate, cotton and bamboo – products of great worldwide significance and with appeal via the stories of their uses to all children.

The Harambee Centre in Cambridge promotes understanding and action on global issues. It runs several projects with hard-to-reach youth audiences. The Botanic Garden has made contact with this organisation to help us increase the delivery of our message on environmental sensitivity and fair trade to an older age profile of students between 13–19 years (Harambee Centre, 2009).

Conclusions

The CUBG Learning Programme has been successful in:

- using opportunities from national initiatives and programmes, particularly those which provide resources and are widely promoted, to develop new projects of local relevance to the Garden and its school visitors
- recognising the importance and benefits of engaging school pupils in the early stages of developing new areas and activities so that their particular interests and values are captured from the very start
- introducing complex issues and concepts to young visitors by starting from objects and experiences they find familiar and captivating.

Appendix: Learning programme for school visits to the Botanic Garden

Typical timing 30–45mins per activity	A series of pick and mix activities for a visit to the Botanic Garden. A class of 30 children might undertake three activities in a day: two in the morning and one after lunch. A larger group of 60 (max size) might undertake 4 activities: 2 in the morning and 2 in the afternoon. (these may include free time at the end of the visit)
Activity 1	**An observational walk** in the Garden where children can collect fallen items from the plants and trees in the Garden, such as cones, pods, petals, twigs, bark and fruiting structures. The idea is to encourage children to use their powers of observation and to learn to really look at their environment. Collecting bags are provided. Teachers will either have a map to make their own tour, or a Volunteer or Education Officer of CUBG could be available to lead this tour.
Activity 2	**Using the Glasshouse range** This can also be subdivided into several distinct activities rather than taken as one activity. A tour provides a taste of vegetation from around the world. The Glasshouse range is divided in to distinct vegetation types and world regions, so a general tour covers the following 1) Plants from two continents with ancestral relationships (South Africa and South West Australia). The temperate house is called 'Continents Apart'. 2) Island vegetation: vegetation from oceanic islands (the Canaries and St Helena) and how and why the vegetation is distinct. 3) Mountains. A display of vegetation adapted to mountain climates. 4) The Tropical Houses: vegetation from the tropical regions of the world, including a rainforest display and many economic plants, cotton, coffee, tea, bananas, pineapple, rubber, cocoa etc 5) The Carnivorous House holds a permanent collection of insectivorous plants. 6) The Arid House. A display of plants from the dry regions of the earth, including cacti and succulent plants.
Activity 3	**Tropical Rainforests**. A tour of the Tropical Houses lead by a volunteer or the Education Officer showing the main features of tropical vegetation and highlighting the plants growing here and those of economic importance. (Some students like to draw in this hothouse) (see also Tropical Fruit Salad as an alternative, activity 17)
Activity 4	**Mountain vegetation**. A tour of the glasshouse with mountain vegetation. This house has many plants with very distinct adaptations and is suitable for drawing .
Activity 5	**Arid land vegetation**. The vegetation here provides a suitable subject for drawing to understand the various ways the plants are adapted to live in this hostile environment.
Activity 6	**Insectivorous plants.** Find out about insectivorous plants, where they come from and how they function. Make drawings of plants in the display
Activity 7	**Comparing some of the biggest trees** in the Garden. Using measuring tapes and recording (if wanted), measure the trunks of the Giant Redwood and the Cedar of Lebanon. Compare the trees: their bark, leaves, cones and overall shape are very different. Using a roll of string measure out along the ground the height of the most massive tree in the world. The Giant Redwood called 'General Sherman' grows in Northern California and is 83 m tall and 13m in diameter at the base.

Activity 8	**Mini-beast hunting**. Using the area of Garden with a display of composting techniques, look for mini-beasts in the leaf litter. Tables, magnifying lenses and identification sheets are provided. There are hand-washing facilities at the end of this activity. (Seasonal: only available from May onwards)
Activity 9	**Tree Trails.** Using pictures of the leaf form of various native or naturalised British trees and a map, go on a tree trail of some of the most common species of tree. (Seasonal: only available from May onwards)
Activity 10	**Bark Rubbing.** In a small area with at least six different bark patterns use wax crayons to make bark rubbings of the texture of the tree bark. Paper and crayons provided.
Activity 11	**Living and Non-Living Trail (**suitable for very young children only). Within a small area of the Garden (The Dry Garden) a set of labels and objects are 'hidden' and the children set out to find and identify the things and decide whether something is living or non-living (a tree, a leaf, a flower, grass stems, a bottle of water, a teddy, a paving stone, a wooden bench, a large pot containing a plant). Needs lots of adult discussion to make this activity vital. (Seasonal: only available from May onwards)
Activity 12	**Navigating with a map.** Using a map with a grid system marked on it and several prepared photographs. Navigate the Garden to find the items in the photograph at a specific grid reference.
Activity 13	**Autumn fruits and seed dispersal mechanisms:** A tour of the Garden collecting seed heads and looking at the various mechanisms of seed dispersal (Seasonal: only available Sept, Oct)
Activity 14	**Mini-Apple day.** Taste and identify some British Apples, do some apple related art activities and make a block graph of the class' favourite apple, and visit the Garden in Autumn (Seasonal: only available Oct and Nov)
Activity 15	**Winter Walks and Christmas decorations.** Sample the delights of the Winter Garden's colours and scents. Use materials from the Garden to make a natural Christmas decoration to take home. (Seasonal: only available in Dec)
Activity 16	**Vegetable Hunt.** Using real vegetables as source objects to examine and find relationships between them (what part of the plant provides the vegetable we eat? can you identify the vegetable? Have you eaten this vegetable?) Then set off on a hunt for the different vegetables growing in the Systematic Beds in the Garden and find out which vegetables belong to specific plant families. (Seasonal: Only available from May – July)
Activity 17	**Tropical Fruit Salad.** Using a sheet with pictures of tropical fruits, set off to find these fruits or their labelled trees and shrubs, growing in the hothouses.

Activity 18	**Seed sowing.** Use the Schools' Garden at the Botanic Garden and sow your own vegetable seed to take back to school to grow. Find out about seeds and where they come from. Examine the world's largest seed. (Seasonal: only available Mar – July)
Activity 19	**The Scented Garden.** Examine the plants growing here and draw your favourite. (Seasonal: only available May – Sept)
Activity 20	**Bananas:** A brief illustrated talk about Bananas and Fairtrade. Looking at how bananas grow, different kinds of banana (plantain, dessert bananas and wild bananas)
Activity 21	**Numbers in Nature.** Use the Number trail written for use in the Garden. (Suitable for age 7 – 11 yrs)
Activity 22	**History of Agriculture.** An illustrated talk about the importance of plant breeding and its use since man began to farm. Modern plant breeding techniques and crops grown in the United Kingdom for use as bio-fuel crops. Using the Genetics Garden to demonstrate plant varieties. ½ day suitable for age 11 yrs and above
Activity 23	**Arid lands and plant forms.** A look at the distinct plants growing in arid regions around the world and their adaptations to their environment. Using the Arid Lands House at the Botanic Garden. Suitable for age 11 yrs and above

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