Digital Initiatives in Online Service Delivery: Case Study of London Art Museums During the COVID-19 Pandemic Lockdown

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1. Introduction

The global outbreak of COVID-19 had a profound impact on the GLAM (galleries, libraries, archives, and museums) sector worldwide. In order to adapt to the challenges posed by the pandemic, museums were urged to prioritise their digital transformations and initiatives, enabling ongoing access to museum resources and fostering a consistent connection with their audiences. As museums and galleries strive to navigate the far-reaching consequences of pandemic-induced lockdowns and envision the future of the cultural industry, it is evident that digital considerations remain important.

In the museum context, the significance of constructing web services and utilising social media platforms to accomplish missions and connect with users has been stressed by many scholars (such as Martin and Lueg, 2013; Enhuber, 2015; Vrana et al., 2019). A democratic and instant communication model that is supported by social media not only brings opportunities for museums to communicate with their followers (Taylor and Gibson, 2017) but also brings challenges to museums' digital initiatives, especially during this period of social distancing.

Therefore, the aim of this study is to investigate how large-scale art museums in London adapted to the COVID-19 pandemic by adjusting their public service delivery and digital initiatives as well as the resulting user engagement behaviours. The research questions that are explored within this context include:

- What campaigns did the museums develop on Facebook during the lockdown?
- How did user engagement behaviours change during this period?
- What can be learned from these practices for future social media arrangements?

The museums chosen for this study are the National Gallery, the Tate (including Tate Modern and Tate Britain), and the Victoria and Albert Museum (V&A). The selection of these museums was based on their collection type, geographical location, and similar scale. Additionally, all three museums are non-departmental public bodies with charitable status (National Gallery, 2022; Tate, 2022; V&A, 2022), further justifying their inclusion in the study.

2. Methodologies

With basic statistical analysis as the main research methodology for this study, the data used is mainly quantitative. With regards to the museums' campaigns, all of the museum posts from the three months before lockdown (23rd of March 2020 in the UK) and three months during lockdown (from 1st of December 2019 to the 30th of June 2020) made by these three art museums' were scraped and analysed. For the assessment of user engagement behaviours on Facebook, the study focused on the interactions: reactions, shares, and comments (see Figure 1), which were the primary means for users to engage with posts during the study period (Facebook, 2021). The study considered the cumulative

count of all these reactions, shares, and comments as a key metric, collectively referred to as "overall engagement" (OE).

Figure 1: Facebook interaction functions <image liu1>
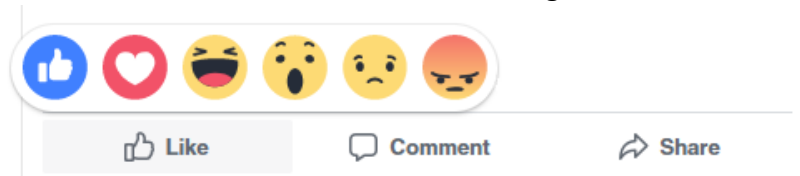
Therefore, a dataset consisting of 863 museum posts, along with corresponding engagement metrics obtained from Facebook's Application Programming Interface (API), was collected for analysis. The dataset included 1,067,598 reactions, 218,195 shares, 38,717 comments, and 10,331 replies to comments. To facilitate analysis, three separate sub-datasets were created, each corresponding to a specific museum. These sub-datasets were saved individually using Microsoft Excel and subsequently visualised using Tableau to examine the changes in user engagement behaviours over time.

Quantitative content analysis was then employed to examine the adjustments made by the museums' digital initiatives and to explore the types of post content that users were more inclined to engage with. To achieve this, open coding was applied to all of the museum posts. This approach, derived from grounded theory, involves building categories or code schemes while reading the research texts (Khandkar, 2009). The coding process involved classifying the posts into categories, encompassing post purposes and post topics. Post purposes referred to the main functions or objectives of the posts, while topic categories captured the content of the posts. A thorough manual examination of the collected museum posts was conducted. This in-depth analysis provided valuable insights into the patterns and trends in the types of content that were being produced and shared by the museums on their digital platforms.

