

Botanic Gardens Conservation International Education Review

# roots

Volume 10 • Number 1 • April 2013

## Professional Development for Educators

Crossing borders, sharing knowledge

Learning on-line cuts the distance  
for Education for Sustainability

Driving educational change through association

Ideas sin fronteras: la influencia duradera de  
Congreso de Educación de BGCI



**BGCI**

*Plants for the Planet*

# International Diploma in Botanic Garden Education

## New course dates announced



Have you just started working for education in a botanic garden or are you an experienced educator looking for opportunities for professional development? Then why not join the next International Diploma in Botanic Garden Education?

Organised by BGCI and the Royal Botanic Gardens, Kew, this five week course aims to equip participants with the skills and strategies needed to communicate effectively with their varied audiences. By the end of the course, participants will have an understanding of all the aspects required to establish and develop further a learning programme for their site.

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### **Course dates: 12 May and 13 June**

For more information and to enroll on the course visit:  
[www.bgci.org/education/diplomacourseoutline/](http://www.bgci.org/education/diplomacourseoutline/)

- There are a limited number of scholarships available for delegates.
  - To download an application form please visit BGCI's website.
- Priority for scholarships will be given to participants coming from Commonwealth countries.

Participants from the 2012 International Diploma Course in Botanic Gardens Education said....

"The course was a great opportunity to get connected to people in other Botanic Gardens and BGCI. I cherish having had time to think about the 'big picture' and not just struggle with everyday problem solving."

"Networking was a great benefit from attending the course. I was able to discuss the daily challenges of education and organisational issues with other professionals and gained an inside view in other institutions."

"I value the most, the opportunity to have some time away to reflect on my work and refocus with some new ideas and insights which I put now in my practice!"

"Before I attended this course I introduced myself as an educator responsible for just students. I now feel that I am responsible for everybody and I should make them appreciate the world of plant and global issues."



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### Forthcoming Issue

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# First word

## A professionalism rooted in training and development

### ENGLISH

Maybe you're just starting out in botanic garden education, or perhaps you are a seasoned practitioner; either way you might regard professional development as a career imperative. After all, the educational landscape is constantly changing around us, regularly introducing new research and ideas, and keeping up-to-speed as we travel across it may appear axiomatic. Or so you'd be forgiven for thinking.

In everyday reality, however, the picture is rather different. Recent research from the Wellcome Trust, a global charitable foundation, reveals that, while there is a substantial body of academic literature addressing science in informal contexts, it is not read by practitioners. Instead, says the research, informal practitioners remain overly reliant on simplistic and sometimes outdated notions of learning and science. A more widespread and better understanding of the latest learning and systems of training is called for. For botanic garden educators, working as we do across many different levels of education – primary, secondary, adult, community – and several subject areas (environment, science, botany) this is a herculean challenge!

It's not helped, either, because botanic garden education is a specialised field in its own right. While plants are the focus of study, the learning itself usually takes place outside and is experiential. And this exposes a worrying conundrum: while educators may be able to update their theoretical knowledge through reading educational research, very few practical training

### FRANÇAIS

Peut-être débutez-vous en matière d'éducation dans les jardins botaniques, ou êtes-vous déjà un praticien expérimenté. Dans les deux cas, une évolution professionnelle peut vous paraître nécessaire au cours de votre carrière. Il est vrai que le paysage éducatif change constamment autour de nous, tout en apportant régulièrement de nouveaux éléments de recherche et de nouvelles idées : nous maintenir à niveau lorsque nous le traversons peut sembler une évidence. Du moins, vous seriez pardonné d'envisager les choses sous cet angle.

Dans la réalité du quotidien, cependant, le tableau est assez différent. Les recherches réalisées récemment par le Wellcome Trust, une fondation caritative mondiale, révèlent que, bien qu'il existe une masse importante de publications universitaires abordant les sciences dans des contextes informels, celles-ci ne sont pas lues par les praticiens. Les recherches stipulent qu'au contraire, les praticiens informels se reposent excessivement sur des notions simplistes et parfois obsolètes de l'apprentissage et des sciences. Une meilleure compréhension plus généralisée des apprentissages et des systèmes de formation les plus récents s'impose. Pour les animateurs des jardins botaniques, dont le travail couvre différents niveaux éducatifs (primaire, secondaire, adulte, communautaire) et divers domaines (environnement, sciences, botanique), il s'agit d'une tâche herculéenne ! Ce travail ne bénéficie pas non plus de soutien, car l'éducation dans les jardins botaniques est un domaine spécialisé à part entière. Alors que les plantes y constituent l'axe de toute étude, l'apprentissage en tant que tel a généralement lieu à l'extérieur et est

### ESPAÑOL

Tal vez seas de los que apenas se inician como educador(a) en los jardines botánicos, o quizá ya seas un experto practicante. Cualquiera que sea la situación, es apremiante poner la mirada en el desarrollo profesional en esta materia. Después de todo, el escenario educativo está continuamente cambiando, partiendo de investigaciones e incorporando nuevas ideas, por lo que mantenernos a esa velocidad aparece como algo evidente, sobre todo si no queremos dar la idea de que hemos olvidado pensar.

Sin embargo, en la realidad cotidiana la situación es un tanto diferente. Investigaciones recientes de la Fundación Wellcome Trust, fundación mundial de beneficencia, revelan que, si bien existe un sustancial conjunto de literatura académica que direcciona el quehacer científico en contextos no formales, ésta no es leída por quienes ejercen la profesión de educadores. En vez de ello, de acuerdo a la investigación, los educadores de espacios no formales se han resignado con nociones simplistas y a veces anticuadas sobre el aprendizaje y la ciencia. Se precisa un mayor y más extendido entendimiento de los sistemas de profesionalización y aprendizaje más actuales. Para los educadores de los jardines botánicos, trabajando como lo hacemos en los diferentes niveles educativos – primaria, secundaria, adultos, comunidades – así como diversas áreas temáticas – medio ambiente, ciencia, botánica – la tarea resulta titánica.

Tampoco ayuda el hecho de que la educación en los jardines botánicos ya es de por sí especializada. Si bien las plantas son el tema central de estudio, el



*Providing educational networking opportunities during the Association of Botanical Gardens in 2012 at Mainz Botanic Garden, Germany. (Jörg Ledderborg)*

courses are designed with botanic garden education in mind. All the while, with the growing and well documented disconnect between people and nature and the drive to achieve the targets of the Global Strategy for Plant Conservation, the argument for botanic gardens to scale up their educational activities is compelling. There's no way around it: we need more botanic garden educators and they need the right sort of training.

This issue of *Roots* embraces the concept of professional development in its broadest sense and signposts the many paths through which botanic garden educators are able to develop professionally – from formal training, including on-line learning, to exploiting informal learning opportunities through networking, congresses and workshops.

In our first article, Costantino Bonomi and colleagues from the Museo delle Scienze, Trento in northern Italy, describe how *INQUIRE* courses in Italy have trained teachers and botanic garden educators in inquiry-based science education (IBSE). The courses have laid the foundation for developing a Community of Practice designed to link schools, museums and botanic gardens.

The highly regarded International Diploma in Botanic Garden Education (IDBGE), jointly organised by RBG Kew and BGCI, remains a benchmark for the

empirique. Ainsi se pose une énigme inquiétante : bien que les animateurs soient en mesure de mettre à jour leurs connaissances théoriques par la lecture de publications issues de la recherche dans le domaine pédagogique, très peu de formations pratiques sont conçues de manière à prendre en compte l'éducation dans les jardins botaniques. À tout moment, compte tenu du fossé grandissant et bien documenté entre l'homme et la nature, et des efforts pour atteindre les objectifs de la Stratégie mondiale pour la conservation des plantes, l'argument pour que les jardins botaniques augmentent leurs activités pédagogiques est irréfutable. Il n'y a pas d'autre solution : nous avons besoin de plus d'animateurs de jardins botaniques et ils ont besoin de formation ad hoc.

Ce numéro de *Roots* couvre le concept d'évolution professionnelle au sens le plus large et indique les nombreuses voies que les animateurs des jardins botaniques peuvent emprunter pour évoluer sur le plan professionnel : depuis la formation formelle, notamment l'apprentissage en ligne, jusqu'à l'exploitation d'opportunités de formations informelles par la mise en réseau, les congrès et les ateliers.

Dans notre premier article, Costantino Bonomi et ses collègues du Museo delle Scienze de Trento dans le nord de l'Italie décrivent comment les cours *INQUIRE* en Italie ont formé les enseignants et les animateurs des jardins botaniques à la démarche d'investigation dans l'enseignement des sciences (*DIES*). Les cours ont établi les bases de la mise en place d'une Communauté de pratique conçue pour mettre en lien les écoles, les musées et les jardins botaniques.

Le Diplôme international en éducation dans les jardins botaniques (IDBGE) hautement réputé, organisé conjointement par les Jardins botaniques royaux de Kew et le BGCI, reste un point de référence pour l'évolution professionnelle des animateurs des jardins botaniques, écrit Pat Griggs de Kew. Depuis sa création, en 1995, la formation diplômante aborde les conditions exigeantes, voire épuisantes selon certains, selon lesquelles les animateurs des jardins botaniques sont tenus de s'investir auprès de publics très diversifiés dans un très vaste domaine. Elle s'attache aux compétences et aux stratégies centrales nécessaires pour faire face à ces difficultés considérables.

aprendizaje tiene lugar al exterior y es vivencial. Ello expone un preocupante dilema: mientras que los educadores pueden actualizar su conocimiento teórico mediante la lectura de textos de investigación educativa, se diseñan muy pocos cursos prácticos de capacitación centrados en la educación en los jardines botánicos. Todo el tiempo, con la creciente y bien documentada ruptura entre la sociedad y la naturaleza, y la presión para alcanzar las metas de la Estrategia Global para la Conservación Vegetal, el razonamiento para que los educadores de los jardines botánicos aumenten proporcionalmente sus actividades educativas es apremiante. No hay vuelta atrás, necesitamos más educadores en los jardines botánicos con la formación adecuada.

Este número de *Roots* abarca el concepto de profesionalización en el más amplio sentido, y señala diversos caminos mediante los cuales los educadores de los jardines pueden desarrollarse profesionalmente, desde los programas formales, incluyendo la modalidad a distancia, hasta propuestas bajo la modalidad no formal explorando oportunidades de aprendizaje a través de redes de trabajo, congresos y talleres.

En el primer artículo, Costantino Bonomi y colaboradores del Museo de Ciencias en Trento, Italia, describen cómo los cursos en Italia basados en el cuestionamiento y la indagación han capacitado a docentes y educadores de los jardines botánicos con el método del aprendizaje basado en problemas (ABP). Los cursos aportaron los fundamentos para desarrollar una Comunidad de Prácticas diseñada para enlazar escuelas, museos y jardines botánicos.

El altamente posicionado Diplomado Internacional de Educación en Jardines Botánicos, organizado conjuntamente entre el Real Jardín Botánico de Kew y BGCI, permanece como un punto de referencia en los procesos de profesionalización de los educadores de los jardines botánicos, escribe Pat Griggs de Kew. Desde su inicio en 1995, dicho diplomado ha orientado de manera demandante, incluso a veces agotadora, las exigencias para que los educadores atraigan a una mayor diversidad de públicos con una amplia gama temática. El diplomado se centra en el desarrollo de herramientas y estrategias esenciales

professional development of botanic garden educators, writes Pat Griggs from Kew. From its inception 1995, the diploma course has addressed the demanding, some might say punishing, requirement for garden educators to engage very diverse audiences over a vast subject area. Its focus has been on the core skills and strategies necessary to tackle these considerable challenges. Given the IDBGE's longevity and the geographical spread of its students, it has potentially impacted on millions of botanic garden visitors around the world. In this respect it is meeting its Target 14 obligations under the Global Strategy for Plant Conservation, by highlighting the importance of plant diversity and conservation and their incorporation into botanic gardens' communication, education and public awareness programmes.

The Gardens without Borders project is a decade long, professional development collaboration involving the Minnesota Landscape Arboretum and partners in Russia and Estonia. Minnesota's Peter Olin and Yuri Naumtsev from Tver Botanic Garden in Russia maintain that co-operation between well established gardens, and others that are underfunded but working hard to connect with and educate their communities on the importance of plant conservation, should be central to the mission of all major gardens. Bringing smaller, under-resourced gardens into the international educational fold is important, they argue, to advancing plant conservation world-wide. Joint conferences, staff exchanges, joint projects and some external funding are all part of the professional development mix.

For over 20 years, BGCI's International Congresses on Education have provided a unique forum for educators around the world to meet and exchange learning and ideas. Last year the congress convened in Mexico, its first visit to Latin America. Here Linda Balcázar and colleagues from UNAM Botanic Garden in Mexico City describe how BGCI's congresses have influenced the development of UNAM's education programmes, both within the garden and in urban and rural areas, and, further afield, how they have impacted at a national and even continental level.

Compte tenu de la longue durée de l'IDBGE et de la répartition géographique de ses étudiants, celui-ci a potentiellement eu un impact sur des millions de visiteurs de jardins botaniques dans le monde. A cet égard, il remplit ses obligations quant à l'Objectif 14 de la Stratégie mondiale pour la conservation des plantes, en soulignant l'importance de la diversité et de la conservation des plantes ainsi que leur intégration aux programmes de communication, d'éducation et de sensibilisation du public mis en place par les jardins botaniques.

Le projet des Jardins sans frontières est une collaboration pour l'évolution professionnelle qui implique, sur 10 ans, l'Arboretum paysager du Minnesota et des partenaires en Russie et en Estonie. Peter Olin de l'Arboretum du Minnesota et Yuri Naumtsev du Jardin botanique de Tver en Russie affirment que la coopération entre les jardins botaniques bien établis et les jardins en manque de fonds, qui œuvrent cependant pour créer un lien avec leurs communautés et pour l'éducation de celles-ci sur l'importance de la conservation des plantes, doit constituer un élément central des missions de tous les grands jardins. Il est important de permettre aux petits jardins sous-financés de rejoindre la sphère pédagogique internationale, argumentent-ils, en vue de promouvoir la conservation des plantes au niveau mondial. Dans l'enveloppe de l'évolution professionnelle se mêlent conférences communes, échanges de personnel, projets communs et une part de financements extérieurs.

Depuis plus de 20 ans, les Congrès internationaux du BGCI sur l'éducation proposent un forum unique pour les animateurs sur le plan mondial, dans le but de se rencontrer et d'échanger sur les apprentissages et les idées. L'an dernier, le congrès a été organisé au Mexique, sa première visite en Amérique latine. Dans cet article, Linda Balcázar et ses collègues du Jardin botanique de l'UNAM à Mexico City décrivent comment les congrès du BGCI ont influencé le développement des programmes pédagogiques de l'UNAM, à la fois dans le jardin et dans les zones urbaines et rurales, et au-delà, comment ils ont eu un impact au niveau national et même continental.

L'Association germanophone des jardins botaniques orchestre un groupe de travail dynamique en matière d'éducation, qui

necesarias para abordar los considerables retos educativos de los JB. Dada la continuidad y procedencia geográfica de los participantes, el diplomado potencialmente ha impactado a millones de visitantes de los jardines alrededor del mundo. A este respecto, está respondiendo a la Meta 14 de la Estrategia Global de Conservación Vegetal, resaltando la importancia de la conservación de la diversidad vegetal incorporándola en los programas de comunicación, educación y concientización de los jardines botánicos.

Desde hace una década, el proyecto Jardines sin Fronteras involucra una colaboración de desarrollo profesional entre el Arboretum Paisajes de Minnesota con sus contrapartes en Rusia y Estonia. Peter Olin de Minnesota y Yuri Naumtsev del Jardín Botánico de Tver en Rusia, mantienen esta colaboración con jardines botánicos consolidados y con otros de financiamiento limitado pero que realizan un trabajo fuerte para reconectar y educar a sus comunidades sobre la importancia de la conservación de las plantas, lo cual debería ser central en la misión de los principales jardines. Los autores argumentan que incorporar y acomodar a los jardines pequeños o de escasos recursos en los fines educativos internacionales es importante para avanzar en la conservación de las plantas a nivel mundial. Reuniones conjuntas, intercambio de personal, proyectos colaborativos y financiamiento externo forman parte de esta mezcla de desarrollo profesional.

Por más de 20 años, el Congreso Internacional de Educación en Jardines Botánicos de BGCI, ha sido un excelente foro para que los educadores de todo el mundo se reúnan e intercambien aprendizajes e ideas. El año pasado el congreso tuvo lugar por primera vez en América Latina específicamente en México. En esta contribución, Linda Balcázar y sus colaboradores del Jardín Botánico del Instituto de Biología de la UNAM en la ciudad de México, describen como el congreso ha impactado en el desarrollo de los programas educativos de la UNAM, tanto dentro del Jardín como en áreas urbanas y rurales y más allá, a nivel nacional y del continente americano.

La Asociación de Jardines Botánicos Germano Parlantes opera un activo grupo que apoya el trabajo educativo de los

The German speaking Association of Botanic Gardens operates an active education working group that supports the educational work of German speaking gardens and provides networking opportunities for garden educators. Jörg Ledderbogen, from Schulbiologisches Zentrum Hannover, outlines how best practice and ideas are shared, advanced training is coordinated and new developments, such as Green Schools, are supported.

And from the University of Delaware in the US, we hear from Sara Levin Stevenson who offers us a student perspective on the Longwood Graduate Programme (LGP) in Public Horticulture, a well-established, Masters-level training programme renowned for providing future leaders of public gardens.

Finally we have news of the first ever international site-based distance learning course on Education for Sustainability. When it comes to developing and delivering education programmes, most outdoor sites share common challenges – understanding audiences, for example, or developing conservation messages, deciding on learning activities and theories, planning educational activities, selecting effective interpretation media and working through ethical dilemmas. To address these challenges, a consortium of international organisations that includes BGCI and London South Bank University (LSBU) have established the Education for Sustainability course.

Although small in numbers on a global scale, our profession occupies a strategically important niche in the world of environmental sustainability. Sitting at the interface between our gardens and our local communities we have a responsibility, therefore, to engage with these communities equipped with the best and most up-to-date professional skills and knowledge available. We have to move away from the amateurism and, whisper it gently, complacency anatomised by the Wellcome Foundation's report towards a professionalism anchored in the highest standards of training and development.

**Julia Willison**

soutient le travail pédagogique des jardins germanophones et propose des opportunités de mise en réseau aux animateurs des jardins botaniques. Jörg Ledderbogen du Schulbiologisches Zentrum Hannover présente la manière de partager les meilleures pratiques et les meilleures idées, de coordonner les formations supérieures et de soutenir les nouvelles initiatives, telles que les Ecoles vertes.

De l'Université de Delaware, aux Etats-Unis, nous vient l'article de Sara Levin Stevenson qui nous propose un regard d'étudiant sur le Programme universitaire de Longwood (LGP) en Horticulture dans le domaine public, un programme de formation bien établi de niveau Master, reconnu pour sa préparation de futurs dirigeants de jardins publics.

Enfin, nous présentons des nouvelles de la toute première formation internationale sur site par correspondance sur l'Education pour le développement durable. Lorsqu'il s'agit d'élaborer et de réaliser des programmes pédagogiques, la plupart des sites de plein air sont confrontés aux mêmes défis : comprendre les publics, par exemple, ou élaborer des messages sur la conservation, décider d'activités et de théories d'apprentissage, planifier des activités pédagogiques, choisir des modes d'interprétation efficaces et travailler tout en traversant les dilemmes éthiques. Afin d'aborder ces défis, un consortium d'organisations internationales comprenant le BGCI et l'Université de South Bank de Londres (LSBU) a mis en place la formation en Education pour le développement durable.

