

Institution: Royal College of Art		
Unit of Assessment: 32 Art and Design: History, Practice and Theory		
Title of case study: Improving public understanding of nature and pro-biodiversity behaviours through open design and engagement		
Period when the underpinning research was undertaken: 2017-2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
PI Dr Robert Philips Co-I James Tooze Co-I Prof Sharon Baur	Senior Tutor Senior Tutor Professor of Design & Materials and Director of Material Science Research Centre	2014–present 2014–2019 2014–present
Period when the claimed impact occurred: 2018-2020		
Is this case study continued from a case study submitted in 2014? N		
1. Summary of the impact		
<p>RCA research into open design and public participation changed the understanding and actions of citizens and organisations towards nature and biodiversity. This resulted in new pro-environmental behaviours and in policy changes to curriculum offerings in schools, universities and the biodiversity learning strategies of major public organisations, such as Design Museum and Natural History Museum. Over 2 million viewers were engaged through BBC <i>SpringWatch</i>, and over 3,500 new biodiversity champions, from diverse backgrounds aged 6 to 83, were trained via public and private organisations. It removed technological barriers for conservation organisations, including The Wildlife Trusts and The Durrell Trust, enabling them to engage new audiences, create new conservation opportunities and foster communities.</p>		
2. Underpinning research		
<p>The research is based on the premise that by ‘democratising’ design – making it accessible for the general public – it is possible to provide a platform in which technical expertise, design thinking and making can combine to enable public agency and benefit. Using this approach, members of the public and community groups are empowered through participatory design to generate locally tailored responses to systemic challenges, and can achieve both strategic and serendipitous outcomes. At the heart of this research are three key principles: human centred design; public participation and engagement; and iterative and active learning among partners and research participants through their own reflective practice (3.1–3.5).</p> <p>This Open Design (OD) approach facilitates the dissemination of design practices and information to people from all walks of life, providing them with the opportunity to participate in design activities and making. Phillips used this approach in a project that involved encouraging expert beekeepers to create, deploy and consider the motivations of actively monitoring their surroundings (3.1). The research argues for the importance not only of ‘content/product’ creation in design practice, but also creation of making instructions for others. As makers/designers share insights and practices, the quality of their ‘shares’ must be understood and open to all, creating new economies and social value by re-skilling citizens through technological and design tools. Phillips’s design practice has built upon this research to emphasise the importance of maker toolkits and their dissemination, in the context of a design-led and pedagogical approach.</p> <p><i>Exploring Open Design for the application of Citizen Science: a toolkit methodology</i> (3.2) broadened the work’s scope by using active engagement with makers, television broadcasters</p>		

and audiences outside conventional conservation roles. The work documented the ‘transformative effect’ people experience when they are able to access technologies in order to learn from their environment, and the design practices that enabled them to ‘make and assemble’ their own interactive tools (3.2). The role of downloadable content and digital design is central to Phillips’s explorations of what people actually create ‘in the wild’, and his toolkit thinking draws upon his insights into digital citizens’ willingness to explore and share ideas and ‘user-led concepts’ through the internet. His toolkit methodology documented a theoretical framework for trialling digital sensing objects with members of the public, using Open Design principles to navigate the risks associated with non-expert users misusing the technology. A consistent theme of Phillips’s research is the role of design practice and technologies in transforming public attitudes to, and understanding of, built and natural environments, thereby prompting more ‘pro-social’ and ‘pro-nature’ choices and behaviours.

Social responses to nature: citizen empowerment through design (3.3) informed the process of encouraging audiences to participate and engage in their surrounding wildlife. Work in India mapped the process of designing with and for people ‘live’ within the context of Indian Train Transportation systems. In turn, this led to defining ‘design engagement’ as ‘actively engaging’ audiences. *The Animal Diplomacy Bureau: designing games to engage and create player agency in urban nature* (3.4) used interactive games to encourage visitors in national parks to question their opinions and to enable them to experience ‘transformation’ after playing the game. These projects are synthesised in *FutureKind: Design for and by the People* (3.5), in which Phillips explains how Open Design mutually benefits economies, society and the built and natural environment(s), and can be a powerful tool for ‘designing in’ sustainability in all its forms (3.6). *FutureKind* collates over 60 interviews from many contexts, cultures and locations, opening up the question of ‘what a product is’ through new and accessible models of designing. The work on socially-led outputs also emphasises the importance of ‘user generated agency’ (3.7).

