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Instagram communication strategies of European museums

Ainhoa del Pino Rodríguez-Vera^a, Carlos de las Heras-Pedrosa^a  and Carmen Jambrino-Maldonado^b

^aFaculty of Communication Sciences, Universidad de Málaga, Málaga, Spain; ^bFaculty of Marketing and Management, Universidad de Málaga, Málaga, Spain

ABSTRACT

In recent years, new technologies have made it possible to reproduce cultural content through new social media tools, thus ensuring the development of cultural heritage on a global scale, but museums have not always seen the introduction of these media in their strategies in a positive way. This article focuses on the analysis of public engagement with the collections of the five most reputable museums in Europe through the visual social media platform, Instagram. The study explores public engagement through a mixed-methods approach, with data mining using the Fan Page Karma monitoring tool. The findings show the value of active listening and interaction with user-generated content as a key component of reputation and image, reflecting the importance of two-way communication. The research may also be useful in the future to help improve strategies in the digital ecosystems of museum institutions.

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1. Introduction

For years, museums have been regarded as one of the main driving forces in the education and economic development of destinations (Van Riel 2021; Van Riel 2019). Museums also play an important role in promoting tourism and creating jobs (Ayala, Cuenca-Amigo, and Cuenca 2020; Jafari, Taheri, and vom Lehn 2013; Lukáč et al. 2021). Museums are responsible for the preservation, conservation and even research of cultural works (Raimo et al. 2022). They prepare these museum pieces to present them to society in an educational, social and exploratory way, thus contributing to a sustainable future (Choi, Berridge, and Kim 2020).

Over the years, entertainment has been added to the museum experience (Özdemir and Çelebi 2017). One of the main reasons for this change is the evolution of society itself, to which museums must adapt (Lamas Álvarez 2020). This has led to museums being recognised as multi-functional institutions, incorporating education, entertainment and social interaction (Choi, Berridge, and Kim 2020).

Today, culture has become one of the main reasons why visitors come to a city or tourist destination and one of the main leisure activities promoted by cities. Therefore, museums can be considered as one of the main institutions that promote the art and culture of destinations to society. (Alvarez 2010; Carey, Davidson, and Sahli 2013; Cellini and Cuccia 2013; Noonan 2023; OECD 2008; Özdemir and Çelebi 2017; Plaza 2000). Museums are becoming places of social interaction where citizens can spend their leisure time, providing not only education but also entertainment to compete in an increasingly diverse market (Capriotti 2010). Museums are closely linked to people's use of time (Roberson 2010). They should

CONTACT Carlos de las Heras-Pedrosa  cheras@uma.es  Faculty of Communication Sciences, Universidad de Málaga, Campus de Teatinos s/n, Málaga, Spain

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therefore develop communication strategies inspired by successful activities in other entertainment industries or educational institutions. As mentioned above, the importance of museums in promoting tourism industries and generating local employment is undeniable. Due to their link with people's leisure time, museums should develop communication marketing strategies inspired by the successful practices of other entertainment and educational entities competing for the public's attention and interest (Lukáč et al. 2021).

For a long time, interaction between museums and visitors was based on membership programmes supported by large advertising budgets. Museums, originally conceived as private collections exhibited as rarities for the enjoyment of a privileged few in 'cabinets of curiosities', have undergone a significant transformation since the 1990s. In this period, visitor experience, education and entertainment have been incorporated into mission statements alongside more traditional curatorial functions. The evolving role of the museum is a recurring theme that urges us to examine current trends and changes in its approach (Babbidge 2015; Booth and Powell 2016).

However, with the help of the Internet, museums have been able to be present and develop low-budget marketing strategies (Chung, Marcketti, and Fiore 2014). In light of the above, it is clear that the current situation of these museum organisations and the way they communicate has changed completely in a very short time, but this new way of communicating is here to stay (Rodríguez-Veras, De Las Heras Pedrosa, and Lugo-Ocando 2023).

