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Forthcoming Issue

Volume 14 Number 2: Developing a new education programme

Cover Photo: Garden Apprentices Tyrell Little and Nina LaLuz-Rivera working in the Children's Garden at Brooklyn Botanic Garden. Photo by Saara Nafici, courtesy of Brooklyn Botanic Garden

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Teenagers are unruly, rowdy and undisciplined. Their potential to cause trouble and lack of interest in authority can make them a problematic and unrewarding audience to engage with. But, is this stereotype warranted or fair?

Anylmadu (2016, p.6) suggests that "Teens are often seen as problematic by museums, either because they are thought of as a tricky group to engage, or as potentially disruptive museum visitors".

Undeniably there are barriers to young people's participation in museums, botanic gardens and other cultural and scientific organisations. A recent report on Access of Young People to Culture, explains that the most significant barriers are money, geographical constraints, time, as well as more culturally constructed issues such as attitudes, social environment and the fact that the offer may not meet the needs of the group (EACAE, 2010).

This issue of Roots aims to address some of these issues and stereotypes and highlight some of the successful ways in which botanic gardens and other organisations are engaging with teenagers, both in and outside school hours, as well as the ways in which dedicated young people can contribute to botanic gardens.

There are many reasons why botanic gardens should attempt to reach young people. A recent report from Harvard's Natural Environments Initiative Working Group (2014, p.19) explains that "early experiences in nature influence subsequent environmental attitudes and concern for stewardship and sustainability". However, it is not only important to instil an appreciation for nature, an understanding of the environmental impact of an individual's life and how this impact can be controlled. Effective outdoor learning can also have positive effects on a teenager's broader education, for example encouraging greater achievement in science (Rios and Brewer, 2014).

In addition, there is a growing body of knowledge on the importance of spending time outdoors for health and wellbeing, for adults, young people and children alike. The RSPB's report, Every Child Outdoors, lists benefits of time spent outside on young people's physical health, mental wellbeing and personal and social skills. For example "Children with stressful life events are more likely to develop mental health problems. There is evidence that children who experience stressful events in their lives are less stressed and have a higher global self-worth the more they are exposed to nature" (2010, p6).

"Museums can demonstrate stereotypical perceptions of their audiences, in much the same way that the general public has preconceptions about museums. Certain groups are sometimes seen as not 'right' for a 'proper' museum environment – for example, teenagers are perceived by some institutions to be loud and disruptive" Anylmadu (2016, p.6)

"major obstacles are money constraints, attitudes (not only of the public in general but of young people themselves), geographical limitations (dichotomy between urban and rural environments, lack of physical access such as transport), time (at least in the perception of young people), social environment, and also what is on offer meaning that the offer does not always meet with the needs and necessities of the young public." (EACEA, 2010, p. 13)

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How do we create experiences that meet the needs of this age group? Unfortunately much of the research out there does not include the voices of the individuals concerned. The Access of Young People to Culture report highlights that "There is still little information available on the evaluation of young people themselves of the cultural offer, structures and opportunities, and their expectations on the required support for participation in cultural activities" (EACAE, 2010, p.14).

Yet there are some wonderful best practice examples, such as those held in this issue, painting a very different picture to the idea of the sulky or disruptive teenager. These articles tell stories about young people adopting and caring for plants, running educational activities to engage people with climate change, contributing to the development of new projects, writing for the RSPB's magazine Wingbeat, taking part in explainer training programmes and encouraging others to sow native wildflower seeds.

There are also several methodologies outlined in the report on *Learning in Museums and Young People* which are associated with programmes that effectively attract and engage teenagers. These can be summarised as:

- "good communication: "youth- friendly" museum vs the idea of the museum as a place which is "not for me"
- creating connections in line with young people's need of identification to overcome the distance between the individual and the objects exposed
- non-formal learning which allows a more personalised approach to learning vs a learning conceived only on accumulation of knowledge
- relations and sociality in line with youth's relational needs. Environment and activities which allow interaction, sharing, debates and discussion lead young people to discover, negotiate and construct their own sense
- an appropriate mix of structure and freedom: structure is fundamental in establishing individual and collective goals. Freedom is an essential condition for taking charge of their own learning
- time and experience with varied opportunities for participation in order to develop and increase a sense of ownership of the project
- active participation to give young people the appropriate role in the meaning-building process; for instance, involving young people in initiatives, such as the design of small exhibitions or the design of activities for their peers, leads to an increase of the sense of responsibility and to the development of personal skills" (NEMO-LEM Working Group, 2015, p.9)

It is important to remind ourselves not to tar this diverse group with the same brush. Of course "Young people are not a homogeneous group and need differentiated, coordinated and long-term policies for accessing culture" (EACAE, 2010, p.13)

It seems to me that active participation is an important and reoccurring theme: in the call for evaluation conducted by young people, in the methodologies outlined above, and in the successful examples of projects that support young people to play an active role in conservation. It seems that when young people are involved in project development or given something meaningful to do then they dedicate themselves to the cause. And it's not just the young people that benefit. I will end with a quote from Schwartz (2005, p.1) "Teens, if we allow them, have the potential to provide our museums with the fresh perspective and energy required by each new generation as it reinvents and finds the significance of its own cultural patrimony."

Liliana Derewnicka

Botanic Gardens Conservation International

"As well as developing knowledge and understanding, and having health and wellbeing impacts, experiences with nature have also been shown to provide many personal and social skills and benefits" (RSPB, 2010, p. 7)

"Teens represent the next generation of political leaders, artists, workers, and inventors. Why not engage them now, learn from them, and as some of our colleagues have boldly demonstrated, invite these youthful audiences to actively participate in the transformation of our institutions?" (Schwarz, 2005, p.1.)

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Author: Sarah Miles

THE NYBG EXPLAINER PROGRAM: YOUTH DEVELOPMENT THROUGH SCIENTIFIC INQUIRY

The Explainer Program at New York Botanical Garden is a work-based educational program for high school students in the New York City area. Through this tiered program, participants are able to gain knowledge, learn skills and work towards goals within a positive, youth development setting. At all levels of programming,

the Explainer Program provides a space for youth to cultivate curiosity, gain knowledge and skills, and explore interests. Through meaningful engagement with adults, peers and the public, the program creates space for youth to explore their interest, find their voice, develop confidence and skills, and build a foundation for their future.

ocated in the heart of the Bronx, New York Botanical Garden engages approximately 150 high school and college students from the greater NYC community each year through a tiered educational internship called the Explainer Program. The program trains youth as facilitators who lead hands-on science activities for drop-in family visitors and assist with staffing for registered camp groups. Over the past 15 years, this youth development program based in a children's educational facility at a public garden has provided new pathways to success in thousands of students' lives, from career development and social emotional learning to outdoor recreation and awareness of their environment.



↑ Top: Staff Explainers pause at summit on Leadership Retreat Hike. Above: Explainers make observational drawings in children's garden ©Isabella Garramone



↑ Explainers pose for photo outside the Mertz Library fountain ©Sarah Miles

CREATING MEANINGFUL EXPERIENCES AND OPPORTUNITIES FOR GROWTH

Students join this selective work-based internship from across the New York City area. The selection process is rigorous, including an application and a project-based group interview. A diverse mix of teens is brought together for each cohort of entry-level Intern Explainers, attracting not only extroverted public speakers and enthusiastic scientists, but also shy students who exhibit curiosity and a desire to learn. During the five-month commitment as an Intern Explainer, they learn basic botany and seasonal content, and share this knowledge through teaching hands-on activities to visiting children and families.

The program encourages the teens to progress through a four-tiered structure from volunteer to paid positions. Teens who successfully complete the Intern Explainer commitment, can apply to continue volunteering as Advanced Explainers. In addition to teaching visiting families, Advanced Explainers also collect and submit citizen science data to the National Phenology Network, and spend individual time in nature observing and journaling. During summer months, field trips and guest speakers provide exposure to different science, technology, engineering and mathematics (STEM)-based career opportunities. Advanced Explainers are then eligible to apply for paid positions as Summer Camp Explainers or Master Explainers.



↑ Interns investigate leaf litter during training ©Isabella Garramone

"I loved the community. I loved being around nature even though we're really in the city. I loved interacting with the children, and teaching them the things that I love to study. And lastly, I loved the other Explainers. Truly, the garden was one of the only places I felt comfortable and where I could be myself. The wonderful Explainers that I met could never be replaced by anyone, and I really want to continue to serve and foster this community and help to make future Explainers' experiences just as enjoyable as mine" Excerpt from application for Advanced Explainer program



↑ Advanced Explainers collect phenology data ©Isabella Garramone



At the Master level, Explainers become peer leaders, role modelling the skills and sharing content knowledge gained in preceding program tiers while developing new skills as mentors. They assist in training incoming Interns and collaborate to develop weekly mentorship meetings. Mentor meetings create an intentional space for peer interaction and team development, as well as for sharing knowledge, experience and skills. After graduating high school, college-age Explainers can apply for a senior position where they take on greater responsibilities in operational, team development and supervisory roles. A highlight of their own personal development is a staff leadership retreat, including overnight camping, hiking and swimming in a lake to further develop teamwork and leadership skills and an appreciation of the natural world.

