

# roots

Volume 11 • Number 1 • May 2014

## Transforming audience experience: botanic gardens going digital

- 'Hot-wiring' the future of botanic gardens
- Is there a place for screens in a garden?
- A digital library for plant education
- Virtual field trips
- The use of on-line & blended learning for capacity building



**BGCI**

*Plants for the Planet*

# Communities in Nature:

Botanic gardens have always brought people closer to nature. As our world grows steadily more urbanised, they remain uniquely placed to support communities towards greater environmental awareness, sustainable living and social inclusion.

BGCI's all new Communities in Nature portal allows you easy access to information and resources which will help your institution to re-examine its mission and roles within a framework of social responsibility.

[www.bgci.org/education/communities\\_in\\_nature](http://www.bgci.org/education/communities_in_nature)



Use our mapping applet to explore case studies that highlight the creative ways botanic gardens are growing their social role all over the world.

[www.bgci.org/education/community-projects-map/](http://www.bgci.org/education/community-projects-map/)



Supported by



CALOUSTE  
GULBENKIAN  
FOUNDATION



**EDITORS**

**Asimina Vergou** Head of Education  
**Liliana Derewnicka** Education Officer

**Forthcoming Issue**

Volume 11 Number 2: Art in the gardens  
 Abstract submission date: 15 July, 2014  
 Full article submission date: 5 September, 2014

**Cover Photo:** Gardensculpture, art installation by Dieter and Björn Roth, (1964) exhibited at Hamburger Bahnhof, Berlin (Øystein Nilssen)

**Design:** John Morgan, www.seascapedesign.co.uk

**BGCI would like to thank the co-editors for their work in the production of Roots**

**For the French Section:**

Thierry Helminger - Musée national d'histoire naturelle, Luxembourg  
 Loïc Ruellan – Conservatoire Botanique National de Brest, France  
 Anne Lindsey - France  
 Allison Marshall – France  
 Réjane Brun – Bordeaux Botanic Garden, France

**For the Spanish Section:**

Veronica Franco - Jardín Botánico Regional Xitibal neek, Mexico  
 Oriik Gómez García - Jardín Botánico Francisco Javier Clavijero, Mexico  
 Maricela Rodríguez - Jardín Botánico de la BUAP, Puebla, Mexico  
 Olive de la Puente Blanca - Real Jardín Botánico Juan Carlos I Universidad de Alcalá, Spain

**For the English Section:**

Jan Chamier

*Roots* is published by **Botanic Gardens Conservation International (BGCI)**. It is published twice a year. Membership is open to all interested individuals, institutions and organisations that support the aims of BGCI.

Further details available from:

- Botanic Gardens Conservation International, Descanso House, 199 Kew Road, Richmond, Surrey TW9 3BW UK. Tel: +44 (0)20 8332 5953, Fax: +44 (0)20 8332 5956 E-mail: info@bgci.org, www.bgci.org
- BGCI-Russia, c/o Main Botanical Gardens, Botanicheskaya st., 4, Moscow 127276, Russia. Tel: +7 (095) 219 6160 / 5377, Fax: +7 (095) 218 0525, E-mail: seed@aha.ru, www.bgci.ru
- BGCI-Netherlands, c/o Delft University of Technology Julianalaan 67, NL-2628 BC Delft, Netherlands Tel: +31 15 278 4714 Fax: +31 15 278 2355 E-mail: l.j.w.vandennollenberg@tudelft.nl www.botanischetuin.tudelft.nl
- BGCI-Canarias, c/o Jardín Botánico Canario Viera y Clavijo, Apartado de Correos 14, Tafira Alta 35017, Las Palmas de Gran Canaria, Gran Canaria, Spain. Tel: +34 928 21 95 80/82/83, Fax: +34 928 21 95 81, E-mail: jmlopez@grancanaria.es
- BGCI-China, 723 Xingke Rd., Guangzhou 510650 China. Tel: (86)20-85231992. email: Xiangying.Wen@bgci.org www.bgci.org/china
- BGCI-Colombia, c/o Jardín Botánico de Bogotá, Jose Celestino Mutis, Av. No. 61-13 – A.A. 59887, Santa Fe de Bogotá, D.C., Colombia. Tel: +57 630 0949, Fax: +57 630 5075, E-mail: jardin@gaitana.interred.net.co, www.humboldt.org.co/jardinesdecolombia/html/la\_red.htm
- BGCI(US) Inc, c/o Chicago Botanic Garden, 1000 Lake Cook Road, Glencoe, Illinois 60022, USA. E-mail: usa@bgci.org, www.bgci.org/usa

BGCI is a worldwide membership organisation established in 1987. Its mission is to mobilise botanic gardens and engage partners in securing plant diversity for the well-being of people and the planet. BGCI is an independent organisation registered in the United Kingdom as a charity (Charity Reg No 1098834) and a company limited by guarantee, No 4673175. BGCI is a tax-exempt 501(c)(3) non-profit organisation in the USA and is a registered non-profit organisation in Russia.

Opinions expressed in this publication do not necessarily reflect the views of the Boards or staff of BGCI or of its members.

**02** **First word: Going Digital**  
 Asimina Vergou,  
 Botanic Gardens Conservation International



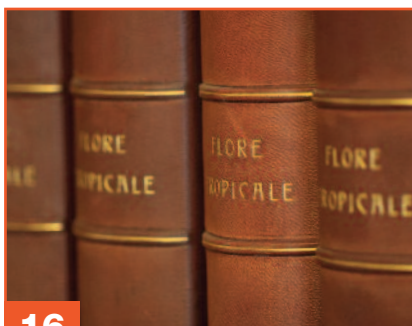
**06**  
**The virtual garden: 'Hot-wiring' the future of botanic gardens**  
 Marcus Ragus, Royal Tasmanian Botanical Gardens, Hobart, Tasmania



**09**  
**The engaging botanic garden: Technology making learning easier**  
 Zhe Zhang, Chenshan Botanical Garden, Shanghai, China



**12**  
**Apps in botanic gardens: Dos and Don'ts** Hanneke Jelles and Paul Keßler, Hortus botanicus, Leiden, The Netherlands



**16**  
**Florathea: A digital library for plant education** Marcin Zych and Krystyna Jędrzejewska-Szmek, Botanic Garden Faculty of Biology, University of Warsaw, Poland



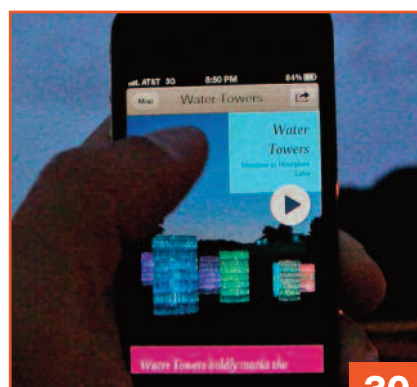
**20**  
**Virtual field trips: Bringing botanic gardens to the classroom**  
 Cheri van Deraa, Chicago Botanic Garden, Chicago, U.S.A



**23**  
**Is there a place for screens in a garden?** Angela McFarlane, King's College London



**27**  
**The Power of Technology: The use of on-line & blended learning for capacity building** Leigh Morris, Royal Botanic Garden Edinburgh



**30**  
**Online learning at Longwood Gardens – ever growing** Susan Caldwell, Longwood Gardens, Pennsylvania, U.S.A

**33**  
**Educational resources for botanic gardens**

# First word Going digital

## ENGLISH

What is the common denominator amongst a digital library of botanical drawings in Poland, a microblog supporting visitor's artwork in a garden in China, a virtual field trip on invasive species in the US and an app developed for a garden through a partnership with a 12-year old techno whizz? These are all examples of how botanic gardens around the world use technology to engage with their audiences in new ways.

Digital technology is changing how we live and communicate and is also profoundly altering our brains, how we think and how we learn. Botanic gardens are responding to this fast pace digital age by exploring the use of different types of technology; on-line courses, mobile apps, social media, websites and specialized software for educational projects help gardens to enhance visitor experience on-site and allow them to connect with a wider community on-line.



Connected Classrooms On air at Chicago Botanic Garden (CBG)

## FRANÇAIS

Quel est le dénominateur commun entre une bibliothèque numérique de dessins botaniques en Pologne, un microblog qui soutient les travaux artistiques des visiteurs dans un jardin en Chine, une sortie pédagogique virtuelle sur les espèces envahissantes aux États-Unis et une appli développée pour un jardin par le biais d'un partenariat avec un jeune prodige de la technologie âgé de 12 ans ? Ces exemples sont tous représentatifs des manières dont les jardins botaniques à travers le monde utilisent les technologies pour collaborer avec leurs publics de façons innovantes.

La technologie numérique transforme nos manières de vivre et de communiquer, et change aussi profondément notre intelligence, notre façon de penser et d'apprendre. En réponse à cette ère numérique qui avance à vive allure, les jardins botaniques explorent l'utilisation de différents types de technologies. Cours en ligne, applis de téléphones portables, médias sociaux, sites internet et logiciels spécialisés pour les projets pédagogiques aident les jardins à améliorer l'expérience des visiteurs sur place et leur permettent d'être en lien avec une plus vaste communauté en ligne.

Dans ce numéro de Roots est saluée la façon dont les jardins botaniques adoptent les innovations technologiques à travers le monde. Le recueil des études de cas et des articles d'opinions sur ce sujet a été réalisé grâce au rapport *Decoding Learning: the proof, promise and potential of digital education* (Luckin et al., 2012). Le rapport présente comment la

## ESPAÑOL

¿Cuál es el denominador común entre una biblioteca digital de dibujos botánicos en Polonia, un microblog que apoya el trabajo artístico de los visitantes de un jardín botánico en China, un viaje de campo virtual de especies invasoras en los Estados Unidos y una aplicación desarrollada por un jardín tras 12 años compartidos con un viejo fenómeno tecnológico? Estos son ejemplos de cómo los jardines botánicos del mundo utilizan la tecnología para atraer a sus audiencias de una nueva manera.

La tecnología digital está cambiando la manera en la que vivimos y nos comunicamos, y también está cambiando profundamente nuestros cerebros, la manera en la que pensamos y en la que aprendemos. Los jardines botánicos están respondiendo a este tránsito a la era digital explorando el uso de diferentes tecnologías: cursos en línea, aplicaciones para celulares o teléfonos móviles, redes sociales, sitios web y desarrollo de software para proyectos educativos lo que ha contribuido a mejorar la experiencia in situ de los visitantes al permitirles una conexión más amplia con la comunidad en línea.

En este número de Roots celebramos cómo los jardines botánicos del mundo están acogiendo estas innovaciones tecnológicas. La recopilación de estudios de caso y artículos de opinión en esta materia se documentan en el informe *Descodificación del aprendizaje: la prueba, promesa y potencial de la educación digital* (Luckin et al., 2012). Dicho informe muestra cómo la tecnología puede utilizarse como herramienta educativa. Permite

In this issue of *Roots* we celebrate how botanic gardens worldwide embrace technological innovations. The compilation of case studies and opinion articles on this subject matter has been informed by the report *Decoding Learning: the proof, promise and potential of digital education* (Luckin *et al.*, 2012). The report showcases how technology can be used as an educational tool. It can structure and present information in an accessible and engaging format; it can encourage social learning, where people support each other to develop knowledge collectively; it can offer new ways to explore information; it can support inquiry-based learning by helping to organise inquiry and change how learners look at problem-solving; it can help people apply and transfer their learning from one setting to another.

We also wish to cast a critical eye over the use of technology for learning and for public engagement in botanic gardens, in general. Offering technological tools in botanic gardens presupposes that the public has access to devices to be able to use them and that the devices have an adequate connection speed. The development and installation costs, along with those associated with training and maintenance can make adopting new technologies in gardens expensive. But it's not just the practical issues related to developing and using technology that need to be considered. It is also about being aware that technology, due to its limitations, may result in negative impact by disrupting the visitors' experience. For example, visitors may get frustrated when they use a digital map with a GPS that is not sensitive enough to provide the spatial accuracy required for successful location of plants and attractions. The *Roots* articles in this issue aim to give a balanced perspective on how botanic gardens can use digital media but also what challenges they may encounter along the way.

If and when botanic gardens decide to employ digital technology to communicate and connect with their visitors on-site or remotely, it is important to clarify what they want to use technology for and consider the impact it will have on their visitors. Very few studies exist that provide evidence of the impact of the use of technologies

technologie peut servir d'outil pédagogique. Celle-ci peut structurer et présenter des informations sous un format accessible et engageant. Elle peut encourager l'apprentissage social, par lequel les participants se soutiennent mutuellement en vue de développer collectivement des connaissances. Elle peut proposer de nouvelles manières de partir à la recherche d'informations. Elle peut soutenir la démarche d'investigation dans l'apprentissage en aidant à organiser les investigations et changer la façon dont les apprenants abordent la résolution de problèmes. Elle peut permettre aux gens d'appliquer et de transférer leurs apprentissages d'un contexte à un autre.

Nous souhaitons également jeter un regard critique sur l'utilisation de la technologie dans un objectif d'apprentissage et de participation du public dans les jardins botaniques, en général. Le fait de proposer des outils technologiques dans les jardins botaniques présuppose que le public a accès à des appareils pour pouvoir les utiliser, et que les appareils ont une vitesse de connexion appropriée. Les coûts liés au développement et à l'installation, ainsi que ceux associés à la formation et à l'entretien, peuvent rendre onéreuse l'adoption de nouvelles technologies dans les jardins. Toutefois, ce ne sont pas uniquement les questions pratiques liées au développement et à l'utilisation de la technologie qui doivent être examinées. Il s'agit également d'avoir conscience que la technologie, en raison de ses limites, peut engendrer des impacts négatifs en perturbant l'expérience des visiteurs. Par exemple, les visiteurs pourraient être frustrés lorsqu'ils utilisent une carte numérique avec un GPS trop peu sensible pour apporter l'exactitude spatiale nécessaire à la bonne localisation de plantes et d'attractions. Les articles de *Roots*, dans ce numéro, tentent de porter un regard équilibré sur les possibilités d'utilisation du numérique par les jardins botaniques et également sur les difficultés auxquelles ils pourraient être confrontés dans leurs démarches.

Si toutefois, et lorsque, les jardins botaniques décident d'avoir recours aux technologies numériques pour communiquer et être en lien avec leurs visiteurs sur place ou à distance, il est important de clarifier dans quel but ils



QR codes used to complement interpretation at RBG, Kew

estructurar y presentar información en formatos accesibles y atractivos. Promueve el aprendizaje social, cuando las personas se apoyan unas a otras para desarrollar el conocimiento de forma colectiva. Ofrece nuevas formas de búsqueda de información. Puede apoyar el aprendizaje basado en la indagación ayudando a organizar el cuestionamiento y ayuda a cambiar cómo los estudiantes miran la resolución de problemas. Puede ayudar a las personas a aplicar y transferir su aprendizaje de una situación a otra.

También quisiéramos exponer una mirada crítica sobre el uso de la tecnología para el aprendizaje y en general en el compromiso público hacia los jardines botánicos. La oferta de herramientas tecnológicas en jardines botánicos presupone que el público tiene acceso a dispositivos y puede utilizarlos si tienen una conexión adecuada y a una velocidad adecuada. El desarrollo y costos de instalación junto con aquellos asociados al entrenamiento y mantenimiento pueden encarecer la adopción de nuevas tecnologías en los jardines botánicos. Pero no son sólo los aspectos prácticos relacionados con el desarrollo y uso de tecnologías los que deben ser considerados. También se trata de estar

in gardens. Mann (2012) looked at the impact of an iPhone app on the visitor experience at RBG Kew. The study found that the use of the app was mainly positive and was welcomed by the public as a positive addition to Kew. The app improved visitors' experience by deepening and expanding their knowledge of the gardens. The study also suggested that for digital mobile apps to become a successful part of the visitor experience they need to be designed and developed with visitor's expectation of and familiarity with technology and their individual motivation for visiting in mind. Although technology can be a powerful educational tool used for example for school visits, the general public's motivation for visiting a botanic garden is often social, recreational or spiritual rather than intellectual.

Lastly, there is always the old debate: technology vs nature. In a world where there is increased concern that young people are disconnected from nature and spend too much of their time using technological media indoors, how is it possible for botanic gardens to employ technology and ensure that this schism is not exacerbated? This issue is not answered by focusing either on using technology or connecting people with nature, it is possible to reconcile these

souhaitent utiliser les technologies et d'analyser l'impact qu'elles auront sur leurs visiteurs. Très peu d'études existent, démontrant l'impact de l'utilisation des technologies dans les jardins. Mann (2012) s'est intéressé à l'impact d'une appli d'iPhone sur l'expérience des visiteurs aux RBG de Kew. Les résultats de l'étude montrent que l'utilisation de l'appli était principalement positive et qu'elle était accueillie par le public comme une nouveauté positive pour Kew. L'appli a amélioré l'expérience des visiteurs en approfondissant et en étendant leurs connaissances des jardins. L'étude suggère aussi que, pour que les applis numériques de téléphones portables soient une réussite dans l'expérience des visiteurs, elles doivent être conçues et développées en tenant compte des attentes et de la familiarité des visiteurs quant aux technologies, ainsi que de leur motivation à visiter. Bien que la technologie puisse être un outil pédagogique puissant utilisé par exemple dans le cadre de visites scolaires, la motivation générale du public à visiter un jardin botanique est souvent d'ordre social, récréatif ou spirituel plutôt qu'intellectuel.

Finalement, le vieux débat de la technologie par opposition à la nature demeure toujours. Dans un monde où les

conscientes de que la tecnología, debido a sus limitaciones, podría tener un impacto negativo afectando la experiencia del visitante.

Por ejemplo, los visitantes pueden frustrarse cuando usan mapas digitales con el GPS ya que no es suficientemente sensible para proveer la precisión espacial requerida para localizar exitosamente las plantas o las diferentes atracciones del jardín. Los artículos de este número de *Roots* pretenden dar una perspectiva balanceada sobre cómo los jardines botánicos pueden hacer uso de los medios digitales pero también sobre los retos que pueden surgir a lo largo del camino.

Siempre y cuando los jardines botánicos decidan utilizar la tecnología digital para comunicar y conectarse con sus visitantes, ya sea en el sitio o de manera remota, es muy importante tener claro para qué quieren utilizar la tecnología así como considerar el impacto que ésta tendrá en sus visitantes. Existen muy pocos estudios que dan cuenta del impacto del uso de las nuevas tecnologías en los jardines botánicos. Mann (2012) observó el impacto de una aplicación del iPhone en la experiencia de los visitantes en el Jardín Botánico de Kew. Dicho estudio encontró que el uso de la aplicación era básicamente positiva y era bien recibida por el público como una aditamento positivo en Kew. La aplicación mejoró la experiencia de los visitantes profundizando y expandiendo su conocimiento sobre el jardín botánico. El estudio también sugirió que para que las aplicaciones digitales para celulares o móviles fueran exitosas en la experiencia del visitante, necesitan diseñarse y desarrollarse con base en las expectativas del visitante y qué tan familiarizado esté con la tecnología y su motivación individual para la visita. Si bien la tecnología puede ser una poderosa herramienta educativa utilizada por ejemplo en las visitas escolares, la motivación del público en general que visita un jardín botánico es a menudo social, recreativa o espiritual más que intelectual.