At the beginning of the 21st century, new communication strategies and openness to dialogue with visitors became a key issue in museums. It is precisely in these years that social networks are emerging (Claes and Deltell 2019). New technologies have been used for years in the world of cultural tourism, such as audio guides. Other tools are more innovative, such as virtual tours or interactive installations (Foronda, Mondelli, and Carboni 2021). Another new form of communication began to emerge with the creation of websites by museums as the only way for them to be present on the Internet (de las Heras-Pedrosa et al. 2022).

Museums have realised that their existence depends entirely on their audiences, and that without them they will not continue to exist (Fletcher and Lee 2012). With the help of new marketing and communication strategies, museums have become aware of this more two-way interaction (Amitrano, Gargiulo, and Bifulco 2018; Claes and Deltell 2019; Sökmen, Yolal, and Özel 2020). Therefore, creating a strong online presence on social media sites, and in the case of museums, Instagram in particular, has been shown to generate more interest than traditional media (Rodríguez-Veras, De Las Heras Pedrosa, and Lugo-Ocando 2023). However, it is essential to understand visitor behaviour in the light of changes in new information technologies, as social media play an increasingly important role in the tourism sector and, consequently, in museums (Özdemir and Çelebi 2017).

Many museums, especially the best-known museums in the world, are already using social networks and other Web 2.0 media. Some museums use podcasts, blogs or social media (Fletcher and Lee 2012), which is the focus of this research, to promote their exhibitions and motivate the public to visit their facilities and collections.

The key point in the transformation of museums in terms of their relationship with society has been using social media as part of their communication strategy (Booth, Ogundipe, and Røyseng 2020). The connection between museums and their audiences is evolving towards more interactive and collaborative modes through the use of social media platforms and museum technologies. This shift implies a move away from a purely informational function towards a conversational and participatory approach (Capriotti 1970). Despite this, the introduction of these social media into institutions has not always been viewed positively by museums, who feel that they are not 'serious' platforms or that the opinions of users can have a direct and negative impact on the perception of the museum (Badell 2015; Budge 2017, 2020). However, thanks to new technologies, it is possible to reproduce cultural content through new social media tools and thus ensure the development of cultural heritage on a global scale (Foronda, Mondelli, and Carboni 2021).

Over the past decade, social media has revolutionised the way collections and museums communicate with the public, sharing knowledge and information in real time (Lessard, Whiffin, and Wild 2017). Social media is helping to shape and co-create popular culture through its users; this is being achieved through digitalisation as people with similar interests find each other and take it upon themselves to create new

or previously minority communities (Reichenberger 2021). Although more and more museums are using social media, it seems that most are not making the most of it, focusing on using it as a traditional promotional channel, which is a mistake (Brown, Smith Dahmen, and Jones 2019; Suzić, Karlíček, and Stríteský 2016).

In recent years, there has been a significant growth in research on the internet and social media in the field of public relations. This is due to the increasing opportunity for organisations to communicate with their audiences through these media (Capriotti and Herrero 2017; Capriotti, Carretón, and Castillo 2016). Social media has led to the democratisation of communication and has changed the broader context of citizen participation by promoting two-way communication (Bosello and van den Haak 2022; de las Heras-Pedrosa et al. 2022). This two-way communication has particular implications for museums (Amitrano, Gargiulo, and Bifulco 2018; Fernández-Hernández, Vacas-Guerrero, and García-Muiña 2021; Hooper-Greenhill 2010). The digital reorganisation of museum culture is based on the new relationship between the museum and the public through a more dynamic approach to the encounter between visitors and museum narratives, which can range from more traditional mediation to co-creation (Amitrano, Gargiulo, and Bifulco 2018; Taylor and Gibson 2017).

In recent years, the lines of research on the use of social networks with images in the communication of museums and institutions are beginning to arouse interest among researchers, especially in social networks such as Instagram (Merrit 2020; Rivero et al. 2020; Souza and Lee 2020; de las Heras-Pedrosa et al. 2022; Agostino, Arnaboldi, and Lampis 2020; Budge 2020).

