Instagram as an Exhibition Space: Reflections on Digital Remediation in the Time of COVID-19

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Instagram as an exhibition space: reflections on digital remediation in the time of COVID-19

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ABSTRACT

This paper explores the impact of COVID-19 on a planned physical exhibition – Prize Books and Politics: Rethinking Working-Class Life in Edwardian Britain – and the experience of transforming it into a digital exhibition through the platform of Instagram. Using feedback from visitors in the form of likes, comments and surveys, I reflect on the exhibition in terms of its scope, content, visitor experience and overall success. I also outline the various potentials, constraints and opportunities of Instagram as an exhibition space and put forward recommendations on how it can be used to best advantage not as a replacement for physical exhibitions, but rather as a complement that can attract new audiences, capture real-time feedback and, thus, add multiple voices and stories to museum objects.

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Introduction

In March 2020, the outbreak of COVID-19 led most museums across the world to close their doors as a precautionary measure to mitigate its spread. Suddenly, exhibition officers and curators were forced to rethink the visitor experience and develop digitally remediated exhibitions and new forms of online programming (McGrath 2020). Pre-pandemic, social media had been mainly used by museums to promote their programmes and generate excitement about forthcoming exhibitions (Samis and Michaelson 2017). However, the pandemic opened up new possibilities for such platforms, particularly their potential as an exhibition space that offers enhanced aesthetic experiences and greater levels of interaction and engagement with audiences (Jarreau, Smith Dahmen, and Jones 2019). The success of these exhibitions, coupled with the inevitable economic hardship that many museums now face, will likely have a permanent impact on the ways that museums use social media, fostering a move from traditional, one-way communication to narratives co-created with visitors (Villaespesa and Wowkowych 2020).

In this paper, I discuss the impact of COVID-19 on my own research activities and my experience of transforming a planned physical exhibition – Prize Books and Politics:
Rethinking Working-Class Life in Edwardian Britain, 1901–1914 – into a digital exhibition through the platform of Instagram. I reflect on the exhibition in terms of its scope, content and visitor experience, as well as the extent of its success based on metrics, user comments and a post-exhibition survey. I also outline the various potentials, constraints and possibilities of Instagram as an exhibition space and put forward recommendations on how it can be used to best advantage not as a replacement for physical exhibitions, but rather as a complement that can attract new audiences, capture real-time feedback and, thus, add multiple voices and stories to museum objects.

Studies on the use of social media for exhibitions is an emergent, yet important and relevant, field of research. To date, most studies have focused on how museums connect with visitors from a marketing perspective (Jarreau, Smith Dahmen, and Jones 2019) or how visitors engage with physical exhibitions on social media, whether in terms of aesthetics (Suess 2018), user experience and feedback (Budge 2017; Budge and Burness 2018) or motivations (Suess 2014). Research centred on Instagram has highlighted its importance for connecting with new and younger audiences (Barron and Leask 2017), extending dialogue beyond the physical setting (Weilenmann, Hillman, and Jungsellius 2013), giving a voice to underrepresented people (Becker 2017) and constructing sites of remembrance, memory and place-making (Chlebus-Grudzien 2018). However, scant attention has been paid to exhibitions made specifically for Instagram or those remediated as a result of the current pandemic. Thus, this paper offers a first attempt to critically reflect on the success of a digitally remediated exhibition in the time of COVID-19. In doing so, it aims to provide an important point of reference for others who may be considering the use of Instagram as an exhibition space and demonstrate its potential as a tool to enhance museum experiences and create more interactive, visitor-centred exhibitions.

The virtual museum: theories, trends and developments across time and space

Over the past decade, the ubiquitous use of the internet and increasingly sophisticated digital platforms and technologies has made ‘virtual museums’ a major topic of interest for many institutions (Quiñones Vilá 2020). Despite their growing popularity, there is no official definition or common agreement on how to define a virtual museum, with descriptions falling on a continuum from a collection of digitised objects available online to an immersive experience of being in a museum using virtual reality (Latham and Simmons 2014, 14). Furthermore, there is no consensus on the term itself, with cyberspace museum, digital museum, electronic museum, experiential museum, internet museum, online museum and web museum often used interchangeably (Biedermann 2017; Kim 2018). Although scholars and museologists do not concur on the definition, nor the word itself, virtual museums are not new phenomena; rather, they have evolved to reflect technological developments in information communication (Schweibenz 2019).

Discussions of virtual museums, in fact, date back to the 1960s when museums introduced automation technologies and recognised the potential of computers as ‘electronic museums’ for the distribution of museum information. Around the same time, André Malraux (1978) developed the philosophical concept of a ‘museum without walls’ – an imaginary museum, free of geographical constraints and full of the world’s greatest art.
However, these ideas only became a reality from a technical perspective in 1987 when the software application HyperCard emerged and allowed for non-linear displays in exhibitions and interactive multimedia facilities. In 1994, a Virtual Library of Museums was established, which served as an early directory of online museums around the world, while museums started producing CD-ROMs of their collections, which visitors could buy from gift shops as take-home souvenirs (Huhtamo 2010).

Writing in 1998, Keene claimed that the internet had made it possible for museums to build collections of information rather than collections of objects. This assertion was furthered by Dudley (2010, 3) who stated that virtual museums offered an ‘object-information package’, whereby the museum object is not just the physical artefact, but all the interconnected information about its provenance. Indeed, Hertzum (1998, 127) has found that many virtual museums exhibit objects from a range of collections and museums that fit into their specific theme or context. Consequently, virtual museums are far more focused on content, knowledge production and collaboration than the objects displayed on screen or their institutional affiliations. While virtual museums have prompted some concerns over authenticity of objects, recent studies (Hampp and Schwan 2014; Schwan and Dutz 2020) have found that visitors consider replicas to be legitimate substitutes as long as sufficient accompanying information is provided, thus further demonstrating the importance of the ‘object-information package’ in a virtual environment.