Por último, siempre surge el viejo debate: tecnología vs. naturaleza. En un mundo en el cual hay una creciente preocupación por la falta de conexión de los jóvenes con la naturaleza y que



*Would the use of technology enhance the visitor experience in a botanic garden? Read the articles in this issue of *Roots* which stimulate debate on this matter*

ideas. Botanic gardens need to consider carefully how they use technology- which has the potential for creating visitor-centred and interactive experiences and help the organization to make the transition from old garden visitor models of passive, didactic learning, to the new garden visitor model of interactive, collaborative and dialogic learning. Within this framework botanic gardens should aim to integrate technology into a visitor's experience in a 'seamless' way (see Weiser, 1991). Seamless in the sense that technology becomes invisible and recedes into the background whilst through, firsthand experience, encourages and supports people's exploration and wonder of plants.

## References

- Luckin, R. Bligh, B. Manches, A. Ainsworth, S. Crook, C. & Noss, R. (2012) *Decoding Learning: The proof, promise and potential of digital education*. London: NESTA. Available at: <http://www.ics.uci.edu/~corps/phaseii/Weiser-Computer21stCentury-SciAm.pdf> [Accessed 10 February 2014]
- Mann, C. (2012) A study of the iPhone app at Kew Gardens: Improving the visitor experience. In *Proceedings of the Electronic Visualisation and the Arts conference 10-12 July, 2012*, London, UK. Available at: [http://ewic.bcs.org/upload/pdf/ewic\\_e v12\\_s1paper2.pdf](http://ewic.bcs.org/upload/pdf/ewic_e v12_s1paper2.pdf) [Accessed 10 February 2014]
- Weiser, M. (1991) The Computer for the 21st Century, *Scientific American*, 255 (3), pp. 6-75. Available at: <http://www.ics.uci.edu/~corps/phaseii/Weiser-Computer21stCentury-SciAm.pdf> [Accessed 10 February 2014]

**Dr Asimina Vergou**

préoccupations s'intensifient concernant le fait que les jeunes soient déconnectés de la nature et passent trop de leur temps à utiliser des supports technologiques à l'intérieur, comment est-il possible pour les jardins botaniques d'avoir recours à la technologie et de s'assurer que ce schisme ne soit pas exacerbé ? La réponse à cette question ne consiste pas à choisir entre l'utilisation de la technologie ou la connexion des gens avec la nature ; il est possible de concilier ces idées. Il est nécessaire que les jardins botaniques prêtent une attention particulière à leur manière d'utiliser la technologie, qui détient le potentiel de créer des expériences interactives, centrées sur les visiteurs et de permettre à l'établissement de réaliser la transition entre les anciens modèles d'apprentissage didactique et passif pour les visiteurs des jardins, et le nouveau modèle d'apprentissage interactif, collaboratif et dialogique pour les visiteurs des jardins. Dans ce cadre, les jardins botaniques devraient chercher à intégrer « en douceur » la technologie dans l'expérience des visiteurs (voir Weiser, 1991). En douceur dans le sens où la technologie devient invisible et se retire en arrière-plan, et à la fois, dans l'expérience directe, elle encourage et favorise l'investigation et l'émerveillement des gens vis-à-vis des plantes.

## Références

- Luckin, R. Bligh, B. Manches, A. Ainsworth, S. Crook, C. & Noss, R. (2012) *Decoding Learning: The proof, promise and potential of digital education*. London: NESTA. Disponible sur : <http://www.ics.uci.edu/~corps/phaseii/Weiser-Computer21stCentury-SciAm.pdf> [Accès le 10 février 2014]
- Mann, C. (2012) A study of the iPhone app at Kew Gardens: Improving the visitor experience. In *Proceedings of the Electronic Visualisation and the Arts conference 10-12 July, 2012*, London, UK. Disponible sur : [http://ewic.bcs.org/upload/pdf/ewic\\_e v12\\_s1paper2.pdf](http://ewic.bcs.org/upload/pdf/ewic_e v12_s1paper2.pdf) [Accès le 10 février 2014]
- Weiser, M. (1991) The Computer for the 21st Century, *Scientific American*, 255 (3), pp. 6-75. Disponible sur : <http://www.ics.uci.edu/~corps/phaseii/Weiser-Computer21stCentury-SciAm.pdf> [Accès le 10 février 2014]

pasan gran parte de su tiempo utilizando medios tecnológicos en lugares cerrados, ¿cómo es posible que los jardines botánicos puedan utilizar esta tecnología pero asegurándose de no exacerbar esta ruptura? Esta pregunta no se responde centrándose ya sea en el uso de la tecnología o reconectando a la gente con la naturaleza, es posible conciliar ambas ideas. Los jardines botánicos necesitan considerar cuidadosamente cómo utilizar la tecnología con potencial para crear experiencias interactivas centradas en el visitante ayudando a la institución para transitar de un antiguo modelo de visitante pasivo, de aprendizaje didáctico, a un nuevo modelo de aprendizaje interactivo, colaborativo y dialógico del visitante. En este contexto, los jardines botánicos deberían integrar la tecnología en la experiencia del visitante de una manera "sin costuras" (véase Weiser, 1991). Sin costuras en el sentido de que la tecnología se vuelve invisible y regresa al fondo mientras que, las experiencias de primera mano alientan y respaldan que la gente explore y se maraville con las plantas.

## Bibliografía consultada

- Luckin, R. Bligh, B. Manches, A. Ainsworth, S. Crook, C. & Noss, R. (2012) *Decoding Learning: The proof, promise and potential of digital education*. London: NESTA. Disponible en: <http://www.ics.uci.edu/~corps/phaseii/Weiser-Computer21stCentury-SciAm.pdf> [Consultado el 10 de febrero, 2014]
- Mann, C. (2012) A study of the iPhone app at Kew Gardens: Improving the visitor experience. In *Proceedings of the Electronic Visualisation and the Arts conference 10-12 julio, 2012*, London, UK. Disponible en: [http://ewic.bcs.org/upload/pdf/ewic\\_e v12\\_s1paper2.pdf](http://ewic.bcs.org/upload/pdf/ewic_e v12_s1paper2.pdf) [Consultado 10 de febrero, 2014]
- Weiser, M. (1991) The Computer for the 21st Century, *Scientific American*, 255 (3), pp. 6-75. Disponible en: <http://www.ics.uci.edu/~corps/phaseii/Weiser-Computer21stCentury-SciAm.pdf> [Consultado 10 de febrero, 2014]

# The virtual garden: 'hot wiring' the future of botanic gardens



*Sebastian O'Halloran, a 12-year-old techno whizz who developed RTBG's first App in partnership with the Gardens (RTBG)*

In a world where communication technologies are becoming ubiquitous, it is more than just a nice idea to make use of them – it is imperative to integrate new technologies into our everyday work, public engagement and learning programmes.

**Marcus Ragus** explains how an ambitious strategy at the Royal Tasmanian Botanical Gardens promises a future of digital learning and interpretation well beyond the physical environment.

It is now commonly accepted that a modern botanic garden may provide a wide range of methods and platforms to enable our visitors to engage with the many wonderful opportunities that such gardens provide. Today, innovative communication technologies are becoming embedded in the day-to-day life of most individuals and there is a growing demand to develop opportunities for people to engage with the many aspects of a botanic garden through these devices. On the other hand, there is an opposing argument that botanic gardens



should remain free of technology – for some people, technological innovations in these environments can have negative effects or, at the least, are an annoyance. Pragmatically, one can conclude that careful management and sympathetic integration of technologies in the setting of a garden should be able to provide significant opportunities for those who wish to use them, while at the same time not interfering with the experience of those who don't. An additional benefit is the potential to reduce the need for, and the size of, interpretive and directional signage infrastructure.

### Early adopter

The Royal Tasmanian Botanical Gardens (RTBG) has a history of creative engagement with communication technologies going back more than a decade. In 2004 the RTBG was a key partner in a groundbreaking Australian National Flexible Learning Framework [1] technology project known as 'Mobile Learning: Handheld Innovations in Flexible Learning' [2]. The project's main focus was to provide 'just in time' learning and interpretation resources that would be available through mobile technologies. Just a decade later that may seem an obvious move, but at the time mobile learning was only just starting to become of worldwide interest. In those days mobile phones and portable communications devices were still limited in their functionality, and devices such as smart phones were some years away.



*Minimizing the aesthetic impact of the various aeriels and transmitters on historical architecture can be a challenge (RTBG)*

The 'Mobile Learning' project produced real, proof-of-concept examples that were practically demonstrated on site within the RTBG. It included a foreshore walk which provided real-time interpretive resources, including historical information and images of what the site looked like more than a century earlier. Of course, GPS technologies were not then readily part of the functionality of mobile devices such as mobile phones or PDAs [3]. Therefore, to achieve the aim of a multi-location experience, users needed to manually recall interpretive information on the device, in conjunction with numbered metal markers embedded in pathways along the foreshore. Whenever the user reached a marker they could click the associated link on the device to bring up the appropriate resource.

Although the project spawned a range of other location-based mobile technology initiatives across Australia, and internationally, it was not further developed by the RTBG at the time, primarily due to a lack of funding and access to specialist staff. Now a decade later, thanks to the quality and visionary foresight of the early digital project, the resources are still relevant and can be adapted for use with the new technology developments currently underway at RTBG in 2014.

### The 2014 initiative

In mid-2013 the RTBG began the first stages of a significant project known as the 'Digital Garden' (DG) initiative funded by the state Skills Tasmania [4]. The project strategy was to bring the Garden into a new era of community interaction, which complemented other community engagement initiatives already underway on site. It followed on from smaller digital projects including one which developed the RTBG's first iPhone App in 2012. As with the majority of our projects, the App development was undertaken as a partnership, in this case a very special one, with a 12-year-old techno whizz App developer, also an RTBG enthusiast, called Sebastian O'Halloran [5].

Since that time the App has proved an excellent tool for engaging visitors, though it was only intended as a first-stage base, to be followed later by a more comprehensive development. It is



*An example of the interpretation provided by the foreshore walk App (RTBG)*

currently being reviewed with the intention of a new updated release later this year.

The overall DG initiative also included a much-needed redevelopment of the RTBG website, long delayed due to funding and logistical issues with staff time, as we chose to do this internally. The new website will be launched in mid-2014.

The RTBG is noted as a leader in online delivery of horticulture learning programmes in Tasmania and the DG initiative promises to enhance online learning through the establishment of high-speed wireless broadband technologies throughout much of the 17-hectare grounds. This will allow remote learners, in all parts of Tasmania and beyond, to access live 'in the garden' horticulture programmes and activities delivered by experts in any area of the Garden.

Live web-streaming cameras will also be mounted in strategically chosen locations of the Garden, including at the top of one of the tallest trees to offer one of the best panoramic views in the area. Streams from the cameras will be available online 24/7 and will have the potential to be remotely controlled by the visitors through the website.

[1] Later to become the National VET E-learning Strategy <http://flexiblelearning.net.au/>

[2] The contents of this project have now been archived, details are available by contacting [Marcus.Ragus@rtbg.tas.gov.au](mailto:Marcus.Ragus@rtbg.tas.gov.au)

[3] [http://en.wikipedia.org/wiki/Personal\\_digital\\_assistant](http://en.wikipedia.org/wiki/Personal_digital_assistant)

[4] <http://www.skills.tas.gov.au/>

[5] <https://itunes.apple.com/us/app/royal-tasmanian-botanical/id454676064?ls=1&mt=8>



*A young visitor using technology at RTBG (RTBG)*

Another camera will also be installed above one of the garden beds of the new Tasmanian Community Food Garden which will enable a unique outreach activity. School students in rural and remote locations will be able to sign up to a programme that enables them remotely to grow a productive food garden at the RTBG and to interact with horticultural specialists while watching their garden grow online. The students will have the opportunity to suggest what they wish to grow, the design and layout of the bed, and even recommend the end use of their produce – for example choose to donate the produce back to the community to be distributed to those in need.

The integration of the high-speed wireless networks will open enormous opportunities for on-site interpretation and learning, using mobile devices through smart tag and virtual reality technologies. Additionally, a potential rise in the use of the garden facilities for commercial, business and private functions, that often require access to wireless communication technologies (indoors and outdoors), will result in increased revenue for RTBG.

### **A work in progress**

To date, there have been a number of issues and constraints encountered with this initiative. One of the trickiest has been the integration and installation of the technological hardware components. The wireless technology infrastructure required small towers to be installed at various points across the Garden and in some cases these towers, with their various aerials and transmitters, presented a

potential conflict with the aesthetics of buildings and natural features of the site. We still haven't found all the answers to these issues, but we continue to look at creative ways to reduce any impact on the natural and built heritage of the RTBG whilst making the most of the innovations.

While the RTBG is well on its way towards completing its vision of a Digital Garden, we recognize that we must continue to remain open to the new possibilities created by the rapid change in communications technology and community expectations.

### **RÉSUMÉ**

Dans un monde où les technologies de la communication deviennent omniprésentes, le fait de les utiliser ne se limite pas à être une bonne idée. Il est à présent impératif d'intégrer les nouvelles technologies dans notre travail quotidien, la participation du public et l'apprentissage. Les Jardins botaniques royaux de Tasmanie (RTBG) développent une stratégie ambitieuse qui promet bientôt un apprentissage et une interprétation numériques allant bien au-delà des portes du jardin.

Des applis de téléphones portables collaborant avec de jeunes prodiges de l'informatique âgés de 12 ans aux Jardins Virtuels, en passant par les environnements interactifs sans fil, le numérique promet une participation et un apprentissage interprétatifs pour les décennies à venir. Cet article est ciblé sur ce qui a été réalisé par le biais de la technologie pour faire participer le

public, les avantages, les opportunités et les problèmes en termes d'organisation ; les impacts sur la communauté de Tasmanie au sens large qui y sont associés et les implications des innovations au niveau national et international. L'article détaille les stratégies utilisées au début du développement et au cours de l'évolution de ces technologies numériques, jusqu'à leur déploiement actuel, ainsi que les soutiens financiers dont elles ont bénéficié et les partenariats de collaboration.

### **RESUMEN**

En un mundo donde las tecnologías de comunicación se están convirtiendo en omnipresentes, es algo más que una buena idea usarlas. En la actualidad, es imperativa la integración de las nuevas tecnologías en nuestro trabajo diario, en la participación pública y en el aprendizaje. Una estrategia ambiciosa del Royal Tasmanian Botanical Gardens ( RTBG ) nos abre un futuro de aprendizaje digital e interpretación, más allá del ámbito del jardín.

Desde el desarrollo de aplicaciones móviles para habilitados informáticos de 12 años, hasta jardines virtuales o entornos inalámbricos interactivos, los medios digitales vaticinan compromisos y aprendizaje para las próximas décadas.

Este artículo se centra en lo que se ha logrado mediante la tecnología para atraer al público. En los beneficios, oportunidades y aspectos de la organización. En los impactos asociados, de un modo amplio, sobre la sociedad de Tasmania y en las implicaciones nacionales e internacionales de las innovaciones. También se detalla el papel de las estrategias utilizadas durante los primeros momentos del desarrollo y su evolución, hasta el conocimiento actual que se tiene de ellas, incluyendo su apoyo financiero y los acuerdos de colaboración.

**Marcus Ragus**  
**Manager Learning and Community Engagement**  
**Royal Tasmanian Botanical Gardens**  
**Queens Domain, Hobart, Tasmania**  
**Australia 7000**  
**Email: [Marcus.Ragus@rtbg.tas.gov.au](mailto:Marcus.Ragus@rtbg.tas.gov.au), [Marcus.Ragus@gmail.com](mailto:Marcus.Ragus@gmail.com)**  
**Website: [www.rtbg.tas.gov.au/](http://www.rtbg.tas.gov.au/)**

# The engaging botanic garden: Technology making learning easier



*Stunning aerial view of Shanghai Chenshan Botanical Garden (Chenshan Botanical Garden, 2011)*

Chenshan Botanical Garden puts a great effort into being a modern garden for a modern city. **Zhe Zhang** explains how they are using a variety of new technologies to engage the public, on-site and online, for a variety of reasons from communicating science to involving them in art projects.

**W**hen developing modern cities there needs to be, not only, up to date facilities, but also significant consideration and appreciation paid to ecology and the environment therein. The sophistication of a city can be shown through its use and protection of ecological resources, as well as through its construction of ecological environments. It is for this reason that we built Chenshan Botanical Garden, Shanghai.



Shanghai Chenshan Botanical Garden App homepage and introduction (Chenshan Botanical Garden, 2014)

Chenshan Botanical Garden, was opened on 23rd January, 2011 and covers an area of 207 hectares (2,070,000 m<sup>2</sup>). The garden is a representation of a harmonious coexistence between humans and nature.

Boasting a collection of over 10,000 species, the garden consists of 26 specialised gardens which serve a variety of functions; from providing fun and educational attractions to visitors, to complementing the physical characteristics of the land and providing sites of *ex situ* conservation. These include: a rose garden, maze garden, sensory garden for the visually impaired, an aquatic garden, medicinal plant garden and a showcased collection of plants native to Eastern China.

Our mission is to conserve plants native to Eastern China, discover sustainable ways of using them, and share our knowledge and enthusiasm with the public. In the digital age, consideration needs to be paid to how to share this knowledge effectively. New media provide on-demand access to content anytime, anywhere, on any digital device. They also enable interactive user feedback, and creative participation. Another aspect of the new media to be considered is the real-time generation of new and unregulated content (Schivinski & Dabrowski, 2014). The development of the internet, digital technologies and handheld devices has revolutionised all aspects of communication and access

to information, including science communication. The 33rd Report on Internet development in China, published by the China Internet Network Information Center, showed that as of January, 2014, the number of Internet users in China had reached 618 million meaning 45.8% of the population were connected to the internet.

More and more people have access to all kinds of scientific information, anytime and anywhere. To remain relevant in a changing world, Chinese botanic gardens are making use of this trend to engage with the public, by using websites, Apps, WeChat – an instant messaging service- and Microblogging.

### Microblog as a method for public engagement

Microblogging sites, like Tumblr and Twitter, allow users to share short bursts of information with the people in their networks. They began appearing in China in 2009 and had attracted an audience of 63 million by the end of the next year, at which point many botanic gardens decided to get on board.