POSITIVE YOUTH DEVELOPMENT AND SOCIAL EMOTIONAL OUTCOMES

This work-based program, grounded in the theory of positive youth development allows participants to engage in active ('building') and reflective ('meaning-making') opportunities. Interns actively build new knowledge and develop skills, encounter new experiences, practice and make valuable contributions. Reflective practices include connecting their experience to other parts of their lives and envisioning future possibilities. The Explainer Program incorporates individual reflections, group work, mentoring and opportunities to build social capital by learning about the greater garden community.

For many participants, the Explainer program is the first place they directly encounter the world of work and practice job readiness skills. A weekly commitment and the minimum hours requirement demands that Interns practice effective time management and hone professional communication skills. Advanced Explainers applying for paid positions also learn how to write a resume, cover letters and participate in formal interviews.

In Ithe context of youth development, rich developmental experiences include opportunities to "try on new roles and perspectives, publicly demonstrate new skills and competencies, and contribute to endeavors that are personally and socially meaningful" (Nagaoka, 2015, p.39). Participants experience these opportunities at every program level. The role of Explainers, in engaging with the public and teaching family programs, provides meaning and value to their own development and a positive sense of self.

 Part of the work-based educational program for visiting children and families at the New York Botanical Garden ©lsabella Garramone

"Rich developmental experiences include those that put children in interaction with peers and adults; build strong and supportive relationships; and provide opportunities to play and explore, try on new roles and perspectives, publicly demonstrate new skills and competencies, and contribute to endeavors that are personally and socially meaningful." (Nagaoka et al, 2015)



★ Explainer work in pairs to teach activity stations ©Isabella Garramone

"I feel like I am impacting future generations. We are a catalyst in shaping their scientific brains and giving them the tools with inquiry based skills to explore their world. I feel like I have impacted someone's life." Master Explainer reflection on the impact of teaching family programs

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YOUTH IMPACT AND FUTURE

Youth enter into the program at all high-school grade levels. Many who join stay throughout their high school careers and some even remain through college. This means participants have the opportunity learn and grow within the Explainer Program over four or more years. The developmental experiences are "maximized – in strong, supported, and sustained relationships with adults and peers that are set within caring communities" (Nagaoka, 2015, p.38). It is no surprise that over time, some refer to the program as a second home, where they have forged a sense of self and belonging and informed their futures.

Through exit interviews and surveys, participants share and reflect on the growth they make during their time in program. At the end of the internship all participants self-report a growth in confidence, social skills and public speaking as a result of their experience, with 73% opting to continue on as Advanced Explainers in 2016. 2016 participants demonstrated significant gains in their positive youth development scores as captured in the Youth Development iLearning System, a survey which measures social-emotional outcomes. Additionally, 85% of Advanced Explainers surveyed reported an increased interest in STEM-related subjects in school and 70% of surveyed program alumni are pursuing STEM-related careers or majors.

"This is where I have grown most as a person" reflects Veniece Pinnock, a current sophomore at Hunter College and five-year program participant. Veniece entered the program initially to fulfil a community service requirement and had never been to NYBG prior to her interview for the internship. "I was really shy and anxious when I first started" she comments, "but after interning I built confidence in what I was saying. I began raising my hand in class and drawing connections to what I was learning at the garden." The first in her family to go to college, she was initially interested in a laboratory science-based career. As a direct result of her experience as an Explainer, she is majoring in Education. "I like what we do as educators here. This is where children are sparking their interest, using their senses and exploring nature." Through experience and community guidance over the years, she has articulated a future plan she is excited about. "The connections made here are real. The staff give real advice. You can talk to adults who have life experience and are really supportive and interested in how you are doing with life and school." Veniece's story is one example of the positive developmental outcomes resulting from program participation.

Whether participants in the New York Botanical Garden's Explainer Program stay for five months or five years, they have the opportunity to grow in a rich experiential learning environment. Through meaningful engagement with adults, peers and the public, the program creates space for youth to explore their interest, find their voice, develop confidence and new skills and build a foundation for their future.



↑ Staff Explainers meeting at the Appalachian Mountain Club camp grounds during leadership retreat ©NYBG

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TREES ON THE MOVE -REACHING OUT TO YOUTH AUDIENCES

Here you will find a brief reflection on the process of developing an outreach programme to engage young people from a local community with a historic tree collection through informal education and a youth work approach. It explores the potential conflict between the agenda of a botanic garden and the needs of young people; the importance of consultation; enabling people to think outside the box and take risks; and how to developing a mutually beneficial relationship between a botanic garden and young people through shared learning.

uesday evening in November. It's cold, wet and dark. A group of teenagers huddle by the local bowls club. Nearby, a small group of staff and volunteers from the Forestry Commission gather in the car park.

The local youth club is about to open its door. It's housed in a shipping container and provides a drop-in space for young people to socialise, learn new skills, build confidence and discuss issues.

Tonight, the young people also have the opportunity to learn about trees!

WHY?

Because three miles away is Westonbirt, the National Arboretum, and despite having a mission statement that aims 'To connect people with trees to improve the quality of life', very few young people visit. Not unusual for a botanical collection.



↑ Top: Shea, cocoa and olive lip balms ©Karen Price Above: Lip balms from trees ©Karen Price



With Heritage Lottery Funding, we have been able to target this demographic. Over three years we have developed a popular range of activities, yet visits from our nearest youth club have been met with mixed success and six months ago lack of transport meant that these visits had to stop.

We were reluctant to let this partnership end, as there was something at odds about this local group being unable to benefit from the arboretum, which was welcoming visitors from around the world.

So, why are we in a car park? Simply - if the audience cannot come to us, then we will go to them.

WHAT HAVE BEEN THE CHALLENGES?

To take any young person on a learning journey, there has to be a level of trust that we are not going to set them up to fail, or put them in harm's way. In return, we trust the young people to act responsibly and respectfully, to enable us to provide a range of stimulating and fun activities. As a youth worker, a fundamental element of my role is about building these relationships. Working together on activities and encouraging conversations we can begin to establish a connection with each other through shared experiences.

For the club leaders, their primary purpose is to support the personal and social development of young people. For young people, it's about having somewhere to go, someone to talk to and something to do. As a botanical garden, we want young people to learn about the history and heritage of the collection.

Enforcing our agenda would cause a breakdown of the relationship and young people voting with their feet. However, our mission statement includes "...to improve the quality of life". Could we develop activities that have an impact on young people's personal and social development, and work towards improving their wellbeing?

OVERCOMING CHALLENGES

When developing any new project with a new target audience, consultation is key. Asking local youth groups what would encourage them to visit the arboretum highlighted a strong interest in survival skills.

So survival activities provided our first outreach session. Fire lighting enabled us to have a visual presence whilst there is something about fire that encourages people to congregate and chat. We were able to use this opportunity to consult about other activities they would like to do. ← Falling in love with trees – chocolate truffles and wooden hearts ©Karen Price

Enforcing our agenda would cause a breakdown of the relationship and young people voting with their feet.

To take any young person on a learning journey, there has to be a level of trust that we are not going to set them up to fail, or put them in harm's way. In return, we trust the young people to act responsibly and respectfully, to enable us to provide a range of stimulating and fun activities.



↑ Cosmetics and couture – jet & amber bracelets ©Karen Price

On each visit, we have continued to ask the young people for their feedback and ideas, and so we can use this information to provide arboretum-based activities when transport is available.

THINKING OUTSIDE THE BOX

Wilderness survival skills may not seem a natural path to follow in a botanical collection. Fortunately, the journal entries of many famous plant hunters are filled with tales of crossing the wilderness, sleeping in make-shift dens and lighting fires to keep warm. This enables participants to learn, if not directly about the trees, then about the people who went searching for them.

Neither is making chocolate truffles, lip balm or bracelets obviously associated with botanical gardens. But teenagers love food and love making things. Chocolate comes from trees, as does olive oil, shea and cacao butter. Whilst beads that imitate amber and jet make quite fashionable bracelets.

PERMISSION TO TAKE RISKS

If you have an historic tree collection, possibly the last thing you want to do is encourage fire lighting. Add to this, the health and safety implications of working with a group you don't know, in an unknown environment, it quickly becomes a high-risk activity. Yet we know that young people want to learn survival skills, of which fire lighting is one.

