Mapping the risks, challenges, barriers and opportunities to using drone technology to engage underserved audiences with heritage.

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Abstract

Although the heritage sector has explored the potential of drone technology for surveying, modelling, monitoring, and documentation, (Themistocleous, 2020) (Historic England, n.d.) there has been little research on how drones could be used to facilitate the engagement of underserved audiences with heritage sites, collections and narratives. By working in partnership with the South Downs National Park Authority (from here on referred to as SDNPA) and the National Trust (from here on referred to as NT), we have mapped what heritage organisations perceive to be the barriers, risks and unique opportunities drone technology brings to their work, as stewards of heritage spaces. The key themes thereby identified are: public perception (including staff's own attitudes towards drone technology and the perceptions of existing audiences on how drones may impact on their enjoyment, privacy, safety and security when visiting); complexity of planning and the logistics of deploying drone technology; conservative organisational policies. This paper reports on those and suggests ways in which drone technology can empower underserved communities to shape how they engage with natural and cultural heritage.

Keywords

Drone technology, Heritage sector, Audiences, Accessibility, National Trust,

Introduction

Since the 2001 reporting of United States having engaged a weaponised drone in the Middle East (Gusterson, 2017) the use of Unstaffed Aerial Vehicles (UAV's) in western societies has expanded far beyond the military and theatre of war, into domestic applications. In fact, "naturalisation" (Jensen, 2016) of UAVs into civic society has been exponential since 2015 (Chabot, 2018), and includes extensive non-violent functions for the benefit of communities. In the United Kingdom, the Government has acknowledged the requirement for stronger regulation to drone use, while recognising the benefits the technology can bring to society.

The heritage sector uses drones for surveying, monitoring, measuring, documenting, researching and accessing sites (Themistocleous, 2020). However, it seems that the Foucaldian Boomerang (Jensen, 2016a, p. 20) of drones involves not only the domestic use of a technology previously tested in a warzone, but also a set of domestic assumptions and stereotypes that link UAVs with a narrative of violence and hyper surveillance. For instance, participants in a pilot study using drones to deliver an object to an individual (closely enough for them to collect the object from the drone), described generally negative feelings towards drones, using adjectives such as "dangerous, worrisome, scary, powerful and strong" (Tan, Lee and Gao, 2018, p 185). Negative feelings also encompass anxiety about the increasing commercialisation of drones and the potential for hacking and security breaches, as drones are hackable mobile data carriers (Jensen, 2016)

Mobility seems to be at the centre of the benign mythology of the drone, as well as being central to how we imagine and critically assess their role in our future societies (Hildebrand, 2020, p 36). Arguably, this extends to the popular negative understandings of drone technology: dystopian fears of autonomous mobility, concerns that drones create a new mobile autocracy, loss of control and power to the machines.

Aided by excessive media reporting on controversial and sensational incidents involving UAVs in civil society, this negative public perception extends to considering this technology as an extension of ubiquitous state surveillance, a tool for civil disempowerment and vulnerability, and awakens fears of threats to safety, privacy, and security. Thus, the potential of UAVs being used to provide new approaches to accessing visual information, access to and co-ownership of the vertical airspace, or to harness social benefits and public good, are overlooked. Kim, Kim and Kim (2016) consider there is a need to overcome the psychological resistance that constitutes a barrier to people embracing the technology in a more positive way, including contesting anxieties of intrusion, omnipresence and excessive control by the establishment, that are very present in the collective consciousness of our hypervigilant society.

What are the perceptions and assumptions a researcher needs to address when employing the technology to increase access and participation from communities? Kim, Kim and Kim (2016) suggest that an unfriendly visual, unpredictability and perception of difficulty to exercise control over the device, appear to be at the core of the public anxieties, compounded by fears of intrusion and ubiquity which pervade the collective thinking. However, for some, the drone's unrestricted movement and new forms of access to space, views and distance are empowering (Hildebrand, 2020). There is something fundamental that remains implicit in the work of all these authors, and that is the human dimension and the role it plays in envisioning the use of drones to engage underserved audiences, namely people's understanding of and access to technology; people's different ways of engaging with information. The context of audiences drives their potential to engage with drone technology, and it must be accounted for.