There are more than 200 botanic gardens in China, and 20 of them have microblogs. As a new interactive platform, microblogs can be personalised in form, include attractive images and provide the opportunity for snappy and immediate communication. In 2010, Chenshan Botanical Garden launched its own microblog. There we provide the public with updates and news about many aspects of the garden for example, plants in bloom, upcoming events such as flower shows and concerts and also receive feedback through an online questionnaire and poll. By Feb, 2014, we had posted a total of 8020 comments, related to 35 different topics and our fans had reached a total of 34200. The most popular post was forwarded 525 times, which means thousands of people will have read it.

More than 50 interactive projects were supported by the microblog. One successful project which was popular with the public was *Autumn Collecting*. The project aimed to highlight, to urban dwellers, humans' relationship with nature as well as providing an opportunity for relaxation. The project was announced a fortnight

before its launch and people signed up through the microblog. A lucky few were invited to the garden to be part of the project. The participants attended a short lecture and then created an artwork using natural materials they had collected from the garden, such as fallen leaves, petals and fruits. Many of the creations surpassed our expectations. Later on, users of the microblog were asked to vote for their favorite artwork and the winner was awarded a VIP card, which allowed them access to Chenshan Botanical Garden for a whole year. Those who voted were also entered into a prize draw.

Projects of this kind facilitate interaction with the online community and therefore provide an opportunity for the garden to communicate with and educate a wider audience.

### Mobile Applications

Apps have been used extensively for education and disseminating information as they provide a personalised service, are easy to use, intuitive and enable quick access to knowledge.

Mobile devices have become very popular and are increasingly common throughout all walks of life; this provides an opportunity for enhancing the way botanic gardens communicate their knowledge to the public. Chenshan Botanical Garden is one of the few gardens that have started to provide services using mobile technologies. The garden now has a fully

A visitor creating a collage out of natural materials and fans voting on the microblog (Jie Gao, 2013)



functioning mobile App. On the App's homepage, visitors can find an introduction to the garden along with other information about plant species, events, tours, etc. We have also produced QR codes for 580 species found in the garden. Visitors can scan these to get further information about the plants. This has successfully enhanced the garden's ability to educate its visitors about botany.

Other gardens across the globe have used Apps in various forms to serve a variety of purposes; from games to those which disseminate digital resources, create online communities and provide community services. Our next step is to pay more attention to the needs of our visitors when it comes to digital resources, find new ways to engage the public with the plant collections, seek technical support from third parties, as well as strengthen our marketing and Public Relations (PR).

### Other public engagement platforms

Besides our microblog and App, we also have other public engagement platforms, such as our official website, online micro magazine, LED screens and WeChat. In the future we plan to produce videos about pruning techniques, cultivating flowers and using plant material in arts and crafts. We have already produced a video about using plant material to create



QR code on plant nameplate (Qiyi Shen, 2014)

artwork that has proven very successful. Video resources can be streamed on a variety of devices including the digital screens in buildings, subways or buses and could prove popular with the public.

Students are another important audience to consider. Our garden has established a good relationship with schools. We are currently exploring the concept of Cloud Education. There are so many options when it comes to Cloud Apps for education. The Cloud can increase collaboration between everyone in an educational setting. With the great flexibility it offers, students have the option to work on group projects from any location and the garden educators can offer extra help remotely through the Cloud.

By being innovative we hope to offer an immersive experience with lasting benefits to all of our visitors.

### Reference

- Schivinski, B. & Dąbrowski, D. (2014) The Effect of Social Media Communication on Consumer Perceptions of Brands, *Journal of Marketing Communications*, pp.2-19 Available online at: <http://www.tandfonline.com/doi/pdf/10.1080/13527266.2013.871323>

### RÉSUMÉ

Avec l'ère numérique, les gens ont accès à toutes sortes de savoirs scientifiques via les nouveaux médias. Le boom technologique est accompagné de nouvelles opportunités et de nouveaux défis pour la diffusion de la science. Étant l'un des jardins botaniques les plus respectés de Chine, le Jardin botanique de Chenshan a toujours fait de gros efforts pour créer des programmes éducatifs innovants, et pour se concentrer sur les besoins des publics, tout en se tenant à ses objectifs organisationnels. Cet article présente et résume les avantages des applications innovantes de la technologie, telles que les applis et le Microblog, qui améliorent l'interactivité dans les sciences de l'éducation. Y figure également une discussion sur la manière d'utiliser ces nouveaux médias pour diffuser la science à un plus large public et améliorer l'image du jardin auprès des visiteurs.



Visitors scanning QR codes to join a project (Zhe Zhang, 2014)

### RESUMEN

En la era digital las personas tenemos acceso a toda clase de conocimiento científico a través de nuevos medios. El boom tecnológico ha dado lugar a nuevas oportunidades y retos para difundir ciencia. El jardín botánico Chenshan, que es uno de los jardines botánicos de mayor reputación de China, siempre ha esforzado para crear programas educativos innovadores y centrados en las necesidades del público aunque en concordancia con los objetivos de la organización. Este artículo presenta y resume las ventajas de las nuevas aplicaciones tecnológicas, como los Apps o los microblogs, que favorecen la enseñanza interactiva de las ciencias. También se analiza de qué forma se pueden usar estos nuevos medios para transmitir la ciencia a un público más amplio y mejorar la imagen que el público tiene del jardín.

**Zhe Zhang**  
**Environmental Educator**  
**Chenshan Botanical Garden,**  
**Shanghai, 201602**  
**China**  
**Email: cskp@lhrs.sh.gov.cn**  
**Website: www.csnbgsh.cn**

# Apps in botanic gardens: Dos and Don'ts

Botanic gardens in the Netherlands are discovering how important a collaborative Approach is when it comes to developing new technologies. From digital guides to talking trees and digital magnifying glasses **Hanneke Jelles & Paul Kessler** tell the story of Hortus botanicus' adventure into the world of Apps.

The Apple App Store had only been available for three years when Hortus botanicus became the first museum in Leiden to launch its own App. We envisioned that the App would fill a gap in the services the garden offered to the public. In the end, what was developed was a very flexible digital guide which would tell the visitor with pictures, sound and more about their location, allowing them to be independent



*The new prototype is easy to use by adults and children. Looking at markers through the 'magnifying glass' shows visitors more information (Hortus botanicus)*



*Visitors to Hortus botanicus enjoying the plants in the sunshine (Hortus botanicus)*

from a fixed tour. In order for this to work it was important to update the App weekly with information about flowering or fruiting of special plants.

The failure of this approach was only fully understood after the Hortus App's launch. In 2011, the App was unfortunately only available for the iPhone, a device which was not commonly used by our visitors. It could not be directly accessed through the App Store, but was only available through the 'Hopper' - a platform which was not well known. Even the 22 iPods which were available for hire from the front desk were not used as frequently as we had anticipated. Most of our elderly visitors were not used to this type of device and had seemingly no interest in being informed on how to use it. Also, on busy days, with large queues of visitors, spending time explaining how to use the devices was not practical. The major problems, however, were the absence of Wi-Fi in the garden and the cost of using internet on the mobile phones, which in 2011, was still quite high. Luckily, the visitors who actually used the App were satisfied with this new service, but their number was much too low to justify the investment in developing this resource. Additionally, the garden's iPods were not easy to synchronize with new information and due to staff's other priorities it was not possible to carry out the intended weekly updates on flowering and fruiting or other events in the garden. It should

be also noted that a garden is constantly changing and therefore information about its plant displays is quickly outdated.

### **Pioneering**

Many changes have happened since the launch of the first App in Hortus botanicus. Following the addition of a national flora and a bird guide to the contents of the iPods there has been an increase in the hiring of the devices. Moreover, in the last few years the costs of producing an App have decreased, and other alternatives like the podcatcher have become available. Many more people own smartphones nowadays and in some areas of the garden Wi-Fi is available for free. However, we felt that the original App is already outdated and an Android version was never realised. This could have meant a sad end to our adventure into Apps. This outcome was overturned on 13th February 2013 when the Postcode Lottery announced its generous funding of two million Euros, over four years, for the project 'Plant (s) for the Future'. The project aims to retrieve, manage and organise information from the living collections of Dutch botanic gardens so that this will be made accessible to the wider public. The project's Partners are the botanic gardens who are members of the Dutch Botanical Gardens Association (NVBT) and the 'Waag Society', an organization that develops technology through creative research

and participatory design so that the Applications are suited to the needs and abilities of their users.

This project involves organizing three 'experimental gardens'. An 'experimental garden' is a format for bringing together staff from the botanic garden, designers and developers of technological Applications and members of the public (garden's current audiences and targeted new audiences). The aim of these 'experimental gardens' is to find new ways to connect the knowledge about plants and biodiversity to the needs of diverse audiences. Each 'experimental garden' involves running six weekly design sessions focused on different topics.

Participants of these sessions discuss which stories from the botanic gardens are important and relevant to the public, identify who our current visitors are and new target audiences, and decide which stories or methods can be used to reach these new audiences. The outcome of this process is the development of a new 'product' - possibly an App or perhaps another form of innovative technology. This product will provide information in a form that meets the interests of the visitor at the time and place they will choose to use it. In September 2013 the first 'experimental garden' took place. In the beginning, we discussed what stories could be told and which would be the best medium to use. At the same time we conducted a survey of all the

Dutch Partner gardens to identify which systems and programs they use for their collections' management. The results of the survey will be used at a later stage to determine how to make the information from the gardens' collections available to garden staff and wider audiences.

### Three favorites

The discussions with the participants of the first 'experimental garden' suggested that the best way to tell the story about plants and botanic gardens is still a guided tour, given by a member of staff or a volunteer. Unfortunately, it is simply not possible to organise a tour for every single visitor. For that reason the following ideas were proposed as alternatives to a guided tour: the 'talking tree', the 'fast route App' and a 'digital magnifying glass'.

The idea for the 'talking tree' was a living tree telling its story in an accessible way. Visitors could touch parts of the living tree e.g. its bark or leaves and an audio recorded story would start to play. By placing sensors at different heights of the tree both adults and children would be able to activate the audio recordings. In the end, this idea was not taken forward to the pilot phase as it is technically challenging and expensive to implement. In particular, it requires access to electricity on the spot and also there is the danger of disturbing the tranquility of the gardens by playing the audio recording in an open space. In addition, it was pointed out that this technological Application could soon become boring for the repeat visitors of the garden.

The 'fast route App' is the easiest to implement idea as it is a variation of an existing technology used in the gardens. The 'Waag Society' has developed an App for a number of museums in Amsterdam that allows staff with little technical knowledge to create a tour in a short amount of time for locations that are at least 15 meters apart. The App enables sound clips, videos, or photos etc to be added easily in order to update information related to each location. However, this Application requires establishing Wi-Fi in the garden. Another challenge is also that mobiles have small screens so using the App under strong sun or rain might be difficult. During the 'experimental garden' sessions it was discussed that

in the near future most, if not all, botanic gardens will offer Apps related to their sites. The Apps will use data from either each individual garden or from a larger, combined database. As it was felt that the gardens would develop this technology by themselves any way and at a low cost, it was decided that the project should focus on a more innovative solution.

### Inspiration

The third idea that came out of the 'experimental garden' sessions was the 'digital magnifying glass' which inspired both garden staff and the target audiences the most. The digital magnifying glass will enable the visitors to focus on and immerse themselves in a particular display in the garden.

By using the form of a magnifying glass which is recognizable to everybody the technology will encourage people to focus their attention to plants in a familiar way. As the model of a magnifying glass is familiar to visitors, they therefore will automatically look through it.

The digital magnifying glass will display, in its lens, any relevant information about the plants by using pattern recognition. It will also give visitors the option of making movies which they can then share. A digital prototype device was designed and tested during the project. The visitors who tested the prototype found that it was intuitive to use, they used it to zoom in and out of a display/plant, walked around objects and looked at them from different angles. The prototype of the digital magnifying glass has hidden smartphone embedded and uses its camera and communication functions. The suggested route for using the digital magnifying glass is plotted by using markers: small symbols which the Application is able to recognize. A lot of technology is required to fully realise the functions of this prototype, but this is by no means impossible.

### Looking ahead

Outlined above are our preliminary results so far. So, what's next? The next steps will be determined in the second and third 'experimental garden'. So far

*Staff and visitors investigating plants to test the new prototype (Hortus botanicus)*







*Hortus botanicus staff shows-off the prototype designed to be used and look just like a regular magnifying glass (Hortus botanicus)*

we can conclude that the collaboration between staff and visitors from different gardens, with different roles and backgrounds has proved rewarding, enabling us to think creatively and enthusiastically. The input of our visitors into how we develop public engagement methods is invaluable. Since the project started we have also found an increase in the interactions between the Partner gardens and how we share materials and stories between our organisations. The use of new technologies in gardens has lots of potential and it can be best

#### Indicative list of botanic gardens with an App:

- Botanischer Garten der Universität Basel
- Coastal Maine Botanical Garden
- Desert Botanical Garden, Arizona
- Chicago Botanic Garden
- Royal Botanic Gardens, Kew (Apps for adults and for children)
- Memphis Botanic Garden
- Naples Botanical Garden
- National Botanic Gardens of Ireland
- Royal Tasmanian Botanical Gardens
- Singapore Botanic Gardens
- The New York Botanical Garden (Apps for each new exhibition).

realised by joint development including many botanic gardens. Moreover, using technologies such as Apps in gardens requires frequently updated information and by doing this in a Partnership with other botanic gardens the risk of outdated or obsolete information is minimized.

The technological outcomes of the 'Plant(s) for the Future' project will be revealed in 2017, the 'Year of the botanical gardens' in the Netherlands. Yet, what is evident already is that the close collaboration and sharing of information amongst the botanic gardens is crucial for the development of new technologies for public engagement.

*More information about the project and the 'experimental gardens' sessions can be found at: <http://waag.org/en/project/botanical-gardens>*

#### RÉSUMÉ

En 2011, l'Hortus Botanicus de Leyde est devenu le premier musée ou jardin botanique des Pays-Bas à développer une appli gratuite pour ses visiteurs. Ceux qui n'avaient pas de smartphone pouvaient louer un Ipad avec l'appli installée. Après coup, nous avons trouvé que les raisons de la faible popularité de ce produit étaient évidentes. Dans cet

article, nous expliquons comment les autres jardins peuvent éviter les mêmes erreurs que nous avons faites et comment, au travers du projet « plante(s) pour le futur », tous les jardins botaniques des Pays-Bas coopèrent actuellement pour développer un meilleur produit qui, nous l'espérons, sera plus utile au public. Dans ce but, nous avons réalisé un sondage pour collecter des informations sur les besoins et les demandes du public au sujet des contenus et des expériences lors de l'utilisation. Le sondage portait une attention particulière aux groupes sous-représentés parmi les différents publics du jardin. Le projet est actuellement dans sa phase pilote et les nouveaux produits développés sont prometteurs..

#### RESUMEN

En 2011, el Hortus Botanicus de Leiden se convirtió en el primer museo o jardín botánico que proporcionó aplicaciones Apple gratuitas para sus visitantes. Aquellos que no disponían de un Smartphone podían alquilar un iPhone con la aplicación instalada. A posteriori, sabemos por qué este producto no tuvo mucho éxito. En este artículo, explicamos cómo otros jardines pueden evitar cometer los mismos errores y cómo, a través del proyecto 'plant(s) for the future' ('Plantas para el futuro') todos los jardines botánicos holandeses están cooperando para desarrollar un producto mejor, que con suerte, sea más útil para el público. Para lograr esto, se hicieron encuestas, para recoger información sobre las necesidades del público, sus preferencias y su experiencia. La investigación puso especial énfasis en aquellos grupos de visitantes del jardín poco representados. El proyecto se encuentra en la fase piloto y los resultados recientes son prometedores.

**Hanneke J.D. Jelles (Education Department) & Dr. Paul J.A. Keßler (Director)**  
**Hortus botanicus Leiden**  
**P.O. Box 9500**  
**NL 2300 RA Leiden**  
**The Netherlands**  
**Email:**  
**P.J.A.Kessler@hortus.leidenuniv.nl**  
**(corresponding author)**  
**Website: [www.hortusleiden.nl](http://www.hortusleiden.nl)**

# Floratheca:

## A digital library for plant education



Drawing of baobab tree (*Adansonia digitata*) flower (University of Warsaw Botanic Garden)

Antique drawings meet digital technology. **Marcin Zych** and **Krystyna Jędrzejewska-Szmek** describe how digitising a collection of over 30,000 botanical illustrations at the University of Warsaw Botanic Garden is giving them a new lease of life and supporting taxonomy lessons for the 21st century.



*'We will always need taxonomists.'*  
(Walker, 2007)

**N**aming things is an important way of making the world around us less hostile. In this sense biological taxonomy which, along with other goals, is all about naming species, is a natural way of creating order out of chaos. Once, an important subject in the school and university curricula, nowadays, taxonomy is perceived as an old-fashioned, dust-covered science. With current students brought up on digital technology, devices and images,



*Patriarch Zaleski collected virtually every piece of printed paper that contained plant images (University of Warsaw Botanic Garden)*

we face the decline of this once popular subject. Heywood (2007) warns that taxonomists are vanishing from universities, replaced by molecular biologists. But the paradox is that we still need to name species, perhaps even more than we did a century ago because, in an era of worldwide biodiversity loss, we cannot possibly conserve organisms for which we have no name (Walker 2007; Wilson & Bisby 2007). In fact, taxonomy was one of the important disciplines that led to the emergence of biodiversity conservation as a scientific discipline itself (Heywood 2007).

### Harnessing digital technology

Teaching taxonomy is an important task, but the question is: how to do it and by what means? No doubt hands-on experience is a crucial step to mastering the ability to identify plants, which is easiest done with botanic garden collections being used as an outdoor classroom (Kenicer 2007). However, this restricts teaching activities to places close to botanic gardens and to within the growing season, which for countries like Poland, with harsh winters, means 6 months at best. Greenhouses or a local florist shop are not always a good solution for beginners as they often offer fancy exotics that are difficult to work with and require quite well developed skills. But this is where technology can come in. As the old proverb says 'a picture is worth a thousand words', so why not refer to pictures, especially since we now live in a world which is heavily reliant on images?

Most botanic gardens and libraries still have large collections of antique botanical sketches and drawings showing the details of plant morphology drawn without the use of microscopes or lenses. Of course it would be unwise to bring the originals into the classroom, but here is where we can make use of digitisation techniques. Digitised old drawings have a large advantage over other online images (e.g. photographs) because they are usually accurately labeled and most of them are drawn to show various stages of a plant's life, i.e. flowers, fruits, seedlings in one picture. Last but not least, they are copyright free and can be legally used without any ethical considerations.

