

Design and Deploying Tools to ‘Actively Engaging Nature’

The MyNaturewatch project as an agent for engagement

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‘Shifting Baseline Syndrome’ is highly apparent in the context of generational shifts in work and life patterns that reduce interaction with and knowledge of the natural world, and therefore expectations of it. This is exacerbated by changes in the natural world itself due to climate change, biodiversity decline and a range of anthropogenic factors. Distributed and accessible technologies, and grass roots approaches provide fresh opportunities for interactions, which enable active engagement in ecological scenarios. The *MyNatureWatch* project uses digital devices to collect visual content about UK wildlife, promoting ‘active engagements with nature’. The project embodies *Inclusive Design in the Digital Age*, as the activity; engages a wide demographic community, can be used by all, provided user led agency and produced methodological design lessons.

The article frames *MyNaturewatch* as an agent for active designed engagements with nature. The research objective is to comprehend ‘how to design tools for positive nature engagement’ holding value for; 1) academic communities as validated methodologies 2) the public through access to enabling technologies, content and knowledge 3) industry in the form of new; experiences, engagements and commerce. The approach is specifically designed to yield insights from a multitude of engagements, through the deployment of accessible, low-cost products. Project reporting documents the benefits, pitfalls and opportunities in the aforementioned engagement uncovered through design-led approaches. Insights are gathered from public/community facing workshops, wildlife experts, ecologists, economists, educators and wildlife NGO’s. The engagement methodologies are compared highlighting which initiative yielded ‘*Active Engagement with Nature*’.

Keywords: User Centred Design, Nature, Engagement, DIY.

1 Introduction

1.1 What is a Nature Engagement?

Governments are implementing policies to “increase people’s engagement with

and connection to nature” [1] owing to the widespread decline of the world’s biodiversity [2] and the benefits that connection brings to pro-environmental behaviours [3] and human health [4]. The National Trust commissioned the *Natural Childhood* report [5]. Moss (founding producer of BBC *Springwatch*) highlights;

“Nature Deficit Disorder: focuses on the lives of Britain’s children, particularly with regard to their lack of engagement with nature. [Impacting on] physical health including obesity, mental health problems, and children’s growing inability to assess risk. Imagine a world where our children are physically and mentally healthier, communities more cohesive and connected, and everyone enjoys a closer relationship with the natural world. Reduced costs to the NHS, higher educational attainment in schools, and happier families” [6].

Engagements with the natural world presents positive impacts (for all ages) including; cognition and development [7], tourism [8], mental health [9], fitness [10], risk taking [11], child development [12] and protecting the ecosystem that supports human life [13]. The 2018 *Living Planet Report* concludes a “60% fall in [wildlife and biodiversity] in just over 40 years – is a reminder and ultimate indicator of the pressure we exert on the planet” [14]. City design (in developed worlds) comprises of infrastructures, concrete, built to move cars and people including buildings sustaining human comfort. Developments “largely ignore the natural processes through which humans are sustained” (food, energy, and water), thereby perpetuating a human disconnection from nature [15]. In *How does engaging with nature relate to life satisfaction* identifies nuances between rural and urban participants, in approaches and engagements in nature. The “rural residents responded more positively to the questions over residents from urban and suburban areas” due to their differences in perspective [16].

This design space provides ‘mechanisms’ for laypeople to engage in their natural surroundings with examples including; the Wildlife Trusts ‘30 days wild’ [17], the British Beekeeping Association’s adopt a beehive [18], Wild Cities [19], Chris Packham’s walk for wildlife [20], photography exhibitions [21], twitching apps [22] etc. Existing ‘nature engaged’ audiences have intrinsic motivation e.g. in *From Poachers to Protectors* it contextualizes the motivations for saving local wildlife through community engagement to “understand how community-level approaches can effectively help combat the Illegal Wildlife Trade” [23]. The World Health Organisation is deeming air pollution the new tobacco as “the act of breathing is killing 7 million people a year and harming billions more” [24]. Our human relationship with the natural world is intertwined, to reach resilience for a sustainable bio-diverse future, change needs to be embedded. The Natural England *Access to Nature Report*, Highlights nature engagements can “increase communities’ sense of ownership of local natural places, by establishing strong partnerships between communities, voluntary organisations, local authorities and others” [25].