Instagram is a social media platform that is primarily used to share experiences between users (Amalia and Hanika 2021). The difference between this social network and other social media is that it adapts to the visual nature of the museum's work and also serves as an educational tool, although the target audience is in a completely different location. In this way, a potential and diverse audience is reached with attractive and visual content (Brown, Smith Dahmen, and Jones 2019).

In the tourism sector, research shows that Instagram is more effective than Facebook in terms of three variables: instability, frequency and previous social media communication activity (Gutiérrez et al. 2021). Today, no one questions the relevance of Instagram, which has positioned itself as an image-based social network that combines Twitter's text messaging with Twitter's social media (Amanatidis et al. 2021; Weilenmann, Hillman, and Jungselius 2013).

Instagram is known as a key social media platform that delivers unprecedented experiences through visuals (Budge 2020; Özdemir and Çelebi 2017). These image platforms are a great help for communication and promotion on social media, as they allow you to generate content in a simple and very visual format (de las Heras-Pedrosa et al. 2022). What makes Instagram particularly interesting for museum management is the power of images and their communication, and the ability to experience them through photo and video sharing (Budge 2020; Villaespesa and Wowkowych 2020).

Art exhibitions are in synergy with the communication model used by social networks, which offer an immensity of photographs. Art and Instagram come together in an educational and entertaining space for its public (Rivero et al. 2020).

For all the above reasons, this research work focuses on analysing the results of the Instagram content of five European museums. As a result, the following research questions arise:

RQ1: What content management approaches do museums usually apply?

RQ2: How have museums used Instagram to disseminate knowledge and culture?

RQ3: Is there a relationship between engagement and interaction of museums with their followers in the audiences of museums' Instagram accounts?

2. Methodology

The study was conducted using a mixed methods approach. According to Krippendorff (2018) the combination of qualitative and quantitative approaches increases the accuracy of the research and its findings, as well as generating new knowledge from this holistic and complementary view provided by the combination of methods. In addition, it reflects the complexity of certain phenomena (Coyle and Williams

2000). The use of content analysis is supported by Weber (2011), who states that it is a particularly useful technique for evaluating social media content and allows researchers to make inferences based on their information (de las Heras-Pedrosa et al. 2022).

There is an analysis of the communication strategy on Instagram of five museums in Europe. For each European country, the museum with the best reputation was chosen, according to a study carried out by the Rotterdam School of Management- Erasmus University (Van Riel and Heijndijk 2017) (Table 1).

Therefore, the quantitative analysis was carried out by extracting the content generated on the official accounts of the five museums (Musée du Louvre, France; Van Gogh Museum, Netherlands; British Museum, United Kingdom; Musei Vaticani, Vatican City; Museo del Prado, Spain) between 1 January 2022 and 30 August 2023. The researchers examined the 2176 digital contents generated on Instagram. From the qualitative approach, a content analysis of a random selection stratified sampling with proportional allocation of 217 publications was applied, representing 10% of the total number of posts.

Following Coelho et al. (2016), general statistics on the volume of publications and other metrics such as likes or engagement contextualise the museums' activity. Nevertheless, the analysis focuses on Instagram due to the volume of users, the average time of use, and the features and functionalities of this social media focused on photo sharing (Ocon et al. 2012). In addition, according to The Social Media Family (2023), 60% of users who make use of the Instagram social network are between 18 and 40 years old. Audiences in this age group are more likely to follow cultural accounts, interact with cultural content and discover new forms of cultural expression through the platform. It is of note that the number of followers, daily activity, engagement reactions (likes and shares), and interactions (comments) provide a complementary basis for this methodological decision (Table 2).

Content analysis focusing on both the images (still or video) and the accompanying text are taken into account in the research. Understanding the type of content, the approach and the effect on the audience's reactions and interaction were some of the main questions. To this end, the study focuses on a series of qualitative variables such as 'image classification', 'domain', 'narrative style' and 'emotions'.