There are already some digitised floras made available from other organisations that we have used in our educational activities at the University of Warsaw Botanic Garden for many years. Recently we decided to create FLORATHECA, an online database offered by our own institution. It includes a part of the *Flore Tropicale*, a rich collection of over 30,000 botanical illustrations hosted by University of Warsaw Botanic Garden. It was gathered by Patriarch (Catholic Archbishop) Władysław M. B. Zaleski (1852-1925). Very few people have ever had a chance to take a glimpse at its treasures but by digitising the collection we made it accessible to the whole world.

### The intriguing life of a Patriarch

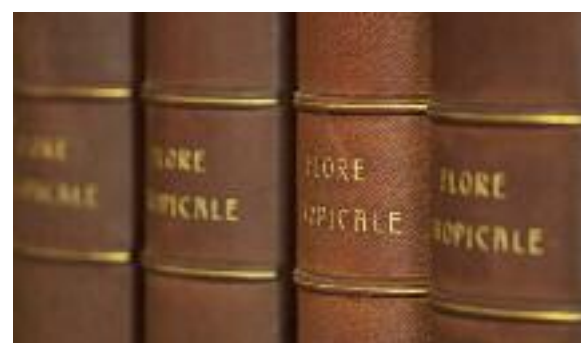
As a most intriguing person, Zaleski deserves a few words. Born in Wielona (now Veliuona in Western Lithuania), he was educated in Kaunas, Warsaw and

Rome, and became a Catholic priest amateur-botanist and travel writer. He spoke ten languages (including Tamil and Sinhalese), and spent a large part of his life in Kandy (Sri Lanka) as the Apostolic Delegate to Eastern India, as well as being the Titular Archbishop of Thebes and Patriarch of Antiochia (Malej, 1965). In 1886 he was sent on a mission to India, where he also started collecting virtually every piece of printed paper that contained plant images. These ranged from ordinary, low quality newspaper pictures, to specialist prints of very fine quality.

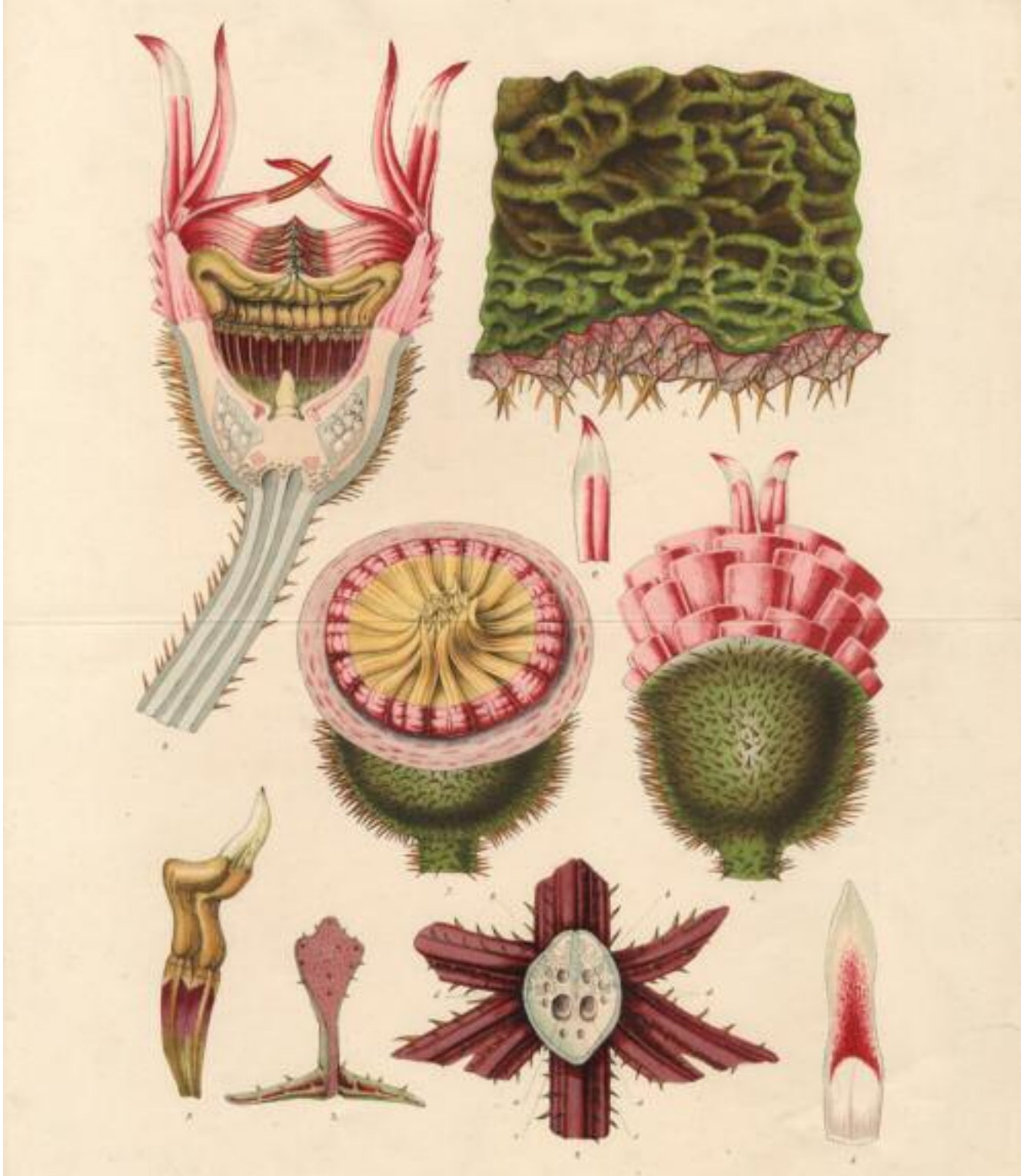
Currently, we are attempting to track down the sources of the illustrations in Zaleski's collection, which is proving quite the exercise in detective work. In the 1920's, after his death, Zaleski's collection passed to the Department of Plant Systematics and Taxonomy, University of Warsaw and perhaps because it was rather unknown to the wider audience was left untouched and luckily survived WWII. Due to lack of awareness of its existence and little understanding of the collection's value it has been locked away in library shelves for many years, until 2006, when the collection passed to the Botanic Garden and it was given a new lease of life.

### Sharing the collection with the world

At first we used the illustrations in our publications and educational materials but still felt we had a responsibility to share the collection with a wider audience. The idea of digitising the collection to produce a database arose a long time ago, but, as always, it was not easy to find the funding. Thanks to the Polish National Audiovisual Institute and University of Warsaw Foundation's



*Access to Zaleski's collection has long been restricted (University of Warsaw Botanic Garden)*



*Drawing of Victoria regia showing details of flower and leaf structure (University of Warsaw Botanic Garden)*

'Digital Heritage' programme, we were able to scan and database 8,000 of the illustrations. Over 3,000 of them are already available online under a creative commons license (CC-BY-NC), which means others can copy, distribute and display the images and make derivative works based on it for noncommercial use as long as they give the licensor credit. Medium size jpeg files (short edge 1000 pixels), sufficient for previews and smaller print-outs, are accessible online, with full-resolution scans (as tiff files), for high quality prints, available on request. Illustrations included in the database were

also subject to historical studies and their detailed descriptions (including, when possible, the engraving technique, names of artists etc.) are also available online (Mączewska 2013).

The next step will be to digitise and study the whole collection and design different educational materials for school teachers and educators to help them use FLORATHECA for taxonomy classes. In addition, the collection, includes images of economically important species, plants from a variety of habitats and with diverse lifecycles (carnivorous plants,

hydrophytes, succulents etc.), so it can be used to support the teaching of various other topics. Such resources should not drive us away from living plants and real gardens, but given the limited funding we usually have for education, and keeping in mind kids' interest in computers and the Internet, why not use old botanical collections in a modern way and show that they are still useful!? In the end, who knows, maybe working with these excellent resources and looking at the timeless beauty of the illustrations, some students may be inspired to master their botanical drawing skills.

## References

- FLORATHECA [www.ogrod.uw.edu.pl/floratheca?locale=en](http://www.ogrod.uw.edu.pl/floratheca?locale=en)
- Heywood, V. (2007) Taxonomy and plant conservation. *BGJournal* 4 (1), pp. 12-15.
- Kenicer, G. (2007) Taxonomy for horticulture students. *Roots* 4 (1), pp.15-16.
- Malej, W. (1965) *Ks. W. M. Zaleski Delegat Apostolski Indii Wschodnich, Arcybiskup Teb, patriarcha Antiochii* [Rev. W. M. Zaleski, Apostolic Delegate to Eastern India, Archbishop of Thebes, Patriarch of Antiochia]. Rome [in Polish]
- Maćzewska, K. (2013) Botanical archives – Flore Tropicale, a collection of illustrations at the University of Warsaw Botanic Garden. *Uniwersytet Warszawski, Pismo Uczelni* 1 (61), pp. 24-26 [in Polish]
- Walker, T. (2007) We shall always need taxonomists. *Roots* 4 (1), pp. 12-14.
- Wilson, K.L., Bisby, F.A, (2007) The Catalogue of Life: indexing the world's species. *BGJournal* 4 (1), pp. 24-29.

## RÉSUMÉ

Comme l'expertise et les ressources relatives aux plantes se font rares, la taxonomie est en train de disparaître des programmes scolaires. Or les technologies nouvelles, comme les bibliothèques numériques, pourraient rendre le monde des plantes plus accessible aux éducateurs et aux étudiants. Ainsi, d'anciens dessins botaniques, correctement annotés et digitalisés, ont un grand avantage par rapport à beaucoup d'autres images disponibles en ligne. Dans la plupart des cas, ces dessins illustrent des phases de vie différentes de la plante, telles que fleurs, fruits, plantules, en une seule image.

D'autre part ils ne sont pas soumis aux restrictions du droit d'auteur et peuvent être utilisés librement sans préoccupations éthiques. Dans cet article nous décrivons Floratheca, une nouvelle bibliothèque numérique en ligne du patrimoine culturel. Hébergée par le jardin botanique de l'université de Varsovie, cette base de données inclut 3.360 images de la Flore Tropicale - une riche collection de plus de 30.000 illustrations botaniques, collectionnées par l'archevêque Wladyslaw M. B.

Zaleski (1852-1925). Floratheca met à disposition des images de haute résolution avec les noms scientifiques et communs ainsi que des descriptions historiques, qui pourraient s'avérer être une ressource éducative inestimable.

## RESUMEN

Debido a la escasez de experiencia y material didáctico sobre las plantas, la taxonomía está desapareciendo de las currículas de las escuelas.

Nuevas tecnologías, como las bibliotecas digitales, podrían hacer el mundo vegetal más accesible a los educadores y a los estudiantes. Por ejemplo, los dibujos botánicos que están correctamente etiquetados y digitalizados tienen una gran ventaja sobre muchas otras imágenes en línea. En la mayoría de los casos, ellos ilustran varios estados de la vida de una planta, por ejemplo flores, frutos, y plántulas en una imagen.

Así también, no están sujetos a restricciones de derechos de autor y pueden ser usadas libremente sin preocupaciones éticas. En este artículo nosotros describimos Florateca (Floratheca), una nueva biblioteca digital de patrimonio cultural. Hospiciada por el Jardín Botánico de la Universidad de Varsovia, esta base de datos incluye 3360 imágenes de Flore Tropicale- una rica colección de más de 30,000 ilustraciones botánicas colectada por el Arzobispo Władysław M. B. Zaleski (1852-1925). Florateca (Floratheca) ofrece imágenes de alta resolución con nombres científicos y comunes, junto con descripciones históricas, las cuales proporcionan un recurso educativo invaluable.

**Marcin Zych (Associate Professor) & Krystyna Jędrzejewska-Szmek (Laboratory Education staff)**  
Botanic Garden, Faculty of Biology,  
University of Warsaw  
Al. Ujazdowskie 4, 00-478 Warsaw,  
Poland  
Email: [mzych@biol.uw.edu.pl](mailto:mzych@biol.uw.edu.pl)  
Website: [www.garden.uw.edu.pl/](http://www.garden.uw.edu.pl/)

*Children learning from living plants at University of Warsaw Botanic Garden (University of Warsaw Botanic Garden)*



# Virtual field trips: Bringing botanic gardens to the classroom

Today's advances in technology are bringing exciting opportunities for improvements in communication and outreach for botanic gardens **Cheri van Deraa** of Chicago Botanic Garden describes how an innovative Google communication platform has helped the Garden to greatly extend its education programme.



Expert interacting with children from the field (Chicago Botanic Garden)

Recently at the Chicago Botanic Garden (CBG) we found a way to extend the reach of our educational programming by teaching students through Google+ Connected Classrooms On Air. This new technology enables us to engage teachers and students around the world and to offer them the chance to participate in live, virtual field trips.

Students can 'visit' places they would never otherwise be able to explore. Connected Classrooms On Air also creates a live streaming video that can be archived on YouTube – this means the Garden is able to reach a global audience before, during and after the broadcast. The technology is quite simple to use and has the added advantage of being free!

In December 2013, Chicago became the first public botanic garden to host a live field trip for more than 1,000 students across the United States. In our first Connected Classroom the Garden's educators, horticulturists, and conservation scientists explored the impact of the invasive Emerald Ash Borer on our native ash trees with the students.

## Detailed planning

The CBG team met early and regularly to strategize and create a field trip that involved both indoor and outdoor activities in early December. We wanted a topic that students across the country could relate to so we decided to focus on invasive species. We then narrowed the topic to the Emerald Ash Borer (*Agrilus planipennis*), a green beetle native to Asia and Eastern Russia which is set to spread across the USA in the coming years. Creating a virtual field trip is a multi-step process, almost like producing a live TV show. The process goes from identifying a topic, to creating a storyboard that organizes content coherently, identifying presenters and creating scripts, and finally, carrying out technical checks and dress rehearsals. We engaged Garden experts from a wide variety of departments for input to create the programme. The Garden wanted to be innovative and creative with this



Students connected with the Garden from remote classrooms (Chicago Botanic Garden)

technology. Video sharing isn't possible with Google Hangouts on air, but we could screen-share PDFs. Our art department designed a comic book (PDF) which was narrated during the broadcast, to introduce the topic and engage young students in a fun way. GIS data maps were shown, illustrating the spread of the Emerald Ash Borer. A microscope was hard-wired to a computer to show the beetle up-close. Staff went into the woods to show how to identify the hole made by the borer and the damage it does, and to give a demonstration of how to inoculate an ash tree. As a grand finale, we cut down an ash tree that was infected. The programme concluded with a question-and-answer session between students and Garden staff.

The interactive field trip was presented from multiple locations. A script with directional cues was essential for staying on topic. Staff members were at the Garden in science laboratories, out in the field and in the office, enabling the connection to remote classrooms. CBG staff were on screen during the live broadcast, teaching ecology and making the problem of invasive species come to life. The broadcast concluded with the Garden experts responding to questions from the students.

With such advanced technology educators now have the ability to teach students complex science in distant classrooms. This approach to the classic field-trip experience meant that students who were physically thousands of miles away from the Garden were able to interact with not only educators, but also

with horticulturists and scientists, to learn firsthand about an ecological crisis. The technology allowed students and teachers access to experiences and individuals that would have been impossible during a traditional field trip because of time and resource constraints.

### Things to bear in mind

For other gardens considering this kind of educational outreach, there are some issues to consider:

- All participants need to have a Google+ account.
- An invitation to the Hangout must be accepted ahead of time.
- We would recommend multiple dress rehearsals on site and with the classrooms to practice controlling screen transitions and ensure clear connection transmission.
- There is a 30-second or more inherent delay in the Hangout broadcast that makes live question-and-answer sessions a challenge.
- We found that all of the computers in the Hangout had to be hard-wired in for clarity, and we had a few problems in the field with different wireless service providers and handsets.

Also, as mentioned, Google Hangouts does not allow for prerecorded video so we couldn't use lessons or fieldwork that we taped ahead of time. This meant that all elements of our programme, including the fieldwork, had to be done live, come rain or shine. The technology allowed up to ten screens to actively participate in an on-air event. We did have enough space on the screen for our Hangout;

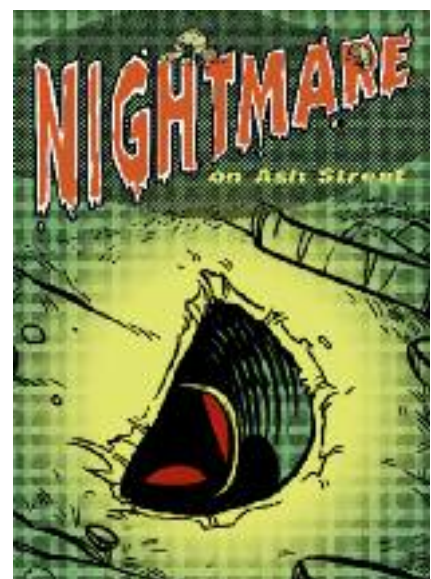
three classrooms were on screen and we used four screens at the Garden – one for our narrated comic book, one in the lab, and two in the field. We expect this technology to improve in time, and allow programmes like this to include video elements and more screen participants.

We chose Google Hangouts because, unlike Skype, it enabled participation by different groups, in multiple locations, all of whom could participate in real time. In our initial Hangout, three classrooms from different parts of the United States were able to ask questions on camera and were seen by CBG experts. Other classrooms could watch the broadcast and type in questions throughout it. Google staff helped to arrange for interested classrooms to participate. We selected from a list of teachers who applied for virtual field trips.

### A new energy

Field trips have been an essential part of our educational outreach and curriculum since the CBG opened more than 40 years ago. Our educators have worked hard to reach new audiences, by offering classes in schools for communities that are unable to come to the Garden. Google Hangouts has allowed that outreach to develop much further.

We found that the interaction among students, educators, and scientists was exciting and productive for all involved.



The comic 'Nightmare on Ash Street' was created to engage young people with the problem of invasive species (Chicago Botanic Garden)

As a learning experience for the students this virtual field trip brought a new energy to the classroom because it was live and interactive. Teachers who had previously explained the science of invasive species using paper handouts and textbooks found that they quickly caught students' attention with the Emerald Ash Borer comic book and the live-action view of an infected tree being cut down. Looking ahead, Garden educators and scientists know that we have a new way to reach classrooms of students of all ages. A virtual classroom can enrich activities in schools that face budget shortfalls and insufficient funding for field trips. While a virtual trip can never replace an actual visit to a botanic garden, where students interact directly with nature, this technology offers something unique, bringing together classrooms from all over the country for a behind-the-scenes view of the research and horticulture at a garden that would otherwise be inaccessible.