Yes, there are risks inherent with this type of activity, but a comprehensive risk assessment and appropriate safety measures will eliminate most of these. There are times when it is useful to put risk into perspective and give ourselves and others the permission to do something a little bit risky - whether that be trying new activities, going out to hard to reach audiences or running a programme that may challenge the perceptions of what a botanic garden does!

WORKING IN A METAL BOX

At Westonbirt we have 600 acres of collection to explore. Limiting ourselves to an average-sized shipping container, has meant rethinking our usual activities. Small is beautiful. Activities requiring minimal resources have been vital. Working in this way also gives us the scope to run more than one activity simultaneously, targeting different interests, from Christmas scented sachets with frankincense and myrrh, to propagating Holford pine seeds. Our record is 20 people and a guide dog inside the club at any one time.

THE FUTURE?

Our aim is to encourage this group to become regular visitors to, and develop a sense of ownership of the arboretum. There is still a way to go. Transport is still unavailable. There is still some uncertainty from the young people as to why they should visit. But last week, some of the young men made chocolate truffles, one young woman suggested other tree-related activities and the two oldest club members (18 and 19 year-olds) spoke to me for the first time.

Progress can be slow, but defiantly worth it!



↑ Fire and food – always a winner with young people ©Karen Price

There are times when it is useful to put risk into perspective and give ourselves and others the permission to do something a little bit risky



↑ The People's Pod Youth Club & our base for the session. ©Karen Price

When developing any new project with a new target audience, consultation is key.

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YOUNG PARENTS BY CHOICE: ATTRACTING ATTENTION AND INTEREST IN PLANT CONSERVATION



In 2014 the Botanical Garden of the Institute of Biology at UNAM created the "Adoption Center of Mexican Plants in Danger of Extinction" with the objective of promoting education and conservation of plants catalogued within some category of risk. Young people between the ages of 13 and 18 are one of our target audiences, and today there are more than 500 who have adopted approximately 1,700 plants in danger of extinction. This article describes educational strategies focused on this audience to: a) involve and motivate them to adopt by choice rather than obligation, and b) encourage contact with and maintain their interest in nature through social networks.

The title of this article "Young parents by choice" may initially cause some alarm, so we should first explain that our project is not about encouraging young people to become real parents (to individuals of their own species). Rather it is about educating young people on the importance of endangered plants through an adoption scheme where by individuals become "parents" of plant species, with the same commitments and responsibilities that parenting brings.

In 2014, the Botanical Garden of the Institute of Biology, UNAM, created "The Center for the Adoption of Mexican Plants in Danger of Extinction" to set up a plant conservation network throughout the country, where each person who adopts a plant takes a role in conservation. This is an education and conservation programme where young people between the ages of 13 and 18 play an important role. ↑ Young parents ©Enrique Lozada

So far, more than 500 individuals between the ages of 13 and 18 have adopted more than 1,700 Mexican plants at risk of extinction.

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With the emergence of new technologies, botanic gardens face serious challenges to capture the attention of young people who spend an increasing amount of time connected to a virtual reality and living through their screens (Krishnan y Novy, 2016). So how can we catch the attention and interest of young people in our adoption programme?

CATCH THEM NOW! GETTING TO KNOW YOUNG PEOPLE FROM START TO FINISH

Young people between the ages of 13 and 18 were born with a link to technology, they have a preference for information in images, simple icons, and handle multiple social networks that give them access to a lot of information. All this makes them creative, innovative, and self-taught people (Rameez, 2015). At the same time they are interested in the environment, and recognize that if they participate now in the conservation of plants, it will be beneficial to them.

YOUNG PEOPLE MAKING DECISIONS FOR SUSTAINABILITY

The Adoption Center has made available to these young people more than 80 species of cactaceae, crassulaceae, agaves, orchids and insectivorous plants in some category of risk, all protected by Mexican law.

To adopt it is necessary to go to the Center of Adoption of the Botanical Garden of the IB-UNAM. There, through a video and an infographic, the adoption process is explained. In addition, there is a person who explains the programme and answers their questions. In our experience this last aspect is crucial. Although boys and girls prefer technology, personalized attention is very important.



↑ Certificate of adoption ©Christian Viveros

The Adoption Center has made available to these young people more than 80 species of cactaceae, crassulaceae, agaves, orchids and insectivorous plants in some category of risk, all protected by Mexican law.



↑ A plant care workshop ©Enrique Lozada



↑ Specimen Identification card ©Enrique Lozada

They adopt the plant either individually or with others (with a friend, siblings, parents or grandparents). This strengthens affective bonds, and fosters values such as respect and care for nature. Finally, they receive an adoption certificate which includes care instructions for their plant. So far, more than 500 individuals between the ages of 13 and 18 have adopted more than 1,700 Mexican plants at risk of extinction.

THE MOST POPULAR PLANTS

The geometric forms of the genus *Echeveria* evoke beauty and perfection. Even the blossoming, flower-like growths catch the attention of the youngsters. These features can work as a hook to interest individuals in endangered species, exploring these species through photos on social networks, as well as by visiting living collections. Crassulaceae are also considered 'attractive plants', because they require minimum care, need abundant sunlight and only need to be watered every two to three weeks.

SMALL DOSES OF SCIENCE

Once a month adoptive parents enjoy multiple educational activities, which seek to give them the right tools for the care of their adopted plants. For example, there are: a) transplant workshops, b) first aid talks, and c) visits to growing greenhouses. These activities are given by botanic garden specialists, who promote a dialogue between scientists and young people interested in conservation. In this way, we create a platform for the successful public communication of science, where the language and content are designed specifically for our audience (Martínez *et al.*, 2012).

Once a month adoptive parents enjoy multiple educational activities, which seek to give them the right tools for the care of their adopted plants. For example, there are: a) transplant workshops, b) first aid talks, and c) visits to growing greenhouses.



↑ Adopted plants ©Enrique Lozada

A large percentage of the individuals are aware that understanding a plant and its needs allows us to take care of it properly, thus avoiding its extinction.

Species	Botanical Family	Risk Category*
Graptopetalum macdougallii	Crassulaceae	In danger of extinction
Echeveria elegans	Crassulaceae	In danger of extinction
Echeveria setosa var. minor	Crassulaceae	In danger of extinction
Mammillaria oteroi	Cactaceae	Threatened
Echeveria longissima var. longissima	Crassulaceae	Threatened

↑ Top 5 most endangered Mexican plants adopted by young people ©Enrique Lozada

* Official Mexican Standard 059- SEMARNAT-2010

PHOTOS, TWEETS, AND COMMENTS

This sector of the population is increasingly immersed in technology, and for this reason we use the powerful tool of "social networks", like Facebook and Twitter, to share content such as: a) "recommendations of care", b) curious facts about the various species, as well as c) a botanical glossary. In addition, short videos on transplanting, acclimatization of orchids, and irrigation in cacti are shared. We use these means to establish a dialogue at a distance, and to address the specific concerns about their adoptive plants, while we invite them to share photos of their plants as they grow, flower, etc.

ADOPTIVE PARENTS: ACTIVE CONSERVATION PLAYERS

We are keen to understand what young people think about this project, and so we have asked them a simple question: Why did you adopt an endangered plant?

The answers of the children reflect a mosaic of ideas, values, and feelings that are fundamental to enrich our educational programmes. A large percentage of the individuals are aware that understanding a plant and its needs allows us to take care of it properly, thus avoiding its extinction. This demonstrates the responsibility they assume, and the commitment they have, to maintain the adopted species and, in general, life on the planet.

FINALLY...

When developing educational programmes for young people, botanic gardens should consider both their interest in social networks (Facebook, Twitter, Instagram, among others), and their desire for real contact with nature. The visual contents used in social networks are a first approach and followed by invitation for young people to visit a botanic garden. The success of the adoption programme depends on being able to involve young people in a personal commitment, which they choose themselves, and through this, helping them to understand that caring for one or more species in this way means they are "acting now," or, in other words, becoming "actors for conservation"



↑ Number of adopted plants ©Enrique Lozada



↑ Crasulácea Echeveria uhlii ©Enrique Lozada

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A WALK IN THE PARK? SCIENCE, YOUNG PEOPLE AND THE HORTUS



↑ Hortus employee Ed de Vogel discovered an orchid and named it after conservationist Jane Goodall. Stories like these appeal to the students ©Petra Sonius

Why, in a botanic garden over 425 years old, would you confine yourself to biology lessons? Language, history, mathematics, art - there is hardly any subject you can think of that cannot be delivered in a botanic garden. The setting can also make the lessons more interesting and add value - the unusual surroundings make every lesson more fun and the material sinks in better.