Insights from this body of work led to an EPSRC grant, ‘Citizen NatureWatch’, in collaboration with Goldsmiths Interaction Research Studio. This built on the Open Design and public participation research to develop a DIY camera trap toolkit called My NatureWatch. The research informed public engagement with new technologies, as a range of students, hackers and nature lovers tried out, modified and built the new device. My Naturewatch served as a powerful catalyst to involve a wide public in engaging in digital making activities. The project deployed the camera trap kit in diverse natural settings with different audiences, transforming users’ attitudes to nature, biodiversity and our role within it.

3. References to the research

3.1 Phillips, R., Baurley, S. and Silve, S. (2014), ‘Citizen science and open design: Workshop findings’, *Design Issues*, 30 (4), 52–66.

3.2 Phillips, R., and Baurley, S. (2014), ‘Exploring Open Design for the Application of Citizen Science; a Toolkit Methodology’, in Lim, Y. et al. (eds.), *Design's Big Debates - DRS International Conference 2014*, 16-19 June, Umeå, Sweden.

3.3 Phillips, R., Brown, M. and Baurley, S. (2016), ‘Social responses to nature; citizen empowerment through design’, *Journal of Design, Business & Society*, 2 (2), 197–215.

3.4 Phillips, R. and Kau, K. (2019), ‘Gaming for Active Nature Engagement Animal Diplomacy Bureau: designing games to engage and create player agency in urban nature’, *The Design Journal*, 22 (sup1), 1587–1602. **Submitted to REF2021** (multi-component output).

3.5 Phillips, R. (2018), *FutureKind: Design by and for the People*, London: Thames & Hudson. **Submitted to REF2021.**

3.6 Phillips, R. (2019), ‘Design insights for socially led interventions’, *Journal of Design, Business & Society*, 5 (1), 7–33. **Submitted to REF2021** (multi-component output).

3.7 Phillips, R., et al. (2019), ‘Design and Deploying Tools to “Actively Engaging Nature”’, in: J. Zhou, and G. Salvendy (eds), *Human Aspects of IT for the Aged Population. Design for the*

Elderly and Technology Acceptance – 5th International Conference, ITAP 2019, Held as Part of the 21st HCI International Conference, HCII 2019, Proceedings, Cham, Switzerland: Springer, 513-531. **Submitted to REF2021** (multi-component output).

Funding: PI R. Phillips, *Citizen Naturewatch*, EPSRC EP/P006353/1, 2016–2020, £351,879; and PI R. Phillips, *#30dayswild NatureWatch*, EPSRC Telling Tales of Engagement Awards, 2020–2021, £10,000.

4. Details of the impact

The My NatureWatch project used an open access, affordable DIY camera trap kit to engage diverse audiences and organisations with a combination of technology and nature. The provision of the camera together with scalable workshops and training-the-trainer events increased participants' learning about and participation in the natural world as a result of using technology to engage with their environment. Participants were aged between 6 and 83, from diverse backgrounds, and ranged from technophobes to techno geeks, wildlife activists to novices. Engagement work using these toolkits also influenced partner organisations' ongoing public participation and learning activities. The My NatureWatch camera toolkit and workshops produced continuing benefits in major national and local organisations by combining the distinctive Open Design approach with public participation in ecology and conservation. Data shows that the instructions have been downloaded nearly 5,000 times since 2017 (5.1) with nearly 2,200 camera kits purchased from the main supplier since June 2018 (5.2).

National museums

The Design Museum in London adopted the My Naturewatch approach to encourage participation 'outside the four walls' of the Museum and engage visitors from different demographics (5.3). Activities included a workshops series, a participant-led pop-up exhibition and two expert panel sessions, which shared the experiences and insights from an RCA-designed training programme (5.3). The sessions were run in cooperation with the Holland Park Ecology Centre, and involved a group of over-60s who would not usually engage in technology creation. This has led to a reconsideration of the museum's strategy for participation, design and ecology: 'This provided the opportunity for the museum's widening participation strand to deliver activity both on- and off-site, and to think about the opportunities for design-led activities in parks and other areas of ecological interest' (5.3). The work transformed the Design Museum outreach team's approach to sustainability: 'It opened up new ways of thinking within the Learning Department on how the museum can collaborate with HEIs on practice-led design research [...] The course also demonstrated that there is a crucial role for museums to play in introducing contemporary design issues and technologies to older audiences' (5.3). My NatureWatch also worked with the Natural History Museum's citizen science team, building volunteers' confidence in technology, and added a new dimension to scientific monitoring of the Wildlife Garden as well as inspiring NHM to plan the install of environmental sensors at their eleven partners across the UK to support learning activities as part of their national learning programme *Explore: Urban Nature* (5.4). The Victoria & Albert Museum included My NatureWatch in its Digital Design Weekend, which attracted 25,000 visitors, increasing engagement with public audiences (5.5).

