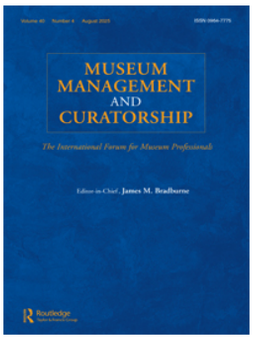

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Experiencing a historic garden online: impact of an inclusive digital multisensory audio descriptive tour

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ABSTRACT

Historic gardens can promote social inclusion and engender a sense of wellbeing. Since the pandemic, many cultural institutions have sought to enhance their online provision. However, content inevitably assume sight. An inclusive audio descriptive online tour of the Chelsea Physic Garden was created for people who were blind and partially blind (BPB) and sighted. Sixty-two participants completed an evaluation questionnaire directly after experiencing the online tour, and then again 2 weeks later. Quantitative and qualitative analysis showed similarly positive responses for enjoyment and emotion. Although BPB participants reported higher levels of interest and follow-up engagement after the tour, the desire to engage with nature as a result of the tour was strong in both groups. The findings indicate that inclusive online museum or heritage tour can create positive and impactful experiences for all audiences, whilst providing the opportunity to reach those who may not be able to attend a venue in-person.

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Blindness and visual impairment; cultural heritage; digital museum; visitor studies; access; accessible filmmaking

Historic gardens have a unique place in our cultural heritage, and, correspondingly, a unique opportunity to engage visitors. As sites of historic interest, they share aims of education and learning with the wider cultural sector, such as museums, galleries, architectural sites or historic buildings (Hristov, Naumov, and Petrova 2018). Simultaneously, in common with other gardens, they have the potential to offer their visitors a connection to nature and an enhanced sense of well-being (Zajadacz and Lubarska 2019). The benefits of spending time in gardens are manifold and are assumed to include enjoyment of peace and tranquillity, restorative benefits, appreciation of aesthetic qualities, and appreciation of plant design and history (Connell and Meyer 2004; Ballantyne, Packer, and Hughes 2008). Interpretation is one way for gardens to support visitors in engaging with these benefits, through enhancing their access to the cultural, aesthetic and historical aspects of their experience (Hristov, Naumov, and Petrova 2018). Museum interpretation involves finding ways to share the stories and meanings behind collections and historical sites with audiences. It is not simply about sharing facts, but arguably about supporting and enriching experience. Interpretation can be offered to visitors either through

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written text, multisensory engagement, exhibition design, through an audio guide, or, we will argue, within an audio descriptive guide. However, the impact of interpretation on the visitor experience in historic gardens is not well understood (Hristov, Naumov, and Petrova 2018).

As part of the wider cultural heritage sector, historic gardens have a mandate to promote social inclusion by broadening participation (DCMS 2000; Hooper-Greenhill et al. 2000). They also have been shown to have a positive impact on wellbeing (Chatterjee and Noble 2016). The onset of the Covid-19 pandemic required millions of people to stay at home, and for many, access to community and nature was highly restricted or withdrawn. This brought a social inclusion agenda into sharp relief as institutions were forced to close their doors and to develop new means of interaction with their communities. Online access to museums took multiple forms, such as live streams of educational activities, podcasts, augmented reality (AR) and virtual reality (VR) experiences, and online tours (Samaroudi, Echavarria, and Perry 2020; Burke, Jørgensen, and Jørgensen 2020), as well as interaction with visitors through social media (Agostino, Arnaboldi, and Lampis 2020). Historic gardens developed similar initiatives, with Kew Gardens (Dequiret 2020) offering a virtual tour of their glasshouses.

However, there is currently little understanding of what visitors want from online experiences within the cultural sector, or how they engage with them. There has also been limited focus on how this digital provision offered by museums is experienced by groups with particular access requirements (Samaroudi, Echavarria, and Perry 2020). Developing this understanding is crucial for developing digital provision into the future.

As cultural institutions continue to explore how they can expand and improve their digital offerings and build virtual communities, questions of access and inclusion have taken on a new urgency. Researchers have already noted that online access may remove some barriers but introduce new ones (Samaroudi, Echavarria, and Perry 2020), for example some museums charge a fee for particular online offerings, introducing a financial barrier, and those sectors of society that suffer from general digital exclusion are obviously excluded from online museum provision. It is crucial that visitors who are blind or partially blind (BPB) are not excluded from this digital expansion.

Implicit ocularcentric biases tend to assume that all sighted museum or heritage visitors perceive the visual information (and therefore understand that information) in one single 'objective' way. Within the context of museum interpretation, it is also assumed that we know what to do with that visual information (see Eardley, Jones, and Zakaria 2025). As a result, description, or 'guided looking' (see Eardley et al. 2017; Eardley et al. 2022) is seen as not necessary for 'typical' visitors. This assumption underpins the 'othering' of blind and partially blind audiences, and leads to the requirement for specialist access provision.