The Leiden museums were approached by the Leonardo College, a secondary school specialising in sports and culture. The aim was to give the museums a role in the school's cultural curriculum. The Leonardo College wanted students to visit two heritage institutions twice a year. The students were not just to have a standard story presented to them, but would get a real peek behind the scenes: real people, real artefacts! Over the course of their high-school career, students would gain a clear understanding of how things are done in a museum.

SCIENCE

At this point in their education, students are being trained for a career in scientific research, so the request to the Hortus was twofold: firstly, thirdyear secondary-school students (aged around 15) after their visit should know where exactly they had been, what sort of research was done there, and what its purpose was. Secondly, the subject of the lesson should be marketing and economics.

The Hortus has been offering these classes for five years now. The classes are different each time, and this is not just due to the weather, although a sunny garden in bloom yields very different suggestions than a day of rain beating against the panes of the tropical glass houses.

With a hypothetical budget of 50,000 euros, groups of high-school students devise campaigns to make scientific work at the Hortus botanicus Leiden more visible to a chosen target group. They also design adaptations that could be made garden to make it more interesting. Divided into six groups, the class works on the assignment over a full day and presents the results to their peers and an informed audience. They discover the garden, observe visitors, discuss, and make sketches. Each day yields different results, depending on the chosen target group, weather, ideas, current events, etc.



↑ The orchid named after Jane Goodall, Dendrobium goodallianum, flowers for a single day and smells of coconut ©Rogier van Vugt

.....

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The results of the session are mainly determined by the target group that the students

decide to focus on - this is decided during a group discussion at the start of the lesson. For example, in one year, the students divided the Hortus visitors principally by age groups, while another year they looked at factors such as social groups, family composition, origin, or disability.

With their chosen target group in mind, the students are given a tour of the garden in which the scientific work is explained and their attention is drawn to particular plants and stories. They make observations and take notes as they go. Then the students themselves get down to work. They are given a hypothetical budget of 50,000 euros and asked to devise a campaign for their chosen group.

FOOD SECURITY

50,000 euros, even if only imaginary, initially seems like a lot of money, but students soon learn that it is not - for example the suggestion of putting a 'daily advert in the newspaper' would not be feasible within the budget. With advice from a Hortus staff member with a graphics background, realistic estimates are made so that the target group can be reached as effectively as possible.

It is even more fun to work together and devise ways of making science more interesting for the target group. By choosing real issues each year – the last groups focused on science and food security within the context of the Horizon 2020 BigPicnic project which aims to create public dialogue around food security (www.bigpicnic.net) – and by stressing that the Hortus really does implement usable ideas, the students' motivation is enhanced. They especially like it when a real scientist comes to talk about his or her work.

A day is a long time: after the break, it can be hard to get everyone 'back on board'. Last year this problem was addressed by setting the students an assignment – as they were heading out en masse for a burger or a kebab – to be reported on after the break. This caused quite a stir: "so much salt in a burger!" "The server himself didn't know how much was in it even though it was on the wrapper!" ← Ed de Vogel again, but now with an ant plant, illustrated for young people. ©Stephan Timmers

Why, in a botanic garden over 425 years old, would you confine yourself to biology lessons? Language, history, mathematics, art - there is hardly any subject you can think of that cannot be delivered in a botanic garden.



Explaining about research in the Hortus

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Devising ideas for a group of their peers is easiest (a branch of Starbucks right in the middle of the garden, with information about food on the cups and placemats, ... a festival... etc.). Then follows a flood of suggestions for celebrities to invite, and a debate about whether 50,000 euros is enough. Thinking something up for a more distant target group (families with young children, for example) is not quite so straightforward. But, the Hortus can now use its co-creation experience from the Big Picnic project to tackle this. Co-creation describes a process where organisations develop products, events, activities, etc. with the intended users. By suggesting that the students think of real people from their own lives and ask themselves if those people would understand, want or like something, the lesson suddenly comes to life and the students are bursting with ideas again. A student who is familiar with someone from the target group suddenly becomes the oracle for his or her classmates. The final presentation at the end of the day is an exciting highlight, particularly if people come specially to see it. Afterwards, the students go home with a sense of satisfaction, and always half an hour earlier than announced.

There are of course some factors to consider - Is this too much work for one class? The other museums seem to think so. There is currently a debate as to whether running these classes can continue in this way, but the main issue is the price the school pays (around 250 euros for the whole day).

The Hortus has occasionally customised the same class for other groups – trainee nurses, a Technasium with a special assignment – and, furthermore, the Hortus itself derives a huge amount of inspiration and ideas from the classes. Try inviting a school into your garden if you want to learn something or to try something out; it's very exciting to know that every year you can expect a group that will be straining at the leash to get into your garden, to shake it awake, and to bring the scientific research lurking in the darkest recesses of the tropical glass houses out into the full light of day.



↑ Ink drawing of an ant plant for an adults' walking guide. Students find these plants extremely interesting ©Esmée Winkel



↑ After a tour, students see the garden with new eyes.

The classes are different each time, and this is not just due to the weather, although a sunny garden in bloom yields very different suggestions than a day of rain beating against the panes of the tropical glass houses.

The final presentation at the end of the day is an exciting highlight, particularly if people come specially to see it. Afterwards, the students go home with a sense of satisfaction, and always half an hour earlier than announced.

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A NEW DIRECTION FOR HORTICULTURAL WORK EXPERIENCE

How do you convince tech-savvy, 'info now' teenagers to 'stop and smell the roses'? You join their world! At the Ballarat Botanical Gardens, we have introduced an exciting new model of school work experience, replacing the traditional one week of gardening experience, with a fast-paced, three-day, group 'taster' program. Developed in partnership with the Work Inspiration Program, and Highlands Local Learning and Employment Network (Highlands LLEN), we now promote more of our dynamic industry, via short sessions, diverse modes of delivery, engagement of all five senses, and the positive interaction with ten members of our passionate horticultural team!

o sell horticulture to teenagers as an engaging, dynamic, and professional industry, with its multitude of exciting pathways you have to make it relevant to their world.

Traditionally we've offered six work experience placements per year, for a week of gardening experience, though we have many more requests. Requests were often clustered, from multiple sources, at our busiest times, or in the middle of our cold winter which can challenge even the most enthusiastic student!

If "the adolescent brain is set up for being fast and impulsive" as Andrew Fuller (n.d.-a) tells us then we needed to speed things up and 'action-pack' it into bite-sized pieces that told the whole exciting career story. We engaged more staff, from more diverse areas and included new topics. This transformed our single site 'botanical gardens work experience' into a more extensive 'parks and gardens horticulture' program utilizing more of our city's broad horticultural expertise.



↑ Above: Presenting the garden design Top: Immersing students into horticulture ©Arnanda Menabue.

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↑ Group activities produced great results ©Amanda Menabue

DEVELOP PARTNERSHIPS WITH YOUTH FOCUSED AGENCIES

Work Inspiration's 'taster' program (www.workinspiration.com.au) provided invaluable case studies and guidelines, to develop the structure of the program, and the partnership with Highlands LLEN, provided new insights into teenage engagement, links with school networks, sourced students and provided valuable feedback throughout the process.

CHOOSE A TIME WHEN YOUR RESOURCES ARE MOST AVAILABLE

Our program now runs in October, to coincide with better spring weather, and the removal of the winter floral conservatory display. The latter provides an abundance of, otherwise composted, potted colour to use in activities.

LEARN FROM A PILOT PROGRAM

The two day pilot program in 2015 showed great potential. Feedback was positive, but encouraged more 'hands-on' activities. We had underestimated the student's learning speed, with some activities completed in half the time expected, and an 'expert panel of horticulturists' had received very few questions.

In 2016, the program was expanded to 14 sessions over three days, including additional sessions of botanical nomenclature, apprenticeship applications, career pathways, three further practical sessions, gardens and nursery experience, a bus tour, a cryptic tree hunt and greater staff interaction.

A maximum of two placements were offered per school, and careers teachers selected students. This change resulted in greater school diversity, a more engaged student group, and a more transparent and streamlined application process.

Our 2016 group attracted eight students from five secondary schools in years 9 -12.