1.2 What is the importance of making?

The act of ‘making’ provides; agency [26], economy [27], craft [28] and control over our material environment [29]. Open Design, digital manufacture and accessible technologies have transformed the access to manipulate/create ‘personal products’ [30]. Professor of surgical education R. Kneebone, stated, “young people have so little experience of craft skills that they struggle with anything practical”, stressing ‘making’ inexperience is impacting dexterity in operating theatres [31]. The *Make or Break: UK’s Digital Future* presents “the role of technology must create a sustainable society for global development” [32]. House of Commons report *Digital Skills Crisis* comments to “equip the next generation with industry [aptitude] but also with skills they require for a future not yet imagined” [33]. Traditional making tools extend to digital tools like ‘Raspberry Pi’, a low cost, “credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. The Raspberry Pi has been used in an array of digital maker projects, from music machines and parent detectors to weather stations” [34]. The *People Fixing the World* establishes “the public desire to fix and repair goods, for sentimental or economic reasons”, leading to “reskilling and sharing knowledge” [35].

Designer Enzo Mari wanted to produce furniture described as cheap, high quality and long lasting. Mari believed that “if someone tried to build something, they would learn something”... resulting in ‘Autoprogettazione’ [36], that translates as ‘self-design’. He believed in the pedagogical element of design and his instructions for self-made furniture served as a tool for learning and were instructions for self-fabrication and Open Design. Open Design is the “free distribution, documentation and permission of modifications and derivations” of an object, product, service or designed intervention [37]. Open Design “empowers people to make and understand products and processes, with more transparency”, leading to more independent user led design [38]. *DIY Citizenship, Critical Making and Social Media*, identifies that we are moving past people just making for themselves and using “DIY construction to provide new modes and possibilities for political and social engagement” [39]. These cases align to the unknown importance of making, that it is not just about the artefact but includes; wellbeing, accomplishment, knowledge, satisfaction, skill development, economic values and most importantly... agency.

1.3 Combining Making & Nature Engagement

The 2017 *Woodland Wise report, Nature Inspires Education*, comments the “need to maximise the education and development of everyone by using the outdoors as a tool for learning about nature, to acquire life skills, and as a platform for standard curricular subjects” [40]. In the UK, an “estimated 87% of households have access to a private garden, varying from a few square metres to several hectares” [41]. Nature facing organisations lack knowledge of people’s gardens. The rationale is that “resources are usually placed in visible locations, thereby increasing the reliability of sightings, particularly of rarer species” [42]. The combination of ‘making, nature

engagement and private space' offer the opportunity for enhanced design experiences. The challenge is balancing i.e., informed public understanding and the contextual requirements without consequences. For example bird feeders can transmit, *Trichomonas gallinae*, a common parasite to pigeons. 2012 studies documented a "30% reduction in green finch numbers" due to the transmission of parasites to other species, via unclean bird feeders [43]. The Dorset Wildlife trust reports smart "phone apps imitating bird song have been used negatively to lure species for amateur photography" [44]. Tony Whitehead, RSPB public affairs officer states, "repeatedly playing a recording of birdsong to encourage a bird to respond, in order to see it or photograph it, can divert a territorial bird from important duties, such as feeding its young" [45]. This space results in the requirement of non-invasive design proposals to explore the natural world. The work frames a process beyond participatory design, co-design and public engagement and enacts 'Design for Active Engagement' in the surrounding world. The *Mynaturewatch* project follows "Human-centred design, develop[ing proposals] based on direct interactions with individuals" [46].

Traditionally, participatory design has involved users in "evaluative research: testing existing products or prototypes of developed concepts" [47]. Participatory design has more "open-ended outputs to look for [design] opportunities" [48]. The often non-linear process of participatory design involves the client, user, designer(s) and alternate stakeholders [49]. Participatory design processes explore users' either "existing or possible contexts of use, aiding the design team to have a more empathetic approach" [50]. Including users in design processes should include "looking at people in context, actively involving [them to] try things" [51]. The design of the *Mynaturewatch* camera embodies some of Chapman's *Emotionally Durable Design* as "The product is developing a tangible character through time and use and some-times misuse" [52]. *MyNaturewatch* uses digital devices to collect visual and audio content about UK wildlife around the British Isles to promote positive engagements with nature. Project objectives include, people investigating nature outside of their back door in all its forms, giving its users agency. The value in wildlife outside of your back door is not often explored in urban and suburban areas.