In fact, psychology and cognitive neuroscience research have demonstrated that there is no objective way of perceiving, to the extent that broadly accepted that no two people will process sensory information the same way (e.g. Emery and Webster 2019). How we pay attention is also different (e.g. De Haas et al. 2019; Blais et al. 2008; Kelly, Miellet, and Caldara 2010). Within the context of a painting, or a historic garden, although there may be similarities, where we start looking, and the journey our attention takes us through what we are perceiving is individual. Perhaps most importantly, research has also confirmed that society, and museums, have grossly overestimated what

(sighted) people can understand through looking alone (see Eardley et al. 2025a, 2025b). In other words, for the majority of people, sight does not provide the 'access' to the meaning and potential depth of experience within a museum or heritage context that has traditionally been assumed.

For people who are blind or partially blind (BPB), access to museum collections is usually provided through audio description (AD), which is traditionally understood as a 'translation' of visual content into verbal narrative (Jiménez Hurtado and Soler Gallego 2015). However, provision of AD can be ad hoc and inconsistent, with live tours only available on certain days, or through recorded guides in a minority of institutions (VocalEyes 2022). Furthermore, there is a risk that the typically visuo-centric nature of interpretation in museums (and gardens) means that access generally focuses on 'what sighted people see', rather than considering the full breadth of sensory engagement (Hadley and Rieger 2021; Eardley et al. 2022). Audio description researchers have called for more research on outdoor spaces (Taylor and Perego 2020).

Underpinned by the fact that AD is always subjective, it can be considered as a form of interpretation (Eardley et al. 2025a, 2025b). Recent research on AD in museums has shown that AD can function as a type of inclusive interpretation, whereby audio describing artworks makes them more memorable for sighted people, compared to listening to a standard audio guide or simply looking (Hutchinson and Eardley 2021, 2023; see also Eardley et al. 2022). Researchers have also challenged the traditional focus on a 'visual to verbal' translation, arguing AD's remit could be to facilitate access to a broader museum experience, with aspects of multisensory, cognitive and emotional engagement (Hutchinson and Eardley 2019; Eardley et al. 2016; 2017; Thompson 2017). These findings support the principles of Blindness Gain (Thompson 2017), which argues that disabled living is an art, and the tools designed to support disabled living can enhance experience for everyone. Multisensory description is a crucial part of this process. Although audio descriptive guides are generally only presented as auditory, the description itself can activate similar brain mechanisms as the actual sensory experiences through imagery (e.g. Kosslyn et al. 1999). Given the multisensory nature of a garden visit, AD has the potential to provide a creative opportunity to draw out aspects of sensory and emotional experience that stand to be enjoyable and engaging for many visitors. However, to ensure these goals are achieved, and provision is effective and beneficial to both sighted and BPB audiences, effective evaluation is necessary.

Considering the dearth of research on historic garden interpretation, the increasing prevalence of online cultural experiences and the pressing need to understand the impact of such experiences on both sighted and BPB audiences, this study set out to assess the creative potential of audio description as inclusive interpretation for historic gardens within an online garden tour. A garden tour was created, but crucially, the aim was neither to audio describe a standard (online or in-person) tour, nor to film an audio described tour. Rather, the aim was to create an online tour, filmed in the garden, which had audio descriptive interpretation at its heart. Central to this project was the need to evaluate the experience and impact of the tour on audiences of people who were blind, partially blind or sighted. To address these aims, the researchers developed an online inclusive tour with the Chelsea Physic Garden (CPG), in the United Kingdom.

The Chelsea Physic Garden is the second oldest botanical garden in the UK. It was established by the Worshipful Society of Apothecaries in 1673 to grow medicinal plants. Occupying 4 acres of land in central London, it contains a collection of over 5000 edible, useful and medicinal plants, attracting over 50,000 visitors per year (Chelsea Physic Garden 2021). While the garden had provided audio described tours on-site in the past, they were keen to develop new connections with BPB visitors, and to continue to reach their wider audience during the Covid 19 pandemic. The project team consisted of the study's authors, a multi-disciplinary team of Psychology and Audio-visual Translation researchers, working with a professional audio describer with expertise in AD of outdoor spaces, and staff from the garden, including visitor experience, the head of volunteering and live tours, and the gardeners.

Development of the tour itself and the subsequent evaluation were carried out over a period of 9 months. This rested on two key principles. Firstly, that AD should be embedded into the creative process from the start, rather than added afterwards, thus working from an understanding of AD as inclusive interpretation rather than 'access' (Eardley et al. 2022; Fryer 2018; Romero-Fresco 2018). Secondly, that the tour should aim to create as rich an experience as possible, providing both historical or botanical information, and also creating possibilities for sensory and aesthetic experiences, both through the subject matter selected for filming and the language used to describe it. Development of the tour therefore took the core principles of audio description as the starting point, namely the centring of multi-sensory imagery, attention to spatial positioning, and inclusion of historical context (Hutchinson and Eardley 2020). The project team drew on information already used by the garden in their standard in-person group tours: historical and contextual information about the garden and botanical information about the plants. Material to be included was selected based on its sensory properties to enable rich multisensory description (decided in consultation with the CPG team). For example, a cork tree was deemed suitable as there was the opportunity to describe its texture and its visual appearance. Further criteria for selection of the tour content were based on the desire to provide a spatial orientation within the garden, and a route through it, much as would be experienced in an in-person tour. Filming took place over two days in autumn 2020. The resulting shots were then evaluated for content that would support multisensory audio description (e.g. movement from the wind; additional animal content; plants with tactile or olfactory properties). Where possible, sounds recorded using the video cameras during the filming (e.g., birds, wind, planes, distant voices) were retained in the soundtrack; no additional sounds were added. A draft of the voiceover was scripted by the audio describer, and more filming carried out in response to this script, as needed. Upon final selection of the content, the audio describer finalised their script, and recorded the voiceover. Drafts of the video tour were reviewed by the CPG and a partially blind consultant and feedback was incorporated before the video tour was finalised for use in the experiment.