Bien que les effectifs soient faibles à l'échelle mondiale, notre profession occupe une niche stratégiquement importante dans le cadre de la gestion durable de l'environnement. Siégeant à l'interface entre nos jardins botaniques et nos communautés locales, nous avons donc la responsabilité de collaborer avec ces communautés, dotés des compétences et des connaissances professionnelles les meilleures et les plus à jour disponibles. Il nous faut nous écarter de l'amateurisme et - murmurez-le avec douceur - de la suffisance disséquée dans le rapport de la Wellcome Foundation, pour nous tourner vers un professionnalisme ancré dans les critères de la plus haute qualité en matière de formation et de développement.

jardines de habla germana y ofrece oportunidades para trabajar en redes con educadores de otros jardines. Jörg Ledderbogen, de la Escuela de Biología Zentrum en Hannover, señala cómo las buenas prácticas e ideas se comparten, cómo coordinan y apoyan la capacitación actualizada y los nuevos desarrollos como el de Escuelas Verdes.

Y desde la Universidad de Delaware en los Estados Unidos, escuchamos a Sara Levin Stevenson quien nos presenta desde la perspectiva de los estudiantes, el programa de posgrado Longwood en Horticultura Pública, el cual es un programa de maestría consolidado y reconocido para la formación de futuros líderes para los jardines públicos.

Finalmente, tenemos noticias del primer sitio internacional del curso a distancia de Educación para la Sustentabilidad. Cuando tenemos que diseñar y desarrollar programas de educación en espacios al aire libre, generalmente compartimos los desafíos – la comprensión de nuestro público, por ejemplo, o bien el desarrollo de los mensajes de conservación, el optar por ciertas teorías o actividades de aprendizaje, planificación de las actividades educativas, la selección de los medios idóneos de interpretación y el trabajo a través de dilemas éticos. Para orientar dichos desafíos, un consorcio de organizaciones internacionales que incluye a BGCI y a la Universidad de Londres en South Bank creó el curso de Educación para la Sustentabilidad.

Si bien aún somos pocos educadores a una escala global, nuestra profesión ocupa un importante nicho estratégico en el mundo en materia de sustentabilidad ambiental. Ubicados en la inter fase entre nuestros jardines botánicos y sus comunidades locales, tenemos entonces la responsabilidad de involucrarnos con dichas comunidades equipados con los mejores y más actualizados conocimientos y herramientas profesionales disponibles hoy en día. Tenemos que dejar atrás nuestra inexperiencia, y susurrar suavemente la autosatisfacción que, siguiendo el informe de la Fundación Wellcome, nos lleve a una profesionalización anclada en los más altos estándares de la formación y desarrollo de nosotros mismos.

# INQUIRE in Italy

## posing the questions in science education

Italian botanic gardens are key partners in the pan-European INQUIRE project, currently promoting inquiry-based science education across the European Union. **Costantino Bonomi** and his colleagues from the Museo delle Scienze in Trento, describe how IBSE training is being pioneered in two northern Italian gardens with teachers from primary and secondary schools and botanic garden educators. Employing a range of workshop formats, including World Cafés, to encourage the take-up of IBSE, the gardens are building towards a Community of Practice that will involve schools, museums and gardens.



*Inquire has helped develop a thriving Community of Practice in northern Italy, which includes teachers and botanic garden educators. (MUSE)*

**B**otanic Gardens are ideal outdoor learning sites – here students take part in real-life interactions direct with nature, engaging with plants and their products, building knowledge and skills, investigating a plant or a particular aspect of it by looking at appearance, origin and function.

The INQUIRE training courses aim to build the capacity among teachers and botanic garden educators to deliver inquiry-based science education (IBSE) to pupils aged 9–14. During each course a good selection of materials, resources and case studies is presented to the participants to enable them to

appreciate the scope and objectives of IBSE methodology. They are then requested to develop their own IBSE activity, with the support of the tutors. The courses focus on key topics for sustainability in the twenty-first century, such as plant conservation and climate change. Here we describe how the courses were run in Italy and how the participants subsequently changed their educational practice.

### **Think like a scientist**

The INQUIRE course in Italy was entitled 'IBSE, think like a scientist!' and was run first in Trento at the science museum and in its two botanic gardens, Arco Arboretum and Viote Alpine Botanic



Garden, for the academic year 2011/12. The following year 2012/13 it was run in Bergamo, as a collaboration between the Botanic Garden and the School of Education of the University of Bergamo. Over the two-year period a total of 75 students attended, including primary and secondary school teachers and educators from botanic gardens, science museums and natural parks.

The course was structured in four modules. The first provided a background to IBSE theory and methodology, the second illustrated different case studies, allowing participants to take active part in four kinds of IBSE activity, and then critically reflect on how they were structured and realised, analysing the different stages of the methodology according to the 5E model (Engage, Explore, Explain, Elaborate, Evaluate) and identifying the level of inquiry that characterised the activities (confirmative, structured, guided or open). The third module used the 'World Café' discussion



*The INQUIRE training courses build capacity among teachers and educators to deliver inquiry-based science education (MUSE)*

format to encourage participants to find ideas for new activities, promoting a brainstorming discussion in small groups to facilitate selection of the topic, the choice of the level of inquiry and how to structure the activity into the five different IBSE stages.

In the fourth module each participant finalised his/her own IBSE activity, tried it out with an appropriate target group and evaluated its success, before submitting a final report. During the whole duration

of the course the work of each participant was observed by a colleague, providing a constant peer review. All participants were in fact paired, matching a teacher with an educator to incorporate different approaches and promote an enriching exchange from different perspectives.

The table below summarises the structure and content of the Italian version of the course, which included 30 contact hours and required approximately 30 further hours of individual study and experimentation.

Title of the module	MODULE 1 Theoretical basis of IBSE	MODULE 2 Case studies of IBSE	MODULE 3 Creative workshop	MODULE 4 Testing, reporting and evaluating
Total duration 60h	8h	12h	4h	16h
Content	Theory and practice of Inquiry-Based Science Education. Web clinic: introduction to the IT tools that support the project, i.e. the global website, the Italian Inquire forum, the freelist and the social media.	Demonstration and critical review of IBSE activities via case studies specifically selected to illustrate the four levels of inquiry: 'Plant at risk' as a confirmative inquiry; 'A new ski run' as structured inquiry, 'How many seeds' as guided inquiry and 'International vegetable gardens' as open inquiry. Parallel analysis of the IBSE steps using the 5E model.	Developing IBSE questioning. Brainstorming session to develop a new IBSE activity using the World Café format, suggesting topic ideas, selecting the level of inquiry and structuring the IBSE stages. Working in small groups, discussion and peer-review.	Evaluating IBSE lessons, introducing a selection of evaluation methods. Small group analysis and review of IBSE lesson plans developed by the course participants. Peer review, feedback and suggestions on the lesson plans. Trials with classes. Assisted evaluation of the effectiveness of the activities. Submission of the final report containing a description and assessment of the activity. Final feedback on the whole INQUIRE course with a world café workshop.
Who	External lecturers	MUSE Staff	MUSE Staff	Course participants and MUSE Staff

### SELF STUDY continuous (20h)

**Content:** self study and bibliographic research on IBSE. Contacts and interaction with other participants and tutors via email, e-forum and social media. Developing and structuring of the individual IBSE lesson plan to trial with their own class. Peer-review contacts and close interactions.



Peer review was a powerful tool to encourage critical reflection on the development of IBSE activities. (MUSE)

### What participants said

Formative and summative evaluation was carried out throughout the course taking advantage of many different techniques, including pre- and post-questionnaires, *ad hoc* interviews, direct observation during teaching using a specific observation sheet, analysis of the documents submitted during the course such as the final report on the lesson plan developed and used with the class, the course journal, the output of the course workshops and the World Café workshop as well as each participant's portfolio of evidence.

Analysis of all these data allowed us to draw solid conclusions on the impact of the course on the participants' teaching practice, confirming that they had developed new skills and abilities both personal and professional, and they were effectively using new methodologies to develop inquiry-centred lesson plans, improving the quality of learning and teaching. The World Café format in particular, was acclaimed as a very effective way to develop new ideas and exchange opinions on specific topics.

Here is a selection of feedback from the course participants:

“ I improved my method of teaching, by trying to offer educational activities in which the student learns and becomes the protagonist of the learning process. ”

“ The IBSE approach allowed me to reflect and to analyse in detail the activities proposed in the classroom, paying more attention to the phase of engagement and evaluation. ”

“ Becoming proficient in IBSE teaching should be considered a step by step process, involving abilities that you can acquire and apply gradually with time and adequate training. ”

“ The course reminded me that the correct role of a teacher in IBSE is to facilitate the learning process, asking questions rather than providing answers. ”

Overall we can conclude that the INQUIRE course was particularly appreciated by the participants because it offered the opportunity to study a methodology that was not well known in Italy, to analyse it in detail and to understand how the different stages of the process contribute to its final outcome using the 5E model. There was particular interest in the initial engagement stage, which is often neglected, but which we consider essential to create an emotional link with the topic being addressed, actively involving the students in the learning process and thereby promoting a real interest in science in young people.

The participants also appreciated support when developing their own IBSE activity. During the World Café session we provided the teachers with the format of the lesson plan and assistance in evaluation which helped facilitate the

“ The INQUIRE course helped me to clarify and strengthen my ideas and to become more confident in my actions. I gained more credibility with colleagues through developing and using IBSE. ”

“ The key impacts of the course on my teaching practice are:

- an increased attention to the students' engagement;
- a realisation of how important it is to include group work in teaching;
- a renewed awareness of the usefulness of continuous assessment. ”

creative process. The IBSE questioning activity which helps to develop teachers' questioning skills was also considered very useful in guiding practitioners to choose the relevant questions – the 'wh' questions that are best suited for investigation by the students, formulating a hypothesis, collecting data and finding evidence to support or falsify that hypothesis.

### Future relations

The continuous peer-review interaction was welcomed too, as an opportunity for an enriching exchange of experience and different points of view. In particular, during the development of the individual IBSE activity the educators were each paired with a teacher, allowing the educators to gain a deeper insight into the work of teaching and laying the foundations for better relations and improved interaction between schools, botanic gardens and museums.

All the resources used in the course and the all the activities developed by the participants can be found on the project forum at <http://inquire.italiaforum.net> (in Italian only); a selection of this material can also be found on the INQUIRE global website [www.inquirebotany.org](http://www.inquirebotany.org) also constant news and updates can be found on the Inquire Italia Facebook page and Twitter account.

## RÉSUMÉ

Cet article souligne les progrès effectués par les enseignants et les animateurs qui ont participé aux cours « INQUIRE » en Italie, illustrant ainsi combien ils ont changé, amélioré et adapté leurs pratiques d'enseignement pour y inclure la démarche d'investigation dans l'enseignement des sciences (DIES) et l'approche de l'investigation. Deux formations ont été réalisées en 2012, à Trente et à Bergame (nord de l'Italie), destinées à 75 praticiens enseignant dans des écoles primaires et secondaires. Les cours ont permis de fournir les outils nécessaires à la compréhension, la conception et l'évaluation des activités de la DIES. Des études de cas sélectionnées ont été présentées aux participants, ainsi encouragés à réfléchir sur la DIES, tout en évaluant ses différentes étapes en utilisant le modèle des 5E et en identifiant les niveaux d'investigation utilisés (confirmative, structurée, guidée, ouverte).



*Teachers during a workshop in Bergamo found the World Café format useful for developing new lesson plans and activities. (MUSE)*

Ils se sont ensuite livrés à un processus créatif en utilisant le format de l'atelier « World Café », pour faciliter le développement des activités de la DIES propres à chaque participant, dans le cadre d'une interaction constante et d'une inter-évaluation mutuelle. Cela a permis de poser les bases pour la mise en place d'une Communauté de pratique qui fait le lien entre les écoles, les musées et les jardins botaniques.

## RESUMEN

Este artículo hace hincapié en el progreso hecho por profesores y educadores que participaron en el curso de INQUIRE (PREGUNTA) en Italia, ilustrando como han cambiado, mejorado y adaptado en la práctica de la educación de la ciencia basada en una estrategia de preguntas (IBSE, siglas en inglés). En 2012 en Trento y Bergamo (norte de Italia) se llevaron a cabo dos cursos participando 75 encargados de la enseñanza de grupos para estudiantes de primaria y secundaria. Los cursos generaron herramientas necesarias para entender, designar y evaluar las actividades de IBSE. Se presentaron a los estudiantes casos estudio selectos y se les pidió reflexionar usando IBSE, para

evaluar los estados, se siguió un modelo 5E, que identifica los niveles de preguntas (corroboración, estructura, guía, abertura). De esta manera para facilitar el desarrollo de cada participante con su propia actividad IBSE, se les pidió hacerlo con un proceso creativo usando el formato de un taller de café mundial, con constante interacción y una revisión mutua al mismo nivel. Esto conforme los fundamentos para el desarrollo de una práctica de comunidad, la cual está uniendo escuelas, museos y jardines botánicos.

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# The International Diploma

## a benchmark for botanic garden education

### Recognising the need for professional development

Botanic gardens have a unique scope for educating people about their natural environment, the threats it faces and the action needed to conserve it. They are in a position to offer environmental education on topics such as sustainability, bridging other fields in sciences, arts, and social sciences. Plus they can reach many different audiences, from school children to politicians. So botanic garden educators need a very diverse range of skills at their disposal. In recognition of this, in 1995 the Royal Botanic Gardens, Kew and Botanic Gardens Conservation International (BGCI) set up the first course specifically designed to provide professional development for botanic garden educators: the International Diploma Course in Botanic Garden Education. To our knowledge, it remains the only course specifically designed for botanic garden educators being run today.

Since 1995, the course has run six times, attracting 65 students from 43 countries, representing local, regional and national botanic gardens and conservation organisations. The diverse backgrounds of the participants ensure that discussions are wide-ranging, whilst highlighting the fact that botanic garden educators everywhere face similar problems. Sharing their ideas for dealing with them gives rise to creative solutions adaptable for different sets of circumstances.

In 1995 BGCI and RBG Kew organised their first international diploma course in botanic garden education. Ever since, the IDBGE has offered garden educators a unique opportunity to develop the core skills and strategies that will enable them to engage with their audiences more effectively. As Kew's **Pat Griggs** reports, students from 43 countries have taken the diploma, potentially impacting on the learning experiences of millions of garden visitors.



*The diploma course employs a wide range of teaching methods. Here students are involved in an observational activity. (Kew)*



*Learning how to use story telling as a method for interpretation. (Kew)*

## Theory and practice

The course consists of two elements; first, five weeks of workshops, presentations and field trips, then a period of project development once students have returned home. While based at Kew, the students cover topics relating specifically to educational messages, including schools activities, visitor programmes, community engagement and interpretation, as well as areas more generally involved in project management such as fund-raising, audience development and international conservation legislation. Field trips include visits to the Eden Project, Oxford and Cambridge Botanic Gardens and Wakehurst Place, Kew's sister garden in Sussex.

At Kew, students begin to develop their ideas for a project covering issues or activities relevant to their home organisation. They discuss their chosen topic with the course managers from Kew and BGCI and contact other botanic garden educators for advice. Projects range from the development of an educational strategy to teacher training programmes and schools activities.

## Measuring outcomes

If we use the visitor numbers at all the botanic gardens, represented by students on the International Diploma course, to measure impact one can see that there is potential to influence several million people across the world.

## Project development

### Susan Morgan, Dallas Arboretum and Botanical Garden, BGE 2008

In 2008, as horticulture manager at the Dallas Arboretum and Botanical Garden in Texas, USA, I began thinking of a vocational training programme for resettled refugees, who at the time comprised several members of the arboretum's horticulture staff. This sparked my pursuance of the Botanic Garden Education course with RBG Kew and BGCI, where I hoped to hone my idea into something more feasible and engage in open dialogue with an international group of educators to broaden my world perspective for working with this culturally diverse audience.

On the course, I had the opportunity to work alongside other botanic garden professionals from five continents, hear guest speakers from a variety of disciplines including horticultural therapy, and visit top notch public gardens around England. Through various interactions and class assignments, I was able to better organize my thoughts and put them on paper. These writings were the foundation for a certificate programme in landscaping materials and techniques that this year sees its second class of students graduate – individuals originally from Afghanistan, Congo, Ethiopia, Iran, Iraq, Sudan, and the United States. This vocational training is part of a broader Therapeutic Horticulture program I launched at the arboretum in April 2012, in which over 1,000 attendees have since taken part, including young people and adults with developmental and physical disabilities and older adults with dementia. My experiences on the diploma course certainly enabled a seed idea to come to fruition, resulting in the development of the arboretum's Therapeutic Horticulture Program.

To provide a feel for how students from courses across the past 18 years have benefitted from studying the diploma course we asked them to share their personal experiences:

### Veronica Franco, Regional Botanic Garden 'Xiitbal neek' at the Centro de Investigación Científica de Yucatán (CICY), Mérida, Mexico, BGE 1995

I am a biologist but my passion is teaching, which became clear when I first started my environmental education (EE) activities in 1992, consisting mainly of guided tours and children's workshops. I may say that then I had no experience in teaching or dealing with school groups. Fortunately, in 1995 I was able to attend the first International Diploma in Botanic Gardens Education. The diploma motivated me to continue in the EE field. The course programme, its lectures, instructors and hands-on activities; meeting people from eleven different countries around the world who, like me, were starting education activities at their own organisations, all with different contexts, realities, possibilities, cultures – a rich diversity that contributed to a course full of techniques, knowledge and memorable moments that were crucial for my development as an educator.

I'm proud to say that the course engaged me firmly in EE. Eighteen years later, my work as an educator has continued to broaden and has attracted lots of commitment, not only in the education programme at our garden, but from the other educators in Mexican botanic gardens. As a result, the Mexican Association of BG (AMJB) organised four workshops from 2009 to 2011 (Martinez, L. et al., *Compromisos compartidos: hacia un plan de acción de educación ambiental en los Jardines Botánicos Mexicanos. Roots*, 2010, Vol 7(2) 5–8), and following this critical and reflective process we have issued the Botanic Garden Education 1995 Strategic Action plan for EE for Mexican Botanic Gardens (2012).

**Suma Tagadur Sureshchandra,  
Foundation for Revitalisation of  
Local Health Traditions, Bangalore,  
India, BGE 2006**

The course was very useful to me in developing needs-based education programmes for schools and households. For example: our 'neighbourhood medicinal plants of Bangalore city' programme for schools was carefully crafted to motivate people to appreciate their plant world and make them aware of its inseparable link to our medical heritage. This was part of the school extra-curricular activities. We linked up with the Kendriya Vidyalaya Sanghats network schools to reach out to thousands of students across Bangalore city.

The International Diploma course was comprehensive, well-structured and based on experiential-learning. We represented 10 countries and had lots to share. We visited several organisations, liaised with experts, there were case studies provided, and activities to do. It was easy to grasp and to replicate. My project work was all the more enjoyable and memorable, because I tried to design my own activities and tested them in my own garden with colleagues and students.

