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PARTICIPATORY SCIENCE COMMUNICATION FOR TRANSFORMATION

Practicing engaged research through pandemic times: do not feed the animals?

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Abstract

From 'Feed the Birds' to 'Do Not Feed the Animals' takes an engaged approach in which science communication is both process and outcome of the research. The project started in the UK in March 2020, coinciding with government-imposed lockdowns in response to the COVID-19 pandemic; since the project's engagement had been designed around in-person interactions, a rapid and creative rethink was needed. This paper outlines the redesign of the project and describes a hybrid model of on-line and in-person engagement, integrating new skills and technologies which the pandemic catalysed, with well-established in-person practice in science communication. Our research develops good practice for online, participatory science communication, and supports the advancement of engaged research more widely.

Keywords

Participation and science governance; Scholarly communication; Science communication: theory and models

DOI

https://doi.org/10.22323/2.21020205

Submitted: 4th October 2021
Accepted: 28th January 2022
Published: 28th March 2022

Context

From 'Feed the Birds' to 'Do Not Feed the Animals' (DNFTA) [Sykes et al., 2020a][1] is an interdisciplinary research project which aims to implement the principles of 'engaged research' — an approach in which 'researchers meaningfully interact with various stakeholders over any or all stages of a research process, from issue formulation, through the production or co-production of new knowledge, to knowledge evaluation and dissemination' [Holliman et al., 2015, p. 3]. The project involves collaborations between anthropologists, zooarchaeologists, geochemists, historians, sociologists and zoologists, alongside institutional partners from across the third sector, using a wide range of methods from isotope analysis, osteology and morphometrics through to archival research, ethnography and interviews.

[1] *From 'Feed the Birds' to 'Do Not Feed the Animals'* is a collaboration between the University of Exeter (zooarchaeology and sociology), the University of Reading (osteology and isotope analysis), the University of Roehampton (anthropology) and the National Museums Scotland (osteology, museology and zoology) funded by the Wellcome Trust (grant number 219889_Z).

Engaged research (which draws from and builds on traditions of science outreach, co-production, participatory research, deliberative research and citizen science [Bergold and Thomas, 2012; Borg et al., 2012; Collins et al., 2020; Vaughn and Jacquez, 2020; Willis et al., 2021]) generally relies on in-person interactions to build social relationships and establish trust, alongside a plethora of embodied facilitation techniques and the use of physical resources including flipcharts, marker pens, post-it notes, maps, art materials and even toys [Brouwer et al., 2019; Kara, 2015; Willis et al., 2021]. Parallel to this there is a growing consensus across interdisciplinary and participatory research that collaboration is best fostered via mutual respect, shared problem solving and regular sociability, traditionally assumed to be best achieved via in-person interactions [Aicardi, 2014; Fitzgerald et al., 2019; Freeth and Caniglia, 2020]. DNFTA was therefore designed around a regular series of in-person participatory workshops complemented by an on-line component, drawing inspiration from a (pre-pandemic) virtual conference model [Hiltner, 2019]. At the start of the project, these workshops would focus on issue formulation and scoping research questions, later workshops would be orientated towards knowledge production and feedback on work in progress, and concluding workshops would interpret and disseminate research findings for the wider world.

This design was significantly disrupted from the project's outset, coinciding as it did with the rapid spread of COVID-19 across the UK. Ensuing government responses to attempt to control the pandemic, namely the introduction of 'social distancing' measures and a nationwide 'lockdown' brought the possibility of deploying tried and tested deliberative and participatory methods to an abrupt halt, requiring us to rethink our approach and compelling us to find new and imaginative ways of engaging with project stakeholders.[2] As was widely experienced, learning to work together while unable to *be* together is difficult, even when relationships are well established. The task becomes even more daunting if those relationships are new or unformed, as was the case at the start of DNFTA. This paper discusses the ongoing processes through which we have built relationships and fostered an environment of trust in which collaboration with stakeholders and across disciplines can flourish, throughout the ongoing uncertainties of a pandemic and in a world with, and eventually beyond, COVID-19.

Project objectives

As a project, the primary research aim of DNFTA is to investigate the drivers and consequences of animal feeding, specifically what we describe as 'non-utilitarian' feeding, i.e., human feeding of other animals that is not part of a direct transaction or a means to an end. Whereas livestock or working animals are fed by humans and provide them with food, resources and labour in return (i.e., there is a

[2]Lockdown is defined by the on-line OED [2021] as 'a state of isolation, containment, or restricted access, usually instituted for security purposes or as a public health measure'. A lockdown was ordered across the UK on 23rd March 2020 with prime-minister Boris Johnson giving 'the British people a very simple instruction — you must stay at home' [Johnson, 2020]. This date was exactly seven weeks after the project heard that it had been granted funding by the Wellcome Trust. The stay-at-home order included the requirement for people to work from home where possible [Johnson, 2020]. Social distancing is defined by the on-line OED [2021] as 'the action or practice of maintaining a certain physical distance from, or limiting physical contact with, another person or people … in order to avoid catching or transmitting an infectious disease, or as one of a number of public health measures designed to inhibit its spread'. In the UK, the 'certain physical distance' was set at a minimum of two metres [Cabinet Office, 2020].