Educators at the CBG hope to continue using this technology to engage new audiences. There will be increased visibility for the Garden in distant regions of the country, and the possibility that students may also visit botanic gardens that are closer to them. Our local Garden members and visitors will learn about these technological new offerings through our website, e-newsletter, blog, and quarterly members' magazine. These outreach efforts connect far-flung students, highlight the work of our scientists, and align with the Garden's stated mission: *We cultivate the power of plants to sustain and enrich life.*

## RÉSUMÉ

Le jardin botanique de Chicago a été le premier jardin botanique public à proposer une sortie pédagogique en direct à plus de 1 000 étudiants provenant de l'ensemble des États-Unis, en utilisant les vidéos-bulles de Google+. Nous avons exploré l'impact d'un insecte envahissant, l'agrile du frêne, sur nos frênes natifs. Trois classes situées à travers les États-Unis ont pu poser des questions aux experts du jardin, par caméra. Les scientifiques et les animateurs du jardin espèrent utiliser cette technologie pour faire participer plus d'écoles et améliorer leurs expériences d'apprentissage. Bien



*Demonstrating during the virtual field trip how to identify the damage done by the borer (Chicago Botanic Garden)*

qu'une sortie pédagogique virtuelle ne soit pas un substitut à une vraie visite du jardin, cette technologie peut apporter quelque chose de vraiment différent et unique, tout en rassemblant des écoles de tout le pays. Les salles de classe virtuelles peuvent également ouvrir des possibilités aux écoles qui rencontrent des difficultés financières ou disposent de fonds insuffisants pour effectuer des sorties pédagogiques. Ce nouvel outil de Google peut aider à sensibiliser les gens aux problématiques liées à l'environnement qui nous affectent tous au niveau local et mondial.

## RESUMEN

El Jardín Botánico de Chicago es el primer jardín botánico público que ha hecho una salida de campo en vivo para más de 1000 estudiantes de todo Estados Unidos usando Google + en la nube. Analizamos el impacto del barrenador invasivo del fresno Emerald en nuestros fresnos nativos. Los alumnos de tres aulas de distintos lugares de Estados Unidos pudieron hacer

preguntas a los expertos del jardín a través de una cámara. Tanto los científicos como los educadores del jardín esperan usar esta tecnología para atraer a más escuelas y aumentar las experiencias educativas. Aunque una salida de campo virtual no es un sustituto de una visita al jardín, esta tecnología puede ofrecer algo único y muy diferente, poniendo en contacto aulas de todas partes del país. Las clases virtuales también pueden proporcionar oportunidades para aquellas escuelas que se enfrentan a recortes de presupuesto o que tienen escasos fondos para salidas de campo. Esta nueva herramienta de google puede ayudar a concienciar en cuestiones medioambientales que nos afectan a todos, tanto a nivel local como global.

**Cheri van Deraa**  
**Director, Online Communication**  
**Chicago Botanic Garden**  
**1000 Lake Cook Road**  
**Glencoe, IL 60022**  
**Email: [cherivan@chicagobotanic.org](mailto:cherivan@chicagobotanic.org)**  
**Website: [www.chicagobotanic.org](http://www.chicagobotanic.org)**



*Over 1000 students across the USA took part in the virtual field trip (Chicago Botanic Garden)*



Les écrans ont-ils une place dans un jardin ?  
¿Hay lugar para las pantallas en un jardín?

# Is there a place for screens in a garden?



*Iconic view of RBG, Kew*

Producing high-tech services that compliment a visit to a botanic garden can be a tricky business. **Angela McFarlane** recounts the twists and turns involved in developing an App to enhance visitor experience at Kew and highlights just how important it is to know your audience.

## **Is it a museum? Is it a gallery? No, it's a botanic garden!**

**W**hether or not a botanic garden is directly comparable to a museum is a matter of some debate. When I was responsible for the

public programme at RBG Kew, it seemed to me that, as the holder of some 19 globally important collections, Kew certainly had a lot in common with a museum. When it came to the visitor experience however, there were two very important differences. The first and most

obvious is that the best known collections are living and housed within a garden, either at Kew or Wakehurst Place. The second is more subtle. Visitor studies suggest that a major motivation for museum visitors is that they expect to learn, particularly if they come as a family.



*Visitors can use the smartphone app to access information on specific plants instantly (Kew)*

Visitors to a botanic garden have rather different motivations. They come to relax and unwind in a beautiful space and to enjoy the company of friends and family. Fortunately for us, given that Kew has a statutory obligation to provide education to the public, visitors are interested in learning once they are on site. However, learning is a secondary motivation and not why they are there in the first place.

A visit to a botanic garden is first and foremost a feast for the senses and a salve for the spirit; an experience of the natural world (albeit in a very un-natural setting) and an escape. Use of interpretation furniture must be subtle and in keeping with that natural aesthetic. No-one wants a botanic garden that resembles a bill board park. Yet, botanic gardens are repositories of the most amazing stories, wondrous acquisitions, both living and non-living, and remarkable science. Furthermore, once visitors are given a taste of this rich mix they tend to love it. So how is it possible to offer the visitor a way into the wonderful world of plants, without disrupting their communion with nature?

### **Getting lost in paradise**

When we experimented with the kind of mobile guide commonly found in museums, we offered access to navigation information and various layers of intriguing and informative content about various aspects of the gardens and the plants via a small, proprietary device with a nice bright screen big enough for

two people to look at together. It was intended as a guide to help you find what you were looking for, alert you to interesting things you passed on the way and to be 'dipped into' from time to time. Early trials had suggested this would be popular, and that visitors would even be prepared to pay for such a service. However, in the end the service was not a commercial success and was withdrawn after a year or so. Other outdoor venues had the same experience. There were a number of problems, not least that users had to learn how to use the software and the device. The staff distributing the units had little time to help familiarise customers with their operation and overall it seemed that it was considered too much trouble. The additional experience was not deemed sufficient to merit the investment of time and money. A dedicated mobile digital guide was not a hit, at least not in this form.

Meanwhile, in the world of personal digital communications, the smartphone App was becoming popular. Could we avoid some of the pitfalls of the dedicated service by offering an App to be used on the visitors' own phones? They would be more familiar with the operation of the device and might even have used other location based Apps. However, we knew that the service had to better match visitors' needs if it was to be successful and so we commissioned a dedicated piece of visitor research to find out, in more depth, what visitors would find

useful and interesting. In particular we wanted to know more about their motivations and information needs, their movement patterns and their ownership and use of smartphones. Researchers stationed at gates, major destinations and key wayfinding points made 1500 tracking observations, carried out 350 mini interviews and 200 in-depth interviews and collected 85 'fulfilment maps'. The 'fulfilment maps' gave a quick snapshot of the reasons for that day's visit when the visitor entered and a review when they were leaving to see if they had done what they had planned to. On such a large site these techniques enabled us to gain a more quantitative insight than accompanied visits would have done.

At over 300 acres, RBG Kew can be difficult to navigate not least because the combination of largely flat terrain and over 14,000 tall trees means that you can rarely see the point of interest you are heading for until you are standing next to it. So we were pretty sure that some aid to navigation would be welcome and that to achieve this, the App would need to use GPS to track where the visitor was. What we were not expecting was the discovery that many visitors, including first timers, actually enjoyed being 'delightfully lost'. Meandering through the site and enjoying serendipitous discoveries is an important part of the Kew experience. Following a map is not high on the priority list, although useful when you need a cup of coffee or a toilet!



*Guides can use a tablet App to access enhanced content such as time lapse video or flowering out of season (Kew)*

For regular visitors (Kew's 80,000 members make some 750,000 visits a year) the map facility served to point out features in the landscape they had never found before, even, in one case, after over 20 years of visits. The Ice House enjoyed an unexpected flurry of interest having lain undiscovered by most visitors before the App.

### Stealth learning?

Having given visitors a reason to download the Kew App – and made it available for free – could we then use this as vehicle to offer rich content that would enhance the visit experience and provide a gateway to the incredible world of plants and fungi? In order to test this out, we set up an experiment in the Princess of Wales conservatory. Interpretation content on the saguaro cactus (*Carnegiea gigantea*), including images, text and video, was made available in three formats (three different treatments), shown in the table below (see Table 1 & Figure 1). A researcher invited groups to view all three and then monitored and timed their reactions as well as asking them to complete a very short and simple tick sheet to rate their experience.

Such research is always prone to bias as not all visitor groups are equally amenable to stopping and taking part in the first place, so any results can only be extrapolated with extreme care. However the results were both encouraging and

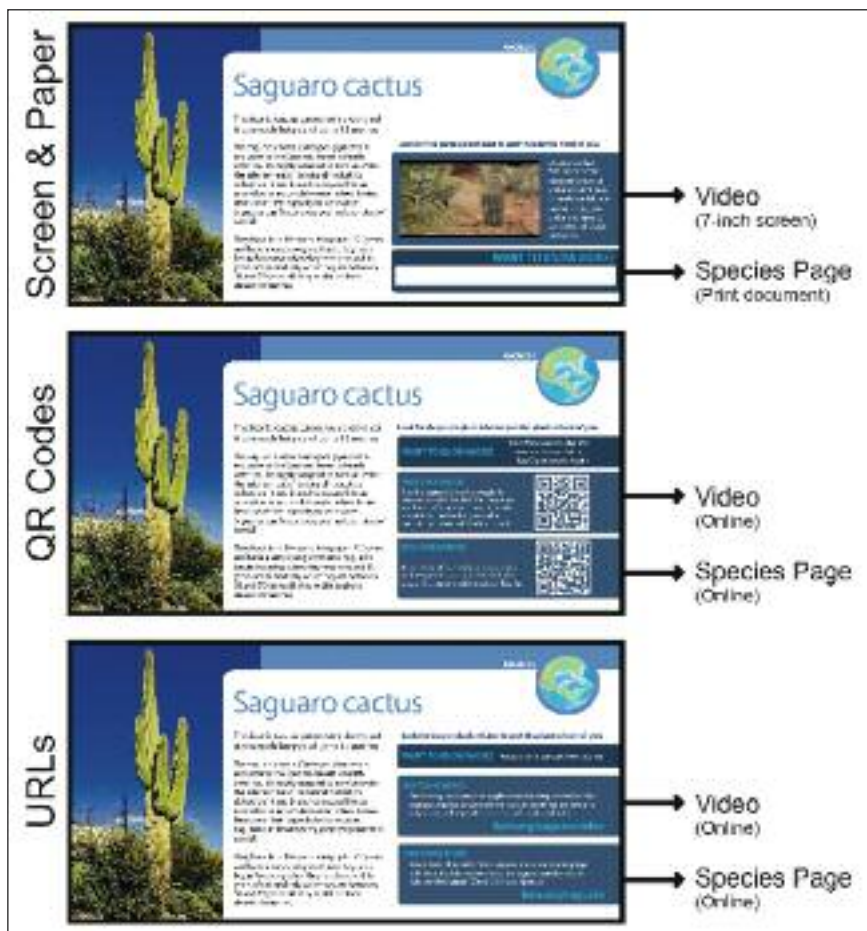


Figure 1: Interpretation panels offering information in different formats

disheartening. Irrespective of the format, the vast majority of groups found the content offered was interesting and the level of detail about right (see Table 2). When it came to rating the different presentations, there was little difference between the scoring based on

experience, but they spent a lot more time on the screen and paper version (see Table 3). This is largely due to the time spent watching the video.

The video was also available via the QR code, and the panel did point this out. However not one group spontaneously got out their smartphone and did this. After they had finished their session on the panels, the researcher showed some groups how to use the QR code and smartphone and they were all very impressed. The reasons they did not do this themselves are varied – the use of QR codes is not something they normally do, they may have concerns about the cost of accessing video on their phone (although there was a free Wi-Fi option in the conservatory) or they did not want to use their phones in the Gardens. This last one is a potential deal breaker. A separate research project working with families visiting Kew found that getting them away from screens is one of the reasons parents bring children to the Gardens.

So where does that leave us? Happily we know that thousands of visitors download and use the Kew App. Evaluation with users of the App find that, where they are

Treatment	Technology	Description
Treatment 1 (Paper & Screen)	7-inch screen Print document	The screen was used to loop the video. The species page could be found in a pocket within the panel.
Treatment 2 (QR Codes)	QR Codes	The panel contained QR Codes that linked to online versions of the video and the species page. Visitors could scan them using either the official Kew Gardens App or a third-party QR code scanner.
Treatment 3 (URLs)	Short-URLs	The same as in Treatment 2 except that the QR Codes were replaced with Short-URLs that visitors could access through the web browser of their mobile phones or capture for future reference.

Table 1: Overview of the experiment (three treatments offering interpretation in different formats)

	N (Groups of visitors)	Interesting	Entertaining	Too Basic	Too Detailed	Not For Me/Us
Screen & Paper	100	82%	26%	0%	9%	2%
QR Codes	100	93%	3%	1%	6%	1%
URLs	100	96%	7%	1%	3%	0%

Table 2: Descriptors assigned to the information available through each panel type.

	N (Groups of visitors)	TIME m:ss		STAR RATING out of a total of 5	
		Mean	Std. Deviation	Mean	Std. Deviation
Screen & Paper	100	1:42	1:00	3.65	.63
QR Codes	100	0:49	0:39	3.51	.72
URLs	100	0:40	0:22	3.52	.56

Table 3: Time (engagement) and Star Rating (experience) evaluation



Interpretation panel on saguaro cactus at the Princess of Wales Conservatory at RBG Kew

keen smartphone users, visitors love the App and find it very useful. It is possible that if we were to repeat the three way comparison study now, when smartphone use is better established, we might find a different outcome. The original study does suggest that visitors appreciate good video content and luckily, at Kew, they have access to a lot of this. Fixed screens are costly though, and will always be a minor part of the offer.

The development of a dedicated interpretation App was a fascinating experiment and, four years on, the result is a beautiful and very popular addition to the public engagement offer at Kew. Given trends in smartphone use I predict that its popularity will continue for some time as more and more visitors will be keen to experiment with the App. A greater challenge in these austere times may be the cost of maintaining the App from the Kew end.

## RÉSUMÉ

Lorsqu'il s'agit d'aborder les technologies sur support d'écran pour faire participer le public, un jardin botanique représente un environnement hostile. Les écrans bon marché sont très difficiles à lire en pleine lumière et, quand il pleut ou que les arroseurs fonctionnent, ils ont besoin d'un boîtier très robuste pour survivre. C'est donc sans surprise que les jardins botaniques, comme les musées, se sont tournés vers la diffusion de contenus par le biais des appareils personnels des visiteurs. Cependant, contrairement aux musées, la majorité des visiteurs dans un jardin botanique ne viennent pas pour rechercher des connaissances. Bien sûr, ils aiment souvent apprendre de nouvelles choses, mais ce n'est généralement pas le but de leur visite. Nombre d'entre eux viennent pour se détendre et se rapprocher de la nature, et probablement pour qu'eux-mêmes et leurs enfants s'éloignent d'activités liées à des écrans. Vu cette opposition, que devons-nous faire pour qu'une visite au jardin botanique soit, pour les visiteurs, une expérience dans l'ère numérique ? S'appuyant sur les expériences des Jardins botaniques royaux de Kew, cet article explore quelques-unes des possibilités, sur place, en ligne et sur les ondes.

## RESUMEN

Quando en un jardín botánico nos servimos de pantallas digitales para atraer al público, el jardín se convierte en un entorno hostil. Las pantallas

económicamente asequibles se ven mal a plena luz. Cuando llueve o se conectan los aspersores, hace falta proporcionarles una buena protección para que lo resistan. Por eso, no es sorprendente que así como los museos, los jardines botánicos divulguen su contenido mediante su personal. Sin embargo, a diferencia de los museos, los visitantes de los jardines botánicos no suelen acudir a éstos en busca de conocimiento. Aunque en general, se divierten aprendiendo cosas nuevas, no suele ser el propósito de su visita. La mayoría vienen a relajarse y acercarse a la naturaleza- posiblemente para mantenerse tanto ellos como a sus hijos lejos de las actividades basadas en pantallas. Con esta presión, ¿qué deberíamos hacer para que un jardín botánico le resulte al visitante una experiencia de la era digital? Este artículo explora algunas de las opciones en el propio jardín, por internet o en la nube, basándose en experimentos realizados en el Real Jardín Botánico de Kew.

**Angela McFarlane**  
**Visiting Professor - King's College**  
**London**  
**Email: [Angela.McFarlane@kcl.ac.uk](mailto:Angela.McFarlane@kcl.ac.uk)**  
**Website: [www.kew.org/](http://www.kew.org/)**

### With particular thanks to:

Mike Saunders and Natasha Waterson Formerly RBG Kew  
 Naomi Haywood  
 King's College, London  
 Renato Verdugo  
 Universidad Católica, Chile

# The power of technology: The use of online & blended learning for capacity building

Virtual learning environments (VLE) allow students to interact with tutors and each other from across the globe at the push of a button. **Leigh Morris** and the project management team at Royal Botanic Gardens Edinburgh (RBGE), Edinburgh have carefully developed their VLE to deliver botanical and horticultural training and to ensure all of their students have specialised support and great content to engage with.

## RBGE's desire for online learning

**R**BGE has delivered botanical and horticultural education courses around the world for over 100 years. Since 2004 our portfolio of courses has expanded significantly, with the introduction of a new BSc in Horticulture with Plantsmanship and a number of RBGE branded Certificate and Diploma courses. The demand is increasing and to widen participation, as well as improve the quality of delivery for existing students, we decided to set up an RBGE virtual learning environment (VLE). The bold vision was to *'establish RBGE, in partnership with others, as the global leader for the provision of online horticultural and botanical education'*. This received support from our Board who seed funded the project.



*A remote learner studying on-line at home via the VLE (RBGE)*

## Project team & tender process

A cross-RBGE project management team was set up, Chaired by myself, with the first meeting in April 2011. Over the next few months we agreed the ambition, Terms of Reference and, most importantly, we benchmarked against other institutions already delivering education in this way.

Invitations to tender for supply of a VLE were sent out in November 2011. Five software companies responded and prices ranged from less than £10,000 for 'off the shelf software' to over £80,000 for 'a bespoke RBGE tailored software package'. The decision was made to go for the cheapest software ('Moodle'), not because of price per se, but because it is the most widely used software and

therefore most easily adapted and supported. We also wanted to invest as much funding as possible in staff development and content creation. We selected the company Synergy Learning (<http://www.synergy-learning.com/>) to be our software provider and trainer; this was delivered by the excellent Jon Bolton, who had previously worked with the RHS on their VLE.



## 'Propagate Learning'

We wanted a name for our VLE and invited the RBGE community to submit suggestions. Dr Ian Edwards proposed 'Propagate Learning' and this was unanimously chosen – it links education to plants, suggests growing and multiplying knowledge, and is also a name and brand that others would hopefully want to partner with in the future.

