WHAT THE RESEARCH SAYS

Revitalizing the School Museum: Using Nature-Based Objects for Cross-Curricular Learning

Caroline Cornish, Felix Driver, Mark Nesbitt and Julia Willison

ABSTRACT
This article analyzes an educational initiative between Kew Gardens, Royal Holloway, University of London, and two London primary schools. The schools, located in areas of high ethnic diversity, worked with the members of the Mobile Museum project team – including the Learning Department at Kew and researchers at both institutions – to create their own school museums. The idea was inspired by historical research conducted by the project team that demonstrated Kew’s historic involvement in the promotion of object-based learning in schools. The project team worked with teachers and pupils to develop a participatory approach to learning about plants and their uses through the creation of school museums. A whole-school framework was adopted, extending the potential reach of the project to pupils’ parents and communities. Inspired by the collections at Kew, schools used plants and plant-associated artifacts to learn more about the rich diversity of pupils’ cultural backgrounds and the importance of plants to their heritage and their everyday lives.

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In July 2019 pupils, teachers, parents, carers and school governors gathered at two inner London primary schools (educating ages 5–11) – St. Monica’s Catholic Primary School in the Borough of Hackney and Wilberforce Primary School in the Borough of Westminster – for the official opening of their school museums. After a few words of welcome from the lead teachers, visitors were free to see the exhibits and chat with pupils. They were met by colorful displays of plant specimens and cultural objects made of plant materials. There were living displays where pupils demonstrated the making or use of objects, such as basket-weaving and drum-playing; interactive elements and opportunities for visitors to contribute their thoughts; and visual and sonic elements, including olfactory and haptic experiences, with the scent of herbs and spices in the air and opportunities for hands-on engagement. The pride experienced by pupils, staff and parents was palpable (Figures 1 and 2). These events marked the culmination of a nine-month process of collaboration between the schools, researchers and educators. In this article we examine the project, considering its objectives, methods, outcomes and wider implications.
About the Mobile Museum project

The Mobile Museum project (2017–2019) was a collaborative research initiative between the Royal Botanic Gardens, Kew and Royal Holloway, University of London, funded by the UK’s Arts and Humanities Research Council. Its overarching aim was to investigate the trajectories of an estimated 60,000 plant-derived specimens and artifacts that had been donated by Kew’s Museum of Economic Botany to a variety of other institutions across the UK and overseas during the nineteenth and twentieth centuries, and to account for the drivers of this vast circulation of objects. As prior research had suggested that a large proportion of these objects had been distributed to furnish school museums, we were particularly interested in Kew’s relationship with British schools over the main period of this activity, from 1881 to 1914. This historical research provided the impetus for a parallel outreach project with two London elementary schools. In the very different context of a twenty-first-century multicultural city, we sought to investigate the potential of object-based learning as a way of engaging pupils with plants and their significance for heritage, community and everyday life.

About the school museum

The idea of the school museum as an active resource for object-based learning was promoted by educational theorists and policy-makers in the UK between 1880 and 1914.
Schools were encouraged to build collections of specimens and artifacts for the teaching of natural history and geography, sourced through a variety of channels: collecting by teachers and pupils during nature study lessons; purchasing from specialist school...
suppliers; and soliciting samples from commercial enterprises and public museums. Objects were typically labeled by pupils under the teacher’s guidance and displayed openly in the classroom or glass-fronted cabinets. This was an international movement, though it was particularly evident in the USA and Great Britain. Kew’s Museum of Economic Botany, as a publicly-funded institution, was actively involved in the school museums movement, and between 1885 and 1916 Kew distributed more than 20,000 specimens to 640 schools and 29 school boards in Britain and Ireland. During the twentieth century, however, school museums fell into decline, disappearing from all but a few schools. The locus of object-based learning shifted to hands-on activity centers located within museums and science centers.