3. Data Analysis and Presentation
3.1 Quantitative Metrics
The data collected was initially analysed quantitatively to identify trends over time. Figure 2 provides an overview of how general user engagement metrics changed from December 2019 to June 2020, the red line denotes the closure date during the lockdown for the three mentioned museums: Tate on the 17th, V&A on the 18th, and National Gallery on the 19th of March 2020. During the lockdown period, the National gallery, the Tate, and the V&A averaged 32, 43 and 42 posts per month, respectively. When comparing this to the period before the lockdown, it is evident that all three museums were relatively less active (as depicted in Figure 2). This decline in activity can be attributed to the restrictions and limitations imposed by the lockdown measures, which affected the museums' regular operations and their ability to engage with visitors in a normal manner.

Figure 2: Average OE per post <image liu2>
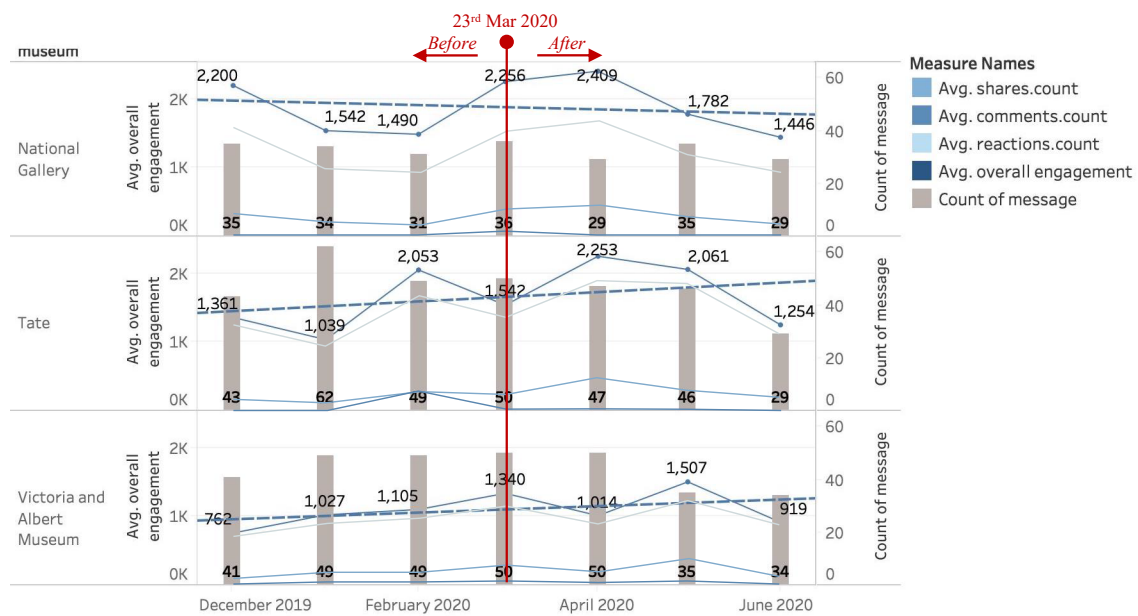
From the perspective of the users, with regards to the average OE per post, Figure 2 shows the upward trends in general for both Tate and the V&A during lockdown, while this dropped slightly for the National Gallery. However, it is noticeable that, in general, all of these museums did experience a peak in average OE on social media during the lockdown, although some fluctuations existed.

Considering the specific ways that users can engage with museums, it is not surprising that reactions and shares were the most common engagement methods, as they are both relatively easy to use and users can respond to the posts instantly. Additionally, although comments were a comparatively less popular way of engaging with museums, the word count of the comments showed an increase in the median and average number during lockdown for both the National Gallery and Tate (see Table1). For example, for Tate, the average word count for comments nearly doubled during lockdown compared to before lockdown. It can be inferred that individuals who did choose to leave comments on Facebook during this time might have been more inclined to provide detailed feedback or engage in longer conversations with the museums.

In addition to analysing the general OE and the average level of the different engagement metrics, the timing of user comments was also examined to gain further insights into user engagement behaviour. Data related to users' active time is typically a useful resource for institutions as it provides insight into the optimum time to reach and engage with users throughout the day (Mahony et al., 2017). Figure 3 below shows a relatively concentrated time for users' active comments during lockdown, spanning from 9am to 9pm local time, with particular spikes of activity between 11am and 1pm and 3pm and 5pm. The lower level of OE in the early morning and late evening hours, compared to pre-lockdown, possibly due to the flexibility of remote work and reduced commuting constraints during the lockdown period.