We soon realised the need to develop and support RBGE staff and create a culture of online learning. We also understood that 'content is key' and wanted to avoid simply putting existing word documents, pdf files and PowerPoint presentations onto our VLE. We appointed a VLE Coordinator and then invested a great deal of his and other staff time in staff support and development, over the next 16 months. We created interactive quizzes, presentations and short films demonstrating horticultural and botanical techniques. We set up a film studio in one of our lecture rooms, persuaded a number of our experienced horticulturists to perform their skills in front of a camera, then edited them and added voiceovers. We now have short films on 23 different horticultural skills, ranging from propagation to potting-on. It has been an excellent learning curve for us and these films are now being



*'Content is key'. The Head of the School of Horticulture, Phil Lusby, is filmed for the introduction to the RBGE Diploma in Garden History (RBGE)*

linked to support learners on a number of our courses and modules. We are now producing a series of botany films for use in the same way.

In early 2013 we officially launched 'Propagate Learning' ([www.propagatelearning.net](http://www.propagatelearning.net)). The courses we prioritised to go online were the ones we believed would attract the most students, to enable us to generate the income needed to sustain the Coordinator post and keep creating more dynamic content. We were delighted when recruitment on our initial 'live' courses exceeded our expectations.

### Blended learning

For me, the most exciting opportunity for online education lies with blended (or hybrid) learning, meaning that learners come together for occasional evenings, days or weekends and then return to their homes to continue studying remotely, supported by the VLE. Alternatively, a tutor visits a group of learners to deliver elements of a course before leaving them to work via the VLE. The clear advantages of blended learning are: that students meet their tutors and peers, form face-to-face bonds and friendships, and most importantly visit a place, engage with plants and get their hands dirty!

RBGE are now successfully applying this blended learning model to a number of our courses: we offer practical horticulture weekends for the students studying remotely for the RHS (Level 2) Certificate in Horticulture; students taking the RBGE Certificate in Practical Horticulture now watch our short lectures and complete exercises online (which means when they come in for the course they go straight into the fun hands-on practical classes);

our RBGE Garden Design and RBGE Garden History Diploma students attend a series of weekends at RBGE throughout the year; and our RBGE Botanical Illustration Diploma is now more easily accessible to students from all over the world since they attend 2-week blocks at RBGE on an annual basis.

Through the offering of blended learning courses, learners from across the UK and the world can now access RBGE i.e. there is a limit to how far people will travel for a one day per week course, but there is seemingly no limit to the distance students will travel for a block course, when supported by an online platform. We believe the key is to plan our courses so that traditional lectures can be delivered remotely so that the days or weeks students spend at RBGE contain lots of hands-on practical sessions, group work, seminars and discussion. In effect, learners *'do the nice stuff in the nice place!'*

### Capacity building

For many years RBGE staffs have delivered short training courses to build capacity in a number of international botanic garden development projects. These courses work well and student feedback is always excellent, however, after the courses have ended, RBGE staff return to Scotland and the students have typically had very little subsequent contact with the tutors. Our vision now is to use 'Propagate Learning' to support these countries both before and beyond the short courses, so that students can do more preparatory work and then when RBGE staff leave, the students can still engage via the VLE. Access to the internet is critical, but there are now very few places on the planet where this is not possible.



*Propagate Learning Home Page (RBGE)*

## The Future?

I delivered our full vision for the future for 'Propagate Learning' in a presentation at the BGCI Congress in Dunedin in October 2013 (<http://www.youtube.com/watch?v=Khl5vWSC1Hg>). In brief, I believe a VLE is now a fundamental tool to being a credible learning provider in the 21st century. It enhances education and provides an interactive 'classroom' that can be accessed 24 hours a day, 7 days a week, anywhere in the world. A VLE, however, is just one part of the whole online package needed to support remote learners, which should also include: email, social media (in its many forms), and technology that enables face-to-face interactions through webcams, such as Skype, webinars, pod casts or augmented reality. This can be highly successful, but you must create a culture of online learning within your team and, whenever possible, add in some element of blended learning for the students.

Will online learning ever replace offline courses completely? I don't believe so, as there will never be any substitute for learning in a wonderful place, taught by enthusiastic, skilled and knowledgeable tutors, using living plants. For a great many people, however, with busy lives, or who don't live close enough, or have the finances to attend regularly, the use of such online technology will undoubtedly become even more important in the next few years, and if we get this right the potential to enhance capacity building through online learning is amazing.

## RÉSUMÉ

Le Jardin botanique royal d'Édimbourg (RBGE) possède une longue histoire dans l'enseignement de la botanique et de l'horticulture à Édimbourg et, au travers de projets, de par le monde. Depuis quelques années, l'éventail des cours a considérablement augmenté. Pour accroître la participation et améliorer le soutien aux étudiants actuels, un environnement d'apprentissage virtuel (VLE) en ligne a été développé en 2003. Le RBGE offre maintenant une partie de ses cours « à distance » ou « en apprentissage mixte », dans le but de mettre tous les programmes en ligne dans un futur proche. Bien que l'utilisation d'un VLE pour « enseigner sur les plantes » comporte des difficultés, il y a des



*Students at the 2013 RBGE horticulture training course at Kunming Botanic Garden. In the future 'Propagate Learning' will support the students long after RBGE have returned to Edinburgh (RBGE)*

opportunités et des avantages conséquents quant à l'adoption de telles technologies pour mieux atteindre et aider les apprenants. Il est estimé que les clés pour réussir consistent en l'établissement d'une vraie « culture du VLE » et en la création de « contenus remarquables » pour que les apprenants les utilisent. Cet article examine les progrès actuels du RBGE et ses ambitions pour le futur.

## RESUMEN

El Jardín Botánico de Edimburgo (RBGE) tiene una larga tradición en la enseñanza de la botánica y horticultura en Edimburgo y de la enseñanza a través de proyectos a nivel mundial. Recientemente el abanico de cursos se ha incrementado mucho. En 2003 se desarrolló un sistema de aprendizaje virtual a distancia (VLE) para mejorar la atención a los estudiantes y aumentar su participación. RBGE ofrece ahora alguno de sus cursos como educación a distancia o semipresencial,

con el propósito de que todos sus programas se desarrollen a distancia en un futuro próximo. Aunque el uso de VLE para la enseñanza de la botánica tiene sus retos, adoptar una tecnología así proporciona enormes ventajas y oportunidades a la hora de captar y tutorizar a los estudiantes. Las claves del éxito parecen encontrarse en establecer una verdadera cultura de VLE y crear buenos contenidos que la hagan atractiva. Este artículo revisa los logros alcanzados y los proyectos de futuro del RBGE.

**Leigh Morris**  
**Associate Director of Horticulture (Learning)**  
**President, Institute of Horticulture Royal Botanic Garden Edinburgh, 20A Inverleith Row, Edinburgh, EH3 5LR**  
**Email: [L.Morris@rbge.ac.uk](mailto:L.Morris@rbge.ac.uk)**  
**Website: [www.rbge.org.uk/](http://www.rbge.org.uk/), [www.propagatelearning.net](http://www.propagatelearning.net), [www.growcareers.info/](http://www.growcareers.info/)**  
**Twitter: @MorrisLeigh**



*The VLE would enable students such as these on the RBGE Certificate in Practical Horticulture, delivered in Lao, PDR, to continue their contact with RBGE after staff have returned home (RBGE)*

# Online learning at Longwood Gardens ever growing

Being a site of high quality and far reaching horticulture education is one of Longwood Gardens' key missions. From mobile Apps that allow visitors to access online content and personalize their visit, to comprehensive online learning environments, **Susan Caldwell** and **Doug Needham** explain how cutting edge technology is being used to enhance and compliment the garden's various educational goals.

## Introduction

Longwood Gardens, where legacy, innovation and stewardship meet, was founded by Pierre S. du Pont. The Gardens aim to inspire people in horticulture, garden design, education, and the arts, through excellence. Education is deeply embedded within our mission and vision and is realized through our K-12 (kindergarten to 12th grade), high school cooperative education, undergraduate, graduate,

college/university internship, international internship and traineeship, continuing education, and interpretation programming.

In 2009 to support Longwood's mission and vision, Longwood's education department embarked on what became a series of technology in education projects. The goals were to reach new audiences, expand learning opportunities, share intellectual capital with the world, support Longwood's undergraduate and graduate programs, enhance the Continuing Education offered, and establish partnerships with other gardening institutions worldwide. One of the initial technology projects focused setting up an online classroom, using Desire2Learn's Learning Environment, to enrich the learning experience for both our on-site and online learners. Now, in 2014, online learning at Longwood goes well beyond courses to include resources, interpretation, lecture capture, webcasts, and interactive video conferencing.

## Online learning: Resources

Our online systems provide remote access to the wealth of Longwood Gardens' resources and include:

- EOS, our integrated library system which allows access to our library holdings and e-resources,
- Asset Bank, our digital asset management system, which provides access to our digital and digitized photographs and archival records,
- Plant Explorer which gives users access to our plant records, mapping, and plant photographs [Image 1].

Additionally, we use technology to enhance our guests' experience through interpretation, including mobile phone audio tours, Apps, and QR codes for direct access to our plant records via Plant Explorer.

In more detail, Longwood Gardens' Plant Explorer (<http://plantexplorer.longwoodgardens.org>) was developed between 2009 and 2010, in cooperation with Mark Glicksman of BG-Map . It provides web-based, searchable access to Longwood's plant records, allowing students, guests, and staff to locate plants, gardens, and garden features and create personalized tours. The system gathers images and information from BG-BASE (Collections Management Software), BG-Map (mapping software designed for botanic gardens), and Asset Bank and, then, dynamically assembles the information



*Longwood Gardens: A garden of horticultural excellence*





Longwood visitor using the Light App to learn more about the special exhibition *Light: Installations by Bruce Munro* (Longwood Gardens)

into web pages that include taxonomic information, plant locations, photographs, and a phenology table. Nearly 27,000 people used Plant Explorer last year to find plants and personalize their visit to the Gardens.

Plant Explorer is also essential to the education department, as it allows staff to generate electronic course manuals with plant fact sheets, which are being used for Continuing Education and plant identification courses in the Professional Gardener Program. The electronic course manuals are integrated into Longwood's online classroom. A popular feature is the 'self-test', where students can assess their knowledge of the plants in each course.

### Online learning: Interpretation

In 2012, Longwood Gardens hosted the special exhibition *Light: Installations by Bruce Munro*. The development of a mobile App was an important addition to the visitor experience. Our guests used the App [Image. 2] to plan their visit, investigate the exhibit, learn about the artist and his team's creations, and to share their reactions to the display. Our volunteers, docents, and staff, also, used the App to provide interpretive information and navigation throughout the display.

### Online learning: Courses

Longwood Gardens offers hybrid and exclusively online courses in its wide variety of adult programs including Continuing Education, K-12 teacher

professional development, staff leadership development and undergraduate Professional Gardener Program. Each year we expand the range of courses that we offer and we also improve the software features that support online learning. Currently, Longwood has about 2,000 enrollments per year, and there were nearly 25,000 logins in 2013.

Longwood's web-based, online classroom [Image 3] allows instructors and students to share course materials, communicate with each other, conduct group work, and deliver and grade assessments and assignments. Notably, integrated within Longwood's online classroom are Plant Explorer, Library e-resources, web conferencing tools, and the web streaming and recording system. The availability of all of these tools offers instructors many options to interact with learners.

### Online learning: Lecture capture

Longwood Gardens hosts professional symposia, conferences, and forums. Some are mainly organized by our institution, such as the Garden Educators' Forum, the Professional Gardener Alumni Association's 'Today's Horticulture' Symposium, and the Longwood Graduate Program Symposium, and others are associated with professional societies. As part of our goal to create partnerships with other gardening institutions worldwide and share intellectual capital, Longwood invested in establishing a web streaming and video recording system,

using Desire2Learn Capture [Image 4]. Desire2Learn Capture is a technological solution that enables the capturing of rich-media presentations with audio, video, and visual aids and broadcasting them to online audiences live and on-demand. The Capture Stations are a paired hardware and software solution that allows the recording and streaming of presentations. There are dedicated Capture Stations installed in Longwood's classrooms, Ballroom, Visitor Center Auditorium, and Interactive Video Conferencing Studio.

Longwood streams live events over the Web and records events for archival and post-event viewing. Participants view live events in their preferred web browser, and each user has the ability to configure the presentation window to his/her liking. Recorded events can be linked or embedded into a web page, and include navigation so users can jump to any point in the recording. Longwood's education department uses the Capture Stations in the classrooms to record instructor lectures and student presentations, both of which are then embedded into their associated courses in the online classroom.

Additionally, as part of this year's programming and in conjunction with the opening of our expanded Meadow Garden, we are hosting a 'community read' of the book *A Sand County Almanac* by Aldo Leopold. This event will explore the book's ideas about environmental conservation, land stewardship, and community engagement. Associated with



The Homepage of 'Exotic and Tropical Plants' Continuing Education hybrid course in Longwood's online classroom (Longwood Gardens)

the community read is the film *Green Fire – Aldo Leopold & a Land Ethic for Our Time*, which we are hosting on our D2L Capture portal. The Capture system has broad applications for education including events, classes, instructional videos, staff training, interviews, and more.

### Online learning: interactive video conferencing

Longwood's most recent addition to educational technology is a state-of-the-art Interactive Video Conferencing (IVC) Studio. The Studio provides built-in access to state of the art technology including:

- Reflecmia chroma key LiteRing and backdrop (professional studio setup)
- Blackmagic ATEM production switcher (to switch between different video or audio sources)
- LifeSize 200 interactive video conferencing system
- D2L Capture Station for recording
- Visualizer for close-ups of plant parts

Although it represents a significant integration of hardware and software, what is important is that the technology allows Longwood staff to connect with K-12 classrooms around the world to deliver interactive, competency-based lessons. IVC lessons, e.g. 'Desert Plant Adaptations', are promoted through the Center for Interactive Learning and Collaboration (<http://ciilc.org>). Additionally, the Studio is used for connecting Longwood staff with colleges and universities to discuss careers in public horticulture and for recording short videos to support courses in the online classroom.

### Challenges and future directions

While technology is an extremely important tool in the education toolbox, it is important to keep in mind that technology itself is not the objective. Rather, the technologies employed must serve the garden's mission and teaching and learning objectives. Initially, the greatest challenges may appear to be funding and project implementation. Equally important, however, is the less tangible challenge of changing culture and overcoming resistance to the application of technology for teaching horticulture.



Longwood's D2L Capture portal for streaming live and recorded webcasts (Longwood Gardens)

Employing educational technology has allowed Longwood to enhance our guests' experience, reach new audiences, teach children near and far, and promote professional development. It does require an institutional commitment of dedicated resources and staff to implement and support educational technologies; however, offering online learning in all its forms helps to establish public gardens as an online resource for horticulture and plant science education. What technology in education will next year bring? We can't wait to see!

### RÉSUMÉ

En 2009, afin d'appuyer la mission et les objectifs des jardins de Longwood, le service éducatif a entrepris de commencer une série de projets ciblés sur la technologie dans l'éducation qui incluait des ressources d'apprentissage en ligne, des interprétations, des cours, des captures de cours (enregistrement de contenus de cours) et des vidéoconférences interactives.

Nos ressources d'apprentissage en ligne incluent notre système de bibliothèque intégré, le système de gestion des actifs numériques et la base de données sur les plantes. De plus, nous utilisons la technologie pour améliorer l'expérience de nos hôtes par le biais de l'interprétation, notamment par des visites audio-guidées, des applis, et des codes QR pour un accès direct à la base de données sur les plantes.

La technologie est également un aspect important de nos programmes d'éducation formelle, c.-à-d. les cours, les colloques et les leçons en ligne K12. Nous proposons des cours en ligne complets ou hybrides pour les apprenants de tous âges, en utilisant l'environnement d'apprentissage

« Desire2Learn ». Des stations de capture de « Desire2Learn » sont déployées à différents endroits pour l'enregistrement et/ou la diffusion en ligne de cours, de conférences, de colloques, et d'événements spéciaux. Un studio de vidéoconférences interactives fournit des instructions en direct dans les deux sens aux étudiants de K12 dans les classes à travers le monde.

### RESUMEN

En 2009, para impulsar el objetivo y la imagen de los jardines Longwood, el departamento de educación se embarcó en lo que han llegado a ser una serie de proyectos centrados en la tecnología aplicada a la educación, que incluyen recursos online, interpretación, cursos, grabación de contenidos y video conferencias interactivas.

Nuestros recursos online incluyen nuestro sistema integrado de biblioteca, sistema de gestión de recursos y sistema de registro de plantas. Además, usamos la tecnología para ampliar las experiencias de nuestros visitantes a través de la interpretación, incluyendo recorridos con audio, apps y códigos QR para acceder de forma directa a la información de las plantas.

La tecnología es también un aspecto importante en nuestros programas de educación formal, por ejemplo, cursos, simposios y lecciones a distancia K12. Ofrecemos cursos mixtos o completamente a distancia para estudiantes de todas las edades usando el Desire2Learn Learning Environment. Las estaciones captadoras del Desire2Learn están desplegadas en distintos emplazamientos para grabar o transmitir en directo lecciones, conferencias, simposios y eventos especiales y una estación de videoconferencias proporciona instrucciones en vivo en los dos sentidos a los estudiantes K2 de distintas aulas alrededor del mundo.

**Susan Caldwell, Instructional Designer, and Doug Needham, Ph.D., Education Department Head**  
**Longwood Gardens, P.O. Box 501**  
**Kennett Square, PA 19348-0501**  
**Email:**  
**[scaldwell@longwoodgardens.org](mailto:scaldwell@longwoodgardens.org) &**  
**[dneedham@longwoodgardens.org](mailto:dneedham@longwoodgardens.org)**  
**Website: [www.longwoodgardens.org](http://www.longwoodgardens.org)**

# Resources

## RESOURCES

### Books

#### Interpretation: making a difference on purpose

In order for a botanic garden to communicate its messages, in any format, via any media it must have effective interpretation i.e. interpretation that its various audiences can understand and engage with.

This book builds on the ideas raised in *Environmental Interpretation* by the same author, which has become somewhat of a bible for outdoor education sites when it comes to communicating themes to visitors. This book suggests that interpretation involves not instruction but the provocation of thought and explains the concept of EROT in effective communication i.e. the theory that, to be effective, interpretation must have a theme, be organized, relevant and enjoyable. As well as highlighting these important issues the book builds on them, bringing them up to date with contemporary evidence. Sam Ham's book also provides a practical guide to how to think about interpretation and develop it from a cognitive perspective. In its 10 chapters the book discusses the aim of interpretation and the rationale behind thematic communication along with how to develop themes.