Research Design

In order to discover how drone technology may be used to empower underserved communities to shape their engagement and connection with natural and cultural heritage, it is necessary to understand the attitudes of heritage organisations and practitioners towards drone technology. The collaboration with heritage partners SDNAP and the NT, provides the context to this research, through facilitating access to sites, staff time and expertise, data capture and collection opportunities; as well as the prospect to explore and test new approaches, focused on the natural and cultural assets the partner organisations care for.

The wider research this paper stems from, includes semi-structured interviews with staff from the NT and SDNPA, as well as with drone users; an online survey targeting the UK heritage sector; a social semiotics analysis of drone content; and focus groups with people living with dementia. The research is designed as an iterative process where the results from the interviews with staff from the heritage partner organisations, and the online survey to heritage practitioners inform the interviews with drone users. The content for the social semiotics analysis was selected in collaboration with the interviewees and survey respondents; and the design of the focus groups responds to the key themes identified by the analysis of all data previously collected.

This paper focuses on the initial stage of data collection, which included analysis of key documents of both the NT and SDNPA, as well as semi-structured interviews of heritage partners and drone experts, and an online survey to heritage experts across the UK (including freelancers and volunteers). Along with the NT's internal report on the Trust's drone use across the different teams; and the South Downs' National Park Authority's Policy Positions on the use of drone technology, the following documents were reviewed: the NT's "Playing our part" (National Trust, 2015), Research strategies, Changing Chalk project Area Action Plan (National Trust, 2021), Strategic Research Framework 2022-2027(National Trust, n.d.); as well as the SDNPA's Communications and Engagement Strategy 2021-2025 (SDNPA, 2020) and Learning and Outreach Strategic Review 2018-2023 (SDNPA, 2018)

Risks, challenges, and barriers to using drone technology in the heritage sector: perspectives from SDNAP and the NT

Heritage organisations use unstaffed aerial vehicles (drones) mainly for functional applications, such as measuring, monitoring, preservation, documentation. Although the sector recognises the pressing importance of becoming more representative and inclusive of underserved communities through collaborative production practices, using drone technology capabilities, has not been a consideration. In fact, negative public perception of drones has been mirrored in corporate policies and culture, which results in heritage organisations retaining a conservative approach to the use of drone technology. Such a cautious position, is also linked to the fact that drone technology

and the regulatory context framing its use, are still in developmental stages. Moreover, the media focus on drone applications in warfare, surveillance and irresponsible use, further contribute to heritage organisations' unadventurous approach to the technology.

Serafinelli and O'Hagan (2022, p 1) posit that drone visuals "produce unexpected perspectives of the world that reveal hidden aspects of our surroundings." Under this perspective, the drone is a "problematiser", a tool that forces us to reflect on how we see ourselves within the landscape and what that means for our identity and belonging. A survey respondent echoes this view when they describe drone technology as an "easy way to open up new views, gain new perspectives, of landscape, historical properties, the environment." This is further reflected in a SDNPA interviewee's comment "It's that landscape story and the story of how the landscape was created but also how the landscape fits together across the region."

Although "[t]here's massive potential for using this as a way of interpreting the landscape and telling the story of the Downs" (interviewee two), it is important to consider, as with other heritage interpretation strategies, which stories are told and who is telling them. One of the interviewees reflected on drone footage produced by their organisation and that of television programmes such as Countryfile, as presenting natural heritage as "twee", through an aesthetics of sentimentalism and nostalgia.

This interviewee identifies the risk of drone technology further excluding underserved communities by amplifying an aesthetics of spectacle, an array of images that show a homogeneous but partial reality of a place as superior (Debord, 1994, p 26), excluding other lived experiences. The same interviewee adds "[S]ome of the footage makes your jaw drop. But I don't know how accessible that is to your average person in the town centres." The spectacle aims to commodify experiences through images. Heritage narratives have also been focused on the object as "spectacle", used as a platform of control, representing the power of the dominant group (Debord, p 13). Concrete aesthetic and design choices are used to retain and reiterate power, regulate behaviour, and produce unified notions of place, identity and nationhood that become omnipresent in institutions and collective consciousness.