Conservation organisations

The RCA team developed a 'Training the Trainers' scheme and worked with 16 leading wildlife groups whose staff were trained to use the My NatureWatch toolkit, including: National Wildlife Trusts, National Wetlands Centres, Kew Gardens, Spitalfields City Farm, The Durrell Trust and The Conservation Volunteers UK (TCV). This led to at least 15 workshops (for which there is data) being run independently with participants, expanding the project's reach substantially. A review meeting held at the Design Museum showed that the My NatureWatch project led to increased deployment of the technology among volunteers, improved understanding of biodiversity, encouraged new technology/nature strategies and spurred greater progress towards achieving conservation aims (5.3).

The Durrell Trust adopted My NatureWatch as part of its 'Conservation Learning' strategy, and has become part of the Knepp Estate's world-leading rewilding project to re-introduce storks to the UK, using the My NatureWatch toolkit to log and tag flighted birds, providing valuable

insights into animal activity. The reduced toolkit cost enabled The Durrell Trust to train volunteers (who feed the storks) to use the My NatureWatch equipment, increasing public engagement as well as cataloguing opportunities (5.6). Following the success of this project, The Durrell Trust is planning to use My NatureWatch in schools with up to 1,000 11-16 year old participants who would not normally have engaged in conservation activities. The Trust has submitted a lottery bid for £235,500 (5.6) for a 'Beauty in Nature project', which will start in Jersey and roll out to rewilding sites around the world. Other examples of the impact of this research include The Ouse & Adur Trust, an independent charity developing a new waterway, which created a rental scheme to enable local families and schools to use the My NatureWatch toolkit, as a way of increasing participation and local interest in, and obtaining a better picture of, wildlife behaviour in the area (5.7); and The Wildlife Trusts (WT) supporting local volunteers to monitor hedgehogs using My NatureWatch (5.3), with a further planned large-scale project for '#30dayswild' (June 2021, delayed due to Covid). My NatureWatch has also transformed the way the 46 senior staff at The WT (directors and heads of policy) view technology as a way to engage a more diverse audience in a new 'ground-up' approach. The WT Head of Policy reported that: 'Without the My Naturewatch project we would not be thinking like this, and/or encouraging the use of technological approaches within our means.' This approach underpins the planning for their 2021–2031 Wilder Future strategy, providing a lasting legacy (5.8).

Engaging the general public with technology and nature via the media

On 11 June 2018, BBC *SpringWatch* dedicated nearly a quarter of their programme to My NatureWatch, with 2 million live viewers. On the programme, Chris Packham said, 'It's fantastic, to be honest with you, the fact that we can all be involved with this is brilliant, they do work really well' (5.9a). Since the *SpringWatch* broadcast, thousands of My Naturewatch camera photographs have been posted to the online forum and social media sites (5.9b). It is evident from forum and social media comments that these are a tiny fraction of the pictures taken, and it is not unusual for hundreds of pictures to be taken in a single session, most containing animals. The BBC *Wild Academy* for young people and schools featured the project, and presenter Maddie Moate independently created a YouTube video about making and using the camera trap (5.9c), posting the resulting wildlife pictures on Twitter and Facebook. The technology was also used on *GardenWatch* (5.9d). BBC *SpringWatch*'s producer noted that, 'Since its inception, *SpringWatch* has tried to innovate in terms of finding ways to interact with its audience and in finding ways for them to interact with wildlife, and the My Naturewatch project allowed us to do both in new and lasting ways' (5.9d). In addition, it 'continues to provide content to this day as well as being a benchmark and inspiration for developing new ideas' (5.9d).