In 2004, the International Council of Museums (ICOM) identified three distinct categories of virtual museums: the brochure museum, which is typically a marketing tool for a bricks-and-mortar museum; the content museum, which is created for the purpose of making information about museum collections available; and a learning museum, which is educationally-oriented and aims to establish connections between visitors and online collections. While the internet has developed significantly since this report, virtual museums still tend to fall into these three categories. More recently, Mateos-Rusillo and Gifreu-Castells (2017) have turned their attention to models of virtual museum, outlining three types in existence: the mirror model, which is linear and offers automatic navigation that guides users virtually; the hypermedia model, which is non-linear and enables mosaic style, free exploration; and the narrative model, which guides viewers with suggested paths but gives them freedom to navigate as they choose. Most current virtual museums align with the narrative model, enabling visitors to move between the role of ‘astronaut’ and ‘pedestrian’ (Battro 2010) as they enter the imaginary space and look around.

A major breakthrough in the digital museum sphere was the arrival of social media in the early 2000s. Platforms, such as MySpace, Bebo and Facebook initially and Twitter, Instagram and Tiktok later, provided open, interactive spaces that expanded the concept of the virtual museum, transforming it from a space for people to a space of people (Choi and Kim 2021, 4). According to Burke, Jørgensen, and Jørgensen (2020), social media has not only given institutions a new voice, but also democratised the use of their collections. Furthermore, it has encouraged opportunities for user participation, engaging communities directly and enabling them to provide feedback on collections (Choi and Kim 2021). Using Goffman’s frame analysis, Kidd (2011) has identified three ways in which museums use social media, which extend the ICOM (2004) categories of virtual museums: marketing, to communicate and attract the public to the physical museum; inclusivity, to create sustainable communities through interactions with the
One of the fastest growing social media applications is Instagram. Launched in 2010, it enables users to upload photos and videos that can be edited with filters, accompanied by captions, hashtags and geotags and shared with others. Given its ability to ‘democratise the art of image-making’ (Becker 2017, 107) and make it possible for users to circulate media rapidly across a global network, Instagram was quickly adopted by museums. As Dornan (2016) notes, museums have a ready-made USP for a dynamic Instagram presence because of their architectural features, interesting objects, events and exhibitions, all of which can be summarised in concise images and captions that provide few barriers to understanding, deepen visitor engagement with themes and reach new audiences, particularly younger people. Furthermore, museums recognise that Instagram makes them more accessible, opening up an active and mutually beneficial dialogue with visitors as they interact through feedback, comments, hashtags and reposts (Gonzalez 2017).

The potentials of Instagram’s visual format also led to the development of a new concept in 2016: selfie museums. Selfie museums blend the boundaries between virtual and reality, being pop-up art installations whose sole aim is to be as ‘instagrammable’ as possible. The first ‘selfie museum’ to launch was the Museum of Ice Cream in the Meatpacking District of New York in July 2016. This interactive experium featured brightly coloured ice-cream-themed exhibits, created intentionally to serve as backdrops for selfies that users were encouraged to upload to Instagram. Since then, similar selfie museums have appeared across the world, including the Colorpool Museum in Seoul and the Color Factory in New York. Barasch, Zauberman, and Diehl (2018) argue that these museums have changed the way that visitors interact with artefacts as they immediately think in terms of photography when looking. This has been reflected in the changing policies of bricks-and-mortar museums, many of whom have relaxed their policies on taking photographs and encourage social media interaction by posting hashtags in the museum, introducing free Wi-Fi and holding photography competitions (Rhee, Pianzola, and Choi 2021). Individual artists have also recognised the potential of Instagram to exhibit their work. Photographer Michal Iwanovski, for example, hosted the exhibition #gohomepolish, tracking his walk from the UK to Poland asking people along the way what home is, while artist Federica Chiocchetti runs the popular Photocaptionist page that explores the relationship between photography and fiction.

In recent years, academics have also started using Instagram to host exhibitions based on their research, whether independently or in collaboration with museums. Celia Jackson, for example, launched the Looking for America project in 2015, posting photographs from her family holiday to the USA in the 1960s accompanied by written reflections, while Huw Alden Davis has used Instagram to exhibit photographs that explore sense of place and cultural identity in Wales. However, the first sustained attempt to use Instagram for dedicated art inquiry was carried out by Alix Beeston who launched Object Women in March 2018 – a digital art exhibition that explored the representation of women in photography, using collections from the George Eastman Museum. These exhibitions emphasise the importance of the ‘object-information package’ in virtual museums, as well as their threefold role of marketing, inclusivity and collaboration and their ability to encourage narrative models of interaction with visitors (Kidd 2011; Mateos-Rusillo and Gifreu-Castells, 2017).
Following the outbreak of COVID-19, the museum sector quickly developed its presence on the internet to maintain connections with the public. A UNESCO report, released in June 2020, identified over 800 individual actions by museums that ‘built on investments made before the pandemic’ to promote virtual museums. Specifically, UNESCO noted the rapid transformation of exhibitions, conferences and outreach activities into digital formats, as well as an intensified use of social media. Museum usage of social media increased by 47.49% in the first three months of the pandemic (ICOM 2020), with Instagram experiencing a 30% growth in use, making it the most popular social media platform for museums (Dawson 2021).

Both UNESCO (2021) and ICOM (2021) reported that many museums did not take advantage of the affordances of social media, using it to replicate the experience in situ and present their activities for audiences already familiar with them. Nonetheless, they identified some creative uses, particularly on Instagram, where museums shared items from their collections, gave behind-the-scenes tours, asked engaging questions and spotlighted followers. Unlike other social media platforms, Instagram’s bright and user-friendly interface also facilitated humorous and playful interactions with the public, leading to the development of special activities and ‘challenges’ to help alleviate the pressures of lockdown. These were quickly promoted by the global press, which helped the accounts gain new followers. Successful examples include the Getty Museum (Los Angeles), which called in March 2020 for followers to recreate famous artwork at home and post their results with the hashtag #betweenartandquarantine, and the Royal Academy (London), which posted soothing paintings accompanied by breathing instructions to help followers meditate.