transactional relationship), we understand non-utilitarian feeding as practices which are less directly transactional and where the 'returns' for humans are less tangible or absent entirely. The drivers of this incredibly widespread human behaviour are complex and appear to be deep rooted. While the full consequences are not always clear, they may not always be positive: such consequences can pertain to the humans and animals directly involved and also to wider ecosystems and environments. Investigating such a wide-ranging topic requires a range of expertise from within and beyond academia. It was this that led us to our second research aim — to implement an interdisciplinary, engaged research approach, recognizing that the complex questions raised could not be answered by one discipline, or even academics, alone but would require a wider range of expertise and experience.

Interdisciplinary research, i.e., 'collaborations between researchers across academic disciplines' [Frickel, Albert and Prainsack, 2017, p. 5], is now well established, if not necessarily routine, within academia. Alongside this, engaged research approaches are increasingly being adopted by scholars, recognising that collaboration should extend to include stakeholders from beyond academia. These changes in the research landscape have taken place in parallel with significant shifts in science communication, whereby participatory approaches are increasingly recognised as important for genuine public understanding of and engagement with science [Bucchi, 2008; Trench, 2008]. Considerable overlaps exist across communication and engagement and this entanglement is a key feature of engaged research, with science communication being both a process and an outcome of such research [Grand et al., 2016]. Indeed Campos, Monteiro and Carvalho [2021] describe engaged research as a form of 'knowledge co-construction' which includes a diversity of scientific and non-scientific knowledge types and which enhances learning; they suggest that at its most fundamental level, engaged research is a form of citizen science since 'citizen science is, in its essence, about widening the process of scientific knowledge construction' [Campos, Monteiro and Carvalho, 2021, p. 4]. Furthermore, they argue that the practice of conducting engaged research is 'a fundamental step to expand the public perception of science' [Campos, Monteiro and Carvalho, 2021, p. 4] — in other words the practice of conducting engaged research is a form of science communication in and of itself. It is important to note that these approaches expand the concept of citizen science to be participatory and collaborative rather than being limited to the collection of data [see also Collins et al., 2020]. For Campos et al. engaged approaches involve:

> [1] the integration of non-scientific knowledge and other types of community-based knowledge within the scope of research projects, giv[ing] equal opportunities [for] all type[s] of interplaying knowledge to be acknowledged and used according to the contexts … [2] the co-design of research projects and … [3] bidirectional [engagement]: citizen engagement with science and scientists' engagement with society [Campos, Monteiro and Carvalho, 2021, p. 8].

Holliman notes that '*if done well and over time,* engaged [research] practices can enhance the quality of research, improve the social and economic significance of the resulting impacts for all participants, and generate evidence of sustained excellence in academic practice' [Holliman, 2017, p. 5, emphasis in original]. Indeed, Holliman views engaged research as 'a way of fostering clear and

consistent communication' [Holliman, 2017, p. 2]. and as part of the professionalisation of science communication.

Like other forms of science communication, engaged research often uses creative methods to assist in knowledge creation and dissemination: these are highly likely to involve in-person interaction both because creative methods tend to be physical and because opportunities to meet in-person assist in establishing trust and building rapport [Danis, 2020; Franklin, 2022]. Performing engaged research while remaining socially distanced therefore involves significant shifts from traditional in-person methods to virtual methods. The pivot to virtual methods, together with their strengths and weaknesses are the primary focus of this article. DNFTA's original approach was planned to foster collaboration across the research team (academics), a core group of project partners (largely third sector institutions), and a wider, diverse research network of stakeholders, using periodic in-person participatory workshops (i.e., meetings of the research team, project partners and research network to discuss and work on the DNFTA project) to drive the process.[3] While we had always intended to have an on-line element to these workshops, they were planned as in-person events. The onset of the COVID-19 pandemic and government mandates requiring the physical separation of people to control viral transmission made such meetings impossible. We therefore had to adapt our aims — not only to conduct engaged research but to do so while keeping all concerned safe in a way that overcame physical distance and while still fostering interactions of as high quality as possible. In doing so we faced significant challenges, most especially that of creating meaningful engagement in a fully online space.[4] It should be noted however that since our stakeholders are all professionals the transition from in-person to on-line deliberation and participation may have been smoother than might be the case if stakeholders are drawn from wider publics [Willis et al., 2021].