Evaluation of the impact of the online video tour required a multifaceted approach to measuring the visitor experience. Evaluation was carried out at two time points: the first was directly after people had experienced the online video tour, to explore the experience on the day and the second was two weeks later, to examine enduring experience. To understand how people had experienced the tour in the moment, we examined emotional response and presence. Presence, widely understood as a 'feeling of being

there', is often used as a tool in AD research (Lombard and Ditton 1997; Witmer and Singer 1998; Felnhofer and Kothgassner 2014; Walczak and Fryer 2017). Here, presence was used as a way of exploring the degree to which people had felt like they were 'in nature'. We also asked participants to evaluate the style and content of the tour, to understand the response of BPB and sighted individuals to this novel inclusive approach. At the second evaluation point we focused on enduring experience. Memory is a useful tool for evaluation in terms of exploring what participants can recall, and how this might be embedded into people's past experiences and sense of self (Hutchinson and Eardley 2021; Hutchinson and Eardley 2022; Hutchinson and Eardley 2023). Research has suggested that ratings of an in-person museum experience, including interest and enjoyment, tend to be more positive on the day of the experience, than they are weeks later (Eardley et al. 2018; Hutchinson and Eardley 2021, 2023). In other words, there is a post experience positivity that is not necessarily representative of how the experience will be remembered into the future. However, from the perspective of a museum, the enduring recollections of interest and enjoyment are arguably more important than ratings given on the day of an experience (for example, through exit interviews), as it is the enduring recollection that is more likely to determine future behaviour. This research also looked at the lasting impact of the tour, by exploring the degree to which participants had re-engaged (either on-line, in-person, or through conversation) up to that point, and their plans for future engagement with similar venues (Hutchinson and Eardley 2021, 2023).

Methods

The mixed methods (quantitative and qualitative) evaluation methodology sought to understand firstly, how blind-partially blind and sighted participants experienced the online tour, and how they evaluated the content, at the time of watching. We also examined the enduring experience, which was the way in which participants were thinking about and remembering the online tour two weeks later. Finally, we explored the impact of the experience, whether or not participants had already re-engaged with the experience, and plans for doing so into the future. For the quantitative element, the dependant variables were measures of attention, enjoyment of and interest in the tour, impact on wellbeing, immersion, evaluation of the audio experience, desire to reengage in similar activities and actual reengagement, emotion, thoughts and memories evoked during the video. The independent variable was Visual Access (sighted, BPB). Where measures had been taken at time A and time B (e.g. enjoyment, interest), Time (A and B) was also used as an independent variable. For the qualitative analysis, thematic analysis (Braun and Clarke 2006) was carried out on participants' answers to free-text responses. The free-text answers to the questions at time A were considered together, and the answers at time B were considered together, analysed using thematic analysis carried out by Hutchinson. An inductive approach was used, as the analysis was data rather than theory-driven.

In total, 31 BPB participants and 31sighted participants took part in this study. Participants were recruited via the researchers' personal networks, and with the help of VocalEyes, the Royal National Institute for Blind People (RNIB), the Thomas Pocklington Trust, and London-based branches of the U3A. Sighted participants were age matched (within 5 years) and gender matched at a sample level. Both the groups contained 9

male and 22 female participants. Age ranges were 23–87 in the BPB group and 22–86 in the sighted group. The mean (the average age of participants) and the degree to which the ages varied (Standard Deviation – given in brackets) of BPB group was 56.25 (14.37) and for the sighted group was 56.43 (13.74). An independent *t*-test confirmed no difference in age of the two participant groups: $t\ (54) = -.05$, $p = .96$.

In the BPB group, 10 participants reported that English was not their first language, compared to 2 sighted participants. All participants rated their level of English as 'competent' or higher. Comparable numbers of participants in the BPB and sighted groups had visited CPG previously (BPB N = 9, sighted N = 8).

Within the BPB group, 11 participants reported no useable vision, 16 reported some usable vision and 4 reported considerable useable vision. The study received approval from the University of Westminster ethics committee and all participants gave informed consent before participating.

Materials

Online film

Video playback duration was 14 minutes and 19 seconds, with automatically generated closed captions available for non-blind participants who might wish to use them (e.g., Simpson, Dalal, and Semaan 2023). These were available as an option as an inclusive measure, because there are non-blind people for whom they can support access. It was filmed using Nikon D3300 and Canon EOS 700D cameras; the tour visited 6 key points of interest within the garden.