Other museums have used Instagram to host exhibitions that run for a set period of time. Just one week after the national lockdown was announced in the UK in March 2020, Guts Gallery (London) responded by launching an Instagram-only exhibition called ‘When Shit Hits the Fan’. Equally, in April 2020, Salisbury Museum (UK) developed a Pick & Mix Instagram exhibition, using specially selected items from their collections to tell the city’s story. There have also been a growing number of art collectives who have established ‘digital museums’ on Instagram to collect artwork in response to the pandemic (e.g., COVID Art Museum, The Lockdown Collection, Mass Isolation). All of these examples show how Instagram can be harnessed by museums, art galleries and academics for creative purposes and that these practices have an important place in future interactions with visitors, even as life gradually returns to normal.

**Prize Books and Politics: a digitally remediated exhibition**

When the COVID-19 pandemic broke out at the beginning of 2020, I was in the process of planning the exhibition *Prize Books and Politics: Rethinking Working-Class Life in Edwardian Britain*, to be held at Cardiff University’s Special Collections and Archives (CUSCA). The exhibition was the culmination of five years of doctoral and postdoctoral research on the forms and functions of Edwardian book inscriptions (1901-1914) and focused particularly on the prize book movement – a movement championed by schools, Sunday schools and social clubs in Britain to award books to working-class children for good behaviour and regular attendance.
The prize books to be exhibited were all held in the Janet Powney Collection at CUSCA. Donated in 2014, the collection contains 800 prize books and provides a rare insight into working-class literacy, schooling, religion, social life and culture for both boys and girls in the long nineteenth century. Based on my research, the exhibition aimed to cover the history of the prize book movement, the range of institutions involved in prize-giving, gender-based prize-giving practices, types of prize inscriptions and children’s creative responses (cf. O’Hagan 2021). It would showcase images of books and inscriptions from the collection, alongside other artefacts, such as newspaper clippings, photographs, Sunday school registers and hymn books, on loan from the local Glamorgan Archives. At the entrance, a screen would run black and white loop footage from Mitchell and Kenyon of Edwardian daily life. A series of audio clips would also be available, taken from Paul Thompson’s oral history project Family Life and Work Experience Before 1918, that told individual accounts of literacy and education in Edwardian Britain. Four organised workshops for visitors were planned for the launch day – design your own bookplate, creative writing and inscriptions, explore the 1911 census and introduction to palaeography – while on closing day, a ‘living literature’ walk was planned around the city of Cardiff, with actors in costume playing the role of prize book recipients and telling their individual stories.

Pre-pandemic, my plan had been to use Instagram in a supporting role to the exhibition, in line with ICOM’s (2004) ‘brochure museum’ or Kidd’s (2011) ‘marketing’ categories, sharing key exhibits with the dual aim of encouraging physical attendance for those in the UK and extending visitor access to those unable to attend the main event in Cardiff. In light of the rapidly escalating health pandemic, I began to rethink how Instagram could be used instead to digitally remediate my exhibition, serving as a ‘content’ and ‘learning’ museum (ICOM 2004) that fostered ‘inclusivity’ and ‘collaboration’ (Kidd 2011). With no budget for a dedicated exhibition website, I felt that the social media platform could offer a unique alternative that allowed public engagement in new and creative ways.

First, I recognised that an online exhibition had the advantage of running over a longer period of time because it was not restricted to the tight schedules or costs of a physical exhibition space. This meant that it had the potential to attract more people as word spread and interest grew over time. With this in mind, I decided to run the exhibition over an eight-week period, adding a new post each day. The exhibition launched on World Book Day (5th March) and ended on International Workers’ Day (1st May). Not only did these dates have personal meaning to the project (given its focus on working-class literacy), but they provided a reasonable – but not excessive – amount of time to build and maintain public interest, as well as to observe and gather data for my visitor study. While the exhibition remained live on Instagram after its end date, no further posts were added, although I continued to monitor the account for messages.

Given the range of other digital activities against which an online exhibition must compete, I felt that it would be better to extend its focus beyond prize books in order to attract viewers with different interests and keep sustained attention over its duration. The 800 prize books of the Janet Powney Collection represented a subset of 1,500 Edwardian working-class book inscriptions I had gathered throughout my research from the two largest second-hand booksellers in the UK: Oxfam and Bookbarn International. The Edwardian era marked the first period of mass literacy and working-class book ownership as a
result of free, compulsory education and the dramatic decrease in book production costs (O’Hagan 2021). It was also a time of much social change and civil unrest due to the rising labour movement, the campaign for women’s suffrage and the Irish fight for Home Rule. All of these experiences and events are captured in inscriptions, enabling access to first-hand accounts from working-class people that offer new perspectives on life in Edwardian Britain.

Instagram’s format provided a ready-made way for me to organise the inscriptions into eight themes, with a particular focus each week: school, work, family, leisure, politics, book culture, class conflict and global events. These themes were selected from my own research (cf. O’Hagan 2021), which had used semiotic and content analysis to identify salient, recurring topics. Using Alix Beeston’s Object Women Instagram exhibition as a prototype,¹ each day at the same time, I posted a photograph of one inscription from my dataset, accompanied by a brief written reflection with information about the artefact, the book owner and the broader social context, as well as relevant hashtags based on

![Figure 1. Prize Books and Politics Instagram exhibition.](image-url)
the uploaded inscription’s content and theme. Bringing together artefacts from ‘protected’ institutional and ‘vulnerable’ non-institutional collections emphasised the ‘object-information package’ (Dudley 2010, 3) offered by virtual museums and its ability to create meanings that go beyond institutions and have wider educational and social significance. The overall aim of the exhibition was to encourage fresh understandings of working-class life in Edwardian Britain through a previously unexplored material resource. Figure 1 provides an overview of the exhibition, while Figure 2 shows a specific post.

The comment space provided by Instagram enabled interactions to take place in real-time with viewers and on a more personal level through direct access to me, the curator. Together, we could reflect and share individual insights in ways not possible in a real-life exhibition space, thereby turning visitors from passive observers into active participants. Through cross-posts on Twitter, they could even become online marketers as images were recirculated and recontextualised with added hashtags and captions, thereby innovating the concept of the ‘brochure museum’ (ICOM 2004) by adding multiple voices and narratives to the inscriptions. This suited the Prize Books and Politics overarching theme of giving a voice to unrepresented people and ensuring that their stories had a chance to be presented to the world. The Instagram model also fit well into the ‘narrative’ model of online exhibitions, considered by Mateos-Rusillo and Gifreu-Castells (2017) to be the most effective at maintaining user interest. The narrative model does not just seek to replicate real-life museum experiences – something both UNESCO (2021) and ICOM (2021) have criticised; rather, it guides viewers yet gives them the ultimate freedom to navigate and respond how they want.