The *MyNaturewatch* project makes the opportunity for interaction accessible to all. The *MyNaturewatch* Camera is designed to capture pictures of wildlife when it detects movement designed to be inexpensive, and aligned to the interests of the BBC's Natural History Unit. The cameras are available as DIY designs for people to make themselves. Constructed entirely from commercially available components, using instructions and software from project website (*mynaturewatch.net*), designed to be as easy to make, and require no direct contact with the project team for success.

1.4 Research objective

The *MyNaturewatch* project is a design led exploration engaging the public in surrounding wildlife with the intention of evolving their knowledge of design, technolo-

gy and nature, and or informs their actions over time. This article is framing the project as an agent for change.

2 Collective Method

The following workshops had a similar methodology and only changed by context, demographic or the business type; amends are highlighted in each section, as they were design workshops that had contextual input, influences and agendas. Design workshops help researchers include participants in questioning problems, situations or defining design territories. In *'Developments in Practice'*, Suri identifies that the “design profession’s major strengths [are] the ability to create tangible expressions of ideas and to invent and exploit new tools” i.e. translating insights into tangible design outputs [53]. The ‘new tools’ Suri describes range from technologies to services, from construction to execution. Design workshops are tools for incubating design outcomes and translating insights as they “establish user needs, test product designs and evaluate final concepts” providing grounded tangible outputs [54].

Workshop participants were recruited by the host communities or by an open call through the Internet and the host’s social media channels. The *Mynaturewatch* camera trap was designed specifically using off the shelf parts that were accessible by a third party and could be assembled without tools on a kitchen table with pre-approved CE certified components. The cameras are; repairable, reusable and utilise components found in schools, homes or technology enthusiasts place of work. All of the parts are publically accessible and purchasable. The cameras were used as an agent to encourage engagement with the natural world and surrounding nature.

Urban Birder David Lindo believes you should “see your urban environment as a bird would: the buildings are cliffs and any green areas are an oasis for nesting, resting and feeding” [55], as we are surrounded by wildlife, it does not solely exist in rural areas. The workshops approach embodied “contact, meaning, emotion, compassion and beauty indicators of, pathways towards nature connectedness” as five strong indicators for positive nature engagement [56]. The workshops included a 30-45 minute camera assembly and check, with follow-ups, or tech support offered by email, website or forum. Factors informing workshop locations were; type of organization, motivation, locality, communities and prior technology or nature knowledge.



Fig. 1. A *Mynaturewatch* camera deployed before a workshop at Wakehurst Place.

In parallel research Hecker *et al* state “research in citizen science takes a diverse approach where the balance between scientific, educational, societal and policy goals varies across projects” [57]. The authors noted, “a major obstacle [in] preventing the adoption of technologies is the presence of those entrenched in traditional solutions” the *Mynaturewatch* advantages do not compete with traditional methods, but advance them [58]. Participants early images were evocative, but they often deleted them feeling unworthy, personally comparing to project partner BBC Earth pictures.

2.1 Sussex Wildlife Trust, Beta Development (Study 1)

Sussex Wildlife Trust is “a conservation charity for everyone caring for nature in Sussex. [They] focus on protecting the rich natural life that is found across our towns, countryside and coast” [59]. SWT are uniquely placed with local; expertise, networks, outreach, passion for surrounding environment(s), the negatives of potential use cases and have experience in engagement campaigns e.g. 30days Wild. SWT are linked to the Sussex Biodiversity Record Centre, actively contribute to local wildlife media, Wildlife Festival and run a public facing troubleshooting hotline called ‘Wild Call’ [60]. Contextual methods included; using a local site (Woods mill) that regularly engages diverse audiences, schools and welcomes volunteers. The organisation was in prime position to help future awareness and use the tool for their own benefit. The workshop was run with 9 rangers and volunteers. The delivery involved a build workshop, example camera placement, with a review of captured content after 1 month.