The risk of the drone panacea emerges clearly in the heritage interviews (and online survey responses.) Purposeful use is elicited as central to preventing heritage organisations' use of new technologies as "strategies of spectacle" (Message, 2006). which distract from what brings real meaning: the narrative, object, or site. If using the drone is the purpose in itself rather than facilitating the storytelling process, then its use becomes detracting.

Public perception

In the context of heritage organisations, a third of the interviewees recognised the opportunities drone technology presents as "endless", but they also acknowledge

existing limitations from an organisational culture point of view, which translates into a cautious and reserved use of and tentative experimentation with drone technology. The organisational culture and narrative of change in NT and SDNPA are informed by the context in which they operate today, as well as by their origin story.

The National Trust was founded in 1895, with the fundamental aim of protection of privately owned natural and historic places "[F]or everyone, for ever" (National Trust, n.d.). NT has since been acquiring properties mostly by private gift.

The open space movement that gave rise to the National Parks was the result of a campaign initiated by a member of Parliament, for public access to the countryside. It mobilised leisure enthusiasts, nature conservation activists and involved pressure from the public through "masses trespassing". The 1949 Act of Parliament to establish the National Parks, embeds in its letter the provision of recreational activities for the public. Debates about the use of common land remain active today.

When heritage experts in both the NT and SDNPA were asked about the uses of drone technology, public perception weighed in heavily in their considerations. Thus, one of the greatest challenges of using drone technology for both the NT and the SDNPA, is associated with human factors. It is important to note here, that the capacity of action of NT and SDNPA is also influenced by a strong stakeholder management element, involving relationships with tenants, farmers, residents, volunteers, staff, landowners, visitors (members, in the case of the National Trust).

People are one of the barriers to using the technology to engage other people, but people are also at the centre of the considerations of opportunities for the use of drone technology, to help individuals familiarise themselves with sites they haven't visited before; to assist planning or considering a visit to a site; to help manage feelings of nervousness and anxiety for neurodiverse visitors, as well as for groups who feel they don't belong in the countryside, or find it intimidating. As one of the interviewees put it, in these circumstances, a drone video can provide "real vision experience."

Access is therefore at the centre of the perceived opportunities of drone technology to reach audiences, in both interviews and online surveys. Nevertheless, when it comes to underserved audiences, interviewees shared concerns in relation to barriers to access to drone technology because of the cost associated with owning a drone (with a good camera), digital poverty and illiteracy prevalent in communities experiencing significant socioeconomic disadvantage.

As one interviewee mentioned, digital literacy fundamentally impacts the success of using technology to reach and connect with communities with experience of exclusion. Moreover, digital literacy combined with technical knowledge may also present a challenge to heritage practitioners themselves: 24% of survey respondents identified technical knowledge as a barrier to using drone technology.

Interviewees often specifically refer to young people when considering the possibilities of the technology in the context of upskilling and employability as well as understanding and connecting with landscape (young people living in urban fringes). Comparatively, survey respondents mostly talked about "data". This is not surprising, because a common current use of drone technology is data capture, monitoring, and recording. What is remarkable is the NT and SDNPA focus on how drone technology can empower people with their sites. We attribute this to the close collaboration of both organisations with this research as illustrated by this quote from an interviewee "[H]aving this conversation around the use of drone technology and other new technologies is really important for us because it creates ways that we might be able to hook people in to showcase what the opportunities are to reduce some of those perceptual barriers to accessing the National Park."

Agency, access, collaboration

Whereas risks and barriers are not so clearly distinct in the interviewees' responses, they are so in the online survey responses. When faced with a multiple-choice question asking respondents to identify the three main risks of using drone technology to engage non-visiting audiences, 82% chose risk of drones disturbing other visitors; 23% indicated risks to privacy and security; and 19% answered "[d]amage to sites or collections".