ENGAGE WITH HORTICULTURE FROM THE MOMENT STUDENTS ENTER THE ROOM

A single Sequoiadendron cone awaited each participant at the beginning of the program. This tactile 'prop' and projected image of a mature Sequoidendron, as one of the biggest living things on earth, announced the theme for day one 'from little things - awesome things grow'. *"Adolescents learn best when there is emotion involved"* (Fuller, n.d.-b, p.8)

Teenagers are not always as convinced as us, that 'plants make the world go round', so we opened the program with plants that were essential to their world, of coffee, chocolate, denim jeans, cotton tshirts, makeup and music



↑ One of two courtyard gardens created ©Amanda Menabue

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RE-INTERPRET HORTICULTURE INTO LANGUAGE AND THEMES CURRENT TO THEIR WORLD

Teenagers are not always as convinced as us, that 'plants make the world go round', so we opened the program with plants that were essential to their world, of coffee, chocolate, denim jeans, cotton t-shirts, makeup and music (wooden drum sticks and guitars), along with those 'sidelines of life' such as oxygen, housing and medicine.

ENSURE ALL STUDENTS START WITH THE SAME PLANT KNOWLEDGE

On day one, tours created a common baseline of plant and industry familiarity for students, and the framework for all sessions throughout the following two days.

Tours included the botanic gardens and nursery, football oval, retail nursery, soccer pitch and central city gardens, whilst interacting with four passionate staff.

INTRODUCING THE QUIRKY & UNEXPECTED, WERE VITAL TO CAPTURE ATTENTION

Araucaria bidwillii, with its sharp leaves, may not normally attract a lot of favorable teenage comment, but when 're-interpreted' to include; 'drops dangerous, six kilogram cones', and 'creates awesome sound boards for guitars', it gained popularity.

RE-ENGAGE ALL THE SENSES

"Most early adolescents are visual learners" (Fuller, n.d.-a, p.4). From the unexpected square stems of mint, to the scented foliage of culinary herbs, creation of a herb basket in the nursery, and the herbs on the pizza lunch we provided – we had engaged touch, smell, sight and taste.

INTRODUCE THE SAME INFORMATION ACROSS MULTIPLE FORMATS

"Spaced repetition has a positive impact on teaching. ...learners encounter the same material in briefer sessions spread over a longer time" (Fuller, n.d.-a, p.3).

Tree identification was built incrementally through a combination of tours, flash cards, tactile engagement, and botanical nomenclature. Culminating in a cryptic tree hunt (the amazing race) in the final session, all students successfully identified nine trees in our gardens to genus & knew one quirky fact.

← Landscape design project was very popular
 ©Amanda Menabue



✦ Football oval - The horticultural team were very engaging ©Amanda Menabue



← Soccer field - career passion and machinery ©Amanda Menabue

"The adolescent brain is set up for being fast and impulsive" (Fuller, n.d.-a, p.1)

'Most early adolescents are *visual learners'.* (Fuller, n.d.-a, p.4)



TO SEE A GENUINE PASSION FOR A CAREER MAKES A DIFFERENCE!

Interaction with passionate staff was pivotal to the program's momentum and success. In a reversal of the 'expert panel' in the pilot program, tours immersed the students into the horticulturist's environments. Students were immediately captivated by staff enthusiasm for their work, engaged by their surroundings and the variety of machinery used.

Talks ranged from five minute impromptu questioning, to comprehensive 30 minute career journeys. Ten staff contributed including, a senior manager, garden curator, nursery team, gardeners, an apprentice, and sports grounds curators.

TAKE THE NORMAL AND MAKE IT EXTRAORDINARY!

A horticultural apprenticeship was promoted as just the beginning of a career, opening up exciting pathways into other areas including floriculture, viticulture, revegetation, nursery, landscaping, arboriculture, and sports turf management.

To make it more relatable, we introduced dynamic examples of real people, with extraordinary careers, such as a nursery career growing plants for animals at our State zoo, or a position preparing a soccer pitch for an international match (& in our city!).

A CAREER TO TRAVEL THE WORLD!

Horticulture is one of the few, truly global careers. It speaks a world-wide language (botanical nomenclature session), teaches universal skills (practical sessions), and enables genuine world-wide opportunities. A simple search of Indeed.com provided 'statistical evidence' of the vast number of job vacancies available regionally, interstate and internationally.

GROUP ACTIVITIES PROVIDED BETTER OUTCOMES, AND IN LESS TIME

Gardening activities as a team, fostered 'natural peer encouragement' which spurred the group along at a 'professional pace' and to a meticulous standard. The finished result that may have taken two hours for an individual, was enthusiastically completed, and proudly admired, in only 30mins. In a simple landscaping activity, two groups designed a courtyard garden for an elderly lady. They discussed the client brief, drew the design, presented the plan, and then 'built' the garden from the salvaged conservatory plants and stands provided. A popular project, and completed in only 90 minutes.

SUMMARY

The level of student interest from this program far exceeded our expectations. Of our eight participants, three showed a new interest in horticulture as a career, one found gardening 'therapeutic' and one found new plants for his reptile enclosures!

Staff were surprised to discover how their career stories could positively influence work experience students, and some have already volunteered for the next program.

Whilst only in its third year, and still with many opportunities for improvement, this program has already offered greater variety, for more students, engaging more schools, more staff, and is delivered in less time. Most importantly, it is one step closer to promoting horticulture as the exciting career that it is!



Amazing race - students identified 9 trees
 ©Amanda Menabue

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Authors: Laura Asther and François Labolle

"COTÉ COURS - LEARN DIFFERENTLY AT THE BOTANIC GARDEN" AN INNOVATIVE SCHOOL WORKSHOP FOR SCIENTIFIC TWELFTH GRADERS



How can a botanic garden help twelfth graders learn the biology of plants? The Botanic Garden of the University of Strasbourg has provided an answer and has created a school workshop which uses collections of plants, game patterns and a website. These tools enable science teachers to tackle four of the seventeen themes of the curriculum in just half a day.

The new French biology and geology curricula for twelfth graders put an emphasis on the importance of plant biology. As such the Botanic Garden of the University of Strasbourg now plays a key-role in science education, providing high school students with an innovative workshop, based on collections of plants that allows students to learn in a different way.

The objective of the workshop is to enable science teachers to tackle six elements of the curriculum in half a day: the protection of flowering plants against aggressions, dispersal seeds, sexual reproduction, speciation, domestication and polyploidization.



◆ 'Birds of a feather flock together?' leads the pupil to propose a scenario of speciation to two species of palm trees Howea forsteriana and Howea belmoreana, on the Lord Howe Island. ©Laura Asther

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↑ The students developing the play patterns during the 'innovation' phase ©Laura Asther

Supported by the programs *Investments For the Future* and the certified *Excellent Initiative*, this project was based on a fruitful partnership with the Strasbourg Academy of Fine Arts (HEAR), an institution of higher education, the Faculty of Life sciences and the botanic garden team. Sixteen plants present in the botanic garden that illustrate the six elements of the curriculum were selected. A steering committee composed of experts in botany and scientific mediation, educational advisers of the HEAR, Regional Educational Inspectors and teachers carried out some original and innovative research which is described in two phases.

The first phase (October 2015 to January 2016) was called 'Innovation' and involved setting up a laboratory of ideas with the students, teachers of the visual didactics workshop (HEAR) and the botanic garden team. Having been provided with the necessary botanical and scientific information, three groups of students developed three game patterns to help others understand speciation, domestication and polyploidization. This was undertaken under the supervision of Charlet Denner. At the same time, seven other groups of students were asked to imagine different scenarios and interpretation systems, this session invited twelfth graders to identify and document the sixteen plants to be studied. Innovative devices emerged from this phase of research. For example 'telescopes' allow specific parts of plants to be targeted. 'Totems' invite the visitor to discover eight remarkable trees of the garden by presenting information on two levels: the top displays information for adults (area, name, uses...) and the bottom for children. 'The Deconstructed Herbarium' is a file with botanical boards and vocabulary, coupled with information plans within the collection and a map. The latter, designed by Julie Escoriza and Pauline Laudet, has been selected to serve as an educational tool in the next phase of the project.

The second phase (January 2016 to June 2016), called 'Production' was delivered under the leadership of Sandra Willauer, a designer of didactic contents, and the botanic garden team. It involved manufacturing the devices identified in the first phase. A lively, scientific school workshop was carried out; this workshop was innovative in its approach to plant biology learning and its use of living plants collections. Various tools were developed. These tools were used to guide pupils in their learning and invite them to answer a whole set of questions on plant biology. Several game patterns were also assembled by Paul Viala and Yves Gergereau. Each with a focus on a specific part of the curriculum:





↑ Resources used while developing the play patterns ©Laura Asther



↑ The students presenting 'telescopes', an interpretation system imagined during the 'innovation' phase which allow specific parts of plants to be targeted ©Laura Asther

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- 'The corn tamers' is based on a ten-level labyrinth which symbolizes the slow domestication of the corn *Zea mays* ssp. The student has to manipulate a tray in order to make a ball roll through crossing points which light up once crossed. It represents the acquisition through time of features of interest. (Design: Guillaume Clausolles, Léon Delage, Manon Galvier and Martial Obry)
- 'Do you know how to cross cabbages?' is based on a matching game and looks at three species of cabbage. The aim of this game is to understand the mechanism of polyploidization and obtain a fertile hybrid from two parents from different species. (Design: Coline Aubert, Caroline Gauthier, Pierre-Baptiste Harrivelle and Claire Martha).
- 'Can birds of a different feather flock together?' asks pupils to propose a speciation scenario for two palm tree species from Lord Howe Island, *Howea forsteriana* and *Howea belmoreana*. (Design: Tanguy Chêne, Armelle Exposito, Camille Fiore and Alice Noulin).