This course has enhanced my understanding of the concepts of environment education. Now, I perceive it as a process which aims at sensitisation and providing appropriate information that is both revealing and engages people to take action. Every time I design a session or an event, I make a conscious effort to do a needs-assessment, to focus on learning objectives and deliver a 'palatable' capsule programme. Since our garden contains the treasure of more than 1,200 medicinal plant species representing different vegetation, different medicine traditions, together with a huge variety of visitors, it is essential for me as an educator to be innovative and to deliver outreach programmes with little external input, using available resources within the organisation.



*Back home - Orlik Garcia putting into practice an educational activity learnt during the diploma course. (Clavijero Botanic Garden)*

**Orlik Gomez Garcia, Clavijero Botanic Garden, Xalapa, Mexico, BGE 2008**

The diploma course was a lifetime experience for me; having opportunities to share educational and practical experiences from eight different botanic gardens (from Venezuela to South Africa, from Kenya to Dallas), under the guidance of expert colleagues from RBG Kew and BGCI, was the most valuable aspect. Other gains included personal and professional networking, of course. The programme and activities were superb! The first-hand experiences and exercises are clearly designed to foster creativity. I liked all the course days because I could find new ideas in each one.

When I returned to Mexico, I put into practice many of those ideas, especially the interpretative system and at least two new exhibitions. Then in 2010 I moved from being botanic garden manager to being technical secretary of my institution, the next level up. The botanic garden was doing well and my colleagues took my ideas and built on them. Now we are busy renewing and updating the botanic garden master plan!

**Felicity Gaffney, National Botanic Garden, Glasnevin, Ireland, BGE 1998**

I found the course very stimulating. It was fabulous to be spending a month at Kew, seeing how it operates and getting the inside track on their approaches to education. As with all international groupings, it was very interesting to meet other people working in the field of botanic garden education as I did not have many contacts in the field at that time. I enjoyed many of the workshops and guest speakers. Looking back on it, if there was to be any criticism, it would be that I and the other attendees were hoping for rather more practical hands-on activities and examples of best practice. However, I am sure the course has changed a lot since 1998!

What I did find incredibly useful was developing an education strategy for the gardens. As this was completed in the workplace on return to Ireland, it encouraged me to reflect on the learning process and provided me with a useful document that could be shared and produced at meetings with higher management. I am actually writing an updated education strategy document for the National Botanic Gardens, Glasnevin and Kilmacurragh at the moment and find myself referring to the original for format and inspiration.



*2012 cohort of students. Back row from left: Richard Adspen (Australia), Corey Barnes (USA), Satu Jovero (Finland). Front row from left: Irina Popova (Krygystan) Sema Cevik (Turkey), Ukobong Ekaette (Nigeria), Gesche Hohlstein (Germany), Clare Cockwell (Falkland Islands), Liz Hood (Canada) and Hitendra Ram (India). (Kew)*

During BGCI's 8th International Congress on Education in Botanic Gardens in Mexico City in November 2012, many alumni from past International Diploma Courses also demonstrated their creative and effective approach to developing environmental education activities. Such activities play a crucial role in ensuring that 'the importance of plant diversity and the need for its conservation is incorporated into communication, education and public awareness programmes', indicating that the holders of the International Diploma in Botanic Garden Education are actively working towards Target 14 of the Global Strategy on Plant Conservation.

The next International Diploma Course in Botanic Garden Education will be held between 12 May and 13 June 2014. Kew and BGCI look forward to welcoming a new cohort of students.

## RÉSUMÉ

Les animateurs des jardins botaniques ont une mission énorme, à la fois en termes de variété des publics avec lesquels ils communiquent qu'en termes de diversité des sujets qu'ils ont à couvrir. Afin de reconnaître leurs besoins en matière de compétences et de stratégies spécifiques pour remplir cette mission, les Jardins botaniques royaux de Kew et le Botanic Gardens Conservation International ont mis en

place la première formation destinée aux animateurs des jardins botaniques, conçue pour leur fournir une évolution professionnelle : le diplôme international en éducation dans les jardins botaniques. Pour la première fois depuis le lancement de cette formation en 1995, 65 étudiants (représentant 43 pays différents) y ont participé, en prenant part aux ateliers qui traitaient de thèmes aussi divers que la pédagogie, la recherche de financements et l'évaluation des publics. L'impact de la formation, en termes du nombre de personnes qui visitent les jardins où travaillent les participants à cette formation, représente plusieurs millions de personnes et démontre ainsi que cette formation contribue activement à atteindre l'objectif 14 de la Stratégie mondiale pour la conservation des plantes, en garantissant que l'importance de la diversité végétale et la nécessité de sa conservation soient intégrées aux programmes de communication, d'éducation et de sensibilisation du public.

## RESUMEN

Los educadores en jardines botánicos tienen una enorme consigna, tanto con las audiencias con quienes se comunican como en las áreas y temas que ellos cubren. En reconocimiento a la necesidad de las habilidades de especialistas y las estrategias a llevar a

cabo, la BGCI y Jardines Botánicos Reales de Kew diseñaron un curso para el desarrollo profesional de los educadores de Jardines Botánicos: Diploma Internacional de educación en Jardines Botánicos. En 1995 fue primera vez que se impartió, a la fecha 65 estudiantes de 43 países diferentes han participado en el diplomado; éste consiste en talleres que cubren temas como: pedagogía, obtención de fondos económicos y evaluación de audiencia, entre otros. El impacto de este diplomado en términos de números llega a varios millones de que gente visitando los jardines caseros de los participantes, indicando que el curso contribuye activamente a la meta 14 de la Estrategia Global para la conservación Vegetal, asegurar la importancia de la diversidad vegetal y la necesidad para su conservación, incorporando así los programas de comunicación, educación y conciencia pública.

*With contributions from: Veronica Franco, Felicity Gaffney, Orlik Gomez Garcia, Susan Morgan and Suma Tagadur Sureshchandra*

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*Students participate in an art session and discuss how they can bring creativity into their education programme and link it with science. (Kew)*

# Crossing borders sharing knowledge

Gardens without Borders is a professional development collaboration involving the Minnesota Landscape Arboretum and partners in Russia and Estonia. **Peter Olin** from Minnesota and Tver Botanic Garden's **Yuri Naumtsev** explain how this synergy between very differently resourced botanic gardens advances the global plant conservation agenda by raising professional standards, especially among educators from smaller, less developed gardens.

## MINNESOTA'S STORY

**N**early 20 years ago the Public Garden Management class received a great message from then Director of the Royal Botanic Gardens, Kew, Dr Ghillean Prance. It was that we, the well established gardens of the world, need to work with the underfunded (mostly small) gardens if we are ever going to make a dent in worldwide acceptance of the need for plant conservation, especially at the local level.



*Above: Peter Olin (left) and Yuri Naumtsev (right) shake hands on a partnership that has endured for over 12 years. Above right: Peter Olin planting a tree at Tver Botanic Garden (Minnesota Landscape Arboretum)*



With this in mind we at the Minnesota Landscape Arboretum (MLA) first developed a relationship with the Tallinn Botanical Garden in Estonia. They needed a research greenhouse to work on plant propagation of local and other cold-tolerant plants. A greenhouse – what would that cost, \$500,000 US? Couldn't do it! However, the then Director, Dr Heiki Tamm said he could get a greenhouse package (kit) from Finland for \$5,000 US, use student labour and get the concrete blocks donated (or scrounged) for the footings and he wouldn't heat it in the winter. So we gave him money for the package and a heater and the structure was built.





*Minnesota Landscape Arboretum supported Tver Botanic Garden in 2012 to purchase furniture for its new building, providing students with better facilities for education. (Minnesota Landscape Arboretum)*

That was in 2000 and it is still there today. Since that time MLA has gone on to work with gardens in Russia, including Tver.

### Find a partner

If one garden wishes to help another with fewer resources, how do you find a suitable partner? Since the University of Minnesota faculty in Horticulture was breeding for cold hardiness, we began looking for compatible partners who were collecting germplasm or working with scientists. If you are not part of a research institution one easy way is to contact BGCI for names and contact details of gardens meeting your particular specifications for a collaborator. Things to consider:

1. Is the garden already working to save endangered species and promoting the use of native flora, or wishing to do such work? This can probably be determined by BGCI or from conversations with garden personnel, web sites, etc. It is critical that the garden you work with has the commitment to species conservation and the interest to educate communities within its reach.
2. Visiting the garden. You can tell a lot just by looking around. Resources or not, does it look well maintained? Are the lawns mowed, the beds weeded, the trees protected from machinery gouging? Are there people visiting the garden, and does anyone care?! It's really not hard to tell when you are on-site, even if the spoken or written information says something

different. Meet the main contact person and perhaps some of the staff to see how they work together.

3. What sort of climate is it? You have to understand climatic conditions, which usually means sticking to gardens that have similar ones to your own. If you don't understand winter or desert, for instance, you may underestimate the potential struggles a garden will have just to maintain plant life, let alone keep it healthy over time. How then could you help the garden to educate its public about saving endemic plants?
4. Who runs the garden? It must be someone you can work with on an intellectual as well as a personal level and someone you can trust. If a garden leader says they will collaborate for plant conservation, will they continue to do so once you hand over resources? Some discussions are necessary, either during the visit or at national or international meetings. It may also be worthwhile inviting the individual to your garden. A written agreement could be best.
5. How will funding work? You will need a continuing source of funds for the partner garden, so it would be wise to set up a special account. At MLA this comes from donations by people going on Arboretum tours and it's ringfenced, so it cannot be used to balance the Arboretum's budget! There are many ways to build up a fund, including the popular 'bake sale' or 'plant sale' approach. You may need to check how you can

actually get the funds to the garden! Political red tape may make it difficult and in places there is the possibility of theft along the way. Direct bank transfers have worked well for us.

6. Be a believer! If a garden can maintain its facilities and employ adequate staff, it can then work on conserving local flora. You must believe this and that your help, be it financial or intellectual, in giving inspiration or just being supportive, will result in a positive outcome.

### What is collaboration?

There are many ways gardens can collaborate to foster ideas of plant conservation in garden staff and to improve a garden's outreach. The MLA has used joint conferences, staff exchanges, joint projects, and just plain old discussions over food and drink. This is fun, and allows one to gain friends and ideas from around the world. Some of our best practices and most creative ideas have come from such collaborations.

We first met the directors of the Botanic Gardens of the State University of Petrozavodsk and the State University of Tver (TBG), Russia, at a conference of the American Public Gardens Association (APGA). Since then we have helped support those directors and others from their garden to attend conferences in Tartu, Estonia, Tver, Washington D.C./Minneapolis, and Dublin (BGCI). What a great way for the staff of small, underfunded gardens to learn about best practices, the latest work in plant conservation, exciting research projects and the experiences of larger well-funded gardens.



*Children plant a tree in the community as part of the Adopt-A-Tree project. (Tver Botanic Garden)*



*Tver Botanic Garden has set up a calendar of events that includes family celebrations. (Tver Botanic Garden)*

In September 2013 the MLA and TBG will co-sponsor a conference in Tver, entitled *Living in Harmony: Botanical Gardens and Society – Dialogue without Borders*. It will cover the Global Strategy for Plant Conservation, the role of botanic gardens in society, innovation in educational programmes, marketing your garden to the public, and the internet as a tool to interpret one's garden.

We invited the director of the Tver Botanical Garden to spend a month in Minnesota. He saw what the staff were doing in the garden, how the fundraisers and marketing staff worked and how membership kept people involved. When we visited Tver we were taken aback by the great reception set up, with TV and newspaper interviews, and even a reporter from the public radio station. This director had things to teach us about developing personal relationships with media folk and letting them know when you had something that would look/sound good.

We were interested but somewhat sceptical when Dr Naumtsev proposed a joint children's project, a competition called Adopt-A-Tree. A child or children, and their parents, were invited to select a tree in their neighbourhood, identify it,

study it and learn all about its conditions. Each then submitted a written report on 'their' tree to the Arboretum for judging and awards. That was Phase I and we are in now in Phase II, where the student (and parents) must find a public spot in the community that needs trees, research the space (including utilities, topography, etc), create a planting plan with trees most likely to survive, present the plan to municipal officials for approval and then plant the trees. They must also convince the municipality to look after the trees in future years. Do you think these students will grow up thinking about plant conservation? I don't see how they couldn't.

### Ongoing support

Once the commitment to another garden is made you must keep it up – perhaps 5 to 10 years, so the garden can begin to develop its own support system. It should be the supporting garden's role to counsel and help guide the supported garden to self-sufficiency. If your collaborators are fast learners they will pick up your ideas readily and give you back good ideas as well.

Of course, ideas must be tailored to circumstances. During a visit to the MLA some years ago, by some Russian garden directors, a volunteer demonstrated how to make flower arrangements out of plants picked from our garden and dried. We count on such loyal volunteers who sell their beautiful arrangements to raise funds for us.

In Russia, however, there was little volunteerism – everyone needed two or more jobs just to keep going. So we suggested finding individuals – perhaps retired women – who might be willing to collect and make dried flower arrangements to be sold by the botanic garden, and they could split the proceeds. Everybody wins! This seemed to go down pretty well.

### Benefits and progress

Supporting a garden that needs help is not a tit-for-tat situation and should not be thought of as such, though there are considerable mutual benefits.

### Exchanging research information and plant material

helps both gardens, binding them together in plant conservation efforts, both in regard to moving plants from region to region and also in highlighting the *ex situ* preservation of endangered plants.

### Producing successful programmes –

if we don't get our children on the conservation bandwagon we have lost the game. The MLA has adopted ideas about educational programmes from Russian and Estonian gardens, and from others in Thailand, Poland, and South Africa.

### Maintenance and conservation:

It's important to consider whether the garden has improved over time. Is it keeping endangered plants *ex situ* and has it developed a means to propagate them?



*Participants at a conference in Tver in 2004 where best practices and creative ideas were shared. (Minnesota Landscape Arboretum)*



*As part of the Adopt-A-Tree project, parents and children select a tree in their neighbourhood to identify and study. (Tver Botanic Garden)*

**Marketing ideas:** Special events are a great way to bring your garden to the public. Pictures and descriptions of how your collaborator has brought locals into their garden convey success.

**Small stuff:** Small yet effective ideas can be swapped – macro-photography of insects, flower interiors, etc. as desktop wallpaper for young people (must be wild, humorous or gross!) that they can have for free; making bird stands behind and higher than garden signs so the birds sit on the stand rather than on the sign, etc.

**International goodwill:** Perhaps most important of all – we try always to be ambassadors of goodwill, and help to work at worldwide collaboration. Measuring this may not be scientific but it is recognisable, and visits to your partner garden can show you just how well the collaboration is working.

### Costs

In the two decades that the MLA has been involved with the gardens in Russia and Estonia, it has spent about \$80,000 US or about \$4,000 US per year. If you take out the cost of bringing 35 Russian garden directors to the MLA from Washington, D.C. (about \$20,000 US) the average annual sum is only around \$3,000 US. We can make more than that on one good Arboretum garden tour!

### Summing up

It is important that gardens in the wealthy nations of the world set up cooperative arrangements with underfunded gardens elsewhere. How will we accomplish real plant conservation without everyone playing a part? Education is the key and working with gardens to educate their populace is essential. It may not always be easy, and there is a cost, but you will gain exponentially and, as discussed, funding is only part of the way you can help. The garden you partner with will gain confidence, understanding and credibility and will therefore generate creativity. Eventually that garden will begin to help other gardens and the good effects will be propagated alongside the plants.

### TVER'S STORY

The Botanical Garden of Tver State University is one of the smallest botanic gardens in the world, with an area of just 2 hectares. But it has a long history. The garden lies in one of the oldest cities in Russia, in the historic centre of the city of Tver, and the unique landscape around it has not changed for more than 700 years. Despite the small size of the collection, the garden contains more than 3,500 species of plants. So, we have a unique garden. And what has happened in recent years has been

hugely important – friendship, cooperation and support at the international level has made it possible for the garden not only to survive, but also to flourish anew.

In 1997, the Botanical Garden of Tver State University joined BGCI. Those were hard times, when the Soviet Union had ceased to exist and the new state of Russia emerged. The country was undergoing a deep economic and social crisis. Of course, academic institutions were hugely vulnerable, especially botanic gardens. They offered no technology or competitive products, they were not schools or colleges, and did not directly train professionals and students. So, many large collections died or were diminished.

Our little garden had been reorganised in 1989, by the Tver State University, on an ancient site without buildings or communications facilities. We concentrated on restoring the collection and actively organising expeditions, with little or no funding. Plants were obtained from other botanic gardens for free and expedition members used their own meagre resources. But after 10 years the coffers were empty. Our budget was just \$2,300 a year to pay the salary of all employees and all expenses. We had reached crisis point.

Then fate took a hand in the form of a meeting between the garden director Yury Naumtsev and Peter Wyse Jackson, then Secretary General of BGCI, in Moscow. In 1999, BGCI proposed a unique project, 'Support for biodiversity conservation in the botanic gardens of the former Soviet Union'. Luckily, although the garden in Tver was the smallest, and probably the most insignificant of the gardens of Russia at the time, we were given the chance to take part in this project. One of the main aims was not only to introduce gardens in Russia to the work of our foreign colleagues, but also to find, for every Russian garden, a sister garden abroad.

### A key meeting

In 2001, on a visit to Denver, USA, for an APGA (American Public Gardens Association) conference, the heads of Russian gardens gave presentations about their work, and the problems of funding. After my talk the director of

Minnesota Landscape Arboretum (MLA), Professor Peter Olin told me our report and our limited budget had made a deep impression on him – \$ 2300 a year was less than his salary per month! He wanted to help us, and to visit our garden in person. This meeting did something very important – it gave us hope! We began to believe that the community of botanic gardens in the world could give mutual support and that we were not alone.

Peter Olin came twice to Tver and I visited Minnesota twice. In addition, the MLA supported the participation of our employees in various international conferences and congresses, which allowed us to communicate with colleagues around the world, to learn and share experiences. And to talk about our achievements – because our garden really has accomplished so much. It's ironic, but the lack of funding has forced us to devise interesting and unique solutions to problems which would never have been thought of by gardens in Europe and the US, who are not short of money. In these gardens, the basis for the implementation of projects in the first place is the availability of the budget. In ours, the basis for such projects is the enthusiasm of employees, even if funding is nil. As a result we fare no worse than the US and maybe even better, because we start from scratch, attracting visitors, donors, grants, and media. Of course, from time to time there is financial support from kindly friends. But those funds are always for a particular purpose, such as purchasing a car for expeditions, equipment for gardens, and so on.

### What have our friends in Minnesota taught us?

- The concept of a public garden. Very often in Russia, people think a public garden is just like an ordinary park where people come simply to relax and enjoy their leisure time. That's important of course, but Russian gardens need to remember that they are also research institutions and need to get the results of their research across to the public. So the public garden is also an educational environment and we have had some great help from MLA on how to develop this side of things.