As Instagram is a predominantly photo-sharing platform, it stands to reason that I was limited to static photographs of inscriptions and, with museums and archives closed, I

![Figure 2. Sample exhibit from Prize Books and Politics exhibition.](image)
could not include other artefacts from their collections as I had originally planned. I addressed this problem by obtaining a small grant to collaborate with Museum in a Box (MiaB), a small London-based company that designs interactive Raspberry Pi (single-board computer) powered boxes with speakers. Each box is connected to MiaB’s website, where audio recordings linked to images of artefacts can be uploaded. In the context of the exhibition, I was able to upload accompanying audio guides for all inscriptions exhibited on Instagram (Figure 3), as well as bonus audio guides to images of supporting artefacts similar to those I had planned to use in the physical exhibition (e.g., Sunday school registers, hymn books, postcards). While MiaB cannot replace the museum experience, it enabled me to replicate it to a certain extent, making the Instagram exhibition more interactive, while also addressing diverse learning needs and sight
imperfections through its audio, zoom and large-format alternatives. In doing so, MiaB challenges concerns around authenticity in visual museums, demonstrating how replicas can, in fact, enhance visitor experiences and knowledge (Ramos 2019).²

Given the novelty of the digital remediation, I wanted to collect feedback from visitors during and after the exhibition to assess its success. My three main points of interest were (1) whether visitor engagement was sustained/grew over time; (2) how visitors engaged with the exhibition; and (3) whether visitors had enjoyed the exhibition and developed a new understanding of Edwardian Britain through it. Although there is no consensus on how best to assess social media engagement, Ryder, Zhang, and Hua (2021) recommend metrics, such as likes, shares, comments and followers. For the purposes of my research, I combined quantitative and qualitative analysis, monitoring and recording these metrics each day and then carrying out a thematic analysis of user comments to assess which images were most popular and which topics recurred. I then critically reflected on this in relation to broader museology literature. Similarly, I designed a post-exhibition survey to gather demographic information about visitors, as well as specific feedback on content, and used qualitative and quantitative analysis to assess responses. The demographic information enabled me to determine the geographical reach of the exhibition, as well as gender, age and education variables, while the content feedback helped me understand to what extent visitors had gained new knowledge on the topic. Again, metrics, thematic analysis and critical reflection were crucial to this assessment. My approach to critical reflection was guided by Howgill (2015) who identified six criteria for analysing online exhibitions: design, comfort, content, engagement, enjoyment and future ideas.

**Results of the visitor study: real-time followers, likes, comments and reposts**

In the weeks leading up to the *Prize Books and Politics* exhibition, I promoted it widely across the project’s social media channels, my own personal accounts and my university’s website. Articles about the exhibition were also published in *Fine Arts Magazine* and *Wales Arts Review*. This meant that, by the time it launched on 5th March, there was already a core group of 120 followers across Twitter and Instagram. This number grew steadily throughout the exhibition and, by its close date on 1st May, there were 352 followers in total. As I had no marketing budget and could not distribute flyers or posters, retweets and tagging played an important role in spreading word of the exhibition, with one person’s retweet often having a snowball effect and leading to numerous new followers. The marketing potential of retweets and tagging is something that museums should value, particularly at a time when they face funding cuts. Furthermore, retweets and tagging enable museums to harness their relationship with the public, turning online spaces into sites of inclusivity and collaboration (Kidd 2011).

While follower numbers is a good starting point for assessing visitor engagement, it does not accurately reflect how many people are actively engaging with the exhibition, nor does it account for the interference of bots. This is emphasised by Instagram Insights, which revealed that each post had roughly 150 page views a day, suggesting that the same people engaged with the exhibition content throughout its two-month duration, even if they did not necessarily follow the account or like/comment on posts. Based on
the limited usefulness of ‘passive’ metrics like followers, Ryder, Zhang, and Hua (2021) argue that institutions should create a custom value system to assign different weights to different types of engagements, with ‘active’ metrics, such as likes and comments, being given the most weight.

Tracking likes and comments revealed that most tended to be left on the day that I first posted the image only. This was likely influenced by Instagram’s algorithm, which shows the most recent posts when a user logs in, but also suggests that many people visited the exhibition page daily to check for updates and immediately responded to new images. An analysis of the images that received the most likes clearly highlights the importance of tagging to increase visibility and gain followers. A prize inscription awarded by the Clarion Club, for example, was reposted by the institution, leading to an influx of new visitors to the exhibition. Likewise, an inscription about the 1906 Labour Parliamentary Fund attracted considerable interest from the Labor and Working-Class History Association and the South Wales Miners’ Library. Similar peaks in engagement came from prize inscription posts that tagged the Boys’ Brigade, Boy Scouts, Hope UK and Railway Mission. This direct link between tagging and increased traffic to the exhibition is important for museums to consider when using Instagram and is something that Jarreau, Smith Dahmen, and Jones (2019) have found that many are yet to do effectively.

In contrast, comments were left predominantly on the most aesthetically appealing inscriptions (e.g., gilt prize stickers, bookplates) and were not necessarily as influenced by tagging. While this fits with the notion that ‘image is everything’ on Instagram (Suess 2018), this did not mean that visitors only commented on cursory or banal features of the inscriptions. In fact, often, deep conversations took place in the comments sections covering four broad themes: the artistic design of the inscriptions, comparisons between life then and now, reappraisals of the working classes and gratitude for unearthing ‘hidden’ histories. Commenters were particularly interested in the changes to the education system that took place in the late nineteenth century and led to the widespread growth of working-class literacy. They reflected on the impact of literacy on all aspects of working-class life, from family relationships and social connections to religious beliefs and political affiliations. I responded actively to these comments, thereby highlighting the importance of using Instagram to bring together heterogeneous groups and inviting them to play a leading role in the production and transmission of knowledge.