The 'arlequinade' file illustrated by botanical boards, is a document that the pupils used to answer the questions of the survey (also developed as part of the second phase workshop). It provided a written record of their work. This individual tool was also useful for the teacher to assess what the scientific twelfth graders had understood and memorized from the educational process.



↑ The students presenting 'The Deconstructed Herbarium', an interpretation system in the form of a file with botanical illustrations and vocabulary ©Laura Asther

★ Experiments carried out by the pilot group in September, 2016 ©Laura Asther



✤ Experiments carried out by the pilot group in September, 2016 ©Laura Asther

A lively, scientific school workshop was carried out; this workshop was innovative in its approach to plant biology learning and its use of living plants collections Back in class, the pupils can use the website www.cote-cours.unistra.fr, designed by the web designer Nathanaël Tardif and the botanic garden team, to verify their answers and to complement their knowledge.

Six groups have already been through the 'Coté Cours - learn differently at the botanic garden' process and gave very positive feedback. The graphic quality of the documents, the ability of the models to be manipulated, the educational progress and the intuitiveness of the products have been appreciated by the pupils and offered them a comfortable environment in which to learn.

In addition, the school workshop has received a lot of interest from science teachers: more than thirty have already made a reservation for 2017.

This method of research through action is innovative and new in France; it was presented during the conference of the Technical Days of Education organized from 21st to 23rd March 2017 by the Botanical Gardens of France and French-speaking Countries (JBF), which took place in the Botanic Garden Meise in Belgium.

ACTORS IN THE PROJECT

Botanic garden - Faculty of Science of the Life / University of Strasbourg

Direction: François Gauer, Jacky de Montigny, François Labolle & Rachel Blessig,

Conception & realization: Laura Asther, Christophe Gass & Frédéric Tournay.

High School of the Arts of the Rhine (HEAR)

Direction: Olivier Poncer, Sandra Chamaret & Olivier-Marc Nadel, Conception & realization: Sandra Willauer & Nathanaël Tardif with the students: Julie Escoriza, Pauline Laudet,

Models: Charlet Denner, Paul Viala & Yves Gergereau and the students: Coline Aubert, Tanguy Chêne, Guillaume Clausolles, Léon Delage, Armelle Exposito, Camille Fiore, Manon Galvier, Caroline Gauthier, Pierre-Baptiste Harrivelle, Claire Martha, Alice Noulin & Martial Obry.

Academy of Strasbourg

Christophe Laville & Barbara Gless.



↑ Experiments carried out by the pilot group in September, 2016 ©Laura Asther



↑ The students presenting 'totems', an interpretation system they developed which invite the visitor to discover eight remarkable trees of the botanic garden by presenting informations according to two levels of reading: for adults (area, name, uses...) and for children (pictures) ©Laura Asther

Tools and files are used to guide pupils in their learning and invite them to answer a whole set of questions on plant biology



↑ 'The tamers of corn' is based on a system of labyrinth at ten levels which symbolizes the slow domestication of the corn Zea mays ssp. ©Laura Asther

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GROW FOR IT! YOUTH ENGAGEMENT THROUGH WILD FLOWERS



Tim Owen of Grow Wild discusses how the Royal Botanic Gardens, Kew has utilised an established youth work approach to engage young people in transforming communal spaces and enhancing their local environment with UK native wild flowers and plants. The article includes the thoughts and views of a young participant and outlines how Grow Wild has enabled young people to develop new skills, gain confidence and become active members of their communities.

HOW DOES A CAMPAIGN LED BY A BOTANIC GARDEN AND FOCUSED ON WILD FLOWERS, ENGAGE AND ENTHUSE YOUNG PEOPLE TO TAKE ACTION?

his was the challenge faced by Royal Botanic Gardens, Kew when it set about launching 'Grow Wild' (the UK's biggest ever wild flower campaign) four years ago.

Supported by the Big Lottery Fund (one of the funding arms of the UK's National Lottery), Grow Wild set out to put people aged 12-25 at the centre of everything it did. The challenge was to ensure young people were in the driving seat, for them to be integral, rather than passive bystanders... So, how did we do this?

↑ Young people create urban meadow spaces in the heart of their community ©Royal Botanic Gardens, Kew

A major objective of Grow Wild is to reach the unengaged; those young people who don't give much thought to environmental issues and are disconnected from the natural world.

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The Art of Youth Work by Kerry Young (1999, p.22) identifies four principles that form a coherent and consistent approach to working with young people. She suggests that at its core, youth work focusses on a commitment to the personal development of young people and encourages autonomous, free and informed decision making. However, it is the two further elements of the approach that Young identifies, that have a strong influence on Grow Wild – that of (1) "active participation" of young people' through (2) "critical involvement in their community and society".

For Grow Wild to truly meet its challenge, it was essential for young people to be given the opportunity to be the active participants that Young described. Grow Wild's 'Grow for It' youth funding element embodies this desire by involving young people at every stage of its design and delivery.

Grow for It offers young people the opportunity to apply for £500 to deliver a creative (arts based) or transformation (of a communal space) project. In addition, a panel of young people are involved in both the design of the funding and the opportunity to select the projects to be funded. In 2017, this panel will also support Kew's independent evaluation of the Grow for It funding.

To understand the importance of involving young people in programmes, who better to ask than a participant? Christian Webb is a member of Youth Cymru (a youth participation organisation in Wales), and has been involved with Grow Wild almost since its inception. During this time, he has participated in several panels and represented Grow Wild in radio interviews and in short films.

I asked Christian his thoughts on Grow Wild's call to action. Put simply, this is to encourage people to sow and grow native wild flower seeds, create habitats for UK native plant species and, as important, share their stories and experiences with others. He said:

"What helps is that this simple message and call to action is broad...[It] can mean doing some planting on a patch of land, transforming a community space, or running an arts and drama project. The simplicity of the call to action allows for multiple interpretations and for young people to use their imagination to connect communities." ↑ A young person captures an image of the vibrant wild flower display near his home in Cwmbran, South Wales ©Royal Botanic Gardens, Kew

For Grow Wild to truly meet its challenge, it was essential for young people to be given the opportunity to be the active participants that Young (1999, 12) described.



↑ Young people in Newry, Northern Ireland preparing to transform the alleyway next to their youth centre with wild flower themed artwork ©Royal Botanic Gardens, Kew

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With such a simple approach, I asked Christian why it is so important to ensure young peoples' engagement in all aspects of Grow Wild. He said that young people should not just be part of doing the project, but also part of:

"the planning, the co-ordinating, and the evaluation. Not only will this be more sustainable, but young people will also see the added benefit for themselves by developing a wealth of new skills, from communication to project management."

A major objective of Grow Wild is to reach the unengaged; those young people who don't give much thought to environmental issues and are disconnected from the natural world. How important did Christian feel this was?

"We hear a lot about how young people are retreating indoors... There is an opportunity, however, to use new technological advances to connect young people with the natural world... Imagine going to a botanical garden and using your smartphone to overlay information about different species of flowers and plants! So although there may be a trend of young people retreating indoors, there are also opportunities to create a long-lasting relationship between young people and the natural world."

Not all young people have access to beautiful gardens and wild areas. Therefore, Grow Wild takes its message to the places where people live and encourages positive change there. How valuable is that for young people?

"Grow Wild is... allowing them to take an active role in developing their communities. With young people at the heart of these projects, an increased sense of ownership and community empowerment can develop. We've already heard from young people who say that they've seen less littering and vandalism in the spaces they've transformed, and that's down to the shared endeavour to [change] spaces for the benefit of the community."

← A youth panel meets at Kew to design the Grow for It funding criteria in 2016 ©Royal Botanic Gardens, Kew

'We got the chance to go out and visit the youth projects and the young people involved in delivering them: from a theatre company teaching young people about biodiversity, to a bunch of younger children changing their community garden. We were incredibly impressed with the diversity of the projects and the passion of the young people involved in transforming their community spaces.' Christian Webb, Youth Cymru

"...the development of young people's values and the 'sort of people' they are to become is, and always has been, a fundamental feature of youth work..." Young, K (1999, p.10)



↑ A marker post reminding people to look out for the wild flowers ©Royal Botanic Gardens, Kew



The impact of Grow Wild on young people has been significant. We know that 700,000 young people have been involved online, helping to spread the word. We also know that more than 330,000 young people have received our seeds Packets; sowing and growing wild flowers in their schools, youth centres and community spaces.