*Engaging children in educational programmes is vital for the future of conservation. (Tver Botanic Garden)*

- How marketing, public relations and information events for the media can raise the garden's profile. Attracting visitors and donors is impossible without mastering this area and raising additional funds for the garden has become an important part of our daily work. Once again we learned much about this in Minnesota.
  - The importance of landscape gardening and displays. The external positioning of collections in the garden, creating a system of thematic gardens – these were valuable learning experiences.
  - The need for interpreting the results of scientific research. Data from scientists, botanists and ecologists are often accessible only to specialists. We have learned from Minnesota to apply different methods to present the insights gained from research to our visitors in the garden, in programmes and publications.
  - How the Internet can be used for development and shared experiences. This was unusual for a Russian garden, but now for Tver the Internet has become not just an additional medium of communication but a powerful tool to inform visitors, friends and partners.
  - The importance of familiarising ourselves with the best gardens in the world – our friends from MLA provided us with opportunities to join their tours and help finance our wider participation in their garden.
  - Environmental education needs to be integrated into garden activities and a programme developed for all ages. In Tver the whole system of environmental education has been revised thanks to the experience we gained in garden art therapy as a means of rehabilitation and education of residents of urban areas. We have set up a Calendar of Events, which comprises family celebrations, exhibitions, seminars, workshops and summer camps.
  - Ultimately of course, the benefit of joint projects. It is very important to develop and implement these as they are always a mutually beneficial experience.
- Many other elements have come out of our cooperation with the Minnesota Landscape Arboretum. For example, we often prepare and present a joint report at conferences and seminars. This helps us to harmonise approaches, gives ideas to other gardens and demonstrates the

opportunities that can arise through cooperation. In the garden displays at Tver, too, we have made use of objects and ideas supplied by MLA, while displays at Minnesota have been carried out under the direction of an expert from Tver. We also enjoyed devising a joint competition called Adopt-a-Tree (described by Peter Olin above). This is a great example of how even a small garden like Tver can make a real impact – nine different regions of Russia from Kamchatka to St Petersburg are involved in the contest, and Tver is coordinating it. Some projects in Tver and Minnesota look similar at first glance, but each have a different slant. So in Minnesota they have ‘memorial trees’ planted in the arboretum by means of donor contributions in memory of relatives or friends, while at Tver, trees are planted by couples on their wedding day – a symbol of family love and unity for the future, which seems to us more optimistic!

### A shared future

In 1999, only 300 people came to our garden in Tver. Five years later, as we began to develop the public garden programmes, this grew to 15,000 visitors, and now it is more than 25,000. It is a great victory!

And it is surely no accident that this success coincides with the decade of cooperation with the Minnesota Landscape Arboretum. We sincerely believe that not only our small garden, but our friends in the US benefit from the learning experience of our joint programmes and partnerships.

But even that is not the most important thing. This partnership in education and science not only brings continued progress in the development of programmes and technologies – it is also true international friendship. Along with our gardens we count the people who work in them and the people who come as visitors. Such links give our activities a personal value – and a botanical garden that evokes no feelings is a dead medium. The emotions are not just aesthetic, they involve a conscious love and understanding of the need to preserve the fragile peace of plants for all of us – we speak different languages and live in different countries and continents, but we live in the same

world. Only together, with shared knowledge and friendship, can we hope to save it's biodiversity.

Now, Tver has become one of our country's foremost centres of botanical research and one of its most striking gardens. It is still small, but specialists from large gardens of the Academy of Sciences of Russia, and even large Russian Biosphere Reserves have begun to come here for education and training. Thus, international cooperation has brought us knowledge, and new friends and passions, and must be the means to unite countries around the world in a common cause.

### RÉSUMÉ

La coopération entre les jardins bien établis et les jardins en manque de fonds, qui œuvrent cependant pour créer un lien avec leurs communautés et pour l'éducation de celles-ci sur l'importance de la conservation des plantes, doit faire partie des missions de tous les grands jardins. L'Arboretum paysager du Minnesota (Etats-Unis), le Jardin botanique de l'Université d'État de Tver (Russie), le Jardin botanique de l'Université d'État de Moscou (Russie) et le Jardin botanique de l'Université de Tartu (Estonie), ainsi que d'autres, collaborent depuis plus de 10 ans pour mettre en œuvre des initiatives pédagogiques mutuellement bénéfiques. Il est important de permettre aux petits jardins sous-financés de rejoindre la sphère pédagogique internationale en vue de communiquer sur la conservation des plantes au niveau mondial. Des conférences communes, des échanges de personnel, des projets communs et certains financements extérieurs font partie du dispositif de développement professionnel, dans le cadre de nos efforts communs pour sensibiliser nos communautés par des messages sur la conservation des plantes.

### RESUMEN

Jardines muy bien establecidos, que a pesar de sus escasos recursos trabajan arduamente en conectar la educación de las comunidades con la importancia de la conservación vegetal, se unen para tomar parte en la misma misión que jardines botánicos de talla mayor.

El Arboreto del Paisaje en Minnesota (EE.UU.), Jardín Botánico de la Universidad Estatal de Tver (Rusia), Jardín Botánico de la Universidad estatal de Moscú (Rusia), Jardín Botánico de la Universidad de Tartu (Estonia), entre otros, han colaborado en conjunto por más de 10 años en la implementación de iniciativas de la educación. En este contexto los jardines pequeños pueden también formar parte de la educación internacional y sus tareas para la conservación vegetal a nivel mundial. El esfuerzo mutuo se proyecta en conferencias en conjunto, intercambio de personal, proyectos en colaboración y la búsqueda de fondos externos que son parte del desarrollo profesional para alcanzar a las comunicadas con un mensaje para conservación vegetal.

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*In 1999 only 300 people visited Tver Botanic Garden, now 13 years later this number has grown to more than 25,000. (Tver Botanic Garden)*

# Ideas sin fronteras

## la influencia duradera de Congreso de Educación de BGCI

El Congreso Internacional de Educación de BGCI es un faro de inspiración en la educación del jardín botánico. Cada tres años en las últimas dos décadas, educadores de todos parte del mundo se han reunido para intercambiar las últimas ideas y aprendizajes. En 2012 este foro único se realizó, por primera vez en América Latina, en la ciudad de México. En este artículo, **Linda Balcázar** y sus colegas del Jardín Botánico del Instituto de Biología la UNAM, explican cómo los congresos de BGCI han ejercido una influencia que se ha extendido más allá de los límites de la UNAM creando un gran impacto tanto a nivel nacional como en América Latina.

### Introducción

La Educación Ambiental es uno de los objetivos de los jardines botánicos en todo el mundo y desarrollar programas efectivos dirigidos a la conservación de la diversidad vegetal es una de las tareas más difíciles que enfrentan los educadores. La Agenda Internacional para la Conservación Vegetal en Jardines Botánicos, sugiere que estos espacios deben ser: centros de educación ambiental y sustentabilidad, con personal capacitado, cuyos programas de educación ambiental deben estar bien planeados, enmarcados en estrategias de educación con objetivos específicos, medibles, alcanzables, realistas y definidos en el tiempo. Sin embargo son escasas las Instituciones que desarrollan programas específicos para la capacitación o formación de educadores ambientales en jardines botánicos y pocos



*Una exposición que se realizó en 2010 que demostró la importancia de biodiversidad que existe en la milpa. (Jardín Botánico IB-UNAM)*

los espacios de oportunidad para el intercambio de experiencias. Es aquí donde los Congresos Internacionales de Educación en Jardines Botánicos organizados por BGCI, adquieren gran importancia para todos los que hacemos educación. A partir de 1991, con la

celebración del Primer Congreso se abrió un aula natural para el aprendizaje y el intercambio de prácticas educativas, de manera que se transforma en un gran banco de semillas, donde los educadores toman experiencias de otros, pero también contribuyen con las propias.

Estas reuniones son a la fecha los espacios por excelencia donde el conocimiento, la creatividad, el compromiso, y el corazón de los educadores se enriquece. En el siguiente artículo describimos algunas de estas experiencias que tuvieron su inspiración en estos congresos pero también comentamos algunas que nacieron en el Jardín Botánico del Instituto de Biología de la UNAM (JB-IBUNAM) y se tomaron como modelo para otros jardines.

El Área de Difusión y Educación del JB-IBUNAM se creó en 1983 y desde entonces ha enfocado sus esfuerzos para desarrollar actividades educativas dirigidas a diversos grupos meta con el propósito de formar una conciencia pública sobre la importancia de la flora mexicana, su conservación y uso sostenible. Aquí se presentan 3 ejemplos de actividades educativas exitosas, que son de impacto local, nacional o internacional y cuya simiente nació o se presentó en alguno de los congresos de educación.

- 1) Los Estuches Educativos del JB-IBUNAM
- 2) La Milpa
- 3) El Plan de Acción de Educación Ambiental en los Jardines Botánicos Mexicanos

### El Jardín viaja a las escuelas

Los Estuches Educativos del Jardín Botánico del IB-UNAM, son verdaderas cajas de sorpresas con materiales



Estuche de los agaves. (Jardín Botánico IB-UNAM)

educativos con temas de plantas mexicanas dirigidos a alumnos de nivel básico. Estos estuches viajan a las escuelas para ser utilizados por los profesores y así facilitar el conocimiento cuando los alumnos no pueden visitar el jardín botánico. Esta idea nace en 1986 y durante el 1er. Congreso Internacional de Educación en 1991 presentamos esta experiencia; el gran interés que se despertó entre los asistentes nos animó a realizar durante el 2do. Congreso en 1993 en las Islas Canarias el taller “Cómo hacer un estuche educativo de flores”, y en 1995, en el II Taller Latinoamericano y del Caribe de Educación para Jardines Botánicos, “El estuche educativo de plantas útiles”, en ambos eventos los asistentes desarrollaron y aprendieron como hacer un estuche y así adaptarlo a sus condiciones geográficas, biológicas y



Estuche de los agaves. (Jardín Botánico IB-UNAM)

culturales (Hernández, *et al*; 1993). En el año de 1994, tanto BGCI, como la Asociación Mexicana de Jardines Botánicos (AMJB) publicaron el ejemplo de los estuches educativos, la primera, en “Educación Ambiental en Jardines Botánicos, lineamientos para el desarrollo de estrategias individuales” (Linares, *et al*; 1994) y la AMJB, en “La Educación en los Jardines Botánicos: un Mundo de Ideas” (Hernández, *et al*; 1994). Así mismo BGCI ha incluido a los estuches educativos en el programa de su Diplomado de Educación, como un modelo exitoso para la enseñanza.

Actualmente el Jardín Botánico ha desarrollado varios estuches con temas como: las semillas, las flores, los frutos, las plantas medicinales y los agaves, entre otros. (Ver las fotos de arriba)

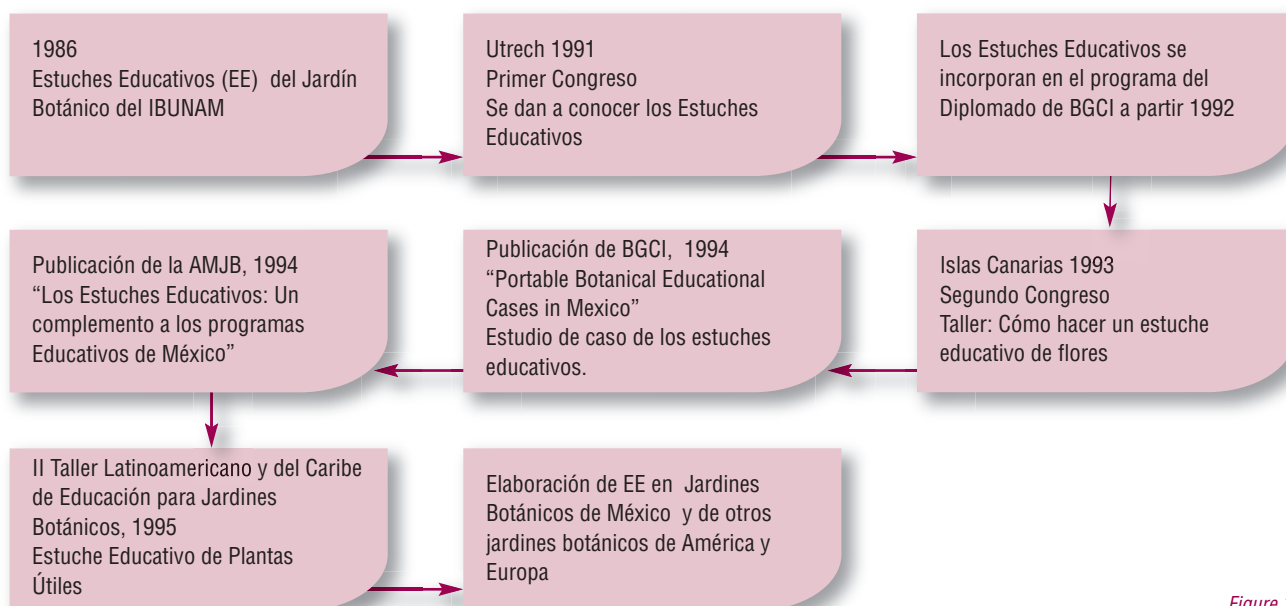


Figure 1

Una de las cosas más gratificantes para un educador es saber que su trabajo tiene eco, al presente varios jardines botánicos en el mundo han desarrollado sus propios estuches para facilitar la enseñanza más allá de los límites del jardín botánico. (Fig. 1)

### Las exposiciones: campos de cultivo de conocimiento

La Exposición “La milpa, baluarte de nuestra diversidad biológica y cultural” fue el evento que inauguró el *Año Internacional de la Biodiversidad* en la Universidad Nacional Autónoma de México en 2010. Esta exposición montada en un principio en pleno corazón de la UNAM tuvo la gran misión de mostrar las bondades, la importancia y la gran biodiversidad que existe en la milpa.

La “milpa” (vocablo náhuatl que significa *mi campo de cultivo*) es considerada un agroecosistema y se refiere tradicionalmente al campo cultivado principalmente con maíz, en México esta siembra se acompaña con otras plantas como calabazas, frijoles, chiles y verduras autóctonas (“quelites”), algunas plantas medicinales y una amplia diversidad de fauna (insectos, reptiles y mamíferos, entre otros), lo increíble de la milpa es que todo lo que nace y habita en ella es utilizado en la vida cotidiana de los campesinos y muchos de estos recursos, se consumen en las ciudades.

Aún observando la importancia de la milpa poco se conoce de ella en las zonas urbanas y semiurbanas de la ciudad de México. Esta exposición dio a conocer a través de diversos



Una visita guiada a la exposición ‘La Milpa’. (Jardín Botánico IB-UNAM)

especialistas, de conferencias, textos, talleres, actividades lúdicas, recorridos guiados, canciones y narraciones populares, el porqué la conservación de la milpa contribuye al rescate biológico y cultural de la biodiversidad. (Foto 4)

El éxito de esta exposición la ha llevado a viajar por distintos lugares a través de nuestro país y presentada a distintos públicos, ha tenido como sedes Instituciones académicas, Instancias de Gobierno, Sistemas Colectivos de Transporte, Áreas Naturales Protegidas, así como ferias y festivales populares del centro de México. Por su relevancia la compartimos en el 8° Congreso Internacional de Educación (2012), como un ejemplo del potencial educativo que puede involucrar e interesar a varios sectores de la población. (Fig. 2)

### Los congresos de Educación como un espacio para la reflexión

Los congresos de educación ofrecen una amplia gama de oportunidades, debido a la gran diversidad de actividades y entre las charlas con los amigos, se abren espacios para el análisis y la reflexión, esto último fue lo que nos sucedió durante el 6°. Congreso Internacional de Educación en Jardines Botánicos realizado en Oxford en el 2006. A este congreso asistieron varios educadores mexicanos, y ante la diversidad de trabajos presentados no solamente de otros jardines botánicos del mundo sino también de nuestros compatriotas, surge la inquietud de conocer más a profundidad nuestra labor en educación. Es así como el Jardín Botánico de la Fundación Xochitla, A. C., el Jardín Botánico del Instituto de Biología de la UNAM, y el Jardín Botánico del Centro de Investigaciones Científicas de Yucatán, miembros de la Asociación Mexicana de Jardines Botánicos (AMJB) se unen para hacer una propuesta de trabajo colectivo en el ámbito de la educación. Estos jardines integraron el *Comité de Educación* de la Asociación y coordinaron a lo largo de 5 años el trabajo de los jardines botánicos mexicanos, con la participación de más de 25 educadores que asistieron a 4 talleres de análisis. Desde el primer taller se comprendió la necesidad de tener una estrategia que direccionara la práctica educativa de acuerdo a los diversos contextos biológicos y culturales de México, además del reconocimiento



Miembros del Comité de Educación. De izquierda a derecha: Veronica Franco (JB del CICY), Teodolinda Balcázar (JB del IBUNAM), Edelmira Linares (JB del IBUNAM) y Lorena Martínez (JB de la Fundación Xochitla). (Jardín Botánico IB-UNAM)



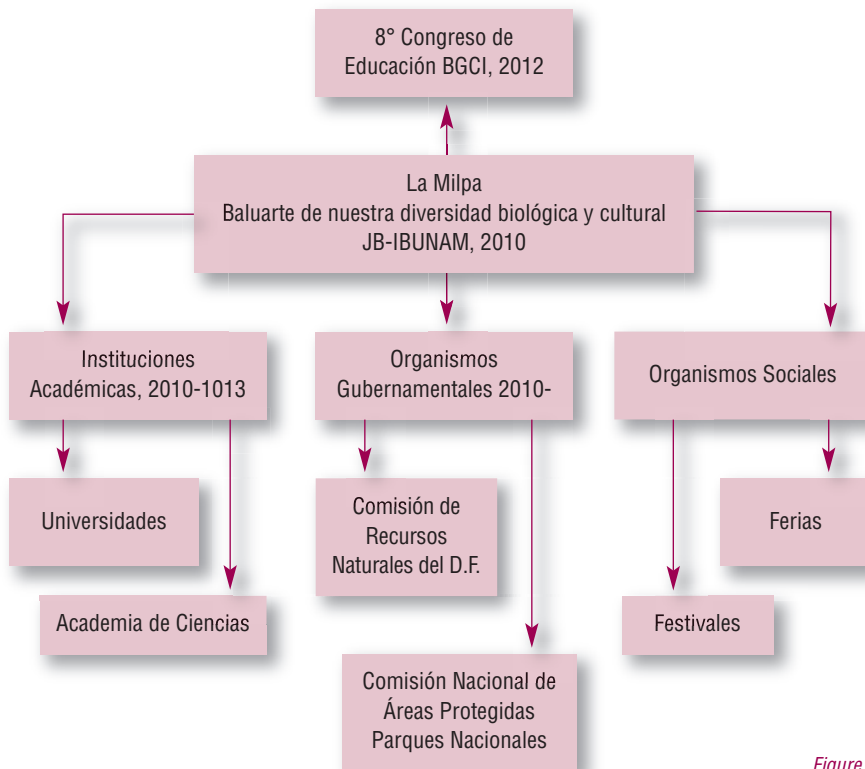


Figure 2

A través de las experiencias vertidas en el presente artículo, se observa como los congresos se ven enriquecidos por un sinnúmero de actividades educativas las cuales son comunicadas, intercambiadas o adaptadas. En el caso de nuestro jardín ha presentado material didáctico innovador, talleres con temas diversos, así como experiencias educativas como las exposiciones que han sido bien recibidas entre los jardines. Finalmente agradecemos a BGCI abrir estos espacios para los educadores de los jardines botánicos y deseamos que a futuro las muchas semillas que en los congresos se han dispersado germinen en cualquier parte del mundo con ideas que contribuyan al conocimiento y conservación de la diversidad vegetal y por ende a la generación de una conciencia pública de respeto a la Naturaleza.