Table 1: Max/median/average word count of comments before and during lockdown

| Time period	Museum	Max	Median	Average
Before lockdown	National Gallery	236	5	10
	Tate	306	4	7
	V&A	1100	5	9
During lockdown	National Gallery	1648	6	12
	Tate	340	7	13
	V&A	455	5	9

Figure 3: Times that user comments were made (calculated in percentage) <image liu3>
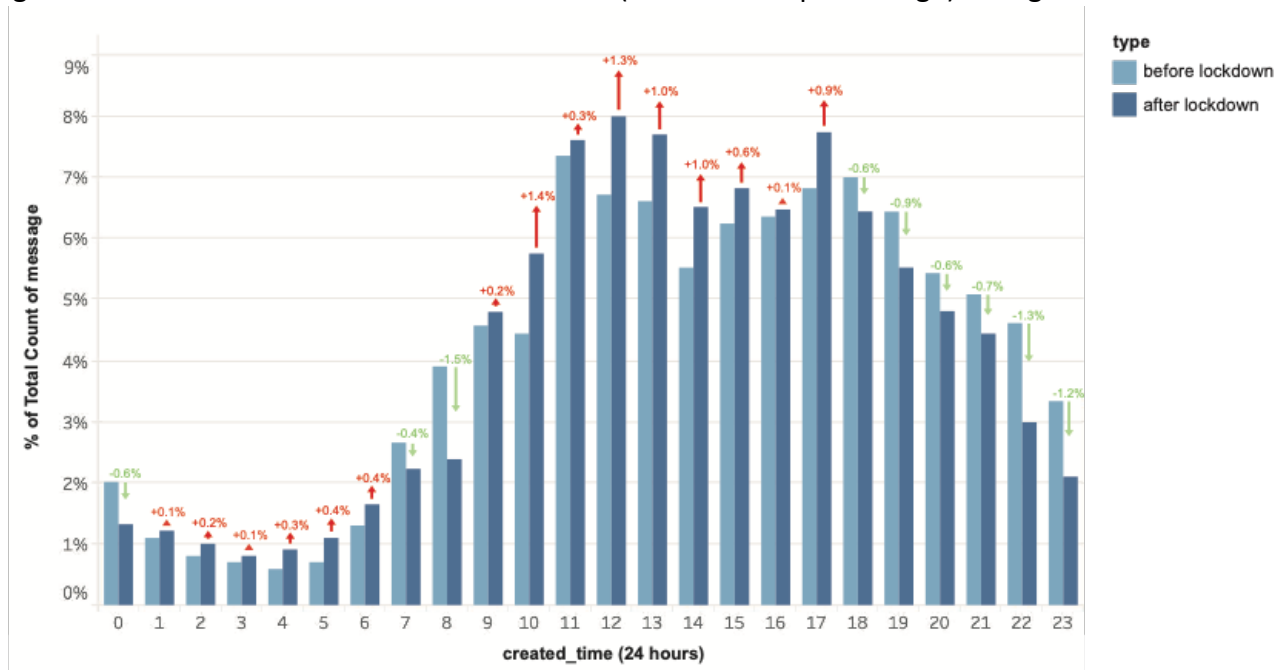
To gain a comprehensive understanding of how users interacted with museum posts, the average OE was analysed based on the format of the post. Figure 4 illustrates the percentage of each post format out of the total content before and during lockdown, as well as the corresponding average OE. The results revealed that photos were the most frequently used format, comprising over 70% of all posts in both time periods. Additionally, during lockdown, none of the museums held live events, which was likely due to physical restrictions imposed to prevent the spread of the virus, but the proportion of visual content increased overall, particularly in the form of video posts.

In terms of the average OE corresponding to posts of each format, in general, posts that are more visually dynamic tend to attract higher OE. Specifically, before lockdown, live posts resulted in the highest user engagement before lockdown, followed by photo posts. However, during lockdown, video posts resulted in greater OE than photo posts. Moreover, the average OE for all of the different types of posts offered during lockdown rose in varying degrees, especially for the video posts and link posts. Therefore, it can be concluded that users during this period were more willing to spend longer time to engage with the museums' posts.