However, some of the deepest impacts have been with the 116 young people that have been recipients of Grow for It funding. Alongside their friends who have also taken part and the panel members who are the creative force behind the process, these young people – who took on the roles of project leaders – have led engagement that has positively impacted on the lives of other people.

Whether it has been a simple transformation of an unloved garden space or the writing of a new educational play for younger children, these young people continue to be inspirational actors for the environment in their communities. I believe that Christian sums this up best:

"It's been hugely rewarding going out to the youth projects and seeing the impact this is having not only on communities at large, but also on individual young people. Seeing them grow in confidence, develop new skills, and lead in their communities, is a truly humbling experience."

In spring 2017 the Grow Wild youth panel awarded funds for another 42 Grow For It projects. Find out more about these projects and other ways in which young people are involved at **www.growwilduk.com** and contact Tim Owen to discuss and explore future partnership opportunities with Grow Wild.

★ Young people exploring the wonders of The Cornfield in Coleraine, Northern Ireland ©Royal Botanic Gardens, Kew

REFERENCE

➔ Young, K. 1999. The Art of Youth Work. UK: Russell House Publishing

AUTHOR

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TWENTY YEARS OF THE RSPB PHOENIX FORUM



THE RSPB PHOENIX FORUM

SPB Phoenix is the teenage membership of the RSPB. There are currently over 57,000 Phoenix members aged 13-18. RSPB Phoenix was first introduced in 1995.

As an RSPB Phoenix member you receive Wingbeat – the only environmental magazine written by teenagers for teenagers - four times a year. As well as articles about wildlife, the environment and conservation, Wingbeat runs many special offers and competitions. You also have free entry to RSPB nature reserves.

Each year, a conservation weekend is held for Phoenix members. It's been held in London where we had the chance to visit Westminster, Leighton Moss in Lancashire one of our most important nature reserves and Minsmere reserve on the Suffolk coast, to name but a few locations.

BEGINNINGS

In 1996, someone within the then RSPB Youth and Education Department came up with the idea that young people should have more of a say in how the teenage membership of the RSPB was being run. Radical, right?

After much deliberation and numerous get-togethers with fellow staff members and young people, it was decided that a selection of the teenage membership should form a kind of council to meet with us 'olds' to help us direct the style and pace of the teenage membership package, write articles for Wingbeat, and attend external events where the presence of a passionate young person was far more preferable to that of a staff member. The RSPB Phoenix Forum was created in 1997, and has been going strong ever since. Youth Officer Tony Garrett shares the history of the RSPB Phoenix Forum and what its members have achieved over the years.

us to do during day Shaeon's get quistus Take photos Check contact dehul RSPB PHOENIX FORUM - INAUGURAL (FIRST) MEETING SATURDAY 25TH OCTOBER 1997 THE LODGE, SANDY, BEDS., RSPB Phoenix Forum TEX et al . COME (TEA AND RECEISE 1845 INTRODUCTIONS 11.15 THE RSPB PHOENIX FO Where the Forum fits wi mn Each The role of You as vol eum s for the RSPE 12.00 PHOTOCALL 12.15 LUNCE (We'll provide the 1:00 ACTIVITIES DISCUSSION TOUR OF YOUTH UNIT AND COMMUNICATION CLOSE EXAMINATION OF WINGBEAY What do you like and dislike? Competition TEA) DISCUSSION - YOU AND THE PORUM ALL 7.45 THE FINAL DETAILS Sharen Eastwood of plant and a plant with a share but all contrad defails of plant 4.00 RSPB Phoenix is for teenage members of The Royal Society for the Protection of B



↑ Top: The first Forum agenda (1997) ©RSPB

↑ Above: The original Forum in 1997 ©RSPB

↑ Top left:Tree planting ©RSPB



↑ Forum member, Leanne, in Brussels

The first meeting took place at the RSPB Headquarters in Sandy, in October 1997. I can still clearly see the faces of the first 10 nervous teenage members of the Forum as if it were yesterday.

Today, our Chief Executive Mike Clarke values the work of the Forum; and you can see from the agenda that this was no different in 1997. The then CEO of the RSPB Barbara Young (now Baroness Young of Old Scone) came along to meet the first Forum.

THE FORUM IN ACTION

The Forum has always been an integral part of our activities for younger children at the annual bird conservation event, The British Birdwatching Fair. Over the three-day event, they have helped man the marquee where facepainting, badge-making, mini-beast safaris and bug hunts are held. They have also rubbed shoulders with celebrities.

In the 20 years since its foundation, the Forum has also given numerous talks and interviews, written many articles for Wingbeat and our website, and are currently involved in a project with our Chief Executive, Mike Clarke, looking at how young people can become more integrated into the decision-making process of the RSPB.

From a personal point of view, I have enjoyed watching these young people develop into outgoing, confident young men and women. Some have gone on to be doctors, teachers, lawyers, environmentalists, researchers and a political reporter for the BBC, and some are Mums and Dads themselves now, too.

The last 20 years have been a blast, and I'm sure the RSPB Phoenix Forum will go on to do bigger and better things in the future.

DEDICATED MEMBERS

In the lifetime of the Forum we have had 74 different teenagers representing their peers (36 boys and 38 girls) and they have come from every corner of the UK. I vividly remember one teenager who lived in Thurso, which is as close to falling off the tip of Scotland as you can get, who used to set off for a Saturday meeting on Friday lunchtime. He would catch a coach to either Inverness or Aberdeen and fly down to Gatwick where he stayed with relatives. He would attend the meeting and go back to the relative's house the same night. On the Sunday morning he would head off to the airport and reverse the journey, sometimes not getting home until 10pm that evening! 2002: Two Forum members attended the Earth Summit in Johannesburg as representatives of the RSPB and UK youth. Jeff Knott and Hannah Grist spent eight days in the company of many world leaders talking about climate change. They also had the chance to do some practical conservation work while they were there.

2005: 30 teenage members of the RSPB, including Forum members,

went to Westminster. As well as meeting their own MPs, the teens had a 35 minute conversation with then Chancellor Gordon Brown. We have been back to Westminster since,



and an MP was heard to remark that he was more scared of being questioned by a teenager than by a fellow MP in the House of Commons

2015: The Forum were asked to provide two young people to represent the RSPB at the European Union Green Week in Brussels. Little did one of them know at the time that she would be asked to sit at the top table for the closing speeches!

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PIONEERS IN PUBLIC ENGAGEMENT HAZRA MOOSA'S STORY



Astute, enthusiastic and self-motivated are a few words to describe Hazra Moosa. Hazra is a keen 19 year old who is always exploring and hungry for adventure. She says "I volunteer at the alluring and captivating natural paradise, Durban Botanic Gardens." Volunteering at the garden offers Hazra the opportunity

to engage with people from all walks of life whilst she pursues a Law degree in the hope of becoming an environmental lawyer.

Hazra's passion for law and nature, a lethal combination has driven her to embark on this profession. Through the guidance of her mentors at Durban Botanic Gardens every day is a learning curve that helps her to grow from strength to strength.

Hazra's volunteering tasks entail facilitating a climate change game which aims to make learners aware of the harsh realities of the world in a fun, yet informative way. The game requires two teams with each player given a card related to climate change. Hazra then reads out a clue and the individual with the right card relevant to that clue identifies themselves and hands their card to the runner. The runner, representing the team, then places the card on an assigned chair. The team with the most cards wins. Learners are very enthusiastic and competitive. Hazra then goes on to explain what the card is about. The cards deal with four main aspects: thinking about climate change, what causes climate change, how climate change affects us and ways in which we can reduce it. Hazra emphasizes that being a winner of the game is a temporary win but gaining knowledge makes you a winner for life!

Hazra says that each volunteer at Durban Botanic Gardens makes a special contribution to the lives of many on a daily basis. People take nature and the environment for granted which is why the volunteers aim to teach them about the importance of nature and the environment and the consequences of human actions on them. Nelson Mandela once said: "Education is the most powerful weapon which you can use to change the world". Following in Nelson Mandela's footsteps, we use education as our weapon to save our environment.