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institucional que en muchos casos era mínimo. Como resultado después de un largo proceso de trabajo colectivo en el 8vo. Congreso Internacional de Educación (2012), realizado en la ciudad de México, se presentó el "Plan de Acción en Educación Ambiental para los Jardines Botánicos Mexicanos". Seis años después la semilla dio frutos, el plan de acción es un documento que sustenta que la actividad educativa en los jardines es un proceso permanente de enseñanza y aprendizaje que contribuye a elevar el conocimiento, la fuerza, responsabilidad y el compromiso social hacia el ambiente en general y las plantas vivas en lo específico (Martínez, et al 2012). Este plan se entregó a los

asistentes al congreso, por lo que esperamos sirva la experiencia mexicana para otros jardines botánicos del mundo. (Fig. 3)

## Conclusiones

Más de 20 años han pasado y 8 han sido los Congresos realizados, sin duda a lo largo de todo este tiempo, los jardines botánicos que hemos tenido oportunidad de asistir a algunos de estos congresos, hemos aportado y tomado de ese gran banco de semillas educativas, aquellas ideas, que basadas en nuestro conocimiento y compromiso han servido para generar programas ad hoc para nuestros jardines.



Los educadores ambientales que asistieron a los talleres de análisis para realizar la estrategia. (Jardín Botánico IB-UNAM)

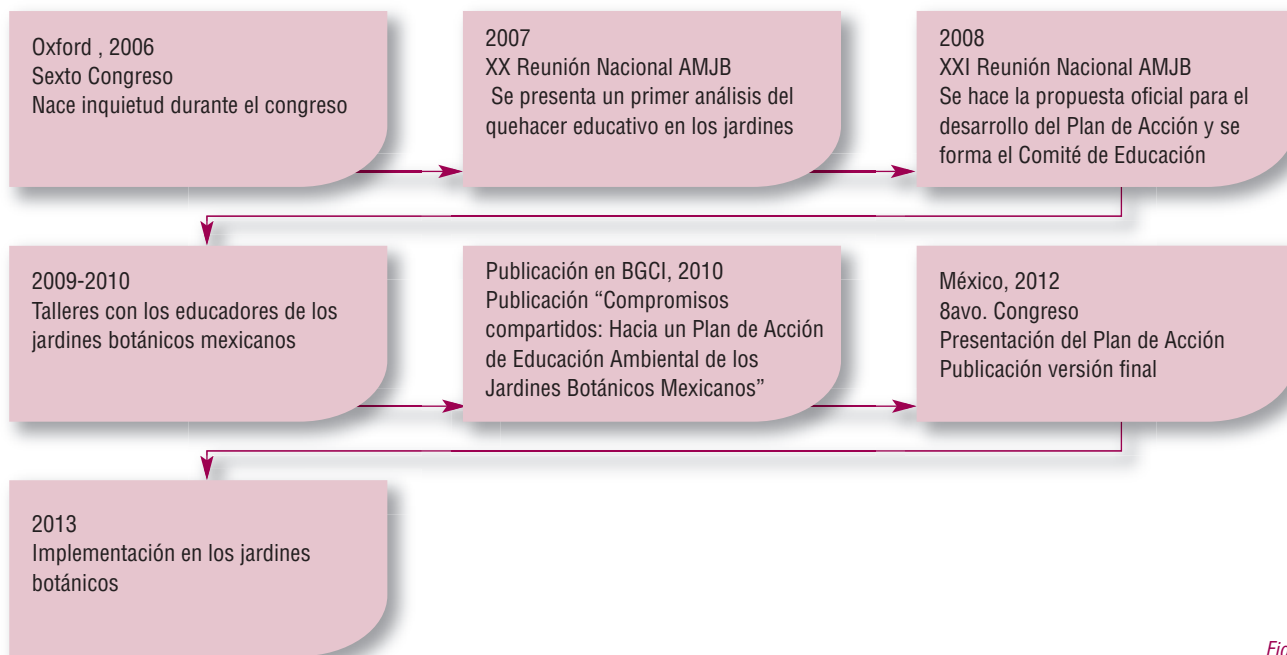


Figure 3

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## SUMMARY

Creating a social conscience about nature conservation is a necessary and urgent task, work that requires analysis of several factors including knowledge, creativity, reflection and the experience of specialists in different areas.

The international botanic garden education congresses organised by BGCI have created spaces to share and learn educational experiences. Here we present a portrait of how these congresses have influenced the development and strengthening of the education programmes at IB-UNAM Botanic Garden, within its collections, in urban and rural areas (educational kits, teacher training courses, culture in the garden and workshops in rural zones), at a national level in collaboration with the Mexican Association of Botanic Gardens (the Environmental Education Action Plan and the creation of national collections) and at a Latin American level (Latin American education workshops). Some of these experiences have been widely publicised in publications but here we bring them together.

## RÉSUMÉ

La création d'une conscience sociale au sujet de la conservation de la nature est une tâche nécessaire et urgente. Ce travail requiert l'analyse de plusieurs facteurs, notamment les connaissances, la créativité, la réflexion et l'expérience de spécialistes dans différents domaines.

Les congrès internationaux sur l'éducation dans les jardins botaniques, organisés par le BGCI, ont permis de créer des espaces de partage et d'apprentissage d'expériences pédagogiques. Nous vous présentons une esquisse de la façon dont ces congrès ont influencé le développement et le renforcement des programmes d'éducation au Jardin botanique IB-UNAM, au sein de ses collections, dans les zones rurales et urbaines (valises pédagogiques, formations de formateurs, culture dans le jardin et ateliers en zones rurales), au niveau national en collaboration avec l'Association mexicaine des jardins botaniques (le Plan d'action pour l'éducation à l'environnement et la création de collections nationales), et au niveau de l'Amérique latine (ateliers d'éducation latino-américains). Quelques-unes de ces expériences ont été largement diffusées dans des publications, mais nous les rassemblons dans cet article.



Plan de Acción en Educación Ambiental para los Jardines Botánicos Mexicanos. (Jardín Botánico IB-UNAM)

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# Driving educational change through association

The educational work of German language botanic gardens comes under the umbrella of the German speaking Association of Botanic Gardens. Jörg Ledderbogen, from Schulbiologisches Zentrum Hannover, describes how the association's education working group promotes research, educational improvement and networking opportunities for garden educators.

## Introduction

With nearly one hundred member gardens and similar organisations, that between them cultivate over 50,000 plant species – around 20% of the world's flowering plants, the Association of Botanic Gardens (ABG) connects individual and institutional members across German-speaking Europe. While the bulk of members are drawn from Germany itself, there is also widespread representation from Switzerland, Austria, Italy, the Netherlands and Poland.

Over the last three decades botanic garden education has grown in importance, not only for schools but also for the general public. Most gardens now accept that education is a core part of their mission, playing a vital role in raising awareness about the importance of plants and supporting people to live more sustainable lifestyles. And inevitably the pressure on specialist educators to deliver their gardens' education agendas has also increased. It has been the role of the ABG to offer support and professional guidance and training to its German-speaking community of educators.



*Preparing cosmetics with essential oils during the educators' meeting in 2008 at Hamburg Klein-Flottbeck Botanic Garden (Barbara Engelschall)*

## From small beginnings...

Even before German reunification in 1990, the green shoots of botanic garden education began to emerge on both sides of the Iron Curtain. In the former German Democratic Republic

a 'botanic school interest group' held its first meeting in 1981, while across the border in the same year representatives from all over the Federal Republic convened in Hannover for the inaugural 'Education at Botanic Gardens, Museums of Natural Science and Zoos'



*How many bottles of water does it take to rain on one square meter? Workshop during the educators meeting in 2007 Botanic gardens in a Globalised World at the Tropical Greenhouses Witzhausen. (Barbara Engelschall)*

meeting. From 1987 onwards in the West these meetings became annual and the momentum continued after reunification. Post-reunification, the meetings provided valuable opportunities for parties from both sides of the former ideological and educational divide to look for common ground, with some Austrian-Swiss-South Tyrolean influences thrown into the mix!

In 1993 educators formed a working group within the newly founded Association of Botanic Gardens to support its educational task. Initially, unlike gardeners, directors, curators and technical managers, who were seen as discrete groups, educators were not permitted their own representative on the corporate management board. However as gardens became increasingly aware of the importance of public engagement and support, as well as school-related activities, the rules were amended. Following the ABG's 1996 meeting in Würzburg Botanic Garden, Renate Grothe of Schulbiologiezentrum Hannover became the first educator to join the board. With the accession of a second educator in 2006, educators now have equal representation on the ABG board.

The ABG's educators' working group now consists of about 15 educators, teachers, freelancers and garden staff drawn from across the German-speaking community. The group coordinates and delivers training sessions and supports the exchange of information. It also publishes the proceedings of training sessions as booklets and offers links to other information sources. Meetings enable face-to-face encounters and the exchange of new ideas and experiences.

The educators' working group is the institution for networking and the central point of contact for all botanic garden staff who are planning to create green schools. Meetings of all kinds, including training and education sessions, are held at member gardens, with the purpose of offering conceptual and best practice examples across a range of subjects within a framework of education for sustainable development.

By the mid 1990s it became evident that there was a need for pedagogical training in botanic gardens. In autumn 1994 the educators' working group conducted its first assessment of the status of educational work at botanic gardens and similar institutions.

## Activities of the educators' working group

### Educational work

- Creation of class lessons, interdisciplinary or specialised
- Development of educational materials
- Researching new topics, discussing and testing their educational feasibility
- Developing education for sustainable development materials for different target groups
- Supporting schools to design school grounds

### Training

- Training teachers to use botanic gardens (indoors and outdoors) and in pedagogical methods
- Training botanic garden staff and freelancers in botanic garden education
- Training participants during annual ABG meetings and regular educators' meetings
- Documentation of materials and results as booklets

### Public relations

- Developing publications
- Co-organisation of events, exhibitions and publications
- Supporting contacts to media and marketing
- Consulting and guest speaking
- Accompanying scientific pedagogical investigations
- Presentations at national and international conferences and meetings

### Networking

- Building and maintaining national and international contacts with educators
- Connecting and collaborating with members of other professions at botanic gardens and NGOs
- Exchanging concepts, teaching materials and addresses
- Cooperation with other out-of-school institutions (museums, zoos, associations)



The touring exhibition 'Devils Claw Goes Public' was produced as a collaboration between the botanical association of Hamburg and the educators working group, financed by the Federal Office for Nature Protection. (Barbara Engelschall)

The study revealed that 94% of the 63 gardens who responded offered public guided tours, while 76% made some kind of educational provision for schools. However, only 21% of gardens employed a professional educator. Guided tours and educational offers were, for the most part, provided by gardeners or curators.

In 1998 the working group translated BGCI's publication 'Environmental Education in Botanic Gardens – Guidelines for developing individual strategies' into German and its publication and co-financing by the ABG underlined the importance of the group's work.

During the annual ABG meeting in Kiel (1999) Marina Hethke presented a keynote lecture entitled 'Evaluation – an opportunity and instrument for educational work at botanic gardens?' Developing educational work in botanic gardens based on sound evaluation became a key theme for subsequent work by the education working group.

Guidelines for planning and designing guided tours in botanic gardens were produced and published in 2002. In the same year the first booklets were published with the proceedings of the educational meetings. The first in the series examined flower ecology in botanic gardens – 'Foxglove calls for Bumble Bee' – while later titles included 'Gardens in Autumn' (2004), 'Paragraph meets Public – Biodiversity and Botanic

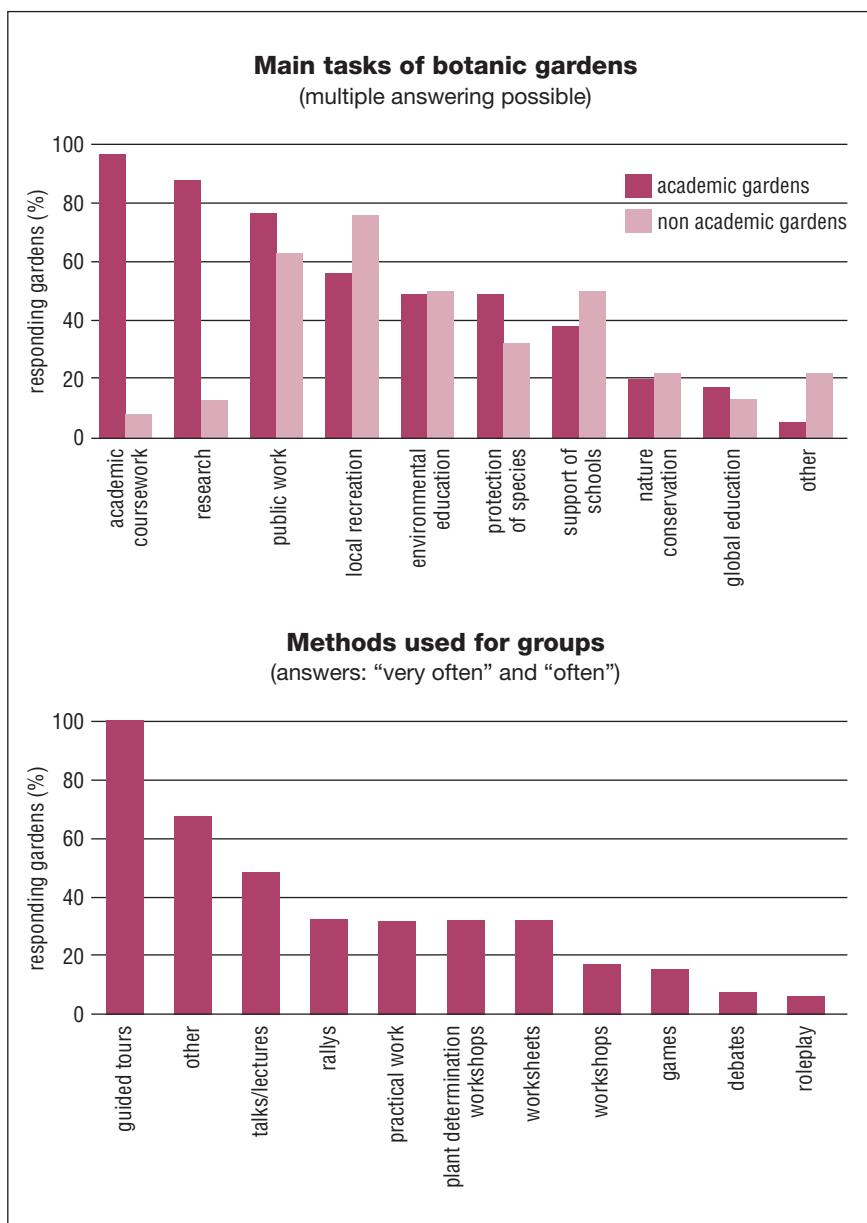
Gardens' (2007) and 'Flower Power – Energy Plants in Botanic Gardens' (2012). The series has proved to be helpful in sharing experiences between educators and botanic gardens.

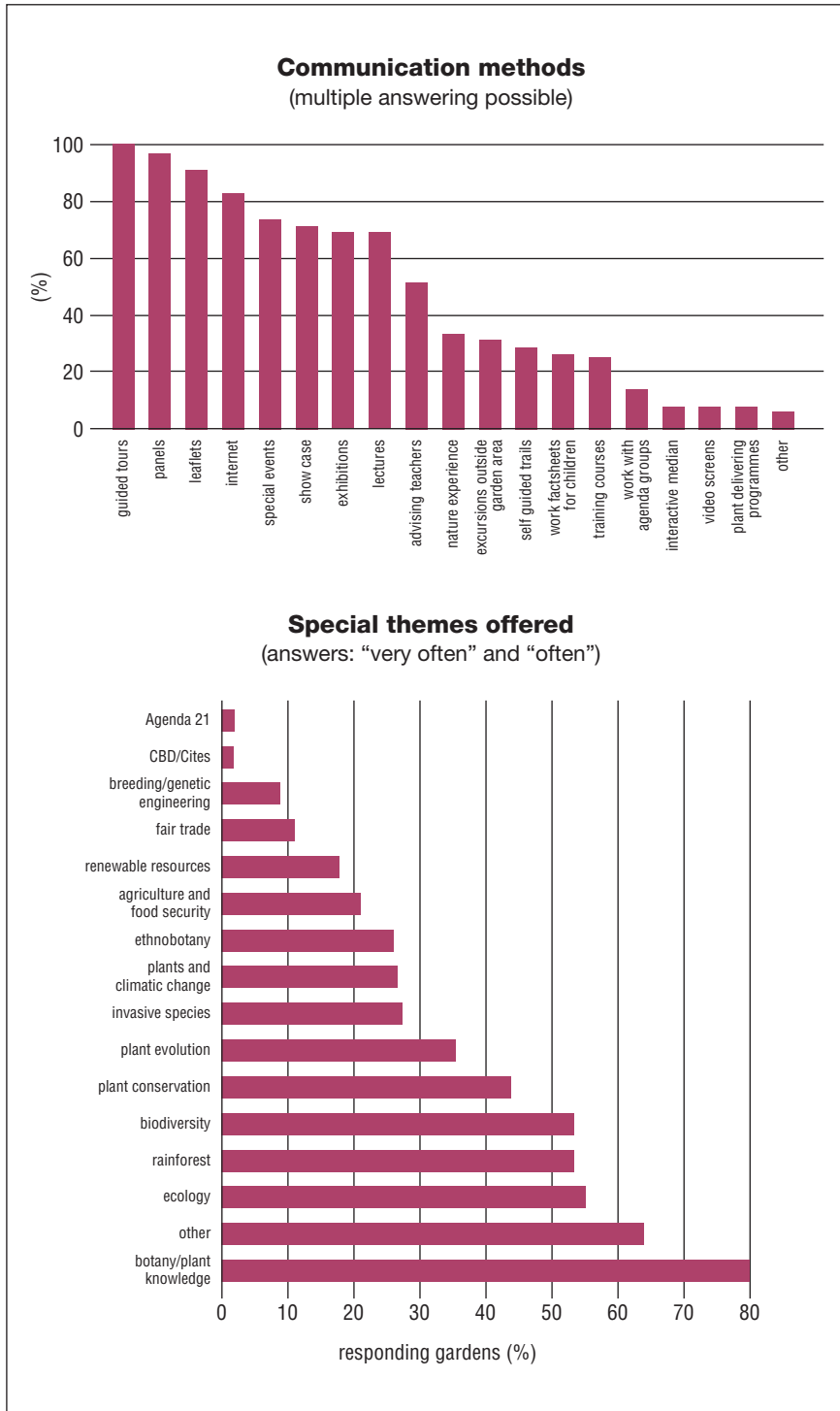
The working group has also developed worksheets on understanding insects and plants in greenhouses and training methods on producing eye-catching and effective information panels. For example 'Female quotas for Ginkos!' was intended to raise awareness about the planting of male only ginkgo trees in streets. The group has also tried, so far unsuccessfully, to create a central pool of printed educational materials. Perhaps in this digital age, an on-line resource bank might be the answer.

Another important development has been the cooperation with teacher training institutes - biology students develop teaching units as part of their curricula, which are then examined.

### Changes in education

The most accurate assessment of the status of education in German speaking botanic gardens was carried out in 2007 by Marina Hethke ('Investigations concerning educational work in botanic gardens with particular attention to Global Learning' – University of Rostock, Umwelt & Bildung). The following graphs provide an overview of the tasks of 64 gardens and the methods they used to communicate to the public:





Methods for connecting people with green ambassadors (plants) from all over the world were developed and tested in six gardens, evaluated, published and disseminated throughout Germany ([www.globaleslernenimbotanischengarten.de/](http://www.globaleslernenimbotanischengarten.de/)).

The UN Decade of Education for Sustainable Development (ESD) has further underlined the imperative for botanic gardens to move from more traditional environmental education to ESD. The challenge is that while one third of gardens do offer teaching modules on sustainability, they are not the ones most selected by schools. The ABG working group is constantly searching for relevant topics to include in training and public education provision, such as water conservation, renewable energy and evolution.