Agency is a challenging aspect of the employment of drone technology because impacting negatively on the experience of other visitors, legal complexities of drone use, and issues of perceived intrusion and security, render void most of the suggestions made by heritage experts with regards to possible uses of drone technology in heritage sites. For example, an online survey respondent talked about the possibility of people directly using drone technology rather than consuming film featuring drone-footage and created by someone else. Another respondent suggested visitors being able to decide where or what a drone operated by someone else would explore. Translating any of these ideas into practice would require a careful consideration of all issues aforementioned.

Interviewees mentioned citizen-science in the context of engaging drone enthusiasts with heritage data collection whilst pursuing or exploring their interest in the technology. This was described as a disruption of the traditional visitor profiles, and as an opportunity to reach and engage people who would not visit natural, historical and cultural heritage sites. Citizen-science frames the relationship between the organisation and the community as a collaboration, and it fosters a sense of ownership and shared responsibility in the care, protection, enjoyment, and promotion of heritage. Collaborative involvement may allow people to "come up with all sorts of interesting and innovative ways" to use drones in the heritage sector, but as another interviewee highlighted, this engagement depends on collaborating to create an output that is meaningful to those very communities. For such a collaboration to be meaningfully established, institutions must recognise their responsibility to address the power imbalance in knowledge production and seek to empower underrepresented

communities with self-determination in the processes of defining, representing and engaging with identity and place. The connection to place drone technology facilitates, is not accessed only through direct products of drone technology such as videos and photographs. Heritage and drone expert interviewees emphasize the opportunities the technology presents to build on drone assets created as part of monitoring and surveying activities, through using Sketchfab, Photogrammetry, Virtual Reality, LIDAR to enhance the diverse ways in which drone technology can help the understanding, awareness of and access to natural and heritage sites. Heritage expert interviewee seven reflects on accessibility as an area of practice offering opportunities for development and creativity "[T]hat we need to be almost testing ourselves as well as coming up with new ideas."

Access and accessibility emerge as an implicit theme. They are the fifth most frequent words chosen by survey respondents to identify the opportunities drone technology presents. When asked to share three words coming to mind when thinking about drone technology, only one of twenty-two survey respondents answered 'access'. Equally, only one survey respondent (a different one) mentioned drone technology as a resource to increase access, although this may have been access as part of capturing data and not visitor access. Nevertheless, the ideas elicited by interviewees and respondents relate to UAV's offering new ways of seeing and understanding place, unlocking hidden narratives, enabling connection to sites the physical integrity of which may be impacted by visitor traffic, or which are otherwise impossible to view or reach, taking heritage to people who can't visit. At the same time, half of the interviewees considered that drone technology could be employed to support skills development and increase employability among young people. This could potentially contribute to help narrowing the digital skills gap impacting on the work skillset of young people in the UK and help address digital poverty experienced by young people in underserved communities (WorldSkills, 2021).

Digital engagement presupposes (potential) audiences are able to acquire and access the necessary technology to participate in activities they are being targeted for. As Bhalla and Lapeyre (1997) argue, the issues linked to social exclusion (lower literacy, skills and education gap, poor health outcomes) are partly determined by material resources (p 417). How can communities develop the knowledge, understanding, and confidence to use digital technologies if they can't afford to acquire or access them or the services to use them?

One of the NT interviewees discussed this aspect at length, interrogating how ethical it may be for an organisation with a conservative drone policy to deploy expensive technology to engage groups facing material barriers that impact on access to basic needs such as food, fuel, water, safe accommodation. Even removing the cost-of-living crisis, the price of entry is itself a significant barrier. As part of this reflection, the interviewee considered the reputational risk of using drone technology to engage underserved audiences. However, social exclusion is much more complex than material resources or disenfranchisement from community life (ibid.). Therefore, addressing material barriers, as in the case of the National Trust, a nearly 130-year-

old national organisation, through reviewing the membership model is significant in the organisational narrative of change towards inclusion. It is, nevertheless, not a sufficient approach to achieve an equitable outcome in terms of underserved audiences developing ownership, belonging and sense of place through connecting with heritage and culture.