Hazra goes on to say that volunteering at Durban Botanic Gardens is not just about trees and plants but rather about connecting with nature and discovering that humans and nature can co-exist in harmony; people just have to take time to appreciate nature as we are inter-dependent. Hazra is very passionate in all that she does and strongly believes that the more knowledge you gain, the more knowledge you should share. "Be the change that you want to see in the world by starting with yourself! You cannot change everything, but each person's little change amounts to a huge difference!" (Ghandi)



↑ ©Fuchs. 2017

REVIEW

BRIGHT THINGS -GREAT RESOURCES

CLASSROOM WALLCHARTS FROM THE BRITISH ECOLOGICAL SOCIETY

The British Ecological Society (BES) has produced a series of wallcharts for use in the classroom which are free of charge on request. Altogether there are 5 wallcharts, four focussing on the ecological aspects of different habitats – urban ecology, freshwater ecology, ocean ecology and hedgerows. The fifth wallchart discusses climate change. The wallcharts are concisely laid out and are both colourful and packed with information. Two of these wallcharts, Freshwater Ecology and Hedgerows have lesson plans that build on the information in the chart.

The Urban Ecology chart includes such items as brief pros and cons of common species in the urban landscape (such as foxes and dandelions), dispels some common urban myths about biodiversity and provides insight into how individuals or communities can enhance the urban landscape. The Climate Change wallchart explores how understanding past changes in habitats and biodiversity through climate change can help inform us about the future impact and help us mitigate against that. The wallchart illuminates how fire in the fossil record, seen in layers of charcoal, informs us about wildfires and vegetation regeneration in the past; also how the pollen found in our soil and rock layers can tell us much about what plants were growing at specific geological periods and where they were prolific as well as when certain species became extinct! Brief descriptions of climate change case studies and notes on how research supports our understanding of climate change and its impact on biodiversity provide useful starter material for debate and discussion or further research by students.

There is not a lot of accessible resource material on hedgerow ecology for students and so this chart is useful for both teacher and student – particularly as hedgerows are often found close to schools and colleges and can be easily accessed for fieldwork or class investigations. The chart describes the different types of hedges and the diversity of species that can be found in them. Using this to explore life cycles of the species held within the hedgerow complex and how species interact offers an excellent opportunity for observation and recording ecological change.



The last two charts deal with water based ecosystems. The Freshwater Ecology wallchart explores how this ecosystem impacts on our lives and what can be found in rivers, lakes and streams. Understanding how we need to manage our water and what the impact of too little or too much has offers opportunities to start a discussion on sustainability and water conservation. Planet Ocean demonstrates the diversity of life below the ocean waves.

These wallcharts can be ordered from the BES main office, however, as there is high demand for them, you cannot order more than two copies of each. More information on how to do this can be found on the website: http://www.britishecologicalsociety.org/learning-andresources/learning-resources/classroom-wallcharts/

BES also provide a number of other resources for secondary schools, including In2science, a resource for A- level students who wish to follow an ecological career and events such as Enhancing Fieldwork Learning which focus on using digital technology in ecological learning programmes. Check out their website at http://www.britishecologicalsociety.org/

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RESOURCES

Students Engage with Scientists at 'Teen Science Cafes'

The Science Café has been used since the 1990s to engage adults with scientific research within an informal environment. This setting provides an opportunity for researchers to share and discuss their work directly with the public. This article in Education Week explores how the Science Café format can be adapted to cater specifically to a teenage audience.

http://www.edweek.org/ew/articles/2016 /12/14/students-engage-with-scientistsat-teen-science.html



©Edward Linsmier/Education Week

Kew Wakehurst Key Stage 4 School Visit Programme

The Royal Botanic Gardens Kew at Wakehurst runs a programme for KS4 students (age14-16). Their website details a typical programme for a KS4 visit day, and also includes information on the various activities and workshops on offer including Grassland and Woodland Biology, Design and Photography and Applied Science.

http://www.kew.org/visit-wakehurst/ schools/more?field_key_stage_tid=2226





Science and Plants for Schools

Science and Plants for Schools (SAPs) was set up in 1990 with core-funding from the Gatsby Charitable Foundation. The site contains resources created by teachers and scientists for use at both primary and secondary level that aim to make learning about the plant sciences exciting. The resources include worksheets, videos and practical activities. Topics cover the full range of the plant sciences.

http://www.saps.org.uk

North Carolina Museum of Natural Sciences Outreach for Teens

The museum runs a programme of outreach events specifically targeted at teenagers and their website provides details. Many of these could be adapted to a botanic garden setting. Of particular interest is the Junior Curators programme which engages young people with the work of the museum through seminars, interaction with scientists and volunteering at events.

http://naturalsciences.org/learn/teens



A Handbook for Youth Programmes in Science Centres and Museums

This handbook was produced by the Association of Science-Technology Centers. It contains practical tools and guidance for designing programmes for teenagers within museums, including '12 Rules for Working With Teens' (page 48).

http://www.astc.org/wpcontent/uploads/2014/11/Full-Doc.pdf

Research on Students and Museums: Looking more closely at the students in school groups

Published in Science Education, this review explores the value of educational visits to museums and how these visits can complement classroom learning. The study concludes that creating strong, continuous links between museums and schools can allow students to have more meaningful learning experiences.

http://www.billabbie.com/fieldtrips/2c_Gri ffin2003_StudentsandMuseums.pdf

Changing Young Lives: Engaging NEET young people in the natural environment

In 2011 the Department for Education reported that there were just under 1 million 16 – 24 years olds not in education, employment or training (NEETs) in England. The Changing Young Lives report by Natural England summarises seven projects that have engaged NEETs across England. The report highlights the common features that contributed towards their success including the use of practical activities and the importance of the young people involved having genuine influence.

file://bgcidc/home/liliana.derewnicka/Do cuments/Downloads/1612%20Natural% 20env%20and%20NEETs.pdf

Botanicum – a childrens botanical art book

This guide to plant life was developed by Kathy Willis, Director of Science at the Royal Botanic Gardens, Kew together with illustrator Katie Scott. The book introduces 8 - 12 year olds to some fantastic facts about plants through illustrations.

https://www.amazon.co.uk/Botanicum-Welcome-Museum-Kathy-Willis/dp/1783 703946



Learning Labs

Learning Labs is an innovative new model regularly used in museums and community organisations to engage young people with new ideas, tools and technologies. Whilst the model is currently used within museums it has not yet been widely adopted by the botanic garden community. This book provides an overview of the Learning Labs model and practical information about setting up a Lab within your organisation.

https://books.google.co.uk/books?id=_J 5eCAAAQBAJ&printsec=frontcover&dq= engaging+teens+with+museums&hl=en& sa=X&ved=0ahUKEwi44KrBkZDSAhWm KMAKHVIMAc0Q6AEILTAD#v=onepage &q=engaging%20teens%20with%20mus eums&f=false



Museum Takeover Days

Takeover Day England, coordinated by Kids in Museums sees children and young people work alongside museum staff and volunteers for the day. The young people taking part take on meaningful roles and make a real contribution to the running of the museum. In November 2016 over 150 museums, castles, historic homes and heritage sites across England took part and hosted over 4,000 young people.

http://kidsinmuseums.org.uk/takeoverday/

Blogs written by teenagers that took part in the takeover day can be found here:

http://www.teensinmuseums.com/

Growing a Life

This book, written by Dr Illène Pevec, explores the influence of educational and community gardening projects on at-risk teens in the US. Through her research Dr Pevec suggests models for developing educational gardens that could be applied by those organizing community engagement projects within botanic gardens.

https://books.google.co.uk/books?id=NZ MkjgEACAAJ&dq=engaging+teens+with +plants&hl=en&sa=X&ved=0ahUKEwiUle -2kZDSAhUKJ8AKHSSzAxEQ6AEIJjAC



Illène Pevec, PhD



Students Michaela and Darrell harvest peppers at Bissel Gardens, The Bronx, New York ©Green Bronx Machine

CONTRIBUTE TO THE NEXT ISSUE OF ROOTS

HAVE YOU BEEN PART OF DEVELOPING A NEW EDUCATION PROGRAMME AT A GARDEN WHERE THERE WASN'T ONE BEFORE? OR DID YOUR ORGANISATION DECIDE TO SCRAP WHAT WAS THERE AND START AGAIN?

The next issue of Roots is all about starting from scratch. Designing a new education programme and putting it in place takes effort and strategy. We want to hear from botanic gardens, museums and Learning Outside the Classroom sites who have developed and established effective education programmes. How did you know where to start? What tools or approaches really helped you? What did you learn along the way that could be really helpful for other organisations?

We are currently looking for a variety of contributions including articles, education resources and and a profile of inspirational garden staff.

To see your work in the next issue of Roots get in touch by 31st May! Email: Liliana.derewnicka@bgci.org Website: www.bgci.org/public-engagement/roots/



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