In 2000, the federal state-wide school system introduced A-level certificates, requiring gardens to re-orientate their educational provision towards this new curriculum. Green schools have been provided with laboratory equipment to facilitate experiments about photosynthesis, plant poisons or genetics and in 2010, Marburg Botanic Garden opened the first comprehensive school laboratory created in a botanic garden.

Education in German speaking gardens has come a long way since its origins in the 1980s and today the gardens work through three major themes: ESD and Global Learning, inquiry-based science education and educational research (in

The stage has now been reached where gardens appreciate that it is no longer sufficient for someone to merely guide groups through gardens and just talk at them. Rooms are needed - as are materials, artefacts and knowledge about working with different groups. In recent years the educational situation in several gardens has improved, with some setting up 'green schools' with newly built classrooms, laboratories and permanent staff. Even university gardens now regard non-university education as part of their remit.

Since 1992, the implementation of the Convention on Biological Diversity through the German National Biodiversity Strategy has been paramount for botanic gardens. The project 'Global learning at local sites in botanical gardens', funded by the German Federal Environmental Foundation, was a collaboration between two biology teaching institutes (Kassel and Osnabrück) and three botanic gardens (Osnabrück, Tharandt/Dresden and Witzhausen/Kassel).



*How much is one cubic meter of wood? Puzzle posed during the Meeting of the Association of Botanical Gardens in 2011 at the Tharandt Forest Botanic Garden, WaldErlebnisWerkstatt Sylvaticon. (Beate Senska)*

collaboration with university education departments). Several gardens have set up green schools (eg. Mainz, Oldenburg and Potsdam), with Mainz University Botanic Garden being the first to establish a permanent scientific position to manage its Green School.

However, the question of ‘who pays?’ still provokes strong debate. Public money has helped enormously in raising the status of education in German botanic gardens, but there are also examples of external funding. These include the research/development project of BfN in 1999 and the EU funded project ‘INQUIRE’ (2010-2013) as well as the touring exhibition ‘Devils claw goes public’ funded by the Federal Office for Nature Protection and the Authority for Urban and Environmental Affairs (BMU) (2008). This exhibition, which includes a toolkit of learning materials developed in the green school of Hamburg Botanic Gardens, is now permanently located in Swakopmund.

### Consolidating

There still much work to be done and the purpose of the ‘educators’ working group’ has to be continually re-examined and, if necessary, redefined. There is a considerable disparity in work experience, circumstances and levels of involvement within the group. Generally, members can be divided into three categories. The first of these include people who have been active in botanic garden education for many years. Indeed several go back further than the association itself. These are the principal collaborators on the sort of projects mentioned above. The second group regularly turns up at training meetings and the third group only attends if meetings are close to their hometown. Many students and freelancers belong to this latter group. Consequently training requirements differ widely, with some educators looking for new methods, some looking for basic information and the more experienced looking for in-depth evaluation. The discussions however, always appear to be valuable for everyone as illustrated by the following experiences of two educators at different stages of their career:

Sabine Kapaun, an experienced special needs teacher, began working in Köln Botanic Garden “Flora” in 2012 and joined the core education working group



*Exploring materials in the forest ecosystem at the Meeting of the Association of Botanical Gardens in 2011 at the Tharandt Forest Botanic Garden, WaldErlebnisWerkstatt Sylvaticon. (Beate Senska)*

at the same time. She quickly familiarised herself with working in a green school and already, through exchanging materials and experiences with colleagues at training meetings and during the meetings of the core group, has a good overview of possible educational offers.

Marina Hethke, who has a degree in agriculture, has said that her participation in the group since 1993 has influenced ‘everything and the whole of her life’. Marina works in the Greenhouse for Tropical Crops Witzenhausen at the University of Kassel and was involved at an early stage in the development of educational policy. Following the production with working group colleagues of a first paper evaluating the educational work at botanic gardens (1994), she went on to publish on botanic garden education in scientific journals. In 2007 she completed her MA in ‘Environment and Education’. Her thesis was *Investigation of the educational work in Botanical Gardens with particular attention to Global Learning*. Today Marina focuses on Global Learning and its evaluation, collaborating in projects with several partners of the educators working group and others of the ABG.

As this article has illustrated, the educators’ working group has established a significant role in supporting the professional development of German speaking botanic garden educators. Meeting two or three times a

year, the group is open to anyone interested in collaborating. Don’t hesitate to contact us if you want to be informed regularly about the activities of the working groups or if you are thinking about establishing your own national working group or network and need some ideas.

It is also important to mention that the development of education in botanic gardens is the result of hard work, commitment and nurturing by the working group. People keep networks together, they respond, invite, inform. The human factor cannot be underestimated. The education working group is extremely grateful to everyone, past and present, who has kept the network alive and is continuing to do so in the present.

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## RÉSUMÉ

Un des groupes de travail, au sein de l'Association des jardins botaniques de langue allemande, concerne l'éducation. Le groupe de travail est très actif et fonctionne depuis plus de 20 ans. Il soutient la mission éducative (qui est en pleine expansion) des jardins botaniques de langue allemande et offre une plateforme pour mettre en réseau les animateurs des jardins. En particulier, le groupe partage les bonnes pratiques et les bonnes idées, coordonne des formations supérieures pour les animateurs et soutient le développement de nouvelles écoles vertes et la recherche en pédagogie. Les membres du groupe comprennent des enseignants, des biologistes ou des jardiniers, des travailleurs indépendants ainsi que des employés et tous ceux qui sont impliqués dans l'éducation et les relations avec le public dans les jardins botaniques.

Il y a deux rencontres par an pour le personnel éducatif : l'une lors des rencontres annuelles de l'association,



*Renewable resources – Opportunity or risk? Activity run at the educators' meeting in 2011 at Mainz Botanic Garden (Marina Hethke)*

et l'autre lors des deux jours de rencontres des animateurs organisés par le groupe de travail. Ces rencontres offrent des formations pour tous ceux dans l'association qui sont intéressés par un thème particulier. Il fournit une vue approfondie de ce thème, met en lumière les théories pertinentes et les idées nouvelles concernant les méthodes pédagogiques. Les résultats de ces rencontres sont retranscrits dans des articles qui sont mis à la disposition de tous les membres de l'association.

## RESUMEN

Uno de los grupos de trabajo de la asociación de Jardines Botánicos de habla alemana es la educación. Este proporciona una plataforma y red de trabajo entre los educadores de habla alemana para apoyar y hacer crecer las tareas educativas. En particular, el grupo intercambia las mejores prácticas e ideas, coordina entrenamiento avanzado para educadores y el desarrollo de nuevas Escuelas Verdes e investigación educativa. Los miembros que integran este grupo son profesores, biólogos, jardineros, personal empleado de tiempo completo o por contrato además de cualquier otro profesional interesado en la educación y relaciones públicas dentro de los jardines botánicos.

Se efectúan dos reuniones por año para el personal educativo – una, durante la reunión anual de la asociación y la segunda durante dos días de la reunión de Educadores en Jardines, organizada por el grupo de trabajo. En esta reunión se ofrece entrenamiento para cualquier persona de la asociación interesada en algún tema en particular. Se proporciona una vista más profunda de los temas, realizando teorías y nuevas ideas enfocadas a la metodología educativa. Los resultados de estas dos reuniones se documentan en artículos que son eventualmente disponibles para todos los miembros de la asociación.

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# Postgraduate perspectives on training

Becoming a senior manager in a botanic garden often requires people to break through 'glass ceilings'. University of Delaware's Longwood Graduate Program (LGP) in Public Horticulture is an established American postgraduate course supporting students to take on this challenge. **Sarah Levin Stevenson** provides a student's perspective in learning how to connect public gardens with their communities.



*The Longwood Graduate Program class of 2013 visiting the Rainforest Trail at the Singapore Botanic Garden in January 2012. (Abby Johnson)*

Like many in our field, my path to public horticulture was a winding one. I was trained as a classicist. I spent my undergraduate years at the Colorado College studying Latin and ancient Greek, then taught high school Latin for four years. While taking a break from teaching to earn an MA in Latin at the University of Washington I picked up a part-time gardening job simply as an

excuse to get outside – I had no idea this move would change the course of my career. The company was a small, organic landscaping operation run entirely by women and my supervisor took me under her wing and patiently taught me how to care for plants. I experienced the instant gratification of installing a garden and making a space beautiful. I learned the long-term process of watching plants

grow through the seasons. We worked with clients to turn lawns into gardens and educated them about environmentally friendly garden design.

Then I began to miss teaching, so I volunteered for an environmental education programme working with young students. It was inspiring to show young minds how to connect with the



*The famous blue poppies (Meconopsis) in bloom, inside the Conservatory at Longwood Gardens. (Wonsoon Park)*

environment in fun and creative ways. For example, before showing the students how to plant seeds, we would get them to mimic seed germination with their bodies, crouching down small and then slowly growing and stretching up towards the sun to feel more of a connection with the seed they were about to plant.

Next came a period as the Education Intern at the Morris Arboretum of the University of Pennsylvania. It was a crash course in the field of education at



*Dr. Robert Lyons, Director of the Longwood Graduate Program and Professor of Landscape Horticulture at the University of Delaware. (Robert Lyons)*

a public garden, with experience of working with volunteers and developing classes. I realised this was the right path for me. What I wanted next was the best training possible to help me achieve a senior position in public programmes.

When I heard about the Longwood Graduate Program (LGP) it was clear that in so many ways it meshed with my interests and the training I was seeking – the Program would propel me into the field and expose me to all aspects of running a public garden. I applied and was accepted.

### **The Program**

Longwood Gardens set up its inaugural Longwood Graduate Program (LGP) class in 1967, really as a reaction to an anticipated lack of professional leadership training in the field, in the short- and longer-term future. The LGP aimed to deliver a training programme that built capacity. It would encourage future leaders to be classmates, to work together, and to create a strong alumni network.

The LGP has been under the guidance of three directors since its inception. Today's head, Dr Robert Lyons, has incorporated requirements to ensure

leadership skills development in a number of areas: project management, teamwork, fundraising, environmental impact, event planning, travel, and personal development through thesis research and selected coursework.

These various aspects of the Program have been incredibly valuable to me, both personally and professionally. I have been able to travel to fascinating gardens and meet top-level staff to learn how gardens all over the world are run and how they approach education. I now have experience with marketing to attract a larger audience to our events, as well as fundraising, budgeting, and design. I have learned both how to lead a group and to be a strong member of the team. All of our projects are planned and executed by the Fellows, under the guidance of our director.

### **Some Program aspects**

**Group Projects:** We plan, organise, and run an annual symposium to cover current issues and bring experts in the field to the Philadelphia area. This year's symposium topic is 'Shifting Landscapes: Cultivating Connections with a Broader Community' and we are fortunate to have an amazing line-up of speakers, including BGCI's own

Asimina Vergou who will talk about BGCI's Communities in Nature project. During our Professional Outreach Project (POP) each summer, we become *pro-bono* consultants. We work with an actual regional public garden to identify a significant issue or challenge and develop solutions for it. This project takes place far from the classroom but has probably taught me the most about what it really takes to work in a public garden.

**Travel:** One of the highlights of the Program is an international trip. My class visited Singapore and Indonesia, and the experience really demonstrated how global the public garden community is. I was able to speak the same botanical language with colleagues abroad and it was especially valuable to meet other educators who shared a similar desire to reach out to the public and create transformative experiences. Closer to home, we get to know our local public horticulture community very well and travel to public gardens throughout North America to make further connections and comparisons. These trips help demonstrate the variety of shapes, sizes and management styles that exist at public gardens around the world. As an educator, it has been invaluable to see how different education and public programmes are executed, and to build a broad network of colleagues.



*Longwood Graduate Fellows pose in front of a mock up the signs created and installed during the Professional Outreach Project. (The Longwood Graduate Program)*

**Professional development:** The LGP Fellows are encouraged to work on a variety of projects at Longwood. My involvement with the Longwood Gardens education department has given me experience in creating coursework for Continuing Education. I focused on designing classes to attract the often-elusive 'millennial generation', hoping to expand the demographic with tempting course offerings.

**Coursework and thesis research:** We take courses at the University of Delaware and develop our thesis work to focus on our personal career interests. My thesis, *Rooted in the Community: Tools for Engagement at Public Gardens*, involves research to help identify strategies for community engagement and social inclusion. I have interviewed

dozens of people and learned a great deal about creating effective public engagement, an area I plan to pursue in my career.

My time in the Program has been invaluable – I know I have developed my skill set and my path in public horticulture has become concrete. Graduation will be in May 2013 and I am hoping to gain a position in the field where I can continue my work in connecting public gardens with their communities.

### Application Process

LGP accepts ambitious students, most often already working in public horticulture or related fields, and helps them to acquire the skills necessary to break through any 'glass ceiling' and find leadership positions after graduation. This is a thesis-driven Master of Science degree, delivered in a partnership between the University of Delaware in Newark and Longwood Gardens in Kennett Square, PA. It is a fellowship programme, so students receive a stipend and funding to cover tuition, thesis research, and general professional development. Applications are due in mid-November and the LGP generally accepts five students a year, coming from anywhere in the world.

Please see our website <http://ag.udel.edu/longwoodgrad/> for more information.

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*Longwood Graduate Fellows enjoying the orchid house at the Cibodas Botanical Garden in West Java, Indonesia. (Abby Johnson)*



Spring blooms at Longwood Gardens. (Woonsoon Park)

## RÉSUMÉ

Le programme d'études supérieures Longwood en horticulture publique (LGP) est un diplôme en deux ans de Master de science, basé sur une thèse, proposé en commun par les Jardins de Longwood à Kennett Square en Pennsylvanie et l'Université de Delaware. Officiellement fondée en 1966, LGP a une longue histoire de formation de dirigeants en horticulture publique. Le programme nécessite plusieurs projets d'équipe, ainsi que la recherche de thèse individuelle et des cours d'études supérieures, pour assurer l'équilibre et un apprentissage par l'expérience. Parmi d'autres projets, le travail d'équipe comprend : la planification et l'exécution d'un colloque annuel, la consultation sur un projet à court terme avec une institution publique régionale d'horticulture et l'évaluation et la réduction de l'impact environnemental de la LGP.

Mon programme de recherche individuelle se concentre sur l'engagement local dans les jardins publics. J'ai travaillé dans le monde entier

pour rencontrer et établir des liens avec des responsables de divers jardins. En tant qu'animateur, j'ai consolidé mes compétences en pédagogie et en gestion au travers du LGP, me préparant pour une position de direction après le diplôme. Le LGP accueille les étudiants américains ainsi que les étudiants internationaux. Consultez [www.udel.edu/longwoodgrad](http://www.udel.edu/longwoodgrad) pour plus d'information.

## RESUMEN

El programa Longwood en Horticultura Pública (LGP) tiene un nivel de maestría universitaria y consiste en dos años, se imparte en asociación con el Jardín Botánico de Longwood en Kennett Square, Pensilvania y la Universidad de Delaware. Fue oficialmente establecido en 1966 y desde su inicio LGP ha entrenado a líderes en horticultura pública.

El currículo del programa incluye tanto proyectos en equipo como tesis individuales, además de cursos de trabajo que aseguran un balance de aprendizaje experimental. En el trabajo en equipo se

incluye el planear y llevar a cabo un simposio anual, un proyecto a corto plazo de asesoría en una institución regional de horticultura pública, y estimación y mitigación del impacto ambiental de LGP, entre otros proyectos más.

Mi programa de investigación individual se enfoca a compromisos de las comunidades con jardines botánicos públicos. He viajado globalmente conociendo y estableciendo colaboración con líderes de diversos jardines. A través del LGP he consolidado habilidades como educador, profesor y administrador, que después de mi graduación me prepararon como líder. LGP recibe estudiantes de los EE.UU. e internacionales. Para información adicional consultar el sitio [www.udel.edu/longwoodgrad](http://www.udel.edu/longwoodgrad)

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# Learning on-line cuts the distance for Education for Sustainability

BGCI and a consortium of international organisations, including London South Bank University (LSBU), are launching the first ever international site-based distance-learning course on Education for Sustainability. Students with good on-line access will be able to study from anywhere in the world at times best suited to them. Accredited and administered by LSBU, the course is conducted in English and delivered entirely on-line by tutors who are also experienced site-based educators.

Educators working at conservation sites tend to have a background either in formal school teaching or in environmental science – neither of which fully equips them for the challenge of working with such a wide range of people, from the general public to youth groups and school parties, in informal settings. There has been a clear lack of professional training routes for educators to develop insights into such topics as understanding audiences, developing conservation messages, deciding on learning activities and theories, planning educational activities, selecting effective interpretation media and working through ethical dilemmas. The need for a course that addressed these topics was identified by organisations that subsequently partnered the University in its development: Botanic Gardens Conservation International, Field Studies Council, Royal Society for Protection of Birds, Wetland Link International and Wildfowl and Wetlands Trust.



*Students participate in an ice-breaking activity during the evaluation of the pilot course. (LSBU)*

Working with these partners, LSBU has developed a tailor-made course which is delivered entirely on-line by experienced tutors who are also themselves practising site-based educators. In addition, expert tutors from the partner organisations moderate the discussions and offer appropriate support.

## Network benefits

The job of a site-based educator can often be rather lonely, with one person responsible for overseeing the entire education programme of the organisation. This solo role means there are no fellow educators to bounce ideas off.



*Barrie Cooper, International Education Manager for the RSPB and one of the distance-learning tutors on the course shares his views with students about an educational resource. (LSBU)*

This course creates an opportunity for a creative, dynamic and safe space on-line where participants can share ideas and build a learning community of good practice in site-based education. The excellent potential for long-term continuation of relationships initiated in this way offers a strong support network after graduation.

The learning process is facilitated through a series of structured and purposeful activities in which participants explore different aspects of their role as an educator. In line with current thinking and theory, the activities are practical and made relevant to their working context. On the one hand, students come to grips with the latest methods of developing sustainable sites that are accessible to a wide variety of visitors. On the other, the course helps them to develop skills in planning, delivering and evaluating sessions. Participants, supported by both tutors and fellow students, can explore a variety of topics which (unpacking both theories and practice) help to develop an individual's awareness of being an agent of change – in themselves, their site and its stakeholders, and their audiences. The work carried out during these activities, which includes several pieces of writing reflecting on personal development and the progress of their studies, is collated in a personal portfolio; this is also the means for students to be assessed.

### Ways to study

This course is accredited by LSBU as a stand-alone certificated module but, alternatively, it can be studied as an optional 20 credit module on the MSc

Education for Sustainability which is also delivered by distance learning. Students electing the first route may later choose to use the credits gained towards the MSc degree. It is an international course which can be studied from anywhere in the world – this allows students to participate at times which suit them, providing they have good on-line provision.

The success of the pilot course run in 2010 illustrates that this approach is highly beneficial for site-based educators. Participants agreed that they had grappled with many issues of which they had not previously been aware, and that understanding these had changed the way they approached both their

teaching and the day-to-day work at their sites. Sharing ideas with other students had enriched their own teaching, and the group agreed that they had found solutions to many of the problematic issues faced in site-based education in the on-line conversations. The virtual learning environment (VLE) is designed in such a way that participants can build up their skills and knowledge gradually, to apply them to the real context of their work environment. This is also an opportunity for managers to support professional development: the course not only helps students realise the potential for an effective education programme, but also equips them to contribute to the development of a dynamic organisational strategy.