Nonetheless, this considerable challenge meant that the initial reaction of DNFTA's lead researchers was to suspend the project for a time, creating space to reconsider its design. This was possible because of, and assisted by, the very early stage we were at whereby project staff and PhD students had yet to be recruited. Project redesign was then incorporated into the recruitment process, with candidates asked to consider how they planned to adapt to pandemic conditions, something which has made sub-projects more resilient and contributed to the functioning of DNFTA as a whole. In addition, Author One was recruited four months ahead of other staff to manage the engaged research process and assist with pivoting to a fully on-line approach, including website creation and workshop design. While these adaptations have brought considerable benefits, a major drawback is that the

[3] The research team are academics from the project's collaborating institutions, the project partners are organisations involved in conservation of natural and cultural heritage, and the research network are stakeholders from within and beyond academia with professional or research interests in human-animal relations [Sykes et al., 2020b]. For the purposes of this paper and the workshops discussed, 'stakeholders' refers to project partners and the research network.

[4] Alongside the central challenge relevant to this paper of creating meaningful engagement in a fully online space readers should not underestimate the impact of the manifold other challenges presented during the early stages of the pandemic, including compliance with fast changing and highly unpredictable public health regulations, maintaining data security while rapidly adopting a plethora of new IT tools, coping with wider stresses such as pivots to online teaching, threats of institutional closure, personal health risks and changing caring responsibilities, and the need to work ethically and with great care, mindful of everyone's physical and emotional safety through a highly stressful time.

majority of the project team has been recruited during the pandemic, with all interviews taking place on-line and some project members unable to travel to their host institute from other parts of the UK or Europe. Having such a newly established research team not only meant that, at time of writing, we still had not met in person,[5] but that the new project had little 'social capital', i.e. 'networks together with shared norms, values and understandings that facilitate co-operation within or among groups' [Keeley, 2007, p. 103], to help us create and maintain productive working relationships — a problem for many new recruits during COVID-19 [MacDonald, 2021].

A similar situation existed with the project partners and research network, most of whom have still not met the DNFTA team in-person, much less each other. This was compounded by the fact that our partners are predominantly third sector organisations (such as conservation charities, museums and zoos) and were particularly badly affected by COVID-19, for example by compulsory closure (leading to loss of income), loss of other sources of funding (including donations), and the need to furlough staff while needing to maintain heritage sites and care for (and feed) animals. The priority once DNFTA restarted was to foster relationships across the research team, project partners and research network, while being sensitive to the new situation that everyone found themselves in. To this end, two online workshops were planned, the first for March 2021, followed by a second in May 2021. In this paper, we discuss and evaluate these early scoping workshops, setting out our methods in the next section and then outlining our observations and reflections on the process. We close with a reflective discussion summarising what we have learnt and the broader implications for participatory and engaged research during, and eventually beyond, the COVID-19 pandemic. This last point is particularly important given how rapidly research is evolving and adapting to operate in pandemic conditions, making the contribution of this paper in informing research practice extremely timely.

Approach

The DNFTA research team is spread across four institutions which are, in turn, widely geographically distributed across the UK. While the original proposal planned for members of the research team to meet in-person for project activities and workshops, relatively little attention had been paid to digital methods. COVID-19 changed all that, both in terms of our attitudes and in terms of accessibility, functionality and familiarity of and with technologies. Once the project restarted, we established weekly team meetings using Zoom (a web conferencing platform) and a 'silver lining' of COVID-19 for DNFTA is that we have been able to meet far more, routinely, informally, and formally, than would have been possible otherwise. This experience of social and intellectual exchange without meeting in person then shaped our approach to workshops and was complemented by the new skills acquired by the project leads during the pivot to on-line teaching which became necessary during 2020. These skills were developed rapidly through practice and from institutional and academic-peer support networks [e.g., University of Exeter, 2021; WIASN, 2021] and directly informed the online workshop practice we describe here.

[5]The first in-person meeting of the research team took place in October 2021, 19 months after the project was granted funding.

As Holliman et al. [2015] note, engaged research entails meaningful interaction with stakeholders over multiple stages of the research process which, critically, should include the issue formulation stage. Since, during the period discussed in this paper, DNFTA was in the issue formulation stage a major aim of the first round of workshops was for researchers and stakeholders to collaborate in shaping the project's research questions and lines of investigation. Many potential lines of enquiry are raised during such workshops and while not all of these can be pursued, such conversations play a vital role in i. shaping the research agenda, ii. contributing to the success of workshops by providing opportunities for follow-up and future collaboration and iii. informing the knowledge production, evaluation and dissemination research stages which, in the case of DNFTA, will include public engagement alongside the broader engaged research approach. Given our original plans had entailed a 'hybrid' approach of sorts, combining in-person and on-line activities, we were, in some ways, well placed to pivot to a fully on-line approach as a response to the pandemic. While digital platforms existed long before COVID-19, the pandemic has encouraged people to embrace these technologies on an unprecedented scale e.g., at its peak, Zoom had 300 million 'daily meeting participants', up from 10 million in December 2019 [Turk, 2020]. A significant consideration for anyone working in a 'digital and distanced' way [Bidgood, 2020] became which platform to choose and for what purpose. This can be guided by several factors: the platform's purpose and function, its usability, the likelihood of stakeholders being familiar with it, and whether it entails any cost. In many cases, as it was for us, it may be more appropriate to use a range of platforms and digital tools rather than trying to adapt activities to fit a single format.