A twenty-first-century school museum

As part of the outreach program for the Mobile Museum project, we sought to test the hypothesis that a new version of the school museum, in the form of a temporary exhibition, could be relevant to schools in a very different context today. In discussion with colleagues in Kew Learning, a cross-curricular and “whole-school” approach was developed, targeted at pupils in Key Stages 1 and 2. Objectives were designed to address a range of subjects across the primary curriculum, including science, geography, history, arts, design and technology, and language. The key aims were to increase understanding of why plants and fungi matter and how our lives depend on them; to increase understanding of other cultures within the school community; and to achieve a better representation of pupils’ cultures in the school. It was also considered important to set goals for developing twenty-first-century skills, particularly in the areas of creativity and innovation; critical thinking and problem solving; and communication and collaboration.

Selection of schools

As part of Kew Learning’s aim to reach more diverse audiences, the criteria used to identify potential partner schools included measures of economic disadvantage, cultural diversity, and lack of existing engagement with Kew. On this basis, 34 schools across London were identified, all with an above-average Pupil Premium rating (indicating economic disadvantage) and of a size suitable for a whole-school approach. These schools were invited to apply for the school museum project. Following a shortlisting process, two schools (Wilberforce and St Monica’s) were selected to participate. In each, there was a lead teacher who took responsibility for communications with Kew and who managed the project in their respective schools.

Training and support

During the project, training for schools’ staff and pupils took place at Kew and in the schools themselves. Training activities took several different forms: meetings at the schools between Kew’s education officer and lead teachers; school-based workshops delivered by the education officer; school-based learning delivered by teachers; workshops held at Kew Gardens for staff as part of Continual Professional Development (CPD) training (Wilberforce) (Figure 3) and for selected pupils (St. Monica’s) (Figure
Figure 3. INSET (CPD) day for Wilberforce School staff, Kew Gardens, February 2019. Image courtesy of the Trustees of the Royal Botanic Gardens, Kew.

Figure 4. Workshop for St Monica’s “museum crew”, Kew Gardens, March 2019. Image courtesy of the Trustees of the Royal Botanic Gardens, Kew.
4). Learning at these Kew workshops was object-based, involved the whole Mobile Museum team and covered the handling, classifying, labeling, and arranging of museum objects. The schools were each allocated a budget to purchase materials for their museums. In addition, Wilberforce organized a self-directed visit to Kew for all pupils and St. Monica’s “museum crew” (see below) attended workshops on different aspects of museum curation and interpretation at a number of other museums – Sutton House, Benjamin Franklin House, and Hackney Museum. St. Monica’s also organized a whole-school visit to the Natural History Museum.

Ethnobotanical objects from Kew’s Economic Botany Collection (formerly Museum) were central to the project. At the beginning engagement with a range of raw materials and plant projects were helpful in demonstrating that plant products were far more diverse than the foods and fibers that might initially spring to mind. Later in the project, they were used to demonstrate how an object can be “read” for evidence of its plant origin and adaptation to use. Objects were also used in practical exercises to demonstrate museum handling, both for groups visiting Kew, and in teaching by Kew staff in the schools. Historic objects were supplemented by new purchases. All these aspects are covered in the Project’s School Museum Handbook.9

Evaluation

A team of two evaluators, one attached to each school, was commissioned to undertake qualitative research, which would both enable an in-depth evaluation of the impact of the project, and offer guidance as to the future potential of the school museum concept. Interviews were conducted with staff and pupils at pre-, mid-, and post-project intervals and an evaluation report was completed in March 2020.10

Our Plants, Our People: St Monica’s School

A distinctive feature of St Monica’s approach was the recruitment by teachers of a museum crew – composed of two representatives from each year group (12 pupils in total). The plan was that this group would share their learning with their peers, and new crews were chosen at intervals to increase pupils’ opportunities to participate.