Villaespesa and Wowkowych (2020) note how likes and comments can be used to gain a sense of which artefacts visitors are particularly interested in and, thus, can guide curators to create more enjoyable and relevant interpretative materials. Receiving such feedback in real time was fundamental in shaping the progression of Prize Books and Politics, leading me to change certain planned posts to appeal more directly to visitors’ interests. Furthermore, this feedback has helped frame future dissemination activities on my research. Throughout the exhibition, I also received emails from visitors, offering positive feedback on particular content, asking for further information and even sharing book inscriptions from their own personal collections. These types of interactions go beyond those possible in a physical exhibition setting and highlight some of the advantages that virtual environments hold in building rapport and establishing trust with visitors. They also mitigate the risk that bots could have skewed the Instagram metrics.

Having reflected on visitors’ engagement with the exhibition in real time, there are a number of changes that I would make and recommend for others planning to host a
similar exhibition. First, I posted images every day over the two-month period. However, I quickly noticed that there was considerably less engagement with inscriptions on a weekend. Consequently, any future exhibition may want to consider only posting on working days to maintain visitor numbers and avoid the risk of oversaturating visitors with information. Second, it also became apparent that visitors were particularly attracted to images with vibrant colours, meaning that those with less visual appeal or of a poorer quality received far less attention. This was disappointing because some of the stories behind the more basic inscriptions were, in fact, the most exciting (e.g., one washerwoman declaring ‘Darwin is my God’ in her copy of The Origin of Species). Given this finding, I would recommend that anybody planning to organise a similar exhibition should make sure that all images be taken at high resolution to ensure optimal quality. Furthermore, I would suggest signposting visitors towards less visually appealing artefacts through Instagram’s Story function. On a more positive note, visitors responded well to inscriptions that showed the ‘human’ side of Edwardians, such as spelling mistakes (e.g., ‘happy birchday birthday’) or insults (e.g., ‘D.H.J. Bamford is a fool’), and brought their experiences closer to the present day. This could be extended further in future exhibitions by encouraging users to take part in ‘challenges’ (e.g., sharing their own inscriptions using hashtags, writing a short story/poem based on a particular inscription). As the reports by UNESCO (2021) and ICOM (2021) show, these types of ‘challenges’ are extremely effective in attracting new audiences and changing public perceptions of museums.

Another important change that I would make is related to the weekly themes of the exhibition. Although the themes worked well as a concept and were an effective way to organise the exhibits, they were only known to Twitter users because Instagram does not enable short imageless posts. Therefore, it is important to find creative ways around the constraints of the platform. One possible way is to post a Story at the beginning of each week to inform users of the theme so that they do not feel lost. Additionally, if I were to host the exhibition again, I would consider changing the order of themes; its top-heavy focus on the prize book movement in the first few weeks seemed to discourage some visitors who were expecting a broader variety of inscription types to be showcased. This did not come until week four, over which time I had lost some followers. This highlights the challenge of maintaining a large number of users when the focus is too niche and suggests that, particularly in an online context, it is beneficial to keep a broader perspective on a topic.

**Results of the visitor study: post-event surveys**

After the *Prize Books and Politics* exhibition finished on 1st May 2020, visitors were asked to fill in a feedback survey online via Typeform. A link was placed in the Instagram and Twitter biography sections and promoted over a one-week period across both social media platforms. In hindsight, the survey should have been left live for a longer period of time as, at this point, the pandemic was reaching its height and many visitors were too busy, stressed or anxious to respond. This is clearly reflected in the low number of respondents vis-à-vis the number of followers: 20 in total, which represented only 7% of visitors. While caution must be exercised when analysing such few responses, they are, nonetheless, beneficial in assessing visitors’ opinions of the exhibition and determining the next stages of its development.
Demographic data showed that 60% of visitors were female and 40% were male. Of these visitors, 40% fell into the 51–70 age category, 30% into 31–50 and 30% into 19–30. Even in this small sample, the fact that the exhibition attracted a large number of visitors from an older demographic was pleasantly surprising (considering Instagram’s popularity amongst young users), with one 62-year-old woman even stating that she had created an Instagram account just to follow *Prize Books and Politics*. This demonstrates Instagram’s potential for museums to obtain a broader demographic of visitors, provided that they are targeted with the right content. Particularly in the current COVID-19 pandemic, Sheldon et al. (2021) have found that this can help alleviate loneliness amongst older adults. The exhibition also attracted users from a diverse range of occupations: researchers (20%), teachers (20%), librarians (10%), students (10%), writers (10%), administrators (10%), doctors (10%) and unemployed (10%). Although based on a small number of respondents, their largely professional background suggests that more promotional work could have been done to attract a lay audience. This is a particular challenge of promoting exhibitions online because it often depends on one’s immediate contacts who tend to share similar backgrounds and interests. In terms of geographical location, the highest percentage of visitors came from the United Kingdom (40%). However, the exhibition was also visited by users in the USA (20%), Canada (10%), Ireland (10%), Japan (10%) and Australia (10%). The fact that, even in such a small sample of respondents, there is evidence that the exhibition reached across four continents is highly positive and demonstrates a major advantage of using digital platforms over physical platforms for exhibitions.

When asked how they had found out about the exhibition, 50% of users stated ‘through a social media website’, 20% ‘word of mouth in person’, 20% ‘word of mouth online’ and 10% ‘other’ (not specified). Despite the small number of respondents, these findings demonstrate the increasingly important role that Instagram and Twitter are playing in promotional messaging and how their functions can be harnessed by museums to generate public interest in events (Suess 2014). Visitors were also asked to reflect on how often they viewed the exhibition during its duration. The vast majority of users (70%) stated that they visited the Instagram page every day, 20% said that they visited every two to three days, while 10% said that they visited once a month or less. These results likely reflect both Instagram’s algorithm and its role as an instantaneous communication platform and suggest that curators must be prepared to engage regularly with visitors and respond to comments within a 24-hour period to ensure sustained interest.