Our hybrid approach to workshops drew on the 'Nearly Carbon Neutral' (NCN) model which, as the name suggests, was developed in response to the significant carbon footprint of academic conferences [Hiltner, 2019]. In offering a virtual conference format, the NCN model entails content, usually recorded presentations, being posted on-line which can then be viewed by participants asynchronously in order to stimulate discussion in advance of, and at, the live event, which is itself held on-line.[6] Building on this approach, the project team created presentations and posted them to a YouTube channel [DNFTA, 2021]. YouTube was chosen as a well-established video sharing platform which has high usability, no cost, and was highly likely to be familiar to participants. Providing content in advance enables participants to view it at a time convenient to them (helping, *inter alia*, to overcome international time differences) and means that rather than passive, one-way presentations live sessions can be dedicated to active, deliberative, discursive, participatory communication which can occur far more effectively synchronously than asynchronously. While watching the videos, participants were asked to consider discussion questions and to post responses on a Padlet board (an on-line notice board). Padlet was chosen (rather than relying on the comment forum provided by YouTube) because the platform is highly user friendly and enables creative interactions between participants and rich opportunities for participation, including extending interactions beyond flat text to drawings, images, documents, gifs, etc. (see Figure 1). In addition, Padlet offers several ways of saving data for later analysis. Padlet was used before workshops (to stimulate discussion), during workshops (for icebreaking activities and to continue conversation), and after workshops (to evaluate and collect feedback). We were fortunate to have

[6] DNFTA had originally planned to adopt the NCN model of recorded presentations followed by live sessions but had intended that live sessions would be in-person.

institutional access to paid-for Padlet accounts, enabling unlimited boards — the process would have been possible, though less easy, using free accounts.

Figure 1. Section of a Padlet board from the 'Have you fed the cat?' workshop.

We chose to use Zoom for the live element of our workshops since, as one of the most popular web-conferencing platforms, it was highly likely that stakeholders would be familiar with it. In addition, its high usability and ability to display large numbers of people on a single screen could support the kind of lively and active interactions we needed. Also, with appropriate consent, it is possible to record Zoom discussions for later analysis. Indeed, formal, written consent was obtained from participants in advance of workshops, with the agreement that they would not be identified. Again, we were fortunate to have institutional access to paid Zoom accounts, enabling us to maintain high standards of confidentiality and data security.

Given that sociality is a critical element of engaged research and knowing that social interactions are one of the hardest things to replicate in a virtual world [Hiltner, 2019; Willis et al., 2021] we also created and supported informal virtual spaces in which to socialize and foster interpersonal relationships, choosing Gathertown for these informal engagement sessions. While Gathertown is also a web-conferencing platform it provides a much less formal environment than Zoom, thereby providing a more comfortable space in which participants could relax and feel less as though they were working, something underlined by the game-like graphics used (see Figure 2). In addition, using separate platforms for the formal and informal sessions, helped to create a distinction between focused research and relaxed social activities, despite still being on a screen, and helped to encourage the informality which we need to consider more carefully during on-line interactions than during in-person interactions where it can occur more organically [Willis et al., 2021].

Figure 2. Screenshot of Gathertown during social session of 'Have you fed the cat?' workshop.

Once we had settled on this set of digital tools, we used the same format for both workshops. The first of these, 'Have you fed the cat?', was held in March 2021 and ran over the course of an afternoon and evening (five and a half hours in total). The second, on 'Care, control and feeding of animals in a pandemic', was held over two consecutive mornings (four hours each day) in May 2021. In both cases presentations were shared in advance, as were links to Padlet boards for preliminary comments and questions. As discussed, the live interactive elements were hosted on Zoom, and Padlet was used for comments and discussion. The workshops comprised plenary sessions, involving all participants, and two breakout sessions each where we separated into smaller discussion groups. The breakouts enabled more meaningful and direct conversations than were possible during plenary sessions and group sizes were deliberately kept small to facilitate this [Willis et al., 2021]. While Jaques and Salmon [2007] recommend no more than twelve participants in on-line groups, we found that groups of six were optimal for generating good discussion while making it easy for everyone to contribute (cf. Willis et al. [2021] who create on-line breakout groups with 8–10 members). Each

breakout was facilitated by one member of the research team who chaired, supported by another research team member who monitored the Zoom text chat, comments on the Padlet board, and took notes. Once the formal discussion elements of the workshops were concluded we moved to Gathertown to continue the conversation, socialise and network.