2.2 Sussex Wildlife Trust / Results

The rangers highlighted scaling ‘baiting’ to attract different wildlife and its challenges. Baiting of “wildlife involves the purposeful placement of natural or artificial food resources in the environment to manipulate the behaviour of wild species so as

to attract and/or retain them in an area” [61]. Large “concentrations of wildlife activity centred around feeding or baiting sites have been widely implicated as a mechanism influencing transmission of infectious diseases” [62]. This highlighted the need for endorsement by wildlife expertise and the delicate balance that is required. Repeatable placing and providing more knowledge of how and when to attract different species, whilst not over attracting vermin and spreading disease, was raised as a concern. Researchers found that ‘permission giving’ was imperative e.g. if participants broke them, through usage it was ok as they could repair or rebuild them. The participants sought external validation from social media ‘as a goal’, to share content.

2.3 Schumacher College, Beta Development (Study 2)

Schumacher College embodies EF Schumacher’s “small is beautiful”, providing a combination of ecology, design and economy teaching [63]. Their Ecological Design course “believe[s] in a future where the things we design no longer need to be detrimental to the wellbeing of our planet, in a future that pioneers ecological possibilities that redress social, environmental and economic imbalance” [64]. Contextual methods; founded by bringing design, ecology, economics together and understanding environments. It was a captive non-tech audience, interested in documenting local wildlife. They were selected as a design orientated audience providing honest feedback, as they had no pre-bias to the project.

2.4 Schumacher College / Results

The participants found the technology magical in its connectivity and simplicity in its connection to a mobile device. In contrast frustrations occurred, as they did not “catch” what they wanted, however ‘wildlife is not an on demand performance’ nor should be made to be so. The “product language” [65] of off-the-shelf technologies and the physical interaction they bring was challenging, as the Raspberry Pi offers countless adjustment rather than restricting the users and lead to confusion. Participants thought the camera kits would instantly catch new species... in this case it did not, highlighting the need to frame the technology appropriately within events.

2.5 Wakehurst National Trust (Study 3)

This was the first workshop after BBC SpringWatch launch, so was out of Beta testing phase. Wakehurst is a “Kew [owned] Wild Botanic Garden in Sussex, situated on the High Weald, [with] more than 500 acres of ornamental gardens, woodlands and a nature reserve. Wakehurst also home[s] the Millennium Seed Bank [66] the largest wild seed conservation project in the world” [67]. Visitor numbers to Wakehurst in 2017 were “2,124,138” [68]. Wakehurst was selected as the National Trust has “5.2 million members of which families [their] (biggest growing group), accounts for over 23% of memberships” [69]. It built on the National Trusts network for further engagement. *Mynaturewatch* cameras were placed throughout the Wakehurst site a month before the workshop gathering material and familiarising the keepers with the

equipment. Participant recruitment included an open call, through Wakehurst’s social media, with 40% of places offered to participants invited through local schools for people estranged to National Trust properties. Local head teachers sent supervised school pupils, rewarding good behaviour. The format, introduced the technology, featured a live demonstration outside, 30-45 minute build with a local ranger offering advice on camera positioning, practicalities and experience.

2.6 Wakehurst National Trust / Results

Families were assembling the kits together and crossed generations. Participants fed off the group dynamic and actively helped each other. Participants actively discussed camera placement and helped each other. The venue acted as validation for the venture. Visitors highly engaged with the *Mynaturewatch* project online (that researchers had never met) turned up to show us their own builds & specific hedgehog camera rigs. Participants sharing material post workshop was very challenging over a digital medium, as it required the simple effort of them putting on to social media. Participant’s definition of a good photo or good output was critical, as they did not need to be a professional. The outputs of ‘drop-in sessions’ were harder to measure as participants had less time invested.

Comments from an attending Wakehurst ranger;

“The beauty of the project is that technology usually makes kids stay indoors and not explore the outside world, the combination is powerful” (*host comment*).



Fig. 2. *Mynaturewatch* Wakehurst Place workshops (*Image credit, James McCauley*).

2.7 Depot Cinema (Study 4)

Lewes is situated in the South Downs National Park and is a “Transition Town”, where people offer knowledge forming a sustainable community” [70]. Depot is an “independent community cinema and cafe-restaurant with education facilities, created and operated by the charity Lewes Community Screen. *Lewes Community Screen* aspires to create a venue that serves as a focal point for the local community, not only in the area of film but through a wider range of art forms” [71]. The location was

selected, as the researchers had not yet focused on the usage of the material but predominantly on the inputs. As Manzini comments “the convergence of social and technical innovation interacts with the way people are and think, in this way new values emerge, impacting what we count as well-being” [72]. Mazini states:

“Collaborative organisations are social groups emerging in highly connected environments. Their members choose to collaborate with the aim of achieving specific results, and, in doing so, they also create social, economic, and environmental benefits” [73].