The next part of the survey contained open-ended questions, with respondents asked whether they had thought about book inscriptions prior to the exhibition and, if so, in what context. The responses to this question were mixed. Four people stated that they had not thought about book inscriptions before, while four replied that they had only been interested in certain types of inscriptions (e.g., bookplates) and had never thought about them from a class perspective. Three other visitors had engaged with inscriptions previously in their work, either as librarians or researchers. The remaining nine visitors said that they had always noticed inscriptions in second-hand books, but had not particularly thought about them. Pedretti and Iannini (2021) argue that the most effective exhibitions are those that challenge how a certain topic is represented traditionally and inspire visitors to rethink an issue critically. The fact that none of the
respondents had previously considered book inscriptions in the context of class demonstrates the potential of *Prize Books and Politics* as a ‘hub of transformation’ (ibid:232) and the importance of selecting a theme that encourages self-reflection and reinterpretation when designing an exhibition.

Similarly, respondents were also asked to state whether they had thought about working-class history before and, if so, in what context. While 19 of the 20 respondents agreed that they had thought about working-class history before, they had all thought about it in different contexts: politics and labour movement (20%), literature (15%), material culture (15%), book history (10%), military history (10%), gender (10%), genealogy (10%) and oral history (10%). This finding was unexpected and suggests that most people were attracted to the exhibition for its working-class rather than book inscription focus. While many visitors discovered *Prize Books and Politics* through hashtags or reposts, this also emphasises the strong algorithmic nature of Instagram, with users who follow other working-class history accounts more likely to find this account. This highlights a particular challenge in attracting diverse audiences to an Instagram exhibition and indicates that museums may need to rely on a blend of innovative and more traditional forms of marketing to counter the power of algorithms. Nonetheless, respondents’ comments were useful in showcasing how the exhibition had successfully appealed to their diverse range of interests: ‘I was particularly interested in how book inscriptions can tell the untold stories of women’, ‘I loved seeing traces of the early labour movement in books!’

Respondents were then asked to share what they had learnt about book inscriptions and/or working-class life from the exhibition. All 20 respondents agreed that the exhibition had improved their knowledge of both topics. While there are caveats with the representativeness of such data, this feedback was encouraging and suggested that the central aim of *Prize Books and Politics* in fostering new understandings of working-class life in Edwardian Britain had been achieved. It was in the context of book inscriptions that

<table>
<thead>
<tr>
<th>Table 1. Themes of visitor feedback.</th>
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<tbody>
<tr>
<td><strong>Book Inscriptions</strong></td>
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<tr>
<td>The amount of history that is embedded in inscriptions and the type of information that can be gathered from them</td>
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<tr>
<td>How much information about the writer that can be recovered is surprising – more than I expected’</td>
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<tr>
<td>How book inscriptions can reflect the political and material conditions of the Edwardian period</td>
</tr>
<tr>
<td>‘I had no idea how much you can find out about political life from them’</td>
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<tr>
<td>How prize books can be viewed through different lens to shape the working classes in particular ways</td>
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<tr>
<td>‘I’d previously only thought of prize book as condescending’</td>
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<tr>
<td>The broad range and heterogeneity of working-class inscriptive practices</td>
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<tr>
<td>‘I learnt there is such a variety of different inscription types’</td>
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<tr>
<td>The artistic creativity involved in the creation of some inscriptions</td>
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<tr>
<td>‘I was surprised at the watercolour gift inscriptions. Very creative!’</td>
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<tr>
<td>How people presented themselves through inscriptions</td>
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<td>‘I found it useful to consider what can be inferred about a person’s identity from the way they write’</td>
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<tr>
<td>How book inscriptions can challenge the notion that they were upper-class tools to shape the working classes</td>
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<tr>
<td>‘I had no idea how much you can find out about political life from them’</td>
</tr>
<tr>
<td>Working-Class Life</td>
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<tr>
<td>The educational opportunities available to the working classes during the Edwardian period</td>
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<tr>
<td>‘The working classes had many more educational opportunities than I thought’</td>
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<tr>
<td>The pride that working-class Edwardians took in the books they read and owned</td>
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<tr>
<td>‘They had such pride in their books’</td>
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<tr>
<td>The extensive literacy of the Edwardian working classes</td>
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<tr>
<td>‘I’m very surprised at the degree of literacy across many types of employment’</td>
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<tr>
<td>The types of books that working-class people read in the Edwardian period</td>
</tr>
<tr>
<td>‘Loved learning about the types of books the working classes owned’</td>
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</tbody>
</table>
the exhibition appeared to be most transformative, with visitors expressing surprise at the range and creativity of working-class book inscriptions, as well as what could be gleaned about broader Edwardian society from them. Respondents also acknowledged that they had learnt new information about working-class education, literacy and reading practices. In total, ten overarching themes were identified from the responses. They are summarised in Table 1 alongside direct quotes from respondents.

Respondents were also asked whether the project had changed their perception of the modern-day working classes and, if so, how. Six replied that it had not, with two elaborating that they ‘already regarded them in high esteem’ and that they already felt that the media ‘does a disservice to working-class people in the way they’re represented’. Two argued that, rather than change their views, it had ‘reinforced’ their own ideas about the working classes as a ‘large and complex group’. The other 14 responses were centred around two main themes: the demonisation of the working classes by the media and the portrayal of working-class people as victims in popular culture. One respondent stated that the exhibition had made him reflect on the fact that nowadays ‘anybody who reads or engages with learning in working-class communities is seen as atypical and not fitting into expected sociocultural norms’. Equally, another respondent felt that ‘the media demonises the working classes today based on their perceived lack of education’. For others, the exhibition had made them think more about the ways in which the media portrays working-class people as ‘helpless, passive, pathetic’ when many, in fact, lead interesting lives and are content with their position in society. Although these comments are based on a small number of respondents, they suggest that Prize Books and Politics made viewers think about working-class life in a new way.

The National Co-ordinating Centre for Public Engagement (2017) notes that a relationship with stakeholders should not end once an event is over; instead, it must be maintained through regular contact to assess long-term impact. Consequently, several months after the exhibition’s end, I contacted all survey participants to ask whether the exhibition had had a lasting impact on them. I received five replies in total: four wanted further information about my research and one sought advice on hosting their own similar digital exhibition. I have since remained in touch with these people to continue assessing the exhibition’s longer-term impact. Having a pre-existing list of engaged followers also provides a readymade group of visitors for any new exhibition I plan to arrange rather than having to build public interest from the ground up. Furthermore, it is a good way to promote future events when on a limited marketing budget.