Sam H. Ham,  
2013, Fulcrum  
publishing,  
Colorado, USA  
ISBN-10:  
1555917429  
ISBN-13: 978-  
1555917425



## RESSOURCES

### Livres

#### Interprétation : faire délibérément une différence

Pour qu'un jardin botanique transmette ses messages, dans n'importe quel format, par tous les médias, il doit avoir une interprétation efficace, c'est-à-dire une interprétation que ses différents publics peuvent comprendre et avec laquelle ils peuvent interagir.

Ce livre s'appuie sur les idées soulevées dans *l'interprétation environnementale* du même auteur, qui est devenue en quelque sorte une bible pour les sites d'éducation en plein air quand il s'agit de communiquer sur certaines thématiques avec les visiteurs. Ce livre suggère que l'interprétation ne doit pas comporter d'instruction, mais qu'elle doit induire la réflexion et explique le concept de communication efficace EROT, théorie selon laquelle, pour être efficace, l'interprétation doit avoir un thème, être organisée, pertinente et agréable. Ce livre met non seulement ces questions importantes en lumière mais les actualise aussi en présentant des témoignages actuels. Le livre de Sam Ham fournit aussi un guide pratique sur la façon de penser et développer l'interprétation dans une perspective cognitive. Dans ses 10 chapitres, l'ouvrage traite de l'interprétation et de la raison d'être de la communication thématique, ainsi que de la façon de développer des thèmes.

Sam H. Ham, 2013, Fulcrum publishing,  
Colorado, USA  
ISBN-10: 1555917429  
ISBN-13: 978-1555917425

## RECURSOS

### Libros

#### Interpretación: haciendo la diferencia a propósito

Para que un jardín botánico comunique en cualquier formato sus mensajes, a través de cualquier medio de comunicación, debe contar con una interpretación efectiva, es decir, una interpretación que las distintas audiencias puedan entender y que las motive a involucrarse.

Este libro se basa en las ideas planteadas en *Interpretación Ambiental*, obra del mismo autor, que se ha convertido en algo así como una biblia para los centros de educación al aire libre cuando se trata de comunicar tópicos y temas a los visitantes. El libro sugiere que la interpretación no implica *recibir instrucción*, sino una provocación del pensamiento y explica el concepto de EROT en la comunicación efectiva, es decir, la teoría de que para ser eficaz la interpretación debe contener un tema, estar organizado, ser pertinente y agradable. Además de resaltar estos importantes temas, el libro los pone al día con base en evidencias contemporáneas. El libro de Sam Ham también proporciona una guía práctica sobre cómo planear la interpretación y cómo desarrollarla desde una perspectiva cognitiva. En sus 10 capítulos, el libro analiza la finalidad de la interpretación y la razón de ser detrás de la comunicación temática, y al mismo tiempo aborda la manera adecuada de desarrollar los temas.

Sam H. Ham, 2013, Fulcrum publishing,  
Colorado, USA  
ISBN-10: 1555917429  
ISBN-13: 978-1555917425

---

## Conversations with Visitors: Social Media and Museums



An important aspect of audience engagement and science communication, in the twenty-first century, is ensuring a two way communication model rather than a top down approach. This book discusses how social media can be used to open up dialogues

between museum visitors, staff and practitioners, as well as how this communication can be analysed. Using examples from museums across the globe such as, The Smithsonian, Washington, D.C, the Copernicus Science Centre, Warsaw and the Experimentarium in Copenhagen, the book draws on a body of knowledge from well respected institutions to offer practice-based advice. Covering a wide range of subjects, with chapters like: *Mobile Phones for Informal Science Centre Learning: A Socio-Technical Analysis*, *Using Twitter For Research and Smartphone Interaction: The Museum as a Gaming Board* the book offers guidance and inspiration to all those working in the field.

Elizabeth P. Stewart, Dana Allen-Greil,  
Beck Tench (et al), *Museums Etc*,  
Edinburgh, UK  
<http://www.museumsetc.com/products/conversations>  
Also available on-line:  
[http://sharemuseumseast.org.uk/shares/resource\\_93.pdf](http://sharemuseumseast.org.uk/shares/resource_93.pdf)  
ISBN-10: 1907697381  
ISBN-13: 978-1907697388

---

## Museums in the Digital Age: Changing meanings of place, Community and Culture

Museums and botanic gardens are important social institutions and have great potential to enforce and enhance the communities they serve. This book focuses on the theoretical ideas involved in the use of technology and presents how five of the most technologically advanced art museums in the USA have integrated new tools for social and cultural purposes. The book is broken down into case studies from highly esteemed museums, including, MoMA

---

## Conversations avec les visiteurs : réseaux sociaux et musées

Au 21ème siècle, un aspect important de l'engagement du public et de la communication scientifique est d'assurer un modèle de communication à deux voies plutôt que descendant. Ce livre explique comment les médias sociaux peuvent être utilisés pour ouvrir le dialogue entre les visiteurs de musées, le personnel et les professionnels, ainsi que la façon dont cette communication peut être analysée. En utilisant les exemples de musées répartis à travers le globe comme le Smithsonian à Washington, D.C, le Centre scientifique Copernic à Varsovie et l'Experimentarium à Copenhague, le livre s'appuie sur un recueil de connaissances d'institutions très respectées pour offrir des conseils basés sur la pratique. Couvrant un large éventail de sujets, avec des chapitres comme : *Téléphones mobiles pour les centres d'apprentissage des sciences informels : une analyse socio-technique*, *Utiliser Twitter pour la recherche et l'Interaction des smartphone : le musée comme jeu de société*, ce livre offre des conseils et de l'inspiration pour tous ceux qui travaillent dans ce domaine.

Elizabeth P. Stewart, Dana Allen-Greil,  
Beck Tench (et al), *Museums Etc*,  
Edinburgh, UK  
<http://www.museumsetc.com/products/conversations>  
[http://sharemuseumseast.org.uk/shares/resource\\_93.pdf](http://sharemuseumseast.org.uk/shares/resource_93.pdf)  
ISBN-10: 1907697381  
ISBN-13: 978-1907697388

---

## Les musées à l'ère du digital : changer la signification du lieu, de la communauté et de la culture

Les musées et les jardins botaniques sont des institutions sociales importantes et ont un grand potentiel pour faire respecter et améliorer les communautés qu'ils servent. Ce livre porte sur les idées théoriques inhérentes à l'utilisation de la technologie, et présente la façon dont cinq musées d'art les plus technologiquement avancés aux Etats-Unis ont intégré de nouveaux outils à des fins sociales et culturelles. Ce livre est constitué d'études de cas de musées de grande renommée, y compris le MoMA et le Walker Art Center, et synthétise leur utilisation de la

---

## Conversaciones con los visitantes: museos y redes sociales

Un aspecto importante del compromiso entre la audiencia y la comunicación de la ciencia, en el siglo XXI, es asegurar un modelo de comunicación de dos vías en lugar de un modelo de comunicación basado en enfoque vertical. Este libro explica cómo se pueden utilizar las redes sociales para abrir el diálogo entre los visitantes a los museos, el personal y los profesionales, así como la forma en que se puede analizar esta comunicación. Utilizando ejemplos de museos de todo el mundo, tales como The Smithsonian, de Washington, D.C., el Centro de Ciencias Copérnico, de Varsovia y el Experimentarium de Copenhague, el libro se basa en un conjunto de conocimientos de instituciones prestigiadas que ofrecen asesoría basada en la práctica. Cubriendo una amplia gama de temas en capítulos con títulos como *"Teléfonos móviles para un centro de enseñanza informal de las ciencias: un análisis socio-técnico"*, y *"Utilizando Twitter para investigar y la Interacción con Smartphones: El museo como tablero de juego"*, el libro ofrece orientación e inspiración para todos los que trabajan en estos campos.

Elizabeth P. Stewart, Dana Allen-Greil,  
Beck Tench (et al), *Museums Etc*,  
Edinburgh, UK  
<http://www.museumsetc.com/products/conversations>,  
[http://sharemuseumseast.org.uk/shares/resource\\_93.pdf](http://sharemuseumseast.org.uk/shares/resource_93.pdf)  
ISBN-10: 1907697381  
ISBN-13: 978-1907697388

---

## Museos en la era digital: Cambiando el significado de lugar, comunicación y cultura

Los museos y jardines botánicos son importantes instituciones sociales y tienen un gran potencial para mejorar y reforzar las comunidades a las que sirven. Este libro se centra en las ideas teóricas involucradas en el uso de la tecnología y presenta cómo cinco de los museos de arte con mayores avances tecnológicos de los Estados Unidos, han integrado nuevas herramientas con propósitos sociales y culturales. El libro se divide en estudios de caso de los museos de gran prestigio, como el MoMA (Museo de Arte Moderno de Nueva York) y el Centro de Arte Walker, y

and the Walker Art Centre, and summarises their use of technology in a cultural context. The merits and weaknesses of each approach are laid out in the 'lessons learned' section, which is particularly helpful for those seeking guidance. Although focussing on art museums the ideas raised are far reaching in their relevance and therefore can provide useful insights to those from scientific institutions.

Susana Smith Bautista.,  
AltaMira Press, U.S.  
[http://books.google.co.uk/books?id=s3FBAGAAQBAJ&pg=PA137&dq=apps+museums&hl=en&sa=X&ei=rjnMUo3\\_O5CrhAeDrYDoDA&ved=0CEQQ6AEwADgK#v=onepage&q=apps%20museums&f=false](http://books.google.co.uk/books?id=s3FBAGAAQBAJ&pg=PA137&dq=apps+museums&hl=en&sa=X&ei=rjnMUo3_O5CrhAeDrYDoDA&ved=0CEQQ6AEwADgK#v=onepage&q=apps%20museums&f=false)  
ISBN-10: 0759124132  
ISBN-13: 978-0759124134

### Museums in a digital age

This book focuses on addressing the challenges and opportunities new technologies present to the communication of cultural heritage. As botanic gardens are becoming more aware of their position and role within community and culture, many of the messages within the book are of great importance. Museums in a digital age covers ideas surrounding: information, space, access, interpretation, objects, production and the future, from a theoretical and practical perspective. Digital technologies provide opportunities for communicating with groups who would have previously been excluded. The section which discusses access, takes a look at using web culture to engage people with disabilities and offers very important insights for gardens wishing to widen their audience demographic. For an area like digital technology which is so quick to evolve, to remain contemporary anticipating its development is essential. Therefore to aid practitioners in doing this, the book ends with a section that looks to the future.

Ross Parry, Routledge, Oxon, Canada and New York, USA  
<http://books.google.co.uk/books?id=fqkQ7plXw0lC&printsec=frontcover&dq=new+technology+in+museums&hl=en&sa=X&ei=gS3MUysiBse6hAfOh4C4BQ&ved=0CDsQ6AEwAA#v=onepage&q=new%20technology%20in%20museums&f=false>  
ISBN-10: 041540262X  
ISBN-13: 978-0415402620

technologie dans un contexte culturel. Les points forts et les points faibles de chacune des approches sont présentés dans la section "leçon apprise", ce qui est particulièrement utile pour ceux qui cherchent des conseils. Bien que mettant l'accent sur les musées d'art, les idées avancées sont assez pertinentes pour représenter des informations utiles pour les institutions scientifiques.

Susana Smith Bautista.,  
AltaMira Press, U.S.  
[http://books.google.co.uk/books?id=s3FBAGAAQBAJ&pg=PA137&dq=apps+museums&hl=en&sa=X&ei=rjnMUo3\\_O5CrhAeDrYDoDA&ved=0CEQQ6AEwADgK#v=onepage&q=apps%20museums&f=false](http://books.google.co.uk/books?id=s3FBAGAAQBAJ&pg=PA137&dq=apps+museums&hl=en&sa=X&ei=rjnMUo3_O5CrhAeDrYDoDA&ved=0CEQQ6AEwADgK#v=onepage&q=apps%20museums&f=false)  
ISBN-10: 0759124132  
ISBN-13: 978-0759124134

### Les musées à l'âge du numérique

Ce livre met l'accent sur les défis et les opportunités que les nouvelles technologies représentent dans la communication dans le domaine du patrimoine culturel. Alors que les jardins botaniques sont de plus en plus conscients de leur position et de leur rôle au sein de la collectivité et de la culture, ce livre contient de nombreux passages très intéressants. *Les musées à l'âge du numérique* traite d'idées autour de : l'information, l'espace, l'accès, l'interprétation, les objets, la production et l'avenir en s'appuyant sur un point de vue théorique et pratique. Les technologies numériques offrent des possibilités de communication avec des groupes qui auraient été préalablement exclus. La partie qui traite de l'accès passe en revue l'utilisation de la culture web pour mobiliser des personnes handicapées et donne un aperçu vraiment intéressant pour les jardins qui souhaitent élargir leur public. Dans un domaine comme la technologie numérique, si prompt à évoluer, anticiper son développement est essentiel pour rester moderne. C'est pourquoi ce livre se termine par une partie traitant du futur pour aider les praticiens à le préparer.



resume el uso que hacen de la tecnología en un contexto cultural. Los méritos y las debilidades de cada enfoque son presentados en la sección "lecciones aprendidas", mismo que es especialmente útil para aquellos que buscan orientación. Aunque centrada en los museos de arte, el alcance y relevancia de

las ideas planteadas es tan amplio que pueden proporcionar información y consejos aplicables a los museos de instituciones científicas.

Susana Smith Bautista.,  
AltaMira Press, U.S.  
[http://books.google.co.uk/books?id=s3FBAGAAQBAJ&pg=PA137&dq=apps+museums&hl=en&sa=X&ei=rjnMUo3\\_O5CrhAeDrYDoDA&ved=0CEQQ6AEwADgK#v=onepage&q=apps%20museums&f=false](http://books.google.co.uk/books?id=s3FBAGAAQBAJ&pg=PA137&dq=apps+museums&hl=en&sa=X&ei=rjnMUo3_O5CrhAeDrYDoDA&ved=0CEQQ6AEwADgK#v=onepage&q=apps%20museums&f=false)  
ISBN-10: 0759124132  
ISBN-13: 978-0759124134

### Museos en la era digital

Este libro se enfoca en abordar los desafíos y las oportunidades de las nuevas tecnologías presentes en la comunicación del patrimonio cultural. Tomando en cuenta que los jardines botánicos son cada vez más conscientes de su posición y función dentro de la comunidad y la cultura, muchos de los mensajes contenidos en el libro son de gran importancia. *Museos en la era digital* abarca ideas en torno a

la información, el espacio, el acceso, la interpretación, los objetos, la producción y el futuro, desde las perspectivas teórica y práctica. Las tecnologías digitales ofrecen oportunidades para la comunicación con los grupos anteriormente estaban excluidos. La sección que trata sobre el acceso, echa un

vistazo al uso de la cultura web para involucrar a las personas con discapacidades y ofrece ideas muy importantes para los jardines botánicos que deseen ampliar su audiencia demográfica. Para un área como la



## Digital Technologies and the Museum Experience: Handheld Guides and Other Media

In recent years museums and botanic gardens have become more focussed on accessibility, participation and communication. This book provides an overview of the 'way mobile devices and digital technology can be used to enhance and transform visitor experience'. Covering a broad range of ideas and technologies, in chapters such as 'designing mobile digital experience', 'interactive adventures' and 'improving visitor access', the book provides theoretical and practical advice to those wishing to creatively incorporate technology into cultural institutions, to allow greater accessibility and communication and enhance visitor experience.

Loïc Tallon and Kevin Walker (editors),  
Altamira Press, Plymouth, UK  
[http://books.google.co.uk/books?id=0mWWjLymuBAC&printsec=frontcover&dq=mobile+learning+and+museums&hl=en&sa=X&ei=CpXOUpOYDYv07AayhYcWbW&redir\\_esc=y#v=onepage&q=mobile%20learning%20and%20museums&f=false](http://books.google.co.uk/books?id=0mWWjLymuBAC&printsec=frontcover&dq=mobile+learning+and+museums&hl=en&sa=X&ei=CpXOUpOYDYv07AayhYcWbW&redir_esc=y#v=onepage&q=mobile%20learning%20and%20museums&f=false)  
ISBN-10: 0759112371  
ISBN-13: 978-0759112377

## Web links/Websites

### Social Media in Public Gardens

<https://www.publicgardens.org/content/social-media-public-gardens>

Social media is an important and varied tool for communicating with the public. This website contains a collection of interviews with some influential botanic gardens, in which they describe some of the ways they have attempted to tap into this valuable resource. The interviews include a description of the tactics



Ross Parry, Routledge, Oxon, Canada and New York, USA  
<http://books.google.co.uk/books?id=fqkQ7pIXw0IC&printsec=frontcover&dq=new+technology+in+museums&hl=en&sa=X&ei=gS3MUysiBse6hAfOh4C4BQ&ved=0CDsQ6AEwAA#v=onepage&q=new%20technology%20in%20museums&f=false>  
ISBN-10: 041540262X  
ISBN-13: 978-0415402620

## Les technologies numériques et l'expérience du musée : guides de poche et autres médias

Au cours des dernières années, les musées et les jardins botaniques apportent plus d'attention à l'accessibilité, la participation et la communication. Ce livre donne un aperçu de comment les "dispositifs mobiles et la technologie numérique peuvent être utilisés pour améliorer et transformer l'expérience du visiteur". Couvrant un large éventail d'idées et de technologies dans des chapitres tels que "la conception de l'expérience numérique mobile", "aventures interactives" et "l'amélioration de l'accès des visiteurs", le livre fournit des conseils théoriques et pratiques à ceux qui souhaitent intégrer de façon créative la technologie dans les établissements culturels, pour permettre une plus grande accessibilité et communication, et pour améliorer l'expérience du visiteur.

Loïc Tallon and Kevin Walker (editors),  
Altamira Press, Plymouth, UK  
[http://books.google.co.uk/books?id=0mWWjLymuBAC&printsec=frontcover&dq=mobile+learning+and+museums&hl=en&sa=X&ei=CpXOUpOYDYv07AayhYcWbW&redir\\_esc=y#v=onepage&q=mobile%20learning%20and%20museums&f=false](http://books.google.co.uk/books?id=0mWWjLymuBAC&printsec=frontcover&dq=mobile+learning+and+museums&hl=en&sa=X&ei=CpXOUpOYDYv07AayhYcWbW&redir_esc=y#v=onepage&q=mobile%20learning%20and%20museums&f=false)  
ISBN-10: 0759112371  
ISBN-13: 978-0759112377

## Liens internet/ Sites

### Les réseaux sociaux dans les jardins publics

<https://www.publicgardens.org/content/social-media-public-gardens>

Les réseaux sociaux sont des outils importants et diversifiés pour communiquer avec le public. Ce site web contient une série d'entretiens avec de grands jardins botaniques, décrivant certaines des méthodes testées pour

tecnología digital que evoluciona tan rápidamente, es esencial mantenerse al día anticipando su desarrollo. Por esa razón, para ayudar a los profesionales en este punto, el libro termina con una sección que examina el futuro.