We found that the web platforms we used created new opportunities for rich input from participants, helping to overcome traditional communication barriers and engendering genuine dialogue. For example, on-line discussion can have a levelling effect on the traditional hierarchies which can assert themselves during in-person discussions, allowing more opportunities for more people to feel (comfort)able to contribute to the discussion. Indeed, the on-line space can be one in which people feel *more* (comfort)able to contribute than the physical space, with the degree of separation providing something of a safety buffer. In addition, on-line discussions can be verbal or textual with the text chat function offering an additional layer of communication not available with in-person meetings, enabling participants who would prefer not to contribute verbally to still play an active part in discussion [Willis et al., 2021]. Managing discussion on two levels can be highly demanding for chairs however and including a support chair (as we did during breakout sessions) can be extremely beneficial. Other common challenges of chairing discussions (e.g., not allowing one person to dominate the discussion cf. Willis et al. [2021]) can be mitigated by some of the tools available to on-line chairs which are not available to chairs of in-person discussions e.g., the ability to mute, or even remove, participants, something which infamously occurred during a fractious English parish council meeting held on Zoom, the recording of which went viral on YouTube [Rice, 2021]. Setting clear 'ground rules' at the start of workshops (including an agreed goal of respectful dialogue and turn-taking) meant that we did not have to resort to such measures [cf. Willis et al., 2021]. Other challenges related to chairing were alleviated by several members of the project team performing active roles in the running of the workshops with roles including a 'technical' chair who oversaw the general running of the workshops, a 'traditional' chair who dealt with the formal research discussion, a host who opened and closed the workshops, and a support person who was on hand in case of any technical issues. In addition to sharing the workload, having several members of the research team performing these roles meant that there were frequent changes of speaker, thereby assisting in maintaining dynamism and interest, and ensuring that workshop participants were introduced to as many of the project team as possible.

In the next section, we outline some key observations from the workshop process, reflect on successes and failures, and consider the wider implications as we continue the process of engaged research in a less locked-down but not yet 'post-COVID-19' world. We should note that what follows are observations and reflections from our practical experience of holding two on-line workshops during national lockdowns rather than analysis of a specifically designed study. Nonetheless such observations and reflections are highly valuable for informing research practice in the rapidly unfolding situation in which we find ourselves.

Observations and reflections

The success of a workshop depends on several factors including: i. sharing of knowledge that is useful and of interest to participants, ii. quality and quantity of discussions (including the opportunity for all to contribute), iii. production of ideas and knowledge, iv. willingness and ability of participants to implement the ideas and/or build on the knowledge produced, v. opportunities to follow-up on the workshop and future opportunities to collaborate, and vi. enjoyment of participants and organisers [Huntington et al., 2002]. Fundamentally workshops are opportunities for communication and collaboration and 'when successful, [they] provide[…] participants with a common reference point that can serve as a summation of what has been done or as the basis for future work and decision-making' [Huntington et al., 2002, p. 790]. As part of our evaluation process, we mapped each of the workshops against these criteria based on feedback from participants (collected by inviting anonymous reflections and suggestions via a Padlet board) and our experience as organisers. In addition, participant feedback was analysed for common themes which are discussed and demonstrated by the illustrative comments included below. Given the relatively small number of participants (and therefore low volume of material) a light-touch analysis of participant feedback was conducted, drawing on the principles of thematic coding of qualitative data [Gibbs, 2007; Guest, MacQueen and Namey, 2012]. The authors carried out close reading of feedback comments, manually highlighting themes which occurred in individual comments. These themes were then compared across all participant comments to identify patterns thus enabling themes to be combined into overarching categories with which to approach analysis of the feedback [Gibbs, 2007; Guest, MacQueen and Namey, 2012]. Since the authors both organised and evaluated the workshops this could have influenced our evaluations of their success either positively and/or negatively. For example, preparing for and then running the workshops was stressful and time consuming and affected our ability to participate fully, potentially leading us to underestimate their success. On the other hand, having organised the workshops, we had a vested interest in their success and may therefore have been more likely to interpret them as successful. It was therefore essential to also consider the perspectives of the other members of the DNFTA team, project partners and our wider stakeholders when evaluating the workshops.

'Have you Fed the Cat?' fulfilled all six of the criteria formulated by Huntington et al. [2002], listed above. Participants found the pre-workshop material useful, which encouraged us that this approach was effective, with this feedback best encapsulated by the statement: 'Pre workshop stuff really useful and interesting' [comment from workshop evaluation Padlet board, 2021]. Participants also appreciated the opportunity to engage in an interdisciplinary way e.g. 'I thought the workshop was really stimulating — I got a lot of ideas from the discussion and I loved having such a range of disciplinary expertise in one place' [comment from participant on workshop evaluation Padlet board, 2021] and

> Bringing together all those areas relating to cats was fascinating and eye opening, especially some of the more historical aspects some of which might be relevant to my interests which I hadn't really considered before outside of my direct area of expertise. This worked especially well in the pre-workshop stuff and the initial breakout in bringing together people interested in various, often very different areas of expertise and getting them talking to each other [comment from participant on workshop evaluation Padlet board, 2021].