When designing the tour, audio description was central to the creative process. The creation of the content plan for the film was determined primarily by the potential for rich, multisensory description, incorporating the historical context of the selected features, which were then filmed. The filmed material then supported the creation of the first draft of the script for the audio descriptive interpretation. The script then determined the second phase of filming, where additional shots were gathered for key aspects that had been initially missed or which were not clear. The full draft, containing the audio described tour and accompanying film and soundtrack were then reviewed by a partially blind audio description user, and an audio description professional, and the content was revised and finalised. Thus, audio description was fully integrated into the process and product, rather than being considered and added afterwards.

Measures

Two questionnaires (time A, time B) were designed for the experiment.

The questionnaires (available from the corresponding author on request) collected the following information: at time A, basic demographic information was collected: age, gender, level of vision (Douglas, Pavey, and Corcoran 2008; see also Fryer 2013), whether English was the participant's first language, with level of English rated on a 5-point scale if applicable. Information about participants' museum visiting habits over the last 5 years, rated on a 5-point Likert Scale (1 = never, 5 = once a week or more), previous visits to the CPG and their prior use of online tours was also collected.

At time A, participants completed a telepresence scale used to measure presence, or the feeling of 'being there,' (Kim and Biocca 1997). When used within television and computer games the scale reliability is good (Chronbach's alpha = .75) (Weibel and Wissmath 2011). The scale assesses to what extent participants a) feel present in the mediated environment, and b) do not feel present in their immediate physical environment while the stimulus (mediated environment) is ongoing. Participants rate statements, for agreement or frequency, using a 1–5 Likert scale. Minor adjustments to the wording of the scale were made for the study such as replacing 'broadcast' and 'television' with 'video'. The presence score is based on a sum of the items.

At times A participants were also asked to rate the feeling of presence in nature, stating their agreement with the statement: 'The online tour made me feel like I had just been in nature'. At time B, participants were asked to recall the strength of that feeling of being in nature, by responding to the same question.

At times A and B, participants provided a rating, using a 1–10 Likert scale, of the following measures of engagement: enjoyment of the tour, extent to which it retained attention, levels of interest. At time A, participants stated whether or not they experienced emotion in response to the video. If they responded yes, they rated the emotion for valence and strength. Participants were asked to rate their agreement with the statement: 'the online tour enhanced my sense of well-being' at time A and time B. At time A, all participants were invited to add additional thoughts or comments in free text responses, and BPB participants were additionally asked to comment on whether the online tour was described sufficiently to make it accessible and enjoyable, and they were invited to explain their answer. The resulting qualitative data informed on engagement levels.

Participants evaluated the content and delivery of the audio experience by rating 3 aspects on a scale of 1–10 where 1 = I absolutely hated it and 10 = I absolutely loved it. These aspects were: the historical and contextual information, the descriptive information, and the clarity of the tour and how easy it was to follow. Participants were asked to rate the duration of the tour on a scale of 1–7 where 1 = far too short, 4 = about right and 7 = far too long. Free text questions asked participants how the tour compared to other online tours that they had experienced, for example, whether it was more or less interesting or enjoyable.

At time B, participants were asked to describe a) their thoughts during video playback and b) any memories that were evoked. At time B, participants were asked whether they had engaged with the video since time A, by either thinking about the video, talking to someone about it or trying to find out more.

Procedure

Participants were sent a link to a questionnaire in Qualtrics, which provided participant information and collected informed consent. Participants provided basic demographic data before being redirected to the video which was hosted on YouTube at the following link: Chelsea Physic Garden Online Tour. Participants were asked to complete the time A questionnaire after viewing the video. Upon completion, participants were thanked, and informed that they would be sent a link to the follow-up questionnaire two weeks later (time B). BPB participants were invited to complete the questionnaire online or via phone or a Zoom call if preferred. Upon completion, participants were

thanked and debriefed, and invited to enter their details for a £200 shopping voucher prize draw.

Results

Qualitative analysis and organisation of results

The themes from the time A data were: 'considering the experience', 'presence' and 'future intentions'. At time B themes were: 'thoughts and reflections', 'emotion and well-being', 'feeling of being there', 'forming future intentions' and 'longing for nature'. Overall, the themes fitted well with the broad categories of quantitative analysis. As such, the results are organised under these categories, for both quantitative and qualitative analysis.

Quantitative analysis

The descriptive statistics within the quantitative analysis are always presented with a summary of the 'central tendency' of sample. Depending on the type of data, this will be the 'average' (or mean value), or the median (which is the middle value). This number is always accompanied by a number that describes how much the values are spread around that middle number. This number is always presented in brackets alongside the 'central tendency' number. When we describe the average, the number in brackets will be the standard deviation (SD). When we describe the median, the number in brackets will be the range. Inference tests then use probability to measure if these differences in the responses people have given are likely to be due to chance, or if they might be genuine differences.

Experiencing the tour on the day

For the telepresence scale (Kim and Biocca 1997), Cronbach's alpha was .93, indicating excellent reliability. The mean (SD) presence score in the BPB group was 29.19 (5.78). In the sighted group it was 24.23 (8.15). Overall, presence scores appear to be moderate, given the maximum score possible was 40. An independent t-test on participants' total presence score confirmed that BPB participants had higher scores than sighted participants: t (54.07) = -2.77, $p = .01$.