If you want to increase your knowledge and skills in site-based education and are keen to orientate your programmes towards sustainability, this is the course for you. While the partner organisations are all conservation-oriented, this is also an ideal opportunity for educators in other fields, such as museums, libraries and national heritage sites, to engage with a broad spectrum of approaches to site-based education. Whether you work at an outdoor site - such as a field studies centre, wetland area or nature reserve - or indoors, the Site-Based Education for Sustainability module will help you deliver education more effectively.



*The course helps develop skills in planning, delivering and evaluating sessions (BGCI)*

## Interested in applying?

The next cohort starts in September 2013 and you will need to commit 200 hours of study over the period from September 2013 to May 2014. To apply you will need to be employed as an educator delivering environmental education and personal engagement activities, or working in education in a voluntary capacity at a site or on a project. For successful application, you will need an honours degree (minimum of 2:2 honours) from a UK, EU or International University, or equivalent qualification or professional experience. We welcome equivalent qualifications from around the world. If English is not your first language, you will need to pass an approved English language test. For further information, contact the course director (see below for details).

## RÉSUMÉ

Quand il s'agit de développer et de fournir des programmes d'éducation, la plupart des sites extérieurs partagent des défis communs. Par exemple : connaître les publics, développer des messages sur la conservation, décider des activités d'apprentissage et des théories, choisir des supports d'interprétation efficaces et travailler sur des dilemmes éthiques. Pour aborder ces défis, un consortium d'organisations internationales et la London South Bank University ont joint leurs forces pour mettre en place le premier cours d'apprentissage à distance sur l'éducation au développement durable. Le consortium comprend le « Botanic Gardens Conservation International », le « Field Studies Council », la « Royal Society for Protection of Birds », le « Wetland Link International » et le « Wildfowl and Wetlands Trust ».

Cette formation est accréditée et administrée par la LSBU, et peut être suivie de n'importe quelle région dans le monde. A condition que les élèves aient un bon accès internet, ceux-ci peuvent choisir le moment de participer en fonction de leur disponibilité. Le cours est donné en anglais et il est entièrement dispensé en ligne par des tuteurs expérimentés, qui sont aussi des animateurs professionnels expérimentés. Il offre également des points pour le Master de science « Education au développement durable » de LSBU.



*Course activities are practical and relevant to students' working situations. (BGCI)*

Cet article explique comment, en participant aux cours, les étudiants peuvent accroître leurs connaissances et leur savoir-faire en éducation et orienter leurs programmes vers le développement durable.

## RESUMEN

En lo que refiere a desarrollar y comunicar programas de educación, la mayoría de instituciones tienen retos comunes, por ejemplo, entender audiencias, formular mensajes de conservación, decidir en qué actividades y teorías de aprendizaje, planeamiento de actividades educativas, selección efectiva de publicidad e interpretación y trabajar a través de dilemas éticos. En respuesta a estos retos, un consorcio internacional de organizaciones y la Universidad de South Bank en Londres (LSBU), se unieron para establecer por primera vez un sitio de un curso a distancia en Educación y sustentabilidad. El consorcio está formado por BGCI, Field Studies Council, Royal Society for Protection of Birds, Wetland Link International y Wildfowl and Wetlands Trust.

La administración y créditos del curso son por medio de LSBU, se puede llevar a cabo a nivel global. De esta forma se proporciona a los estudiantes un buen acceso en línea que les permite consultar flexiblemente de acuerdo a sus horarios. El curso es en inglés y lo apoyan tutores expertos, quienes también tienen práctica en educación por medio de sitios electrónicos. Los créditos del curso son a nivel de MSc de la Educación para la sustentabilidad. Este artículo explica a los estudiantes como pueden participar en un sitio electrónico e incrementar el conocimiento y habilidades orientados hacia la sustentabilidad.

**Ros Wade**  
**Course Director**  
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**Website: [www.lsbu.ac.uk/ahs/departments/socialsciences/efs.shtml](http://www.lsbu.ac.uk/ahs/departments/socialsciences/efs.shtml)**

# Resources

## RESOURCES

### Books

#### Transforming Museums in the Twenty-first Century

This book argues that museums must transform themselves if they are to remain relevant to 21st Century audiences - something which is necessary despite the current economic crisis. The development of new technologies and the way we interact socially demands a re-assessment of how cultural institutions engage with their audiences. Through case studies and practical examples, this book creates a new vision for museums committed to participation and collaboration, unrestricted by walls and opening hours. In particular, it features:

- an introduction focusing on the challenges that face museums in the 21st century
- an analysis of population trends and their likely impact on museums
- boxes showing ideas, models and planning suggestions to guide development
- examples and case studies illustrating practice in both large and small museums
- an up-to-date bibliography of research, including numerous websites

Museums and botanic gardens share a long cultural history and, while they are different types of organisations, they would do well to heed Black's words.

Graham Black, 2011, Routledge  
[www.routledge.com](http://www.routledge.com)

ISBN: 978-0-415-61573-0 (Paperback)  
ISBN: 978-0-415-61572-0 (Hardback)

## RESSOURCES

### Livres

#### Transformer les musées du 21ème siècle

Ce livre soutient que les musées doivent se transformer s'ils veulent rester en phase avec les publics du 21ème siècle – ce qui est nécessaire malgré l'actuelle crise économique. Le développement des nouvelles technologies et la façon dont nous interagissons socialement, demandent une révision de la façon dont les institutions culturelles en appellent à leurs publics. A travers des études de cas et des exemples pratiques, ce livre apporte une nouvelle inspiration pour les musées ouverts à la participation et la collaboration, et qui ne sont pas enfermés dans leurs murs ou dans leurs horaires d'ouverture. En particulier, il comprend :

- une introduction centrée sur les défis qui attendent les musées du 21ème siècle
- une analyse des tendances démographiques et leur impact sur les musées
- des encadrés avec des idées, modèles et propositions de programmes pour orienter le développement
- des exemples et études de cas qui illustrent la pratique dans des musées, grands et petits
- une bibliographie à jour des recherches, y compris de nombreux sites internet

Les musées et jardins botaniques partagent une longue histoire culturelle et, bien que ce soit des types d'organisations différentes, ils feraient bien de suivre les conseils de Black.

## RECURSOS

### Libros

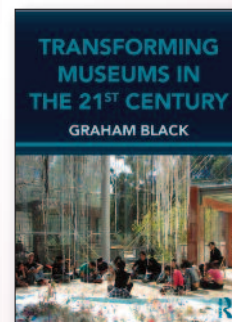
#### La transformación de los museos en el siglo XXI

Este libro sostiene que los museos deben transformarse si quieren seguir siendo relevantes para el público del siglo XXI, algo sumamente necesario a pesar de la crisis económica actual. El desarrollo de nuevas tecnologías y de las formas en que interactuamos socialmente, exigen una reevaluación de la manera en que las instituciones culturales se relacionan con sus audiencias. A través de estudios de casos y ejemplos prácticos, este libro crea una nueva visión para los museos comprometidos con la participación y la colaboración, sin restricciones dadas por paredes u horarios de apertura.

En lo particular, el libro presenta:

- una introducción enfocada sobre los desafíos que enfrentan los museos en el siglo XXI
- un análisis de las tendencias demográficas y su posible impacto sobre los museos
- muestras de ideas, modelos y propuestas de planificación para orientar el desarrollo
- ejemplos y estudios de casos que ilustran las prácticas en museos grandes y pequeños
- una bibliografía en materia de investigación, actualizada, incluyendo numerosos sitios web

Los museos y los jardines botánicos comparten una larga historia cultural y, aunque son diferentes organizaciones diferentes, ambos harían bien en tomar en cuenta las palabras de Graham Black.





### **Why Aren't We Saving the Planet? A Psychologist's Perspective**

Have you ever asked yourself why are we not saving the planet? This book follows one psychologist's mission to find some answers to this question. Challenged by a student to use psychology to find the root of the problem, Geoffrey Beattie (a self-confessed environmental non-believer) begins a personal and life-changing journey of discovery using psychological

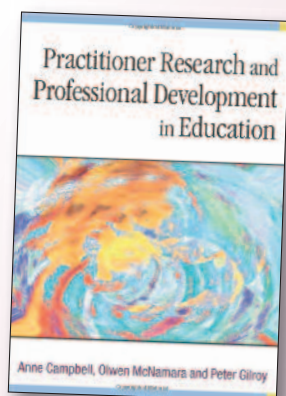
methods to examine people's attitudes to global warming. Along the way Beattie's own attitudes are challenged, as well as our own. This readable book highlights new and innovative research carried out into how we

can change attitudes, encouraging people to become more concerned about the environment and adopt sustainable behaviours.

*Geoffrey Beattie, 2010, Routledge  
www.routledge.com  
ISBN: 978-0-415-56197-6(Paperback)  
ISBN: 978-0-415-56196-9 (Hardback)*

### **Practitioner Research and Professional Development in Education**

This practical and accessible book promotes action research, helping practitioners to develop their skills in critical appraisals and analysis of practice. It aims to support practitioners in undertaking small-scale inquiries and research investigations to improve their professional capacity and their students' achievement. The authors suggest a range of activities for evaluating teaching including observations, autobiographical approaches and narrative writing. They also cover related areas such as data analysis, write up of research and disseminating



*Graham Black, 2011, Routledge  
www.routledge.com  
ISBN: 978-0-415-61573-0 (Paperback)  
ISBN: 978-0-415-61572-0 (Hardback)*

### **Pourquoi ne sauve-t-on pas la planète? Le point de vue d'un psy**

Vous êtes-vous déjà demandé pourquoi l'on ne sauve pas la planète ? Ce livre suit le parcours d'un psychologue pour trouver quelques réponses à cette question. Relevant le défi d'un étudiant qui lui demandait d'utiliser la psychologie pour trouver la source du problème, Geoffrey Beattie (un « non croyant » environnemental, tel qu'il se définit lui-même) se lance dans un voyage initiatique personnel, utilisant des méthodes psychologiques pour examiner les attitudes des gens sur le réchauffement climatique. En chemin, les attitudes de Beattie lui-même sont remises en cause, ainsi que les nôtres. Le livre met en valeur des recherches nouvelles et innovantes sur comment nous pouvons changer nos attitudes et encourager les gens à se sentir plus concernés par l'environnement et adopter des comportements responsables.

*Geoffrey Beattie, 2010, Routledge  
www.routledge.com  
ISBN: 978-0-415-56197-6(Paperback)  
ISBN: 978-0-415-56196-9 (Hardback)*

### **Recherche et développement professionnel dans l'éducation**

Cet ouvrage, pratique et accessible, fait la promotion de la recherche-action, aidant les professionnels à développer leurs compétences en évaluation critique et en analyse de la pratique. Il vise à encourager les professionnels à mettre en place des enquêtes et des études à petite échelle pour améliorer leurs compétences professionnelles et les résultats de leurs élèves. L'auteur propose une série d'activités pour évaluer l'enseignement, y compris des observations, des approches autobiographiques et l'écriture narrative. Des sujets proches comme l'analyse des données, la rédaction de travaux de recherche et la

*Graham Black, 2011, Routledge  
www.routledge.com  
ISBN: 978-0-415-61573-0 (Paperback)  
ISBN: 978-0-415-61572-0 (Hardback)*

### **¿Por qué no estamos salvando el planeta? La perspectiva de un psicólogo**

¿Alguna vez te has preguntado por qué no estamos a salvando el planeta? Este libro sigue la misión de un psicólogo para encontrar algunas respuestas a esta pregunta. Retado por un estudiante a utilizar la psicología como vía para encontrar la raíz del problema, Geoffrey Beattie (un auto-confeso ambientalista incrédulo), comienza un viaje de descubrimiento, personal y de cambio de vida, utilizando métodos psicológicos para examinar las actitudes de la gente frente al calentamiento global. En el camino nuestras actitudes y las del propio Beattie son cuestionadas las actitudes. Este libro de fácil lectura resalta las nuevas e innovadoras investigaciones que se realizan para conocer cómo podemos lograr un cambio de actitud, alentando a la gente a tener mayor consciencia hacia el ambiente, y a adoptar conductas sostenibles.

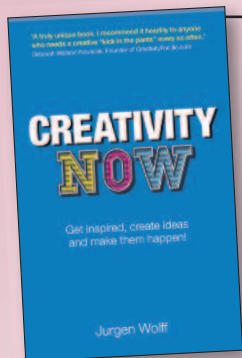
*Geoffrey Beattie, 2010, Routledge  
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### **Investigación y Desarrollo Profesional en Educación**

Este libro práctico y accesible promueve la investigación-en-acción, ayudando a los profesionales a desarrollar sus habilidades para una apreciación crítica y para el análisis de la práctica. Su objetivo es apoyar a los profesionales en la realización de indagaciones en pequeña escala, así como investigaciones para mejorar tanto su capacidad profesional como los logros de sus alumnos. Los autores sugieren una serie de actividades para evaluar la enseñanza, incluyendo observaciones, enfoques autobiográficos y escritura narrativa. También cubren áreas relacionadas, tales como el análisis de datos, la escritura y divulgación de los resultados de la investigación. Esto sería sin duda un recurso muy útil para los educadores de jardines botánicos, interesados en llevar a cabo investigación para mejorar su práctica.

results. This would make a very useful resource for educators in botanic gardens keen to carry out research to improve their practice.

Anne Campell, Olwen McNamara, Peter Gilroy, 2004. SAGE Publications  
[www.sagepub.com](http://www.sagepub.com)  
ISBN: 978-0-761-9 7468-0



### **Creativity Now: Get Inspired, Create Ideas and Make Them Happen!**

This book will instantly help you generate new ideas through exercises, tips, tricks, stories and inspirational examples. It is divided into four parts offering advice on:

- 1) Dreaming - getting into the state of mind to invite new ideas.
- 2) Originating - different ways to come up with new, exciting and innovative ideas on any topic.
- 3) Applying - taking action and turning ideas into reality.
- 4) Adapting - how others successfully realised their dream.

Each page is creative in content and format and has been designed to give an instant jolt of inspiration!

Jurgen Wolff, 2012, Pearson Education Limited  
[www.pearsoned.co.uk/bookshop/](http://www.pearsoned.co.uk/bookshop/)  
ISBN: 978-0-273-77047-3

### **Living within a Fair Share Ecological Footprint**

Many of us would accept that as a species, we humans are consuming the earth's natural resources faster than they can be replenished: we are living beyond the planet's carrying capacity. This book is therefore a timely resource, focusing on solutions rather than problems. Its aim is to demonstrate how we can live within a 'fair earth share ecological footprint'. The authors describe numerical methods used to calculate this, concentrating on low or no cost behavioural change, rather than on potentially expensive technological innovation. They show what people need to do now in regions where their current lifestyle means they are living beyond

dissémination des résultats, sont également couverts. C'est une ressource très utile pour les éducateurs de jardins botaniques qui souhaitent faire de la recherche pour améliorer leur pratique.

Anne Campell, Olwen McNamara, Peter Gilroy, 2004. SAGE Publications  
[www.sagepub.com](http://www.sagepub.com)  
ISBN: 978-0-761-9 7468-0

### **La créativité tout de suite: soyez inspirés, créez des idées et appliquez-les !**

Ce livre vous aidera immédiatement à trouver de nouvelles idées à travers des exercices, des conseils, des histoires et des exemples inspirants. Il est divisé en quatre parties qui proposent des conseils sur :

- 1) Rêver – se mettre dans un état d'esprit qui invite les idées nouvelles
- 2) Donner vie – différentes façons de trouver des idées excitantes et innovantes sur tout sujet
- 3) Appliquer – agir et transformer les idées en réalité
- 4) Adapter – comment d'autres ont réalisé leurs rêves avec succès

Chaque page est créative, dans le fond et dans la forme, et a été conçue pour stimuler l'inspiration !

Jurgen Wolff, 2012, Pearson Education Limited  
[www.pearsoned.co.uk/bookshop/](http://www.pearsoned.co.uk/bookshop/)  
ISBN: 978-0-273-77047-3

### **Vivre dans une empreinte écologique équitable**

En majorité, nous sommes d'accord pour dire que nous, les humains, consomons les ressources naturelles de la Terre plus vite qu'elles ne peuvent se régénérer : nous vivons au-delà des capacités de la planète. Ce livre est donc une ressource qui arrive à point, se concentrant sur les solutions plutôt que les problèmes. Il vise à démontrer que nous pouvons vivre dans une « empreinte écologique équitable ». Les auteurs décrivent les méthodes numériques utilisées pour la calculer, se concentrant sur des changements de comportement gratuits ou presque, plutôt que sur des innovations techniques coûteuses. Ils montrent ce que doivent maintenant faire les gens

Anne Campell, Olwen McNamara, Peter Gilroy, 2004. SAGE Publications  
[www.sagepub.com](http://www.sagepub.com)  
ISBN: 978-0-761-9 7468-0

### **¡Creatividad ahora: Inspirarse, crear ideas y hacerlas realidad!**

Este libro le ayudará instantáneamente a generar nuevas ideas a través de ejercicios, consejos, trucos, historias y ejemplos inspiradores. Se divide en cuatro partes que ofrecen consejos sobre:

- a) Soñar: entrar en el estado mental óptimo para hacer surgir nuevas ideas.
- b) Originar: diferentes formas para llegar a ideas nuevas, emocionantes e innovadoras sobre prácticamente cualquier tema.
- c) Aplicar: actuar y transformar las ideas en realidad.
- d) Adaptación: cómo otras personas han llevado a cabo sus sueños exitosamente.

Cada página es creativa en su contenido y formato, y ha sido diseñada para dar una sacudida instantánea a la inspiración.

Jurgen Wolff, 2012, Pearson Education Limited  
[www.pearsoned.co.uk/bookshop/](http://www.pearsoned.co.uk/bookshop/)  
ISBN: 978-0-273-77047-3

### **Viviendo dentro de una Huella Ecológica Justa**

Muchos de nosotros aceptaríamos que, como especie, los seres humanos estamos consumiendo los recursos naturales de la Tierra más rápido de lo que pueden ser reemplazados: estamos viviendo por encima de la capacidad de carga del planeta. Por lo tanto este libro es un recurso oportuno, enfocado en las soluciones en lugar de en los problemas. Su objetivo es demostrar cómo se puede vivir dentro de una 'huella ecológica justa'. Los autores describen los métodos numéricos utilizados para calcular esto, concentrándose en los cambios de conducta de bajo o con ningún costo, en lugar de enfocarse sobre las innovaciones tecnológicas potencialmente caras. Los autores muestran lo que hay que hacer hoy en aquellas regiones cuyos estilos de vida actual demuestran que están viviendo

their ecological means, such as in Europe, North America and Australasia. The calculations focus on outcomes rather than on detailed discussion of the methods used. The main objective is to show that living with a reduced ecological footprint is both possible and not so very different from the way most people currently live in the west.