Ross Parry, Routledge, Oxon, Canada and New York, USA  
<http://books.google.co.uk/books?id=fqkQ7pIXw0IC&printsec=frontcover&dq=new+technology+in+museums&hl=en&sa=X&ei=gS3MUysiBse6hAfOh4C4BQ&ved=0CDsQ6AEwAA#v=onepage&q=new%20technology%20in%20museums&f=false>  
ISBN-10: 041540262X  
ISBN-13: 978-0415402620

## Tecnologías Digitales y la Experiencia en el Museo: Guías de mano y otros medios

En los últimos años los museos y jardines botánicos se han enfocado paulatinamente sobre accesibilidad,



participación y comunicación. Este libro proporciona una visión general de "la manera en que los dispositivos móviles y la tecnología digital pueden utilizarse para mejorar y transformar la

experiencia del visitante". Cubriendo una amplia gama de ideas y tecnologías en capítulos tales como "El diseño de la experiencia digital móvil", "Aventuras interactivas" y "Mejorando el acceso de los visitantes", el libro ofrece consejos teóricos y prácticos para quienes deseen incorporar creativamente la tecnología en las instituciones culturales para permitir una mayor accesibilidad, mayor comunicación y reforzar la experiencia de los visitantes.

Loïc Tallon and Kevin Walker (editors),  
Altamira Press, Plymouth, UK  
[http://books.google.co.uk/books?id=0mWWjLymuBAC&printsec=frontcover&dq=mobile+learning+and+museums&hl=en&sa=X&ei=CpXOUpOYDYv07AayhYcWbW&redir\\_esc=y#v=onepage&q=mobile%20learning%20and%20museums&f=false](http://books.google.co.uk/books?id=0mWWjLymuBAC&printsec=frontcover&dq=mobile+learning+and+museums&hl=en&sa=X&ei=CpXOUpOYDYv07AayhYcWbW&redir_esc=y#v=onepage&q=mobile%20learning%20and%20museums&f=false)  
ISBN-10: 0759112371  
ISBN-13: 978-0759112377

utilised by the gardens, discuss those that proved unsuccessful, and provide links to the relevant sites to offer insight and inspiration to others in the field. There is also the opportunity for those gardens who feel their experience may be of value to others to contribute with their stories of using social media.

### Museums and the Web

<http://www.museumsandtheweb.com/>

*Museums and the web* is the leading conference in its field. It focuses on how museums and their visitors can take full advantage of the web. The conference is held in the USA each spring. The *Museums and the web* website contains information and news regarding upcoming conferences along with papers, proceedings and summaries of past conferences, to offer insight into how cultural institutions can benefit from the web. In addition, the annual 'Best of the Web' awards showcase some of the best examples of websites, for various categories such as: *education, social media and research.*



The website includes a list of past winners and nominees and gives summaries of their merits which provide great examples to those looking to improve the way they use the World Wide Web.

### Map the Museum: An Experiment in Crowd sourcing

<http://www.museum-id.com/idea-detail.asp?id=386>

Crowd sourcing is becoming an important tool for mutually beneficial public engagement. This article gives an example of a simple but powerful project, developed by Brighton and Hove's Royal Pavilion and Museums. Visitors are asked to place objects from the museums' collections on a map of

utiliser cette ressource précieuse. Les entretiens présentent les stratégies utilisées, analysent celles qui se sont révélées infructueuses et fournissent des liens vers les sites qui peuvent apporter aux autres une compréhension et de l'inspiration dans ce domaine. Les jardins qui pensent que leurs expériences pourraient être utiles à d'autres, peuvent contribuer avec le récit de leur utilisation des réseaux sociaux.

### Les musées et la toile

<http://www.museumsandtheweb.com/>

*Les musées et la toile* est une conférence phare dans ce domaine. Elle est centrée sur comment les musées et leurs visiteurs peuvent profiter pleinement des avantages du web. La conférence a lieu aux Etats-Unis chaque printemps. Le site contient des informations et nouvelles concernant les conférences à venir, ainsi que des comptes-rendus et résumés des conférences passées, afin de comprendre comment les institutions culturelles peuvent tirer profit du web. De plus, le prix annuel « Le Meilleur du Web

» présente quelques uns des meilleurs sites dans différentes catégories telles que : éducation, réseaux sociaux, recherche... Le site comprend la liste des lauréats et nominés des années précédentes avec un résumé de leurs mérites, fournissant de très bons exemples pour ceux qui souhaitent améliorer la façon dont ils utilisent la toile.

### Cartographier le musée: une expérience en externalisation ouverte

<http://www.museum-id.com/idea-detail.asp?id=386>

Le collaborat devient un outil important pour un engagement du public profitable pour tous. Cet article donne l'exemple d'un projet simple mais puissant, développé par les Musées et Pavillon Royaux de Brighton et Hove. Les visiteurs sont invités à placer des objets issus des collections du musée sur une carte de la ville pour explorer et mettre en valeur les liens entre ces collections et l'environnement local, ainsi que son histoire. Les collections botaniques étant intrinsèquement liées à l'environnement au sens large,

## Sitios Web / Enlaces Web

### Redes Sociales en Jardines Públicos

<https://www.publicgardens.org/content/social-media-public-gardens>

Las redes sociales son una herramienta importante y variada para comunicarse con el público. Este sitio web contiene una colección de entrevistas con algunos jardines botánicos influyentes, en el que se describen algunas de las formas en que estos han tratado de aprovechar este valioso recurso. Las entrevistas incluyen una descripción de las tácticas utilizadas por los jardines, discute y examina aquellos casos no exitosos y proporciona enlaces a los sitios de interés que ofrecen información e inspiración para otros actores involucrados en este campo. Para aquellos jardines que sienten que su experiencia puede ser valiosa para otros, incluye una oportunidad para contribuir con sus historias del uso de las redes sociales.

### Museos y la Web

<http://www.museumsandtheweb.com/>

*Museos y la Web* es la conferencia líder en su campo. Se enfoca en cómo los museos y sus visitantes pueden sacar el máximo provecho de la web. La conferencia tiene lugar en los Estados Unidos cada primavera. *Museos y la Web* contiene información y noticias sobre las próximas conferencias, junto con documentos, informes y resúmenes de conferencias pasadas, y ofrece una idea de cómo las instituciones culturales pueden beneficiarse de la web. Además, el premio anual "Best of the Web", muestra algunos de los mejores ejemplos de sitios web en diversas categorías, tales como *Educación, Redes Sociales e Investigación*. Este sitio web incluye la lista de ganadores y nominados del pasado y da un resumen de sus méritos, mismos que proporcionan excelentes ejemplos para aquellos que buscan mejorar la forma en que utilizan la World Wide Web.

### Mapa del museo: un experimento de Crowd sourcing

<http://www.museum-id.com/idea-detail.asp?id=386>

El *Crowdsourcing* se está convirtiendo en una herramienta importante para el compromiso público de beneficio mutuo.



the city, to highlight and explore the connection the collection has with the local area and its history. Since botanical collections are intrinsically linked to the wider environment, on a local and global basis, a project which follows this model could be very successfully implemented by their sites.

### Decoding learning

<http://www.nesta.org.uk/publications/de-coding-learning>

Botanic gardens have an important role in education which can be greatly enhanced by the effective use of technology. This report provides evidence of ways in which technology can effectively be used to enhance the learning experience. Although focussed on formal settings, the concepts discussed in the document are also of great relevance to informal education. *Decoding Learning* covers many popular themes for improving education, such as through inquiry and exploration and by using assessment for learning. In addition, the chapter: '*learning in and across settings*' covers learning outside the classroom, including examples which could be easily implemented in the context of a botanic garden.

### The best of the best in online audience engagement

<http://colleendilen.files.wordpress.com/2011/08/best-of-social-media.pdf>

Social media and online communities are of great and increasing social importance. To remain contemporary, museums and botanic gardens must learn to utilise this to communicate and engage with their audiences. This document includes a brief overview of some successful examples of inventive ways in which museums have used

au niveau local et global, un projet qui suivrait ce modèle pourrait être mis en place sur leurs sites avec succès.

### Analysier l'apprentissage

<http://www.nesta.org.uk/publications/de-coding-learning>

Les jardins botaniques ont un rôle important dans l'éducation, qui peut être développé par une utilisation efficace de la technologie. Ce rapport apporte des preuves de comment la technologie peut être utilisée efficacement pour améliorer l'apprentissage. Bien que centrés sur les environnements formels, les concepts abordés dans le document sont également d'un grand intérêt pour l'éducation informelle. *Analysier l'apprentissage* couvre de nombreux thèmes populaires pour améliorer l'éducation tels que l'exploration, l'enquête et l'utilisation de l'évaluation formative. De plus, le chapitre « *Apprendre dans et à travers les lieux* » traite des apprentissages en dehors de la classe, y compris des exemples qui pourraient facilement être mis en place dans le contexte d'un jardin botanique.



### Le meilleur de l'engagement en ligne

<http://colleendilen.files.wordpress.com/2011/08/best-of-social-media.pdf>

Les réseaux sociaux et communautés en ligne sont d'une importance croissante pour la société. Pour rester modernes, les musées et jardins botaniques doivent apprendre à utiliser ces moyens pour communiquer et échanger avec leurs publics. Ce document comprend un aperçu rapide d'exemples réussis de façons originales dont les musées ont utilisés les réseaux sociaux. Il présente entre autres des idées simples mais

Este artículo proporciona un ejemplo de un proyecto simple pero potente, desarrollado por el Brighton and Hove's Royal Pavilion and Museums. En este experiment se pide a los visitantes colocar los objetos de las colecciones de los museos en un mapa de la ciudad para destacar y explorar la conexión que la colección tiene con el área local y su historia. Debido a que colecciones botánicas están intrínsecamente relacionados con el medio ambiente en general, tanto a nivel local como global, un proyecto que siga este modelo podría ser implementado con mucho éxito en diferentes sitios.

### Aprendizaje decodificado

<http://www.nesta.org.uk/publications/de-coding-learning>

Los jardines botánicos tienen un papel importante en la educación, el cual puede ser mejorado en gran medida a través del uso eficaz de la tecnología. Este informe proporciona evidencias de las formas en que la tecnología puede utilizarse eficazmente para mejorar la experiencia de aprendizaje. Aunque se enfoca en contextos formales, los conceptos discutidos en el documento también son de gran relevancia para la educación informal. *Aprendizaje decodificado* abarca muchos temas populares para mejorar la educación, tales como la investigación, exploración y el uso de la evaluación en el aprendizaje. Además, el capítulo "Aprendiendo en y a través de escenarios" cubre el aprendizaje fuera del aula, con ejemplos que podrían aplicarse fácilmente en el contexto de un jardín botánico.

### Lo mejor de lo mejor de la participación de la audiencia en Internet

<http://colleendilen.files.wordpress.com/2011/08/best-of-social-media.pdf>

Las redes sociales y comunidades en línea son de gran y creciente importancia social. Para mantenerse actualizados, los museos y jardines botánicos deben aprender a utilizar estos medios para comunicarse y relacionarse con sus públicos. Este documento incluye una breve descripción de algunos ejemplos exitosos de formas innovadoras en las que los museos han utilizado las redes sociales. Estos ejemplos incluyen ideas



social media. This includes simple but effective ideas like quizzes and storytelling as well as more elaborate projects such as the Museum of Science and Industry's project, during which a member of the public moved into the museum for a whole month and used the museum's blog and social media to communicate their experience. There are also examples of museums having to be adaptive as they discovered that their tactics proved ineffective.

### Case studies of tours and mobile programs

<http://wiki.museummobile.info/category/casestudies>

Considering the difficulties involved in installing interactive devices outdoors, the popularity of mobile technology has great potential for enhancing interpretation and visitor engagement within botanic gardens. This wiki includes examples of how some highly esteemed museums are developing and using mobile apps to enhance visitor experience and participation. Of great interest for botanic gardens is the case study from The Smithsonian's National Museum of Natural History which presents *Leafsnap*— an interactive app which allows users to identify tree species from leaf photographs.



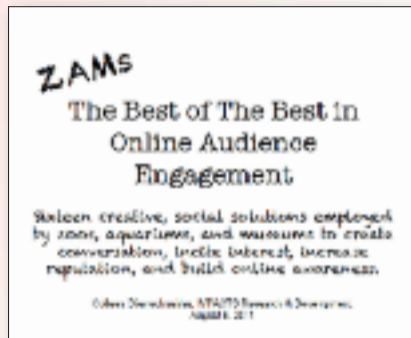
efficaces comme des QCM et des contes, ainsi que des projets plus élaborés comme celui du Musée des sciences et de l'industrie où un membre du public s'est installé dans le musée pendant un mois entier et a utilisé le blog du

musée et les réseaux sociaux pour communiquer son expérience. Il y a aussi des exemples de musées qui ont dû s'adapter en découvrant que leurs stratégies s'étaient révélées inefficaces.

### Etudes de cas de tours et programmes mobiles

<http://wiki.museummobile.info/category/casestudies>

Vu les difficultés engendrées par l'installation de matériel interactif en extérieur, la popularité des technologies des portables présente un grand potentiel pour développer l'interprétation et l'engagement des visiteurs dans les jardins botaniques. Ce wiki contient des exemples de comment des musées réputés développent et utilisent des applications pour portables afin d'étendre l'expérience et la participation des visiteurs. L'étude de cas du Musée national d'histoire naturelle Smithsonian est d'un grand intérêt pour les jardins botaniques. Il présente Leafsnap – une application interactive qui permet aux utilisateurs d'identifier des espèces d'arbres à partir de photos des feuilles.



simples pero eficaces, como acertijos y cuenta-cuentos, así como otros proyectos más elaborados, como el proyecto del Museo de la Ciencia y la industria, en el que un miembro del público se

trasladó al museo por un mes entero y utilizó los blogs y redes sociales del museo para comunicar su experiencia. También hay ejemplos de museos que tienen que ser adaptables, ya que descubrieron que sus tácticas de comunicación resultaron ineficaces.

### Estudios de casos de tours y programas con tecnología móvil

<http://wiki.museummobile.info/category/casestudies>

Teniendo en cuenta las dificultades que implica la instalación de dispositivos interactivos al aire libre, la popularidad de la tecnología móvil tiene un gran potencial para mejorar la interpretación y la manera de involucrar a los usuarios de los jardines botánicos. Este wiki incluye ejemplos de cómo algunos museos de gran prestigio están desarrollando y utilizando aplicaciones móviles para mejorar la experiencia del visitante y su participación. De gran interés para los jardines botánicos es el estudio de caso del Museo Nacional Historia Natural del Smithsonian, que presenta Leafsnap— una aplicación interactiva que permite a los usuarios identificar las especies de árboles a partir de fotografías de hojas.

# Learning for Sustainable Development bgen 2014 Conference

Does your work involve inspiring people about plants and are you keen to share and learn more? Then join Botanic Gardens Education Network (bgen) and attend the **bgen 2014 Conference**

- **When/Where:** Wednesday 5 - Friday 7 November, 2014 at Paignton Zoo Environmental Park, Devon, UK
- **Theme:** Learning for Sustainable Development; what have we learnt and where are we going?
- **What:** A variety of activities for you to enjoy including tours to Paignton Zoo Environmental Park, a programme of workshops and interactive sessions, Speed making (carousel of delegate's activities with 5 mins. at each stop for individuals to engage), conference dinner.

bgen members are working with a variety of audiences to raise awareness of plant diversity, conservation and the role of plants in our daily lives all around the world.

bgen membership offers the chance to share and improve skills, knowledge and resources, through value-for-money training workshops, an annual conference and other networking events, an email newsgroup for rapid responses to queries



Delegates from the 2013 conference said:

*"Inspiring and full of creative people who are passionate about plants..."*

*"A professional shot in the arm; a chance to make new friends and meet old ones; a reminder of why you do the job"*



For more information and to join contact [info@bgen.org.uk](mailto:info@bgen.org.uk) or visit [www.bgen.org.uk](http://www.bgen.org.uk)

## Host a future International Congress on Education in Botanic Gardens

BGCI has launched the call for proposals to host and co-organise the 10th International Congress on Education in Botanic gardens in 2018. Held every three years, the congress brings together experts from across the globe to inspirational gardens to share ideas, knowledge and experience about developments in the field of botanic garden education. Hosting a BGCI congress offers great potential to raise the profile and enhance the reputation of a garden.



For more information about criteria and how to apply please visit [www.bgci.org/education/news/1112/](http://www.bgci.org/education/news/1112/)

Deadline for submissions: 15th September, 2014



**BGCI**

*Plants for the Planet*

**Botanic Gardens  
Conservation International**

Descanso House, 199 Kew Road,  
Richmond, Surrey, TW9 3BW, U.K.

Tel: +44 (0)20 8332 5953

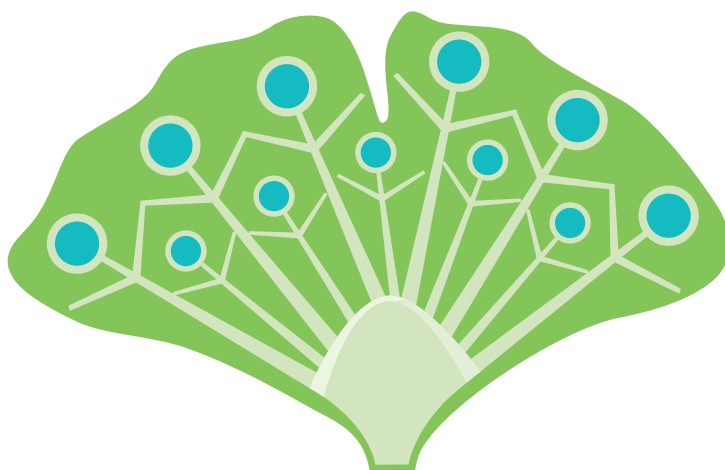
Internet: [www.bgci.org](http://www.bgci.org)

E-mail: [info@bgci.org](mailto:info@bgci.org)

<https://twitter.com/bgci>

ISSN 0965-2574

CALL FOR ENTRIES NOW OPEN



**BIODIVERSITY**  
— FOR A —  
**BETTER WORLD**  
Wild Ideas Worth Sharing

St. Louis, MO ● April 26–May 1, 2015

BGCI's 9<sup>th</sup> International Congress on  
Education in Botanic Gardens



[www.bgcieducationcongress2015.org](http://www.bgcieducationcongress2015.org)



MISSOURI BOTANICAL GARDEN