The theme of 'presence' was also salient in the qualitative analysis at Time A. Various aspects of the tour contributed to a sense of place. The spatial information was helpful for some: 'explaining the geography helped in imagining I was walking round the garden' (BPB # 23). Colours perceived by another BPB participant (BPB #30) 'made it seem like I was there'. Sounds 'of the garden, birds and traffic' made it 'very vivid and real' for another (# 36). Several BPB participants expressed similar views about enriching the audio description with these sounds, which are not normally included in audio descriptive or standard audio guides. A participant who had never had full vision (sighted #11) said that they would like a 'more immersive soundtrack.' However, it is worth noting that for some BPB participants, the sounds reduced presence: 'I don't need the video to be enhanced with added city sounds and birdsong and also to be told that is the

environment. One or the other is enough. In fact, telling me that is what I am hearing makes it seem less real' (BPB #44); 'the sounds changed abruptly and almost continually from sound to sound – birds to plains to machinery and traffic which broke my concentration and the flow' (sighted #40).

The tour did not engender a sense of presence for a number of the sighted participants, and they indicated that they would prefer a direct experience, for example: 'Gardens are a sensory experience and need to be seen in real life' (sighted #10). However, for one sighted participant, the tour did create a multisensory experience: 'this video makes you focus on what you see, you want to touch those things and smell them. It made my senses come alive.' (sighted #24).

Emotions in response to the experience were reported at Time A by 74% of participants in the BPB group, compared to 58% in the sighted group. A chi-sq test confirmed there was no association between Visual Access and evocation of emotion $p = .18$. For those that reported experiencing emotions, in the BPB group, the median (range) emotion valence rating was 8 (9), it was 8 (8) in the sighted group, suggesting very positive emotions (maximum 10). A Mann–Whitney U test confirmed no difference between BPB and sighted participants for emotion valence: ($U = 173.50$, $N1 = 21$, $N2 = 17$, $p = .88$). In the BPB group, the median (range) emotion strength rating was 7 (7), it was 6 (7) in the sighted group, suggesting a moderate strength. A Mann–Whitney U test confirmed BPB participants rated their emotion as significantly stronger than the sighted group: ($U = 133.50$, $N1 = 23$, $N2 = 18$, $p = .05$).

Content of the tour

When asked about the content of the tour (at time A), ratings (median, range) for the balance of historical and contextual information were 9 (8) in the BPB group and 8(6) in the sighted group, indicating that participants thought that the content was very appropriate. BPB ratings for descriptive information were 9(5), and sighted ratings were 9 (8). Clarity was rated 9 (9) by BPB participants, and 9 (7) by sighted participants. Mann–Whitney U tests confirmed that BPB participants gave higher ratings to their satisfaction with the amount of historical and contextual information, compared to sighted participants: ($U = 256.50$, $N_1 = 31$, $N_{2=}$ 28, $p = .01$). However, there were no differences for either descriptive information or clarity ($p \geq .31$).

Exploring the duration, the median rating from BPB participants was 4 (range 5), and for sighted participants it was 4 (range 4) at time B. This suggests that broadly speaking, participants thought the duration was just right. However, a Mann–Whitney U test indicated a significant difference between groups at time B ($U = 326.50$, $N_1 = 31$, $N_{2=}$ 31, $p = .02$). Exploration of the data suggests that overall, the BPB participants would have liked the online tour to be a little longer, and the sighted participants a little shorter, even though broadly speaking they both thought the guide was about the right length.

The theme of 'considering the experience' (time A) included comments and suggestions from the participants about specifics of the tour and ways in which it could be improved. BPB participants generally were positive about the audio description, saying that it was clear, informative, detailed, clearly spoken and even poetic or beautiful. For one BPB participant, it was access to historical or contextual information that ignited interest: 'I really liked the fact that things like the emblem were described. It's all (part of the)

context of the gardens and the belief systems in history' (BPB #46). Information about structure and shape was also appreciated: 'I liked that the plant and tree descriptions were not too visual but have plenty of information about size and form.' (BPB #44). One sighted participant also commented on the interweaving of information: 'the balance of historical vs. horticultural vs. location information was perfectly judged to keep the curious viewer informed while maintaining the sense of magic that the visual impact of the garden delivers' (sighted # 39). The language of the descriptions was also noted: 'I loved the breadth of vocabulary in the commentary. Very descriptive and evocative' (sighted #51). The descriptive element of the tour was also explicitly identified by one sighted participant (sighted #24): 'I do not have any known sensory impairments, and enjoyed the addition of these details as it made the tour unique. At the start I wasn't sure if I liked it, and after a few minutes I felt that I really did, by the end I was wondering why there were not more tours of this kind.'