Evaluation of Instagram as an exhibition space

Drawing together the findings of the real-time and post-exhibition feedback allows for a critical reflection on the success of the Prize Books and Politics exhibition and how this relates more generally to the potential of Instagram as an exhibition space. Returning to the six criteria outlined by Howgill (2015) for a successful online exhibition – design, comfort, content, engagement, enjoyment and future ideas – can be useful in assessing (1) whether visitor engagement was sustained/grew over time; (2) how visitors engaged with the exhibition; and (3) whether visitors had enjoyed the exhibition and developed a new understanding of Edwardian Britain through it.
For Howgill (2015), design and comfort refer to whether an exhibition is easily navigable, consistently structured, easily readable and reasonably well-balanced between image and text. Many users were already highly familiar with Instagram’s format, so they felt more at ease and less intimidated than entering an unfamiliar virtual museum space as they knew what to expect. Furthermore, several visitors shared with me via email that, without the ‘expert barriers’ of a physical museum (e.g., cataloguing systems, curatorial taxonomies), they felt more in control of what they were viewing. While no visitors criticised Instagram’s format, its fixed structure in terms of text size and colour can pose challenges for visitors with dyslexia or sight impairments. Therefore, curators should think about offering complementary resources to aid visitor comfort and foster inclusivity, such as MiAB’s audio guides or PDF packs in large print or different coloured paper.

Instagram’s heavy focus on appearance allows visitors greater immersion and enhanced aesthetic experience because they can ‘get up close’ to artefacts that are usually hidden behind glass or, in some cases, may not even be publicly exhibited due to conservation concerns (Jarreau, Smith Dahmen, and Jones 2019). In the case of Prize Books and Politics, none of the exhibited inscriptions had been seen before because they belonged to an uncatalogued collection in CUSCA and second-hand bookshops. Therefore, the exhibition provided a rare opportunity to view them and explore their semiotic and material features, which many visitors praised in their feedback. While scale, texture and other three-dimensional qualities of the inscriptions cannot be reproduced on Instagram, this did not seem to affect visitors’ engagement with them and many commented that they were satisfied to still have access to such resources at a time when they could not visit physical institutions.

Given Instagram’s visual focus and viewers’ expectations around the platform in terms of images, curators must have different priorities to a physical exhibition, prioritising exhibits that are immediately eye-catching and engaging to sustain interest in a competing environment (Kwastek 2013). Visitors to Prize Books and Politics seemed to particularly value inscriptions that featured bright colours, ornate patterns and imagery or striking calligraphy as these were the most likely to catch their attention when scrolling through their Instagram feed. Linked to this, the image-heavy focus of Instagram means that many visitors are less concerned with the accompanying text and expect shorter captions than in a physical setting. In Prize Books and Politics, this was reflected in visitor comments, which tended to focus more on what they saw in the image than the text. This may also have been influenced by the stress of the pandemic, which affected people’s concentration and attention span. To ensure that all visitors’ needs are met, the inclusion of links to source documents, scholarly articles and related materials or relevant collections is recommended. Indeed, many visitors commented positively on these additional resources, stating that they encouraged further sustained interaction with the exhibition’s themes.

When discussing content and engagement, Howgill (2015) is concerned particularly with whether visitors can choose their routes through the exhibition and whether there are different routes for different groups. Addressing the former, Instagram is particularly strong and reflects the ‘narrative model’ advocated by Mateos-Rusillo and Gifreu-Castells (2017) for virtual museums. Posts for Prize Books and Politics were organised into weekly themes and published once a day. However, this only acted as a guide and did
not dictate the way that users interacted with them. Once in the exhibition, visitors could scroll through the square grids and click on images that particularly attracted their attention. While virtual museums have been criticised for their linearity and lack of ‘stumble upon’ nature, Instagram challenges this concern and, in many ways, replicates a physical exhibition space as visitors can move around freely rather than following the exhibition’s signposts. Equally, the portable online format means that visitors are not limited by time and can access the exhibition at any hour of day and stay as long as they want. Indeed, feedback from visitors suggests that they liked the ability to ‘pick and choose’ what they engaged with and not be bound to ‘fixed visiting times.’

Despite these strengths, Instagram’s fixed format means that it cannot offer tailor-made routes for specific demographics. Furthermore, being accessed only from a mobile phone means that visiting the exhibition is a solitary activity and requires more enhanced concentration. Therefore, it unintentionally excludes certain groups, such as schoolchildren and families, who frequent bricks-and-mortar museums communally (MacDonald 2015). While nobody commented on this in relation to Prize Books and Politics, it is something that I would like to improve in future exhibitions, perhaps through more targeted activities aimed at children (e.g., hashtags, selfie challenges, creative writing) or by launching the event in conjunction with a national festival, such as the Festival of Social Sciences or Being Human. While there was a large number of older people who visited Prize Books and Politics, this demographic is typically underrepresented on Instagram. Therefore, more targeted activities, such as talks or workshops, could also be aimed at them to foster inclusion and ensure that the platform does not unintentionally discriminate against them.

In terms of enjoyment and future ideas, Howgill (2015) asks two simple questions: ‘is the exhibition enjoyable?’ and ‘are there further learning opportunities?’ While a primary aim of Prize Books and Politics was to encourage a new understanding of Edwardian Britain, it was essential that this was done in such a way that visitors interpreted and defined the exhibition according to their own needs (Smith and Wolf 1996). The ability to leave comments on Instagram was an important way for visitors to achieve this: by engaging in conversations with one another (and the exhibition curator) about artefacts, the museum experience was democratised, and multiple narratives and memories were generated that co-created collective understanding of the exhibition’s content (Villaespesa and Wowkowycz 2020). Visitors were also able to take on ambassadorial functions by reposting content and thereby attracting more people to the exhibition in a grassroots manner. Halfway through the exhibition, I created a post simply asking visitors ‘are you enjoying Prize Books and Politics so far?’ The responses were overwhelmingly positive and showcased the variety of ways that people ‘enjoyed’ the exhibition: from developing new knowledge about the Edwardians through admiring the art of inscriptions to the escapism offered by the posts. Visitor comments also enabled me to assess the success of the exhibition in real time and helped shape certain content that was not working well, which is harder to do in a physical setting when content has already been printed and laid out.