Figure 4: Proportion of different formats of posts and average user engagement with posts of different formats <image liu4>
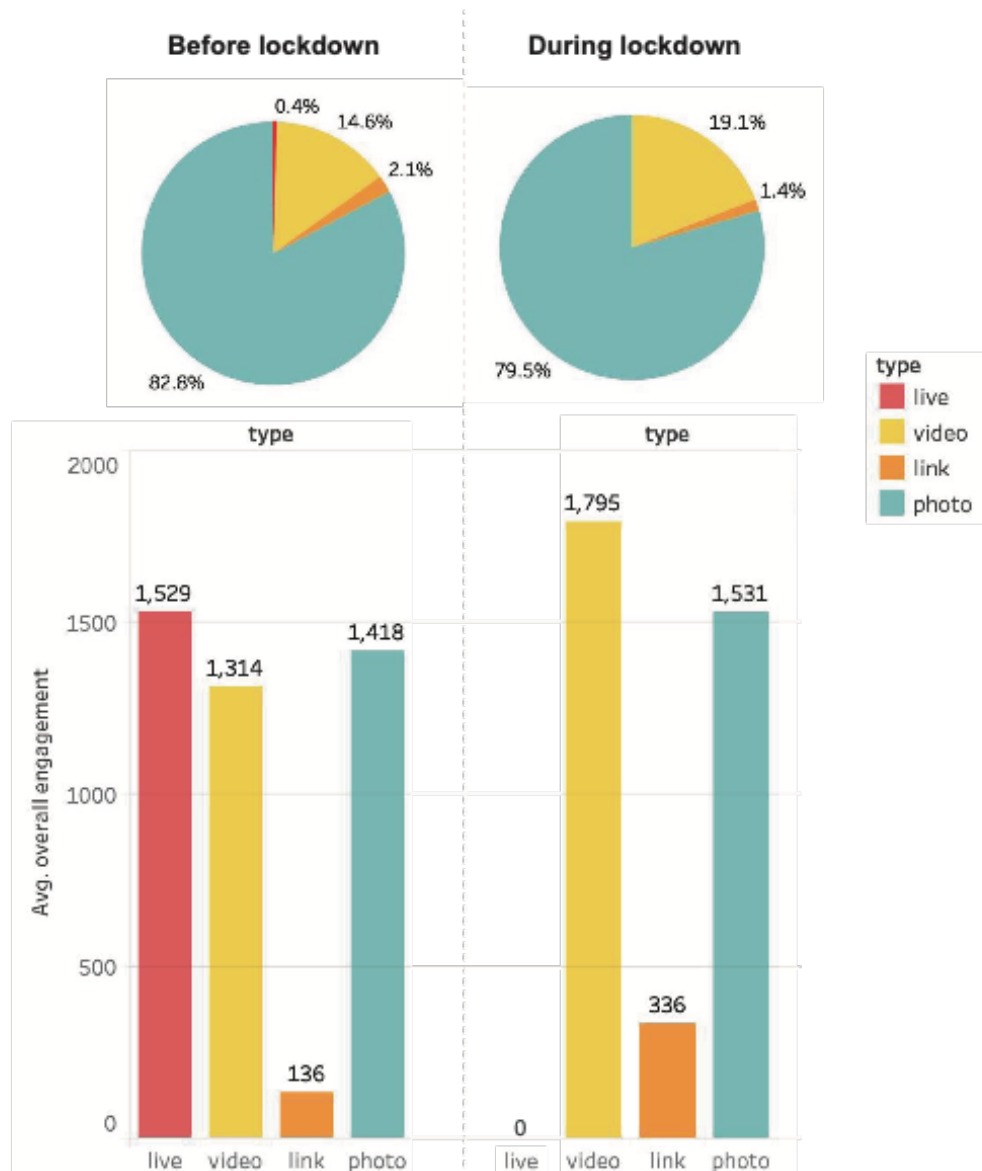
3.2 Analysis of museum posts

With regards to the post content, through the analysis and comparison of all the social media posts before and during lockdown, all of the identified purposes of the posts are summarised in Table 2, as well as their percentages and the corresponding user engagement. Celebration posts and remembrance posts are both offered for special days, festivals, or commemorations. Posts with an appreciation purpose show gratitude on behalf of the institutions. Commentary posts, education posts and share posts disseminate art-related information and knowledge with different amounts of information, from more to less respectively. Announcement posts publish formal statements, while promotion posts are to encourage the publics to visit or increase people's awareness of museum activities. Interaction posts are used to code the mobilising posts or call people to participate in and respond to museum activities.