When asked about improvements, some suggestions related specifically to the description were about the order and sequencing of information. For some participants, the order of information was problematic: 'it was confusing when the description would move to the next area and then describe something else before returning to what you had been prepared for' (BPB # 40); 'I think that a short video giving an idea of the layout of the overall garden at the beginning would be very helpful and reduce the confusion I experienced' (BPB #32). Another BPB participant mentioned that measurements should be given in inches as well as cm (BPB #49) to cater for older listeners. Participants also mentioned information that they were interested in and would have liked more of, mainly more in-depth description of the plants, including their functions and fragrances. One participant with no vision cautioned against the inclusion of overly visual content: 'some of the language makes assumptions about understanding visual references e.g. Edwardian style buildings. A sentence or two describing the building would help me to understand what is meant by 'Edwardian style' (BPB #44). Other practical considerations from BPB participants were to provide still close ups of the plants that were described and to avoid low light levels in filming (BPB #4). One participant (BPB #44) noted that measurements would help the spatial orientation: 'a sense of how far we are moving between gardens or beds or from quadrant to quadrant would be helpful e.g. 20M, 50M etc along the path.'

Participants were additionally invited to comment, in the questionnaire, on how the tour compared to any other online tours they may have experienced. Ten comments were provided by BPB and 9 by sighted participants. 68% of the comments indicated that the participants preferred this online tour to others online tours they have experienced, with the majority of comments saying it was more enjoyable, interesting or informative. 62% of these comments were provided by BPB participants. Other reasons given were the information: 'a good mix of topics' (sighted #8); the descriptive language and delivery: 'very clearly spoken and beautifully descriptive' (BPB #17), and the multisensory engagement: 'If anything this was better than the gallery tours I have previously experienced because in this tour there was the background sounds which made it more real' (BPB #37). 32% of comments said that the tour was less favourable than others; 67% of these comments were made by sighted participants. Reasons given were that it was 'less interesting', or lacking content or detail about the plants. Two sighted and one BPB participant felt that the tour was not more or less favourable, with one (sighted

#31) regarded the tour as having a distinct purpose compared to other tours: 'It was different because I felt that rather than being on a fact-finding learning tour, I had been transported on a guided tour of a beautiful outdoor place.'

Enduring experience

In this study, where ratings for measures were taken at time A and time B, few if any differences were observed, with results following the same pattern of similar or marginally lower ratings at time B (e.g. Hutchinson and Eardley 2022, 2023). As a result, only results at time B are reported here, and they are discussed as the enduring experience, i.e. this is how the tour is remembered.

Table 1 suggests that BPB and sighted participants gave high positive ratings for all three measures of engagement (although variability is high). Mann–Whitney U tests confirmed that BPB participants rated their level of interest more highly: ($U = 338.50$, $N_1 = 31$, $N_{2=}$ 31, $p = .04$). Attention was close to significance: ($U = 302.00$, $N_1 = 31$, $N_{2=}$ 27, $p = .06$); but there were no differences between groups for enjoyment: ($U = 332.50$, $N_1 = 31$, $N_{2=}$ 28, $p = .11$).

At time B, participants were asked whether any memories had come to mind during the tour. Memories were evoked for 61% of BPB participants and 42% of sighted. A Pearson Chi-Sq analysis confirmed no association between evocation of memories and visual access: $p = .25$. When looking at the qualitative data for the memories that came to mind, 42% of memories came from sighted participants and 58% from BPB participants. Memories of previous visits to CPG were salient; 67% of these came from BPB participants. Participants also recalled memories of being in other gardens or public spaces such as parks. The social context of some of these memories was also important: 'I thought back to past experiences of visiting Kew gardens with family members' (sighted #25). Memories were evoked from various time periods within the participants' personal chronologies ranging from childhood and the past. Memories of participants' own gardens were prominent, and related to the lockdown context. Finally, some of the memories evoked were simply of nature and outdoor space: 'just the memories of being outside in other gardens and woods and other open spaces' (BPB #11); 'I was immediately reminded of all the beautiful views of nature that I have experienced' (sighted #54). As such, the tour evoked a range of memories from across the life span, ranging from simple recall of experiences of nature through to richer autobiographical memories of shared social experiences.

At time B, there was an enduring theme of 'feeling of being there' consisting of feelings of presence, of being in the garden, and 69% of comments in this category came from the BPB participant group, reflecting the higher sense of presence from this group at Time A. Although instances of full immersion were rare, people described some of the thoughts

Table 1. Median (range) ratings for enjoyment, tour holding attention, and stimulating interest at time B for BPB and sighted participants, where maximum =10.

	BPB group	Sighted group
Tour enjoyment	8 (9) ($n = 28$)	8 (7) ($n = 31$)
Attention	9 (4) ($n = 27$)	8 (8) ($n = 31$)
Interest	9 (9) ($n = 31$)	8 (8) ($n = 31$)

that distracted them: 'occasionally my mind drifted to other places based on what I had heard about plants or people but mostly I stayed in the garden.' (BPB #27), and some of the factors that helped them stay immersed in the experience: 'I remember thinking about the sound of the birds and how it drew me into the description' (BPB #37); and 'I tried to piece together in my mind the layout of the whole garden' (sighted #39).