The St. Monica’s museum – Our Plants, Our People – represented the specifically cultural approach to plants and plant-based objects that the school had adopted from the outset. Pupils were encouraged to bring in plant-based objects from their various communities and each year group voted for one focal object to represent their year in the final exhibition, giving a total of six objects. Across all stages of the project, the school’s lead teacher developed “flipcharts” (digital lesson plans and associated resources used by the school) for each phase, which were modified and used by the teachers of other year groups as they saw fit. Pupils researched the objects and created replicas as part of their art, design and technology learning and these, too, formed part of the exhibition. The principal themes under which the objects were displayed were: “Ceremony and celebration”; “Culture and music”; “Fashion forward”; and “Fantastic food” (Table 1). In addition to written text and object labels, focus objects were accompanied by a map showing where they came from (Figure 5).
Wilberforce planned its museum learning project to take place on a number of “collapsed curriculum” (CC) days when the school’s normal timetable was suspended. Each CC day focused on content designed to develop the knowledge and skills needed to deliver a museum. On such days, every class worked on the same theme but at an age-appropriate level. The themes were: “International Celebration of Cultures” (February), “Creating Personal Objects” (March), “Learning from Objects” (April), “The Importance of Plants” (Years 5 & 6 only, May), “Oral Storytelling” (June) and “Interpreting Objects” (Year 6). A planning document was produced early in the project outlining the themes and curriculum links for each CC day, plus details of variations between different classes. Sometimes work took place in individual classes, sometimes in mixed year groups across the school.

The resulting display, the Wilberforce Museum of Plants and Cultures, was composed of many different objects (>50), again largely sourced from pupils’ families and extended communities. Objects were grouped according to the themes: “Around the home” (curated by Year 1); “Food and drink” (Year 2); Entertainment (Year 3); “Celebrations and culture” (Year 4); and “Sustainability” (Year 6). These themes had emerged during pupils’ workshops with Kew Learning staff. Additionally, there was a display of objects created by pupils in a section entitled “Our Museum Story”. Objects were displayed on tables and in glass-fronted cabinets (Figure 6).

## Knowledge and understanding

**Plants and fungi**

Through its focus on plant-based cultural objects, the project increased pupils’ knowledge and understanding of the importance of plants and fungi. Pupils learned which plant materials their objects were made from, though increasing their knowledge of plants more seems to require more direct and explicit emphasis in the teaching. Overall, learning was different from that gained in typical school science lessons because the project promoted the value of plants in students’ daily lives and communities. As well as increasing

| Year group | Section theme | Focal object | Other objects | Additional interpretation |
|------------|---------------|--------------|---------------|--------------------------|
| Reception  | Fashion Forward Culture & Music | Bracelets | Handbags (woven) | Lift-the-flap labels, photo collage |
| Year 1     | Ceremony & Celebration | Zampoña (Colombian flute; made by children) | (multiple examples of zampoñas) | Tablet showing video of zampoñas being played |
| Year 2     | Ceremony & Celebration | Ethiopian cross | Ethiopian guitar, drum, Eritrean verse (inscribed on wood), crosses made by children | Child in traditional Ethiopian dress playing drum |
| Year 3     | Ceremony & Celebration | Maasai warrior mask | Warrior masks made by children | |
| Year 4     | Fantastic Food | Pestle & mortar | Paper maché pestle & mortar (made by children) | Hands-on activity – grinding herbs & spices on replica pestle & mortars |
| Year 5     | Fantastic Food | Mesob | Extra examples; Mesobs made by children; Ethiopian coffee set (donated by parent) | Mesob weaving, guided by children |
knowledge and understanding of plants, pupils tended to express their importance and value in ways that mattered to them personally rather than in more abstract terms. This may be because objects were personally owned by them and their families, enabling a stronger connection between the object, the plant it was made from, and the pupils.

**Other cultures**

The project made a strong impact on pupils’ knowledge and understanding of other cultures. It gave them with opportunities to learn about cultural objects from their own and others’ countries of origin – from other pupils, from parents and from online research. They
recognized similarities and differences in objects and cultures due to the discussions around objects which were a key feature of the project in both schools. Parents and carers were also involved in the process, through explaining to their children the uses of unfamiliar cultural objects or discussing the materials objects were made from and why those materials were used. There was evidence, too, of parents encouraging their children to conduct online research. Information gathered in these ways was then passed on by the children to their peers.