The authors empowered social groups in every case study, but the Depot was specific as the result was a film, with the intention on wider benefits. Cinema’s can be “social levelling, social hubs” that cross generations and unite audiences [74]. The organisation hosted an open call for filmmakers of all ages, with the incentive of a trailer to be played in the cinema over the coming months. The age ranges (advertised) were from 8-15, 55-80. Locals who could not attend were also invited to digitally submit imagery. The follow up workshop focused on community film making techniques.

2.8 Depot Cinema / Results

Researchers were surprised that the participation incentive was not inclusion in a trailer, but people exploring their gardens, rooftops and local space. The process highlighted the importance of repeat visits, also solving early tech support issues were vital as if people got frustrated, they would not seek the information on the forum or ask friends. A number of participants to this day are still sending images that they feel are important to them and the trailer still remains to be of interest.

“The camera is doing its job well, I regularly look in the garden from the window or when I am working in the garden. 24 species in the garden (so far) and another 6 "from" the garden like Swift and Peregrine” (*Participant email*).

2.9 Victoria & Albert Museum, Digital Design Weekend (Study 5)

Digital Design Weekend “presents installations, workshops, talks and performances from over 40 artists, designers, scientists and engineers”, it is a “weekend of free events exploring human-machine interaction and potential future worlds” [75]. The researchers ran open workshops hoping to invite a multicultural art and design facing audience. This time researchers relied on passing traffic and timed workshop sessions rather than pre-sign ups. The Victoria and Albert museum, was also selected as; it has great experience in running engagement events, is of international significance and has a mixed visitor demographic with 3,789,748 [76] visitors in 2018, that is free and accessible. The workshop was run during the 2018 London Design Festival.

2.10 Victoria & Albert Museum / Results

Venue's significance offered trust and contextualisation as in discussion people thought they were creating 'works of art' rather than just taking photos. Adhoc participants commented they 'wanted to see what they would get' from a 45 minute assembly workshop before they committed their time. The negative of running a workshop in such a prestigious location, was the re-enforcement that we were a research project and not just an extension of the museum was sometimes confusing to participants. One shared result was a participant using the technology to form a link with their next-door neighbour as they did not have a garden. Whilst the interaction between the participant and neighbour lasted a month, it did bridge an age divide of 45 years between two people that had not interacted before or created a technology intervention. The participant responded by email with:

"A fruitful collaboration with a neighbour (an old lady) who has a birdbath, we got some pretty amazing shots of the (quite busy!) bird ecosystem in both of our backyards. It was a really nice thing to collaborate on" (*participant email*).

2.11 The Design Museum (Study 6)

The Design Museum "champions design and [it's] impact on the world. Design is about innovation, technology, creativity and craftsmanship and influences our lives. The museum is an independent charity and relies upon its loyal members to continue this valuable work" [77]. Since opening the museum has attracted "672,000 visitors, in 10 months" [78]. Authors initiated a 'sixties+ nature tech group' meeting weekly for a month. Participants were local to the Design Museum and Holland Park (collaborating as local wildlife experts) opening their Ecology Centre [79] and staff. The process utilised repeat visits over 4 weeks for support. Session 1) camera assembly and troubleshooting session 2) deployment in Holland Park, advising camera placement after a week living with the cameras, to ensure debugging. Session 3) participants collected the cameras for image review, taking the cameras home with them. Session 4) group discussion, followed by a pop-up exhibition providing the participants the opportunity to share data with family members. The approach borrowed lessons from citizen science and community practices. In *The Knowledge Gain and Behavioral Change in Citizen Science Programs* Jordan *et al* comment that trial participants claimed that the largest motivating factor for participation is "content knowledge" [80]. Content knowledge is the education that participants experience from exploring the world, it also offers training opportunities where volunteers can increase their skills, expertise and 'content knowledge'. In *The Rise of The Expert Amateur: DIY Projects, Communities, and Cultures*, Kuznetsov describes the main motivation of users contributing to DIY projects as the "learning of new skills and communal sharing" [86].