Further, an enduring theme in the recollections of people's thoughts, as described at Time B, was 'longing for nature': 'I felt like going to the park or somewhere outside' (sighted #57); 'The birds and outside noise in the background evoked wishes to be out in nature' (BPB #36), or a feeling of sadness at being separated from nature, which was more prevalent in sighted participants: 'It made me a little sad how covid has made us have to watch nature through a screen' (sighted #59). BPB and sighted participants' comments contributed equally to this theme.

At time B, the theme 'thoughts and reflections' described the participants' experience of cognitive engagement, such as feeling interested or curious as well as the range of topics upon which the participants' attention was focused as they listened. It is worth noting that the thoughts described were all related to the tour, its content, or reflections that arose from it, suggesting that the tour held people's attention (only one participant mentioned that their thoughts drifted to non-related topics). Participants from both groups expressed their interest in the plants, their medicinal purposes, or the historical context of the garden: 'I was interested to know that the garden was near to the river so that the botanicals could be brought straight in' (BPB #47). They recorded reflections on the garden: 'So much in a small space, an oasis in London' (BPB #48). Some participants mentioned a more general sense of interest and curiosity: '(I was thinking) that it was interesting, and what would be coming up next' (sighted #3).

'Emotion and well-being' (time B) described the emotional experience of the tour, and the impact this had on the participant. The most commonly expressed emotion was that of enjoyment, which arose from many aspects. These included enjoyment of the sensory experience of the experience more broadly, and enjoyment of the descriptions and language: 'at times, I simply enjoyed the beauty of the imagery complemented by the poetic language chosen by the describer/narrator' (sighted #39), and enjoyment of the audio describer's voice. Four BPB participants specifically mentioned that they found the tour 'relaxing' or 'calming'. Two sighted participants made similar comments, evoking words such as 'peaceful' (sighted #51) and 'relaxation' (sighted #40).

Impact of the experience

In thinking about the experience of the tour at time B, participants in both groups had strong agreement that the tour had enhanced their sense of well-being (BPB median 8, range 9; Sighted median 7, range 9), although variability was high. Scores appear higher in the BPB group. A Mann–Whitney U test confirmed there was no difference at time B: ($U = 359.50$, $N_1 = 31$, $N_{2=}$ 31, $p = .09$).

At time B, participants were asked whether they had thought about the experience of the tour, talked to anyone about it, or tried to find out any further information about the garden. 75% of BPB responded 'yes', compared to 42% of sighted participants. A Pearson's chi-sq test confirmed that there was an association between participant group and follow-up engagement: $p = .01$.

At time B, there was also a qualitative theme of 'Forming future intentions', which related to participants recalling a desire to be in the garden, or expressing a concrete intention to visit.

Museum experience and time taken to complete questionnaire at Time B

The median (range) value for frequency of museum visits in the last five years was 3 (4) in both groups, where 3= 'once every 6 months'. A Mann–Whitney confirmed no difference in the museum visiting habits of BPB and sighted participants: $U = 392.50$, $N_1 = 31$, $N_2 = 31$, $p = .20$. Thirteen sighted participants (42% of sample) had used online tours before, compared with 11 BPB participants (35%). Pearson's chi square test confirmed no difference in previous online tour experience: $p = .60$. The mean (SD) number of days taken to respond to the follow-up questionnaire was 1.45 (2.16) in the sighted group and 2.23 (3.12) in the BPB group. An independent t-test confirmed no difference: $t(60) = -1.14$, $p = .26$.

Discussion

This study sought to examine the ways that BPB and sighted audiences responded to an inclusive online audio descriptive tour of an historic garden. The aim was to understand the potential of audio description as a form of inclusive audio interpretation within the historic garden context, at the same time as understanding the impact of online content on audiences within the cultural heritage sector.

We sought to understand firstly, how people experienced the online tour at the time of watching. We also looked at what people recalled about the experience, by exploring participants memories and impressions of the experience. Finally, we asked them if they had re-engaged with anything related to the experience, or planned to so in the future.

Overall, the enduring recollection of the online historic garden tour for both BPB and sighted participant groups was that it held their attention very well, that it was strongly enjoyable, and that it was interesting (median scores all a minimum of 8 out of 10). Both groups were equally likely to experience emotions in response to the tour, and these were equally likely to be highly positive emotions. The simple message here is that, in line with previous research on museum collections, this research shows that inclusive audio descriptive interpretation can be beneficial to both sighted audiences and BPB audiences (Hutchinson and Eardley 2019; 2022, 2023).

Little formal evaluation has been carried out exploring visitor experiences of online tours. Considering the audience evaluation of this online audio descriptive historic garden tour, it was generally agreed by both BPB and sighted participants that 15 minutes was a suitable length, although with a tendency for BPB participants to want something slightly longer, and sighted participants to want something slightly shorter. This may partly reflect the fact that BPB participants are more used to listening to audio described TV and film. Interest was rated high in both groups (median 8/10); however it was significantly higher on average in BPB participants. Interest is generally considered to relate to feelings of wanting to know or learn something. The interest finding can therefore be considered in conjunction with the fact that sighted participants gave lower ratings to their satisfaction with the historical content within the tour, compared with BPB participants. It is possible that differences in museum interpretation that has been designed for blind or sighted

visitors had an impact here. In recorded museum audio guides designed for BPB people, there is variability in how context is dealt with. Guides written for BPB audiences can either become longer (to allow for context and description) or reduce context (to allow for the time taken to describe). However, audio guides for sighted people typically focus on context, and contain little or no audio description. With the provision of live museum tours, tours that assume a sighted audience will not contain audio description and would focus exclusively on context. Tours designed for a BPB audience will consist of audio description and the degree of context will vary. It is therefore likely that some sighted participants would have expected more context as part of the tour.