By highlighting the effectiveness of the first breakout session this participant raises an implicit criticism that the second breakout was less effective. This theme was picked up by another participant, who also offered some constructive feedback: 'Unlike the initial breakout I'm less sure about the second session which perhaps needed more defined interest groups (while still keeping the multidisciplinary aspect), stronger chairing or something to help produce more useful outputs' [comment from participant on workshop evaluation Padlet board, 2021]. This feedback enabled us to fine tune our workshop design, introducing more tightly focused breakouts, alongside two larger adjustments, the first being that recording was introduced. We had decided not to record 'Have you fed the cat?' because it was the first workshop and we wanted participants to be able to speak entirely freely to help foster an atmosphere of openness and trust. The ensuing conversations were so rich that we felt able to ask permission to record the second workshop in order to capture material as research data. It was however decided that only the full group discussions would be recorded so as to continue to foster an environment of intimacy and confidence in breakout sessions.

The second change related to introductions. Given that there were thirty participants in the first workshop a considerable amount of time was taken up with introductions. Because these are so crucial for building relationships, not only between the project team and stakeholders but also between the stakeholders themselves, we were reluctant to abandon them but hoped to make them more concise by making detailed biographical information available in advance. To this end participants were asked to provide a picture of themselves and a biography, both related to animal feeding. Unfortunately, this idea was not a success, with only three people providing the requested material, meaning that we reverted to introductions during the second workshop. A compromise was adopted however with a version of the originally intended activity performed as an icebreaker — participants were asked to upload a picture of themselves feeding animals to a Padlet board to generate interaction and stimulate discussion. A question for future workshops remains however — should we repeat similar icebreaker activities or consider alternatives. One option we are considering is for the project team to record short introductory videos of themselves rather than provide a picture and biography.

Because the first workshop was used as a piloting exercise we invited only project partners and research network members involved with or interested in cat feeding while the second workshop was open to all our stakeholders. In the event however there were more attendees at the first workshop (n = 30) than at the second (n = 15). We think a combination of factors contributed to this:

- Timing: the first workshop was the first major activity of DNFTA after our delayed start and therefore generated substantial interest; the second workshop was only two months later, potentially asking too much from stakeholders in a short space of time.
- Focus: the first workshop was tightly focused on cat feeding while the second workshop had a much broader theme of care and feeding in a pandemic which may have diffused interest.
- Transitions out of lockdown: while the first workshop was held when public health restrictions in the UK were extremely stringent, by the time the second

workshop was held zoos, museums and other heritage sites were reopening, meaning that stakeholders from those sectors were much busier.

This final factor is a major risk for future on-line engagement — during lockdowns stakeholders may be willing and able to participate in engaged research (as they have fewer demands on their time, coupled with fewer entertainment opportunities) but once lockdowns are lifted the demands of the real world may start to take priority over on-line (or even in-person) engaged research. Our timing of the second workshop raises significant questions as to how genuinely engaged we are with our stakeholders: perhaps we should have known that the timing was not ideal? On the other hand, such workshops have to be planned with significant notice for participants and when we started planning the second workshop it was not at all clear that zoos and museums would be open to visitors again within a few months. This raises a wider problem — unpredictability, not so much of the pandemic itself but of the policy responses to managing COVID-19. This has made any kind of long- or even medium-term planning extremely challenging over the past two years.

The question of time and timing raises another important issue — there is a significant disparity between the (usually paid) research team, who can dedicate time during their working day to engaged research activities, and the (usually unpaid) stakeholders, who donate their time and must fit research activity around their other commitments. While this is a well-recognised phenomenon, and is not unique to digital engagement, COVID-19 exacerbated the problem. Many of the project stakeholders are involved with charitable or not-for-profit organisations, which were severely affected by the pandemic and associated restrictions. Museums for example were closed and experienced loss of income (through loss of entry fees but also reduced donations) and had to furlough staff, further limiting the time and resources that stakeholders had at their disposal to contribute to the project. Zoos were likewise closed and experienced the same issues but were far less able to furlough staff and reduce costs, since animals still required feeding and care. Indeed, many zoos made public appeals to help feed their animals and likewise pivoted to online forms of engagement to support these campaigns [McKim, 2020]. Our project has a budget to provide honoraria to stakeholders in recognition of this disparity, but it cannot hope to fully alleviate it.

On-line engagement also creates other ethical considerations which are subtly different from those faced by in-person engagement, foremost of which is inclusivity. On one hand, digital engagement can improve inclusivity by removing barriers to participation e.g., it can increase accessibility for those with physical disabilities which make attending in person challenging, it can remove time and financial boundaries (including those associated with international boundaries and geographical distance[7]), and it can enable those with caring responsibilities to participate remotely without compromising their other commitments [Willis et al., 2021]. On the other hand, digital technology can be a significant barrier to participation, for example physical disabilities can make screen, keyboard and/or

[7]Conducting engaged research on-line is particularly helpful if international stakeholders are involved and while this is not the case for DNFTA, our stakeholders (and indeed research team) are widely geographically distributed which, in itself, can make in-person meetings challenging. This can then be compounded (as it is in our case) if stakeholders face financial and time constraints.

digital sound use difficult, financial constraints can limit access to hardware or connectivity, location (especially rurality and/or being in the global south) can mean that people lack digital connectivity, and lack of technological skills can inhibit participation, something which is especially, but not always, an issue for older participants [Willis et al., 2021]. Interestingly, this may become less of a barrier in future, not only with regard to participation but in relation to wider societal interactions. As Bidgood [2020] points out, while 'for those of us on the older side of the generational map, it may seem impossible to foster community through on-line interactions; for younger people whose social sphere is increasingly constructed with on-line interactions', the digital world is a familiar, and friendly, space. Indeed, the familiarity with on-line interactions gained as a result of the pandemic may make digital methods of conducting engaged research more viable in the future. Nonetheless attention must be paid to ensure that accessibility is not compromised.