Fig. 3. Assembly and deployment of *Mynaturewatch* cameras, over 60's tech group.

2.12 The Design Museum / Results

The number of sessions meant that participants did not lose faith due to technical difficulties, as each session could troubleshoot, building confidence. The places participants deployed their cameras included participants; window boxes, allotments, gardens and small green spaces. The feedback opened up the conversation to include how the *Mynaturewatch* project could be used as a health tool, against sedentary lifestyle and contribute towards a good physical and mental wellbeing. The sessions empowered them to use different tools that they had not used before. There was great power in making a group of 60-80 year olds, know more about a technology over their grandchildren, as they commented on numerous occasions. The sessions reinforced a social impact, due to participation they subsequently met externally (to the organised events) creating; friends, made bread together, learnt a language together, as a social group, which previously did not know each other before.

“It’s a fantastic project and it’s shown us how the museum can support older people to get engaged in nature and technology” (*Host institution email*).

The Design Museum study was the most successful of all of the workshops, as it established a small community that led to a wider impact. The participants also felt the value in sharing their ‘captures’ as it was straight forward and they could learn of each other quickly. The participants commented that re-skilling [81], was an important skill of the workshops, they understood things they had not done before. Researchers witnessed a change in ownership once the participants ‘I made that to take that photo’. The feedback highlighted a number of themes unknown in other prior workshops with following statements from participants:

“The process has made me feel re-skilled and I am keen to learn more” (*workshop participant*).

“I know more about this technology than my grandchildren, which is empowering” (*workshop participant*).



Fig. 4. Captured images from, *Mynaturewatch* over 60's tech group.

3 Discussion

3.1 Project Support

The authors found that physical repeat visits to the locations were important, not from a debugging perspective but from a social side unifying workshop participants to share their stories and insights that might not have happened through an online presence as we focused on attracting participants that had not previously engaged in creating technologies. The groups over-reviewed their imagery and deleting very valuable images that might not have “captured” a species, but had taken a great photograph. The concept of “group making” re-enforces the social sustainability and exploration provided by others and not just undertaking a solo activity [82]. The workshops also uncovered the value of peer-to-peer knowledge, especially in elderly participants sharing their knowledge with grand children [83]. The authors believe that this support can also build project sustainability over time supporting Hess's theories of Community Technology that combines a community with empowerment.

“To light that candle which is so much better than cursing the darkness. To be as much as the human condition can sustain, rather than being only what a system can allow... To be... To do... That is Community Technology” [84].

3.2 Motivation

Clary describes that the “protection of one's self-interest is key to motivation” [85]. Motivation to participate remains a challenge, however communities ‘self-interest’ can be designed in to it appropriately. Borrowing from Citizen science, to “engage a public it should be innovative and imaginative combining the collation of data while appealing to the volunteer community” [86]. Hieman also agrees with the importance of ‘appealing CS activities to participants’ and comments that “democratize[d] science should not fall solely to those formally trained in the natural sciences” [87]. When participants were asked they often responded with “I want to see the garden when I am not there” or “I have never made a piece of technology before”. The

motivations were surprising as the ‘big sell’ of trailers or ‘recognised on TV’ were not the incentive, but learning the tech and the feeling of constructing it yourself.

3.3 Barriers

Where possible we encouraged serendipity, so participants could use cameras to explore. The work followed a “research through design” process responding to engagement and participants [88]. The barriers to entry highlighted through the workshops were the type of people that felt they could attend or were able. The researchers made the workshops as accessible, in times appropriate to ‘childcare’, school access and on weekends. A 3rd party, Pimioroni, who packaged componentry for easy purchase, removed one large barrier for the project. The final barrier was giving ‘permission’ to participants. When they attended workshops there was a different approach to the object after they had ‘made it’ as they had invested their time and skill into its assembly. Researchers had to give them permission to edit, repair and even break them through use, rather than not use them. The last barrier was limited to participants “fieldsense” in how they engaged or scared wildlife, in urban settings this was less of a challenge; in rural settings had quite elaborate positioning [89].