Nevertheless, although this difference in interest was significant, it is useful to remember that the enjoyment scores did not differ. Crucially, it is also important to note that BPB and sighted participants were both equally satisfied with both the level of descriptive information and the clarity of the tour. In other words, although sighted participants may have reported slightly lower interest levels, and may have preferred more context, they did not consider that there was too much description. As one sighted participant is quoted as saying above: 'It was different because I felt that rather than being on a fact-finding learning tour, I had been transported on a guided tour of a beautiful outdoor place' (sighted #33). It is also important to note that the impact on wellbeing was positive in both BPB and sighted participants (median rating 7/10).

That is not to say that the experience is identical in both groups of participants. Looking at ratings of the experience on the day, similar numbers of BPB and sighted participants had an emotional response, and these were strongly positive. The strength of these emotions was moderate, and significantly higher in the BPB compared to the sighted group. Similarly, there was a moderate sense of presence in both groups, but this was overall stronger in BPB participants compared to sighted. This was mirrored in both free-text reflections on the day, and at time B. It is possible that the stronger feeling of presence was simply because an inclusive online museum offering is more unusual for BPB people, and therefore is likely to engender more enthusiasm. However, similar numbers of BPB and sighted participants had previous engaged with this type of content online, and enjoyment ratings were similar for both groups.

Alternatively, it is possible that some BPB may have a stronger experience of presence when listening to auditorily delivered information if sensory (visual) engagement with the immediate physical environment is lower. It is important to recognise the heterogeneity of the BPB participant group, both in terms of level of visual experience and levels of sight and therefore visual memory across their lifespans. Nevertheless, all participants were users of audio description. For the BPB group who were relying more on hearing, the sense of presence was created by the lexis, syntax, and delivery of the voice-over and the ambient sounds. Within this context, the experience of presence may be similar to the 'transportedness' reported by readers of novels (Kim and Biocca 1997). Given the differences in the strength of presence, it is interesting that both groups had similar strength of feeling of being in nature, which suggests a sense of transportedness for both groups. From the perspective of long-term impact, and the potential for museums to enhance well-being in audiences, it is interesting to note that although the impact was positively enduring, and both groups remembered a positive feeling of wellbeing resulting from the experience, BPB participants did re-engage more with the CPG in some way, whether that be online, in-person or through conversation, between time A and time B.

Considering the impact of this research going forward, recent work has highlighted the importance of including blind and partially blind people in the creation of AD (Chottin and Thompson 2022; Eardley et al. 2025a, 2025b). Whilst the response to the online tour was overall very positive, there were some participants who would have valued more factual information about the plants, and some who commented that it was 'less interesting' than other similar tours. This underlines the importance of choice in this area of interpretation (Hutchinson and Eardley 2023). There were also some constructive criticisms from BPB participants about the sequencing of information and some general suggestions for the improvement of access, such as avoiding low contrast shots. Within this study we did not explicitly tell participants that the content was audio described, because we wanted all participants to experience it without pre-conceptions about what the experience might or should be. For this reason, we did not explicitly ask sighted participants about their experience of the AD at stage 1, because we did not want it to influence their responses at stage 2. However, we would suggest that future studies ask all participants explicitly for their comments on the AD.

It is important to note that data collection took place during the context of the global Covid-19 pandemic, when the majority of museums, gardens, and heritage sites were closed to visitors. In the UK, there were periods of formal lockdown, when everyone was confined to their homes, and for people who were physically vulnerable extended self-isolation was often required. This may have impacted on the level of responses given by our participants. It would be useful to explore continuing engagement with online museum and heritage provision in post-pandemic audiences. Nevertheless, it is also important to note that whilst such online experiences might provide inspiration for people who are able to follow-up with in-person visits, they also provide ways in which museums and heritage organisations can potentially extend their audiences by reaching the many people for whom travel is difficult, for reasons of physical or mental health, distance, cost, or other reasons. It also extends audiences to those who may not initially feel comfortable visiting cultural venues.

This research provides an important insight into the impact of inclusive online museum experiences on audiences, and their potential to broaden participation beyond the walls of the museum or heritage garden. Given that there was limited accessible content online during the pandemic, it is interesting to note the direct impact that this had on the BPB group, who were more likely to have re-engaged with the online tour after the event, through talking about it, looking up further information, or thinking about a future visit to the garden. It provides a strong argument not only for the continued development of online museum and heritage experiences, above and beyond simply putting collections online, but also for ensuring that those experiences are made inclusive and accessible from the design stage (Eardley et al. 2022). It also underlines the importance of paying attention to both museum collections and outdoor heritage spaces, as experience of both of these environments has potential impact on the wellbeing of audiences.

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