Conclusion

The survey results indicate that, generally, heritage organisations are familiar with drone technology and use it for (in descending order): surveys, photography and building related work (inspections, conservation and surveys); promotional (marketing) materials; and building modelling. These survey results are aligned with drone usage reported by NT and SDNPA, although both organisations also use drone technology to generate content for their YouTube channel and social media presence as part of their efforts to support a more in-depth understanding of landscape by the public. NT and SDNPA understand the practical value of drone technology and may place it at the same level as other tools used in the documentation and preservation of collections and sites, such as hygrometers. The great difference is that other tools used in heritage may not exist within a recreational dimension that collides with the institutional approach.

A second important difference is the tainted past of drones as technology of war, which still permeates public perception. The physical identity of the drone is still perceived as a threat to privacy, safety and security. Jensen, (2016a) points to the highly computerized nature of UAVs, as they carry large amounts of data, and the vulnerability to hacking. The dystopian perception of the drone (Hildebrand, 2020) is visible through the interviewees and answers to the survey, only at different levels. Interviewees who express an extremely enthusiastic perspective of the technology, still acknowledge the drone has work to do to achieve 'redemption'. Thus, the burden of public perception significantly limits how the heritage sector uses them.

The endless potential of drone technology is widely recognized in the heritage sector, but factors such as regulations, cost of the technology, 'manageability' of operation of drones (including licensing, limitations of the technology itself such as battery life, impact of unpredictable variables such as weather, etc.), greatly limit the creative and experimental uses of drones in the sector. As one interviewee put it: "[b]ut then you look at the drones which could be much better but they're very complicated, it's very easy to just to go, that's too much of a faff, I'll just have to stick to what I know."

Access is the common denominator for the perceived opportunities drones may bring. Survey participants stated, "Drones provide access to new viewpoints and can allow all audiences to see parts of the site that aren't physically accessible." Other respondents considered drones as providing access to a space that extends human beings' own physicality "Visitors at sites which include remote or unreachable elements, for example due to conservational, hazardous or geological/geographical

and/or low accessibility reasons"; access to understanding; access to remote places and remote access for those who are not able to visit.

Access is also the key element for underserved audiences. One interviewee particularly commented on the suitability of drones for "working with people who may have autistic spectrum disorders or other forms of neuro diversity" as they allow to provide visitors with "a bit of an understanding as to where you're going and what's it like and what you're going to do" before you are actually there. NT and SDNPA both identify disabled people as one of the priority underserved audiences. Thus, drones could be used "to create responses to landscape that can then be used to engage people facing health inequality" and living in an urban area with high levels of deprivation (NT's Strategic Framework for Research 2022-2027; NT's "Changing Chalk" Area Action Plan; SDNPA's Strategic Review of Learning and Outreach 2018-2023). On the online survey, participants identify disabled people as one of the top four priority audiences (with the same percentage as schools, young people and people who are ethnically diverse). This reflects the discussions in the data collected, highlighting the importance of purpose in the use of the technology. "Drones enable people to understand a site in context, within its landscape. This could be particularly beneficial for archaeological sites, but the technology needs to be relevant and engaging to non-visiting audiences." Furthermore, responses from the online survey indicate that some practitioners view drone technology as tool of decentralisation of institutional power. The potential for "visitor control of drone to choose where to explore" exists, as well as of engaging "younger, teenage audiences, but only if they can use the technology not just see something someone else has filmed".

In summary, heritage organisations are cautiously positive about the use of drone technology. Public perception, stakeholder management, reputational risk, and fear of loss of control are the key identified barriers and risks. Interviewee and survey respondents identified opportunities and were deeply reflective of how drone technology can be employed to advance social justice and equity, and to end disparities of access and interpretation. The use of drone technology is not provided as a surrogate that isolates people from place, but on the contrary, it is an experience with its own value, which can be shared with a wider range of groups.

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