**Twenty-first-century skills**

The concept of twenty-first-century learning and associated frameworks comprises skills, abilities and learning habits required to prepare students for life and work in a rapidly changing world, including creativity and innovation, critical thinking and problem solving, and communication and collaboration. Across both schools, from the post-project interviews conducted with staff and pupils, there was ample evidence that pupils used these skills during learning activities, with teachers agreeing strongly that the project supported their pupils’ development in these areas. The process of creating a school museum involved creativity and innovation, for example in thinking about and experimenting with ways to display an object; critical thinking and problem solving as demonstrated in deciding how to describe an object; and communication and collaboration where, for example, pupils worked with their peers to determine which objects should be featured in their museum and how best to display them. Moreover, many of the activities involved in the process used these skills simultaneously.
Values and attitudes towards other cultures

At both schools, learning outcomes around values and attitudes towards other cultures were particularly positive. Evidence from both schools reflected the impact of the project on pupils’ interest in other cultures, as well as their own, and the opportunities the project offered them to show respect for each other’s cultures. For example, in giving tours of their museums, pupils pointed out objects they or their friends had lent and made connections to objects at home. The children demonstrated pride and curiosity regarding the objects, particularly in the context of the source culture or country of the objects.

Project approaches

Whole-school approach

This was an attractive feature of the project to teachers at both schools from the beginning but it did pose challenges. In one school, for example, Year 6 withdrew from activities due to time pressure in the run-up to Standard Assessment Tests (SATs). There were other logistical challenges implicit in the approach: lead teachers were inevitably involved in extra work to create the overall approach and individual lesson plans; scheduling the project within the whole school’s timetable was difficult, and later in the project, ring-fencing that time proved a challenge when new opportunities arose that needed to be scheduled.

Nonetheless, both schools reported positively on the whole-school approach. And the term “whole school” extended beyond the pupils themselves. In one school the project was initiated on a Celebration of Cultures Day; parents and guardians attended the assembly or contributed by sending in food and objects, and pupils spent time with other children who shared the same national heritage, independent of age group. Overall, pupils enjoyed working alongside peers in different classes and of different abilities; teachers noted that children who struggled in their typical class groupings often “shone” when placed in a different group; they also observed older children demonstrate supportive and nurturing behavior towards younger children; and parents enjoyed the fact that their children in different classes were working on the same topic so that the whole family was involved.

Cross-curricular approach

Both schools planned their projects to be cross-curricular, with English (particularly non-fiction writing), Art/Design & Technology, Geography, ICT, Religious Education and Science as the subjects worked into the project to greater or lesser degrees. Importantly, it was not just the principle of cross-curricular work that appealed (both schools were already accustomed to topic-based work, designed to be cross-curricular), but the way in which it supported cross-curricular learning in a more organic way.

Collaborative approach

The collaborative ethos of the project meant that project researchers wished to avoid being overly prescriptive on the precise content of the museums in order to encourage greater ownership of the project by the pupils and teachers themselves. Nonetheless, support was provided through weekly phone calls, workshops, resources for teaching –
notably objects from Kew’s handling collection and plant-based stories for Wilberforce, and a handbook – *Curating a School Museum: Teachers Handbook* – that consolidated the resources developed by the Mobile Museum team for the Kew-based workshops (Figure 7). However, the evaluation findings suggested that schools would have

![Curating a School Museum: Teachers' Handbook](image-url)
preferred more direction at an early stage, for example in the provision of examples of museum displays and closer guidance on the steps required.

**Home-school relationships**

The impact on families at both schools was one of the most significant outcomes of the project. This was manifest in the high number of contributions of objects from homes and in parents’ and guardians’ evident pride in having their possessions presented as museum objects, in being valued as “experts,” and in presenting knowledge of their cultures to the rest of the school community. Parents and guardians clearly enjoyed being more directly involved in their children’s learning and schools were delighted with the level of family engagement.

**Pupil agency and ownership**

The ownership felt by pupils was evident as they led visitor tours around the museums. This sense of ownership was derived from the presence of objects they had brought from home, and from the knowledge they had of them, often more than their teachers. Pupil ownership was also reflected in the object labels which gave the names of the lenders.