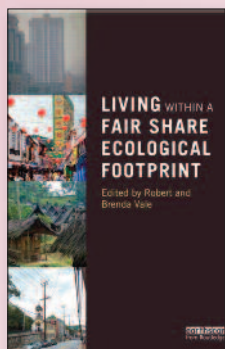
*Robert Vale and Brenda Vale, 2013, Routledge  
www.routledge.com  
ISBN: 978-0-415-50723-3*

## Web links/Websites

### Learnist

<http://learni.st/category/featured#/category/5-science>

Learnist is a useful website for teachers and educators. It allows users to collect web resources around a topic and add them to 'Learnboards' to educate an audience about a particular subject. You can create multiple boards within your account and include images, videos, and text. The science area of Learnist contains a range of fascinating 'Learnboards' relevant to botanic garden education, for example, permaculture, photosynthesis, biodiversity and nature's numbers.



vivant dans des régions où le mode de vie dépasse la capacité écologique, telles que l'Europe, l'Amérique du nord ou l'Australasie. Les calculs sont centrés sur les résultats plutôt que sur une discussion détaillée des méthodes utilisées. L'objectif principal est de montrer

que vivre avec une empreinte écologique réduite, est à la fois possible et proche de la façon dont vivent la plupart de gens en Occident aujourd'hui.

*Robert Vale and Brenda Vale, 2013, Routledge  
www.routledge.com  
ISBN: 978-0-415-50723-3*

### Liens internet/ Sites

#### Learnist

<http://learni.st/category/featured#/category/5-science>

Learnist est un site Internet utile pour les enseignants et les éducateurs. Il permet de rassembler des ressources internet sur un sujet et de les ajouter à des « tableaux éducatifs » pour renseigner un public sur un sujet particulier. On peut créer des tableaux multiples dans son compte et inclure des images, des vidéos et des textes. Le domaine Science de Learnist contient une série de «



tableaux éducatifs » passionnants et utiles pour les jardins botaniques, par exemple sur la permaculture, la photosynthèse, la biodiversité et les nombres dans la nature.

### Des voix dans le musée: recherche qualitative dans les musées nationaux

[www2.le.ac.uk/departments/museumstudies/rcmg/publications](http://www2.le.ac.uk/departments/museumstudies/rcmg/publications)

Comment les musées nationaux peuvent-ils contribuer à la cohésion européenne et faire face aux questions sociales qui dérangent la stabilité et l'unité européenne ? Ce sujet de

por encima de sus medios ambientes, como ocurre en Europa, Norteamérica y Australasia. Los cálculos se centran en los resultados, en vez de hacer una discusión detallada de los métodos utilizados. El objetivo principal es mostrar que la vida dentro de una huella ecológica reducida es posible y no muy diferente a la forma en la que viven la mayoría de las personas en occidente.

*Robert Vale and Brenda Vale, 2013, Routledge  
www.routledge.com  
ISBN: 978-0-415-50723-3*

## Sitios Web

### Learnist

<http://learni.st/category/featured#/category/5-science>

Learnist es un sitio web útil para profesores y educadores. Permite a los usuarios compilar recursos del internet en torno a un tema y añadirlos a "Pizarras de aprendizaje" para educar al público sobre un tema en particular. El usuario puede crear varias tarjetas en su cuenta e incluir imágenes, videos y texto. El área de la ciencia de Learnist contiene una serie de fascinantes "Pizarras de aprendizaje" relevantes para la educación en los jardines botánicos, por ejemplo, sobre temas de permacultura, la fotosíntesis, la biodiversidad y la numerialia de la naturaleza.

### Voces del Museo: Investigación cualitativa realizada en Museos Nacionales de Europa

[www2.le.ac.uk/departments/museumstudies/rcmg/publications](http://www2.le.ac.uk/departments/museumstudies/rcmg/publications)

¿Cómo pueden los museos nacionales apoyar la mayor cohesión europea y hacer frente a los problemas sociales que ponen a prueba la unidad y estabilidad de Europa? Esta pregunta de investigación está siendo examinada por el proyecto EuNaMus, financiado por el Séptimo Programa Marco para la Investigación en la Unión Europea. Tres equipos universitarios de investigación han examinado experiencias de los visitantes a los nueve museos nacionales de toda Europa, para comprender el uso de estos museos nacionales por el público, para mapear su entendimiento de cada nación y de

### Voices from the Museum: Qualitative Research Conducted in Europe's National Museums

[www2.le.ac.uk/departments/museumstudies/rcmg/publications](http://www2.le.ac.uk/departments/museumstudies/rcmg/publications)

How can national museums best aid European cohesion and confront the social issues which test European stability and unity? This research question is being examined by the EuNaMus project funded through the European Union's Seventh Framework Programme for Research. Three University research teams have

examined visitor experiences at nine national museums across Europe to understand the use of national museums by the public, to map their understanding of the nation and Europe in the



present and to explore how visitors use the past to construct national and European identities. The research identifies many of the variables that influence visitor responses around identity and citizenship. The discussion around the role of national museums is particularly interesting with the findings demonstrating that visitors see national museums as having cultural and historical authority and an important political role. The research also highlighted the fact that museums need to be more inclusive of minority issues and to provide more opportunities for dialogue around contemporary issues and identities.

### Geocaching

[www.geocaching.com](http://www.geocaching.com)

Geocaching is a real-world, outdoor treasure hunting game using GPS-enabled devices. Participants navigate to a specific set of GPS coordinates and then attempt to find the geocache (normally a waterproof container with small items inside) hidden at that location. Participants need a GPS device or a GPS-enabled mobile phone to navigate to the cache, and register for a free Geocaching membership. Geocaches can be found all over the world including several botanic gardens!

### Natural solutions- Nature's role in delivering well-being and key policy goals - opportunities for the third sector

[www.neweconomics.org/publications/natural-solutions](http://www.neweconomics.org/publications/natural-solutions)

This report by the New Economics Foundation provides an overview of the multiple ways in which the natural environment is used to deliver key society goals. Interviews were conducted with representatives of 33 different organizations revealing that there is a good deal of evidence linking nature with well-being and pro-

recherche est étudié par le projet EuNaMus, financé par le 7ème programme-cadre de recherche de l'Union européenne. Trois équipes universitaires ont examiné l'expérience des visiteurs de neufs musées nationaux à

travers l'Europe, pour comprendre leur utilisation de ces musées, cartographier leur compréhension présente de la nation et de l'Europe, et explorer comment les visiteurs utilisent le passé pour construire l'identité nationale et européenne. L'étude identifie de nombreuses variables qui influencent les réactions des visiteurs sur l'identité et la citoyenneté. La discussion sur le rôle des musées nationaux est particulièrement intéressante, avec des résultats montrant que les visiteurs considèrent que les musées nationaux font autorité sur la culture et l'histoire et qu'ils ont un rôle politique important. L'étude souligne également le fait que les musées doivent mieux prendre en compte les questions de minorités et fournir plus d'occasions de dialogue sur les questions contemporaines et sur les identités.

### Geocaching

[www.geocaching.com](http://www.geocaching.com)

Geocaching est un jeu en extérieur de chasse au trésor utilisant des appareils GPS. Les participants se rendent sur un site indiqué par des coordonnées GPS et tentent de trouver le geocache (habituellement une boîte imperméable contenant des petits éléments) caché sur le site. Les participants doivent avoir un appareil GPS ou un portable équipé d'un GPS pour trouver le cache, et s'inscrire gratuitement pour être membre de Geocaching. Les geocaches se trouvent dans le monde entier, y compris dans plusieurs jardins botaniques !



toda Europa en el presente, y para explorar cómo los visitantes utilizan el pasado para construir las identidades nacionales y europea. La investigación identifica muchas de las variables que influyen en las respuestas de los visitantes en torno a la identidad y la ciudadanía. La discusión en torno al papel de los museos nacionales es particularmente interesante con los hallazgos que demuestran que los visitantes ven a los museos nacionales como legítimas autoridades culturales e históricas y con un papel político importante. La investigación también puso de relieve el hecho de que los museos tienen que ser más incluyentes en cuanto a las cuestiones de las minorías, y que deben ofrecer más oportunidades para el diálogo en torno a temas de actualidad e identidad.científica y aprender de los errores.

### Geocaching

[www.geocaching.com](http://www.geocaching.com)

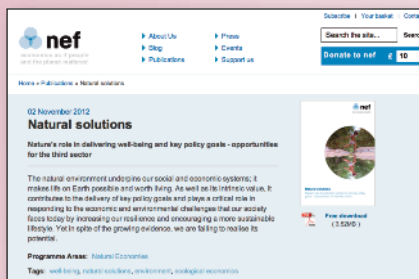
Geocaching (Geo-escondrijo) es un juego al aire libre sobre búsqueda de tesoros en el mundo real, que utiliza dispositivos habilitados con GPS. Los participantes se dirigen a un conjunto de coordenadas específicas para el GPS y luego trata de encontrar el escondrijo (normalmente un contenedor a prueba de agua con objetos pequeños dentro) que está escondido en el lugar que marcan las coordenadas. Los participantes necesitan un aparato GPS o un teléfono móvil con GPS para ubicar el escondrijo y registrarse para obtener una membresía gratuita en Geocaching. Estos Geo-escondrijos se puede encontrar en todo el mundo ¡incluyendo varios jardines botánicos!

### Soluciones naturales: el papel de la Naturaleza en el reparto de bienestar y metas políticas clave. Oportunidades para el tercer sector

[www.neweconomics.org/publications/natural-solutions/](http://www.neweconomics.org/publications/natural-solutions/)

Este informe de la New Economics Foundation brinda una visión general de las múltiples formas en que se utiliza el entorno natural para ofrecer objetivos sociales clave. Se realizaron entrevistas con representantes de 33 organizaciones diferentes, que revelaron

environmental behaviours. However the findings also show that this is not being fully exploited by policy makers and that there needs to be a platform for organisations to share information to encourage synergies and action.



## Research into environmental education

<http://eelinked.naaee.net/n/eeresearch>

The research area of the website for the North American Association for Environmental Education (naaee) provides access to hundreds of research papers on environmental education. Two recent papers which will be of interest to botanic gardens are:

- 1 Use behavioral theories to cultivate environmental literacy and pro-environmental behavior

Dr. Martha Monroe has used the literature on behavioral theories, significant life experiences, and environment-based education to identify “two broad avenues for activities that may nudge individuals and society toward more responsible environmental behaviors”: 1) targeting a specific behavior change, and 2) cultivating environmental literacy through educational programmes.

- 2 Multicultural school gardens facilitate learning about language, culture and environment

Dr. Cutter-Mackenzie explored learning outcomes of a school gardening programme in Melbourne, Australia. The research programme involved 70 students in designing, construction and implementation of a gardening programme along with teachers, parents and community volunteers. The programme was connected to the school curriculum and designed specifically for underserved, multicultural

## Solutions naturelles – le rôle de la nature pour atteindre des objectifs clés de politique et de bien-être - des opportunités pour le secteur tertiaire

[www.neweconomics.org/publications/natural-solutions](http://www.neweconomics.org/publications/natural-solutions)

Ce rapport de la Fondation New Economics fournit un aperçu des différentes façons d'utiliser l'environnement pour atteindre des objectifs sociétaux clés. Des entretiens ont été réalisés avec des représentants de 33 organisations différentes, révélant qu'il y a de nombreuses preuves liant la nature avec le bien-être et des comportements plus écologiques. Toutefois, ces résultats montrent également que ce fait n'est pas suffisamment utilisé par les politiques, et qu'une coordination entre les organisations est nécessaire pour partager les informations, encourageant les synergies et l'action.

## Recherche en éducation à l'environnement

<http://eelinked.naaee.net/n/eeresearch>

Le domaine « Recherche » du site internet de l'Association nord-américaine d'éducation à l'environnement (NAEEE) donne accès à des centaines de publications de recherche sur l'éducation à l'environnement. Deux publications récentes sont intéressantes pour les jardins botaniques :

1. Utilisez les théories comportementales pour développer les connaissances en environnement et les comportements écologiques

Dr Martha Monroe a utilisé la littérature sur les théories comportementales, des expériences vécues significatives et l'éducation basé sur l'environnement pour identifier « deux voies principales d'activités qui pourraient orienter les individus et la société vers des comportements plus écologiques » : 1) Fixer des objectifs précis de changement de comportement et 2) développer la connaissance de l'environnement à travers les programmes éducatifs.



la existencia de una gran cantidad de evidencias que vinculan a la naturaleza con el bienestar y el comportamiento pro-ambiental. Sin embargo, los resultados también muestran que esto no está siendo aprovechado totalmente por quienes crean las políticas, y que es necesario que haya una plataforma para que las organizaciones compartan información para fomentar sinergias y acciones.

## La investigación en educación ambiental

<http://eelinked.naaee.net/n/eeresearch>

El área de investigación de la página web de la Asociación Norteamericana para la Educación Ambiental (NAEE) proporciona acceso a cientos de trabajos de investigación sobre la educación ambiental. Dos artículos recientes que sin duda serán de interés para los jardines botánicos son:

1. Uso de la teoría para fomentar la cultura y el comportamiento pro-ambiental.

La Dra. Martha Monroe ha utilizado la literatura sobre las teorías del comportamiento, las experiencias de vida significativas de la vida y la educación basada en el ambiente, para identificar los "dos grandes avenidas para las actividades que tanto individuos como la sociedad pueden tomar para llegar a comportamientos más responsables hacia el ambiente":

- 1) Dirigirse hacia un cambio de comportamiento específico, y 2) el fomento de la alfabetización ambiental a través de programas educativos.
2. Los jardines escolares multiculturales facilitan el aprendizaje sobre el lenguaje, la cultura y el ambiente.

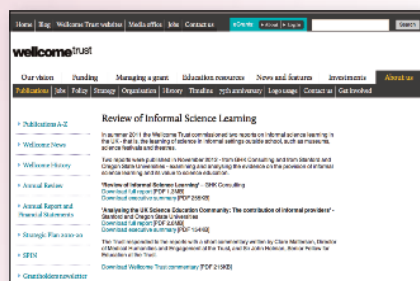
Dr. Cutter-Mackenzie exploró los resultados de un programa de jardines escolares en Melbourne, Australia. El programa de investigación involucró a 70 estudiantes en el diseño, construcción e implementación de un programa de jardinería junto con los maestros, los padres y voluntarios de

children, whose first language is not English. Qualitative data demonstrated that participation in this programme increased students' sense of belonging to the local community, provided a real-life opportunity to improve English, and contributed to students' connection to the environment and their 'sense of agency in protecting the environment'.

### Science beyond the classroom

[www.wellcome.ac.uk/About-us/Publications/Reports/Education/WTP040865.htm](http://www.wellcome.ac.uk/About-us/Publications/Reports/Education/WTP040865.htm)

The Wellcome Trust is a global charitable foundation dedicated to achieving improvements in human and animal health. The report 'Analysing the UK Science Education Community: The contribution of informal providers' makes provocative reading for botanic garden educators. It reveals that while there is a substantial body of academic literature addressing science in informal contexts, it is not read by practitioners. The research found that informal practitioners are overly reliant on ideas about learning and ideas about science that are simplistic, pointing to the need for a better knowledge of literature and systems of training.



2. Les jardins d'école multiculturels encouragent l'apprentissage autour des langues, la culture et l'environnement

Dr Cutter-Mackenzie a exploré les résultats d'un projet de jardins d'école à Melbourne, en Australie. Ce programme de recherche impliquait 70 élèves qui ont conçu, construit et mis en place un programme de jardinage avec les enseignants, parents et des bénévoles locaux. Le programme était lié au projet d'école et conçu spécialement pour des enfants défavorisés d'origines diverses, et dont la première langue n'est pas l'anglais. Les données qualitatives ont démontré que la participation à ce projet a développé un sentiment d'appartenance à la communauté, fournit une occasion réelle d'améliorer leur anglais, et contribué à créer des liens avec l'environnement pour les élèves, et développer leur envie de protéger l'environnement.

### Les sciences au delà des classes

[www.wellcome.ac.uk/About-us/Publications/Reports/Education/WTP040865.htm](http://www.wellcome.ac.uk/About-us/Publications/Reports/Education/WTP040865.htm)

La fondation Wellcome est une fondation charitable mondiale qui vise à améliorer la santé humaine et animale. Le rapport « Analyser la communauté d'éducation scientifique au Royaume-Uni : la contribution des éducateurs informels » est une lecture renversante pour les éducateurs de jardins botaniques. Il révèle que, bien qu'il existe quantité de publications académiques sur les sciences dans le contexte informel, elles ne sont pas lues par les professionnels. L'étude a démontré que les professionnels du secteur informel s'appuient sur des idées sur l'apprentissage et sur les sciences qui sont simplistes, soulignant la nécessité d'améliorer la connaissance des publications et les systèmes de formation.

la communauté. El programa estaba ligado con el currículo escolar y diseñado específicamente para niños de bajos recursos y diferentes culturas, cuyo primer idioma no es el inglés. Los datos cualitativos demostraron que la participación en este programa aumentó su sentido de pertenencia a la comunidad local, les ofreció una oportunidad real para mejorar el inglés, y ha contribuido a la vinculación de los estudiantes con su ambiente, creando un "sentido de agencia para la protección del ambiente".

### La ciencia más allá del aula

[www.wellcome.ac.uk/About-us/Publications/Reports/Education/WTP040865.htm](http://www.wellcome.ac.uk/About-us/Publications/Reports/Education/WTP040865.htm)

El Wellcome Trust es una fundación global sin fines de lucro, dedicada a lograr mejoras en la salud humana y animal. El informe "Análisis de la Comunidad Educativa del Reino Unido: La contribución de los proveedores informales crea lecturas estimulantes para los educadores de jardines botánicos. El informe revela que, si bien existe un importante conjunto de literatura académica atendiendo las cuestiones de ciencia en los contextos informales, éste no es leído por los profesionales. La investigación encontró que los profesionales informales dependen demasiado de ideas acerca del aprendizaje e ideas acerca de la ciencia que son simplistas, señalando así la necesidad de un mejor conocimiento de la literatura y de los sistemas de formación.

# Communities in Nature: Growing the Social Role of Botanic Gardens

Are you working in a botanic garden and keen to engage with your local community more effectively?

*A Communities in Nature: A Manual for Gardens* is a new BGCI publication that provides a step-by-step guide.

It walks you through how to get started, how to negotiate access to your communities and create partnerships and, crucially, how to embed the social role in your organisation's culture and practices in order to achieve long-term sustainability.



Visit BGCI's Communities in Nature portal  
[www.bgci.org/education/communities\\_in\\_nature](http://www.bgci.org/education/communities_in_nature)

to download the how-to manual and register your  
interest in joining BGCI's initiative.

For inspiration, take a look at our new animation produced by Cognitive Media or watch the four films showcasing how botanic gardens have engaged with their local communities.



**BGCI**

*Plants for the Planet*

**Botanic Gardens  
Conservation International**

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# INQUIRE

**Save the date!** Join us for the INQUIRE conference

## Raising standards through inquiry: Professional development in the Natural Environment

**Royal Botanic Gardens, Kew 9-10 July 2013**

Registration is now open for the INQUIRE conference, an event which will showcase the efforts of botanic gardens and natural history museums across Europe in working with schools to help reinvigorate Inquiry-Based Science Education (IBSE). The INQUIRE conference, will bring together academics and professionals involved in the INQUIRE and other European projects to share their IBSE experiences under the following themes:

- IBSE outdoors
- Reflective Practice
- Professional Learning Communities
- Evaluation of IBSE
- Students perspectives on IBSE
- Developing training courses in LOtC sites

Book your place at the conference by registering on-line at: [www.bgci.org/education/inquireconference](http://www.bgci.org/education/inquireconference) and enjoy an evening conference picnic while listening to the iconic Blondie at Kew the Music concert.

There is also an opportunity for delegates to participate in the post conference tour to Oxford on 11th July visiting the University of Oxford Botanic Garden and other exciting sights of the 'city of spires'.

The full conference programme and abstracts will be available for download from the conference website in April.



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