To summarise, the main advantages of engaging digitally rather than physically are increased accessibility and inclusivity (in some cases), decreased carbon footprint, decreased time requirements, and decreased financial investments [cf. Willis et al., 2021]. Conversely, the disadvantages are decreased accessibility and inclusivity (in some cases), and (potentially) decreased quality of engagement [cf. Willis et al., 2021]. This second point is particularly important and worth reflecting on. While, as mentioned above, on-line engagement may increasingly become second nature both to ensuing generations of digital natives and to those who have become familiar with it out of necessity while working in distanced ways [Willis et al., 2021], a question remains as to whether it is as effective as in-person engagement, and even as to whether it 'counts' (cf. questions of whether on-line conference presentations 'count' for academic careers [Bidgood, 2020]). Researchers must ask themselves whether the engagement they are conducting on-line is genuine and, if not, if and how it can be made so. Again, this relates to issues within science communication more widely which has historically faced criticism for not being genuinely consultative or dialogic and which participatory approaches are seeking to address [Bucchi, 2008; Trench, 2008]. In particular a question remains regarding quantity versus quality. Hiltner [2019] notes that NCN conferences can generate 'three times more discussion than takes place at a traditional Q&A' and while it is laudable that on-line engagement can create opportunities for many more people to be actively involved in research dialogue, we argue that extreme care needs to be taken to ensure that, due to large numbers, engagement does not become superficial and that depth is not sacrificed for the sake of reaching large numbers of people. Counterintuitively, it may be necessary to *limit* the number of stakeholders involved, and likewise tighten discussion topics, in order to garner genuine engagement, which in turn creates genuine opportunities for stakeholders to shape knowledge production.

An additional and extremely important consideration is that while such events aim to foster research collaboration, this cannot happen unless meaningful social and personal relationships are established first. While NCN advocates argue that 'while different from a traditional conference, meaningful personal interaction was not only possible, but in certain respects superior', other scholars recognize that 'it is unlikely that an on-line conference experience will ever replicate face-to-face interaction' [Hiltner, 2019]. The question for on-line interactions then is not how to replicate in-person interactions, since this cannot hope to be achieved, but how to take advantage of the additional and varied benefits that on-line interactions can

offer to create new and different social connections and conversation. A second crucial question arises from this — how to transition from fully on-line engagement to a combination of on-line and in-person activities so that the strengths of one can compensate for the weaknesses of the other?

This transition is the next step for our, and many other, research and engagement projects. First and foremost, we must retain what we have learnt from these experiences: the transition must not simply be a shift back to old methods without incorporating any of the new possibilities that the pandemic has opened up, or any of the advantages that on-line engagement creates [Willis et al., 2021]. We arrive at this opinion in part by drawing upon the views of our stakeholders for example: '[t]he wider participation afforded by on-line meetings needs to be maintained somehow' [comment from participant on workshop evaluation Padlet board, 2021] and 'I'm not sure how on-line and in-person can best be combined but those who cannot attend in person must be included equally so that the freedom digital attendance has afforded everyone in academia is maintained' [comment from participant on workshop evaluation Padlet board, 2021]. While we recognize that such models are sometimes referred to as 'blended', we prefer the term 'hybrid'. Blended has connotations of a mixture which at best becomes homogenous and at worst results in diverse components becoming a bland 'soup'. By contrast, 'hybrid' implies the creation of something new with the potential for successful and powerful combinations of diverse elements. We see hybrid modes as creating scope for complementarities, synergies and tailoring of participatory methods to better fit diverse aims, topics, contexts, stakeholders and publics [see also Carrigan, 2021]. While the 'hybrid' metaphor has particular appeal to scholars of human-animal relations, we hope that it is also of wider relevance. Major challenges for us include how we manage this hybrid approach with a growing network of researchers and stakeholders, how to avoid on-line interactions being superficial and limited, and how to maintain interest in on-line activities as more and more in-person interaction becomes possible again. Here too DNFTA has something of an advantage given our original plans involved a form of hybrid engagement. Nonetheless, we can build upon and improve these plans to incorporate the technological innovations which COVID-19 has precipitated alongside people's new familiarity with these technologies. In demonstrating and describing such a hybrid approach we build on and extend previous engaged research practice which has been conducted successfully in the physical space [e.g., Franklin, 2022] and is now expanding into the virtual sphere [e.g., Willis et al., 2021]. Moving on-line changes the way that engaged research takes place, changing not only its context but the way that researchers and stakeholders interact. The practical implications of the change in context are described above but the changes in researcher / stakeholder dynamics are harder to document. It has been posited that digital technologies have the potential to increase the participatory nature of research generally and to improve the scope and quality of engaged research specifically, and that 'the use and availability of digital media is changing researchers' roles and simultaneously providing a route for a more engaging relationship with stakeholders throughout the research process' [Grand et al., 2016]. The challenge for projects such as ours is to capitalise on these benefits while not losing the advantages that in-person engagement offers.