As shown in Table 2, before lockdown, the most common (43%) purpose of the art museums' Facebook posts was self-promotion. It was also used as a platform to share (19%) and educate (17%). During lockdown, although the main purposes of the museum posts stayed the same, the ratio of each purpose differed from the period before lockdown. Specifically, the percentage of promotion posts dropped by 34%, while the percentage of posts with education and share purposes increased by 8% and 17%, respectively.

From the perspective of the users, remembrance posts were more likely to attract them to engage with. Moreover, celebration and appreciation posts attracted greater interest from the public during lockdown, while the interest in announcement posts and commentary posts were lower compared to before the lockdown. Furthermore, the OE with posts for the purposes of educating the publics of art, generally sharing art-related information, and interacting with users all showed an upward trend.

Table 2: Tagged post types from three art museums

Post purposes	Before lockdown		During lockdown		Changes	
	Avg.OE	Percent%	Avg.OE	Percent%	Avg.OE	Percent%
Celebration	1514	2	2895	4	+1381	+2%
Remembrance	2844	6	2837	8	-7	+2%
Appreciation	1181	1	2782	1	+1601	0
Commentary	2041	5	1741	7	-300	+2%
Education	1557	17	1691	25	+134	+8%
Announcement	4498	2	1603	4	-2895	+2%
Share	1129	19	1524	36	+395	+17%
Interaction	997	5	1365	7	+368	+2%
Promotion	1071	43	850	9	-221	-34%

Regarding the identified post topics listed in Table 3, the percentage of posts related to both regularly posted content (such as Work of the Week from Tate and #Didyouknow from the V&A), online collections/resources and artists/artworks/art style related posts increased during lockdown. Additionally, it is reasonable that the percentage of posts on exhibitions/events, and courses/workshops dropped during lockdown because of limits on in-person gathering.

While for the users, on average, demonstrated increased OE with most types of posts during the lockdown period, except for posts related to physical museum visits. Notably, posts responding to current affairs experienced the highest growth in OE. This can be attributed to the announcement of the museums' closure on Facebook, which generated a higher level of engagement due to the unexpected nature of the news. Posts related to in-gallery/exhibition tours and behind-the-scenes content also saw a significant increase in average OE during the lockdown. Besides, posts showcasing behind-the-scenes content, such as exhibition set-up and the preservation of collections, remained popular topics for engagement both before and during the lockdown.

It is important to note that the increase in average OE for these types of posts indicates a heightened level of interest and interaction from users during the lockdown. While physical museum visits were no longer possible, users showed a stronger engagement with virtual experiences and the behind-the-scenes aspects of museum operations.

Table 3: Tagged post topic from three art museums

	Before lockdown		During lockdown		Changes	
Post topics	Avg.OE	Percent%	Avg.OE	Percent%	Avg.OE	Percent%
Behind the scenes	1950	1	2934	3	+984	+2
Regularly posted content	1835	18	2260	25	+425	+7
Projects and collaborations	1384	6	1881	2	+497	-4
In-gallery/exhibition tours	699	1	1718	1	+1019	0
Current affairs/Museum actions	423	1	1627	4	+1204	+3
Artists/Artworks/Art style	1140	33	1245	49	+105	+16
Online collections/resources	793	1	1221	6	+428	+4
Handicrafts/drawing techniques	254	1	1041	3	+787	+2
Exhibitions/ Events	959	33	724	3	-235	-30
Online shop	359	3	522	4	+163	+1
Courses/Workshops	613	2	0	0	-613	-2

4. Discussion

The previous section shows the online practices on Facebook of the National Gallery, the Tate, and the V&A as well as their corresponding online user engagement behaviour during the period before and during lockdown. The findings show that from the perspective of general museum practice, although the main function of the Facebook platform stayed the same before and during the COVID, however, all three museums adjusted their Facebook strategies in terms of both post type and content. To be specific, Facebook became more of a platform for information, providing more art-based educational content, instead of being a promotional platform dominated by content related to museum exhibitions, activities, and events (shown in Table 2 and Table 3). Moreover, the posting frequency also reflects the challenges that museums faced in maintaining their usual level of activity. However, the data indicates that the museums that posted more content on the Facebook generally led to more user engagement.