**Learning from objects**

Learning from and through objects was central to the project at both schools. Pupils were given permission to touch, smell, and play with objects some of which were familiar, some not. They asked many questions about their functions and the materials they were made from. Pupils found these lessons fun because questions and speculation were encouraged, and objects could be explored, using new skills in museum handling taught during the project. At St Monica’s, object-based learning was further enhanced through making of replicas, a process requiring careful observation and developed skills in collaboration, creativity and critical thinking.

**Teacher–pupil relationships**

At both schools, the project brought benefits to relationships between teachers and pupils. This was underpinned by the opportunities that the project offered for teachers to get to know their pupils better, including learning more about their lives beyond the classroom. Teachers reported being impressed by how engaged their pupils were in the project. It is clear that the use of objects from pupils’ homes elicited deep engagement and high-quality discussions with pupils. While object-based learning was central to the project, it was the particular nature of the objects themselves that made them so effective for learning.

**Final thoughts**

The Mobile Museum project team aimed to test the hypothesis that the school museum, first introduced into British elementary schools in a nineteenth-century context of trade and empire, could have resonance and relevance to schools in the twenty-first century. During the course of the project, the pedagogic potential of the school museum was
amply demonstrated. The museum handbook and lesson plans are available online, and we encourage experiment with this approach in other schools.\textsuperscript{12} As a result of the Covid-19 pandemic of 2020–2021 and the periodic closure of UK schools, these materials have also gained a new resonance as aids for home-schooling. Above all, the project showed that teaching through plant-based objects emphasized the broader connections between plants, pupils and community. Such cross-curriculum, cross-generational encounters with the plant world are an effective way of raising awareness of plants and their economic, social, and cultural significance.

Notes

1. Cornish and Driver, “‘Specimens Distributed.’”
2. Cornish, “Curating Science in an Age of Empire.”
3. Kohlstedt, \textit{Teaching Children Science}; Kohlstedt, “Mobile Botany”; Newman and Driver, “Kew Gardens and the Emergence of the School Museum.”
4. Newman and Driver, “Kew Gardens and the Emergence of the School Museum”; Newman, “Plants on the Move”.
5. Kohlstedt, \textit{Teaching Children Science}; Paris, \textit{Perspectives on Object-Centered Learning}; Shaffer, \textit{Object Lessons and Early Learning}.
6. Definitions of these can be found in Roberts, \textit{The School Curriculum in England}.
7. Dede, \textit{Comparing Frameworks}; Trilling et al., 21st Century Skills.
8. Foster and Long, \textit{The Pupil Premium}.
9. Mobile Museum Project, \textit{Curating a School Museum}.
10. DeWitt and Pegram, “Mobile Museum Schools Project”.
11. Mobile Museum Project, \textit{Curating a School Museum}.
12. Mobile Museum Project, \textit{Lesson Plans}.

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About the authors

Dr. \textit{Caroline Cornish} is Honorary Research Associate at the Royal Botanic Gardens, Kew and an historical geographer in the Department of Geography at Royal Holloway, University of London. She was Postdoctoral Research Assistant on the Mobile Museum project. Her research interests lie at the intersection of the histories of museums, collections and science.
Professor Felix Driver is an historical geographer in the Department of Geography at Royal Holloway, University of London, who specializes in collections-based research and public engagement in the arts and humanities. He was Principal Investigator on the Mobile Museum project and is an Honorary Research Associate at Kew and a Fellow of the British Academy.

Professor Mark Nesbitt is Senior Research Leader for Economic Botany at Kew Gardens and Visiting Professor in the Department of Geography, Royal Holloway, University of London. His research interests center on the use of botanical collections to study changing uses of plants through time.

Julia Willison is Head of Learning and Participation at the Royal Botanic Gardens, Kew. She has overall responsibility for Kew’s Schools, Outreach, Community and Volunteer programs, and is an advocate for widening participation in botanic gardens.

ORCID

Caroline Cornish http://orcid.org/0000-0003-2063-3983

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