One of the most interesting insights gained from reflecting on our project thus far was that our initial reaction to COVID-19 was to pause all activity, a widespread response early in the pandemic and something which Bidgood [2020] identifies as occurring in response to a crisis. In hindsight, COVID-19 created opportunities for us to examine the new forms of animal feeding that emerged[8] and to engage with stakeholders creatively. This experience was shared by other researchers during the pandemic with many science communicators embracing the digital sphere [Forrester, 2020] and a flourishing of citizen science not only in relation to COVID-19 research [Bowser, Parker and Long, 2020] but much more widely whereby publics appear to have been willing and able to dedicate time to citizen science during lockdowns [Sigal, 2021]. Other participatory research projects have responded creatively to the challenges posed by the pandemic [e.g., Coverdale, Nind and Meckin, 2021], and the UK held its first national Climate Assembly over this time, pivoting on-line, to great effect [Climate Assembly UK, 2020]: there are now calls to capitalize on the progress which has been made in this respect [Nature Medicine, 2020; Provenzi and Barello, 2020]. Bidgood [2020] suggests that, in times of crisis, research needs to be *more* outward looking rather than less, and that digital approaches offer a means of doing so. While our project took some time to pivot, it has now done so successfully and, like many others, is in a far better position to respond similarly in the future should the need arise.

Conclusion

The 'anthropause', a 'considerable global slowing of modern human activities' [Rutz et al., 2020], precipitated by COVID-19, enforced a period of reflection regarding how we conduct research, while also acting as a catalyst for change. This has offered significant benefits to engaged research — while digital engagement was conducted before the advent of COVID-19, the pandemic transformed this from being something which was done for a specific purpose to the norm. Indeed, the pandemic induced move on-line 'normalised' the digital world and 'its on-line interactions now seem less exotic than they did before 2020' [Bidgood, 2020]. The digital shift also accelerated the development of a plethora of new tools which can greatly enhance engaged research. Wider familiarity with these digital technologies creates new opportunities for engaged research by making it more accessible and enabling more stakeholders to participate in shaping and guiding research agendas. Having said that, the digital shift is far from universal: within and across countries severe inequalities and disparities exist in relation to digital access. While for the most part these asymmetries are minor in the context of our particular project, designed as it is to primarily engage with third sector professionals and in turn their public audiences, these asymmetries have the potential to exacerbate rather than alleviate inequalities in research engagement.

The next challenge for furthering the development of engaged research and participatory science communication [Holliman, 2017; Campos, Monteiro and Carvalho, 2021], will be to build on what we have learned during the pandemic and use it effectively in a post COVID-19 world, combining the benefits of on-line and in-person meetings. We should be cautious of reverting to 'normal', in-person methods simply because we can [cf. Willis et al., 2021], but nor should we remain in

[8]New ways that people fed animals during the pandemic include an increase in pet ownership [BBC, 2021; Burgess, 2021; Ho, Hussain and Sparagano, 2021], especially among millennials [PFMA, 2021], and an increase in feeding garden birds [Dhanesha, 2020; Hormozi, 2020], including charities giving out bird feeders to those who were severely affected by the pandemic [SWT, 2020].

a purely virtual world with its inherent restrictions. A hybrid approach allows us to benefit from the advantages of each method, with the strengths of each compensating for the weaknesses of the other. Some things can be achieved on-line that would not be possible in-person and vice versa. Therefore, when planning any future engaged research, organisers should ask themselves which format is most appropriate for the particular aims of the project [Carrigan, 2021]. In addition to this they must ask whether that method is sustainable in terms of its financial cost, the time investment required and its environmental impact. The most suitable approach will be the one which can most easily be justified in response to all these questions. We believe that 'hybridising' engaged research, building on everything we have learned to develop more creative, inclusive, sustainable research and science communication approaches can only strengthen and deepen collaborative research as we eventually, and with hope, start to move and think beyond the pandemic.

Acknowledgments

This research was carried out as part of a project funded by the Wellcome Trust (grant number 219889_Z).

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How to cite

Thomas, V. and Cassidy, A. (2022). 'Practicing engaged research through pandemic times: do not feed the animals?'. *JCOM* 21 (02), A05. https://doi.org/10.22323/2.21020205.

ISSN 1824-2049. Published by SISSA Medialab. jcom.sissa.it