According to Falk and Dierking (2016, p.123), users in the digital age exert increasing control over the content and experiences they seek, which is further evident in the user engagement behaviours observed in this study. Based on the statistical data presented above, several noteworthy findings emerge regarding users' online habits during the studied period. Firstly, there is a notable presence of longer comments, as indicated in Table 1, suggesting that users displayed a greater willingness to actively engage with museum posts

during the lockdown. Secondly, visually dynamic content, particularly live posts, demonstrated high appeal to users, despite being less common. These live posts received the highest average OE, underscoring their interactive nature and effectiveness in disseminating art knowledge. Besides, it is understandable that photo posts, with their instant viewing capability, received high user engagement prior to the lockdown, while video posts exhibited a higher average OE during the lockdown, highlighting their potential as an effective means of attracting users.

Table 2 shows that the posts with celebration and appreciation purposes led to higher OE, which is probably due to the situation of the lockdown, during which the public was experiencing a difficult period and these types of content were relatively more positive and inspiring. This seems to indicate the necessity for museums to be responsive to current affairs while expressing their messages in an empathic way. This can also be demonstrated by the high average OE of the posts with current affairs as the topic. These types of content are not only beneficial in getting close to the public but also useful in showing how museums are taking on social responsibilities as a kind of public institutions.

Considering the post topics, utilising museum-created tags or topics can be considered as effective online practices in establishing and maintaining a consistent and engaging relationship with museum followers. By doing so, museums can cultivate anticipation and familiarity among their audiences, resulting in a stronger connection. Additionally, posts that provide behind-the-scenes glimpses into the inner workings and research processes of museums are particularly engaging. Such content offers unique experiences, bridging the gap caused by limited physical access. Through these posts, museums connect with their audience on a deeper level, showcasing their dedication, expertise, and efforts involved in curating and preserving collections.

Overall, these findings of this study emphasise the significance of delivering consistent web service and diverse content to engage users, particularly during periods when physical access to museums is limited. By providing empathetic, supportive, and regular content, museums can establish a meaningful online presence and ensure a continued user engagement even in challenging circumstances.

5. Conclusion and Future Plans

This study addresses how museum digital initiatives and user engagement with Facebook changed during the COVID-19 lockdown in Britain. As digital technologies become more common and available, the utilisation of social media can help museums break the limitations of the space and time. While digital technologies are not the panacea for all museums' issues, adjusting digital initiatives is necessary for museum institutions in keeping up to date and staying competitive. Furthermore, as proposed by Falk and Dierking (2016, p.265), digital efforts towards virtual visitors are as necessary as physical visitors. Therefore, continually observing the ways, the reasons, the places and the content that users are consuming is useful in better communicating and engaging with them, as well as the better use of museum resources, especially under some emergency situations.

The pilot study, as the first stage of an ongoing research, tested the feasibility of the research methods and design. The whole study aims to understand the user engagement

patterns with different digital information services provided by museums. There are some limitations to this study. In terms of research methods, the subjectiveness of coding is an unavoidable weakness of content analysis (Mayring, 2004, p.161). The data samples for this pilot study are only large-scale art museums in the UK, so the results might be inapplicable to other types of museums or institutions in other countries. Moreover, this pilot study as part of the whole PhD project that is particularly concerned with the recent pandemic lockdown and discusses the quantitative aspects of data mainly.

The next step of research is to analyse longer timeline of museum practices and corresponding user engagement behaviour from both the quantitative and qualitative perspectives. Therefore, in the future work, more qualitative data such as the content of user comments will be included and analysed in order to gain a deeper understanding of user perceptions. Also, the data sample could be extended to include more museums posts so as to get a more comprehensive understanding of museum online practices over time.

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