3.4 Trust and Ethics

The authors are aware, that everything is open to abuse, its how you design out the detrimental abuse to engage people in the natural world... to aid positive interactions is the challenge. As highlighted by [90] the simple act of “tourism and footfall in areas of natural beauty” require careful consideration, however the authors are highlighting that documenting our back garden and surrounding parks in urban and suburban environments could not only provide interesting design material or content but in turn effect our relationship with the natural world. The work was conducted using institutional ethics procedures and IDEO’s mandate of “Respect, Responsibility and Honesty”, as the work continually “acted to protect people’s current and future interests” of the information they were gathering [91]. Ethics of capturing and wider scale, safeguarding was an issue in certain schools if there was a child with a “fear that a vulnerable child might be identified”, even though that was virtually impossible [92]. The work also identified the possible ethical situations of ‘do no harm’ and “empathy with wildlife challenges of conservation” [93]. Some participants often got frustrated they did not ‘catch anything’, researchers had to re-enforce that “Wildlife is not performative” [94] “managing peoples expectations” [95] that things are not “on demand” in this space, nor should they be [96]. Baiting en-mass if all the public participated at the same time could be catastrophic, “attracting vermin and disease” [97].

3.5 Health and Wellbeing

The health benefits of ‘engaging with nature’ are documented earlier in this paper. Hartig *et al* discuss the health benefits of ‘nature experiences’ including; physiological impacts, restorative aspects, learning and personal development supporting “views

about nature and health, are using methods and theories now viewed as scientifically credible” [98]. The NHS is now using “Social prescribing involves helping patients to improve their health, wellbeing and social welfare by connecting them to community services which might be run by the council or a local charity. For example, signposting people who have been diagnosed with dementia to local dementia support groups” [99]. This is further grounded as the “government says about 200,000 older people have not had a conversation with a friend or relative in over a month” [100]. In *Active Ageing, Pensions and Retirement in the UK*, “Active ageing has the potential to provide a framework for strategies relating to population ageing, ultimately it can assist with the process of optimising opportunities for health, participation” [101]. Prescribing ‘nature as healthcare’ could be a valid direction for ‘*Actively Engaging in Nature*’. Gaming platform Pokémon GO, surprised health experts as a “Real World Gaming Platform us[ing] real locations to encourage players to search far and wide in the real world to discover Pokémon. Pokémon GO helps you find and catch Pokémon by exploring your surroundings” [102]. This platform created for profit and exploration; never considered the health implications of getting people to explore their world. In studies Iqmar *et al*, [103] documented 32,000 users “added a total of 144 billion steps to the US physical activity”. Pokémon players were going to locations previously unvisited [104] and helped people with social withdrawal [105].

3.6 Meaningful Engagement

The World Wide Fund for Nature (WWF) highlight issues with smart phone apps recording sightings, specifically in Yellowstone, national park. Not only does it remove the ‘wild nature of discovering wildlife’ with “grizzly bear sightings at such spots are especially challenging for park rangers, who have to both direct traffic and keep people a safe distance away” [106]. This extreme example of ‘logging wildlife’, does raise the issue of health and safety and drawing people to locations, that do not have the knowledge to cope with that environment. Public Engagement is defined as “the involvement of specialists listening to, developing their understanding of, and interacting with, non-specialists” [107]. The authors see ‘Design for Active Engagement’ differently as it is not passive; it presents design to actively engage through physical, system or digital interactions. Authors see active engagement as an opportunity for potential behaviour change over time. Workshop activities established a deep level of engagement with participants; investigating there surroundings, public environments, presenting findings at camera clubs, sharing it with friends both personally and via social media.

4 Conclusion

The repeat visits gave permission; yield data, establishing a community was important to the success of the work for the demographics we engaged with. The design language of off the shelf parts, was intimidating to some participants and can be confusing to the public, so the overall design was imperative. The researchers had to frame

the work appropriately as it often came across during feedback as a ‘doing good tool’ rather than just people exploring their outdoor space with a designed product. The project appeal to the volunteer community was paramount, as people often became champions of the project telling their friends and families. Giving permission was essential especially when given kits as somewhere to scared to break them. The issue of giving things for free did present bias’s that would require further investigation over time. The notion of ‘public press’ or ‘getting their name in the paper’ was not of interest to the majority of the participants. Finally as Clary describes that the “protection of one’s self-interest is key to motivation” [108], is of the utmost importance and remains a challenge, however communities ‘self-interest’ can be designed in to it appropriately. An intrinsic motivation/bias was noted as participants were given kits for free.

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