The further learning opportunities provided by Instagram are manifold. Although the exhibition only ran for two months, the account and content remains live. Thus, it provides a ready-made permanent archive that can be consulted when assessing impact or developing further exhibitions. In contrast, once physical exhibitions have finished,
they are cleared away and few traces remain, despite all the work that went into their initial creation. The permanent archive on Instagram also offers an important teaching resource that can be used to deliver workshops and lectures on digital exhibitions, as well as more reflective writing and arts educational programmes. Over the course of the pandemic, I have used it to teach online and deliver conference presentations, while my MiaB resources have been circulated by several educational bodies in the UK and the USA and used by students working from home.

Table 2 shows a summary of the potentials, constraints and opportunities of Instagram as an exhibition space based on Howgill’s (2015) criteria.

**Conclusion**

Perry (1993) asserts that visitors have three basic expectations when they visit an exhibition: participation, social interaction and intellectual engagement. If visitors have enjoyed themselves, interacted with others and learnt something from the experience, then an exhibition can be classed as successful. Based on an examination of real-time metrics and visitor comments, coupled with post-exhibition survey responses and critical reflection, *Prize Books and Politics* can be considered a successful exhibition. Although its potential impact was hampered by COVID-19, it, nonetheless, was able to gain and retain visitor interest and engagement throughout its two-month duration and encourage users across the world to think about working-class history and book inscriptions in new ways.

Prior to the pandemic, most museums used Instagram for marketing purposes and did not take advantage of its potentials to promote museum collections and establish connections with visitors. Over the past eighteen months, they have rapidly developed

| Table 2. Potentials, constraints and opportunities of Instagram as an exhibition space. |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Design                           | ✓ Greater immersion                                                                                                                |
|                                  | ✓ Enhanced aesthetic experience                                                                                                     |
|                                  | ✓ Signposts to further resources                                                                                                    |
| Comfort                          | × Fixed structure can be challenging for those with visual impairments/dyslexia                                                   |
|                                  | × Cannot reproduce scale and texture                                                                                               |
| Content                          | ✓ Breaks down ‘expert barriers’ of bricks-and-mortar museum                                                                       |
|                                  | ✓ Already familiar with platform                                                                                                   |
|                                  | × Increased competition                                                                                                             |
|                                  | × Shorter attention span                                                                                                             |
| Engagement                       | ✓ Encourages freedom of movement around exhibition                                                                               |
|                                  | ✓ No time limits                                                                                                                   |
|                                  | × No tailor-made routes for specific demographics                                                                                     |
| Enjoyment                        | ✓ Access to international audiences                                                                                                                                                           |
|                                  | ✓ More accessible for disabled people                                                                                               |
|                                  | × Solitary experience                                                                                                                |
|                                  | × Unintentionally excludes children and the elderly                                                                                   |
| Future Ideas                     | ✓ More interactive (talk to other visitors and curators)                                                                             |
|                                  | ✓ Ability to share content                                                                                                           |
|                                  | ✓ Co-creation of narratives                                                                                                         |
|                                  | ✓ Can assess visitor satisfaction in real time and amend accordingly                                                                 |
|                                  | × Labour intensive/requires constant monitoring                                                                                      |
|                                  | • PDF packs with large print/coloured paper                                                                                         |
|                                  | • Greater use of Stories                                                                                                            |
|                                  | • Links to other resources for further reading                                                                                      |
|                                  | • No posts on weekends                                                                                                              |
|                                  | • Targeted activities aimed at certain groups (e.g., challenges, workshops)                                                        |
|                                  | • List of engaged followers to contact for future events                                                                          |
new ways to engage with users through the platform and even reach wider audiences through creative and fun posts that showcase new forms of cultural heritage, break down perceived power structures and increase accessibility. Although only a handful of museums have used Instagram as an exhibition space during the pandemic, *Prize Books and Politics* indicates that the platform is highly suitable for such purposes. While it cannot replace the real-life experience of a physical exhibition, it can work as a useful complement and has an important place in our post-pandemic world.

Instagram exhibitions foster the concept of a ‘learning museum’ (ICOM 2004), extending dialogue beyond the physical setting of a museum, removing geographical boundaries and offering extras to increase engagement with populations that might not visit a museum in person. They also provide an opportunity to share exhibition content with others through retweets and Stories. They can serve as ‘teasers’ to physical exhibitions by exposing people to items that they may then want to seek out in person or can be used to pre-educate visitors so that a deepened conversation takes place in the physical space. They can also enable visitors to interact directly with other users and museum professionals through comments, thereby offering a way of triggering memories, conversations, place-making, aesthetic inspiration and post-visiting sharing that fits with Kidd’s (2011) criteria of ‘inclusivity’ and ‘collaboration’. This, in turn, boosts the physical experience of visiting a museum and maintains interest in the days or weeks following a visit. Thus, more institutions and scholars should harness the potentials of Instagram as an exhibition space to offer an experience that works *in tandem* rather than *in opposition* to the physical exhibition experience. In this way, it will encourage visitors to play an active role in the documenting, (re)cursing, sharing and communicating of content, thereby improving overall visitor engagement and deepening connections within (inter)national and local communities.

**Notes**

1. I worked as a research assistant on this project for three months in 2018, helping to assess its impact in bringing together academic research, museum collections and social media. Beeston is currently developing a book on the topic, *Photographic Women*, due to be released in 2024.
2. The MiaB also comes with a set of microchips that can be attached to copies of each artefact and, when scanned on the box, automatically plays the related audio response. In a real-life setting, this brings to life the artefact held in a visitor’s hand, adding a strong sensory and tactile function to their experience.
3. Unfortunately, it was not possible to obtain data on how many visitors engaged with the Museum in a Box platform alongside the Instagram exhibition as no metric system is in place.

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References