Impact on participants

Engagement activities, using the three key principles of Phillips' Open Design work, have been held with at least 3,500 participants, run directly by the project team and indirectly by other participating organisations, between April 2018 and March 2020. Evaluations with participants investigated how their knowledge of the natural world and the environment had changed as a result (5.10, 5.11). Richmond University, Kingston University, University of Bristol, EPSRC Young Researchers, Pearl Institute (India), Schumacher College, Lewes Old Grammar School, Westmeads School London and Coder Dojo extra-curricular schools have all used the My Naturewatch approach to engage students with biodiversity through technology. Westmeads School noted the beneficial impact on pupil attendance and punctuality as well as curriculum development (5.12), and a CoderDojo lesson plan for constructing and using the My Naturewatch camera was published in *HelloWorld* (5.13). The University of Sussex Ecology Department used the My Naturewatch toolkit for their 'Watch and Learn' project involving students at 10 primary schools in Brighton and Hove: 'Passing it onto the schools was pretty cool, seeing the artwork that they've generated and the poems that they've written was pretty cool. That wouldn't have been created without the initial spark. First from you guys, obviously, making the camera, and then me taking the idea and forcing it onto the schools' (5.14).

Amateur participants reported increased awareness of biodiversity or lack thereof in their environments, and reported capturing images of wildlife they didn't know existed in their gardens or immediate environment. Participants also reported making changes to improve the

biodiversity of their garden or immediate environment in order to increase their chances of taking more and better wildlife photographs (5.11). Technological benefits were particularly prevalent in the over-60s, who reported feeling digitally 're-skilled', with reduced fear of technology and greater engagement with outdoor spaces and species: 'The process has made me feel re-skilled and I am keen to learn more'; 'I know more about this technology than my grandchildren, which is empowering' (5.10).

In terms of engagement with biodiversity and conservation, the recorded impacts include: participants developing new understandings of the local environment, changing their landscape architecture and adding ponds to encourage wildlife: 'I've come to some sort of acceptance of the foxes and the squirrels, and I've adapted my behaviour to accommodate their lifestyle, to protect my plants, and things like that'; 'This project has allowed me to look at things in a completely different way in my tiny little garden' (5.11). The experiences of the hundreds of people who made and used the cameras demonstrates the profound impact of this approach on public participation in design.

5. Sources to corroborate the impact

5.1 Download analytics from <https://mynaturewatch.net/>

5.2 Sales data and selected customer feedback, Pimoroni, camera kit supplier (2021).

5.3 Design Museum My Naturewatch film: <https://designmuseum.org/whats-on/talks-courses-and-workshops-3/make-your-own-my-naturewatch-camera>; and Bernard Hay, Senior Learning Producer, Design Museum, London, testimonial letter (2020).

5.4 Citizen Science Programme Coordinator, Natural History Museum, London, testimonial letter (2021).

5.5 Victoria & Albert Museum Digital Design Weekend 2018 programme, pp. 13-14; and Victoria & Albert Museum Annual Review 2018-19, p. 31.

5.6 Director of Conservation Knowledge, Durrell Wildlife Conservation Trust, Bath, testimonial letter (2020); and Durrell Wildlife Conservation Trust UK National Lottery Heritage Fund bid (2020).

5.7 Project Officer, Ouse and Adur Rivers Trust, interview transcript (2019).

5.8 Director for Campaigning & Policy, The Wildlife Trusts, Newark, testimonial letter (2020).

5.9a BBC *SpringWatch*: <https://www.bbc.co.uk/programmes/b0b6stlq>

5.9b My NatureWatch user forum pictures and feedback (PDF), <https://mynaturewatch.net/> and https://twitter.com/search?q=%23mynaturewatch&src=typed_query

5.9c Maddie Moate: https://www.youtube.com/watch?v=liOH5LUVkWo&feature=emb_title and Wild Academy:

<https://www.bbc.co.uk/programmes/articles/XkwSbqnWqXvH4jQf2WpXvz/springwatch-wild-academy>

5.9d Series Producer 2016-2019, BBC *SpringWatch*, testimonial email (2020).

5.10 Phillips, R., et al. (2020), 'Urban & suburban nature interactions; impacts and serendipitous narratives of the My Naturewatch diy project', in: Proceedings of the Design Society – DESIGN Conference, vol. 1, 2109–2118.

5.11 As 3.7 in Section 3 above.

5.12 Acting Head Teacher, Westmeads Community Infant School, Whistable, testimonial letter (2020).

5.13 Shersby, Natalie (2020), "Discovering Wildlife with My Naturewatch", *HelloWorld*, 14, 82-85.

5.14 Head of Technical Services, University of Sussex, interview transcript (2019).