Table 1. A reputation study of the 18 most famous art museums among visitors in 10 countries.

Museums	Average reputation
Musée du Louvre, Paris	84.3
Van Gogh Museum, Amsterdam	81.9
Rijksmuseum, Amsterdam	81.7
State Hermitage Museum, St Petersburg	81.4
British Museum, London	80.8
Musée d'Orsay, Paris	80.6
Musei Vaticani, Vatican City	80.4
Museo del Prado, Madrid	80.0
National Gallery, London	79.5
Metropolitan Museum of Art, New York	79.3
National Gallery of Art, Washington D.C.	79.1
Tate Modern, London	78.9
Museum of Modern Art, New York	78.4
Musée National d'Art Moderne, Paris	78.4
Reina Sofia, Madrid	78.2
National Art Center, Tokyo	77.5
Shanghai Museum, Shanghai	75.0
Centro Cultural Banco do Brasil, Rio de Janeiro	74.4

Source: Rotterdam School of Management Erasmus University.

Table 2. Main Instagram metrics for museums.

Museum	Total number of publications	Fans	Interactions	Posts/day	Total Reach, Comments, Shared	Number of publications qualitative analysis
Van Gogh Museum	603	2,454,926	1.48%	0.991776316	74,983	60
Museo Nacional del Prado	536	1,150,307	0.86%	0.881578947	87,445	54
Vatican Museums	373	347,157	1.93%	0.613486842	15,767	37
British Museum	358	2,196,020	0.39%	0.588815789	45,529	36
Musée du Louvre	306	5,075,887	0.75%	0.503289474	70,056	30
Total	2176	11,224,297	5.41%	3.578947368	293,780	217

Table 3. Technical sheet for content analysis.

Study variables	Qualitative analysis			
	Classification of images	Content domain	Narrative styles	Emotions
Post	Painting / Artwork	Corporate	Narrative	Joy/happiness
Likes	Collection / Exhibition	Information	Descriptive	Anger
Comments	Artist/s	Education	Persuasive	Sadness
Interactions	Own Events	Entertainment	Psychological	Surprise
Engagement	Experiences	Engagement Social Causes		Neuter
Followers	Art Lovers			Resilience
Fans	Museum			Uncertainly
	Special Dates & Museum			
	Others			

Following Peters et al (2013), content analysis will be analysed from three aspects: *content quality*, subsuming content domain (e.g. education, entertainment, information, etc.), and narrative styles (e.g. narrative, descriptive, persuasive, etc.) and *content valence*, subsuming emotions (e.g. anger, sadness, joy, etc.). However, for the classification of the images the methodology used by de las Heras-Pedrosa et al. (2022) has been used for the analysis of museum content in social networks, whose study variables are as follows: Painting/Artwork, Colletion/Exhibition, Artist, Own Events, Experiences, Art lovers, Museum, Special dates & Museum. Table 3 shows the technical evaluation sheet (Table 3).

Depending on the results obtained from the qualitative variables and which ones predominate in each museum during the content analysis, it will allow us to examine whether the priority is to improve the image of the museum, to maintain the memory of the 'brand', to strengthen relations with the public, to connect with potential visitors, and so on. The originality of the work, and therefore of the methodological approach, places particular emphasis on the reputational aspects and on the interaction and management of relations with the public through the social media content management strategy.

Finally, the text mining software Kh Coder was used to calculate word frequencies and word networks and the software Fanpage Karma to evaluate the main interaction variables for the museum accounts; determining: followers, number of likes, number of posts, total number of comments, total number of reactions, posts per day, actual comments per post, etc. (Gonzalez-Carrion and Aguaded 2020) (Gonzalez-Carrion and Aguaded, 2020).

It is important to highlight the robustness of the methodological design, which qualitatively and quantitatively analyses the content generated on Instagram by the museum's official account, providing greater consistency to the analysis. Furthermore, the use of Fanpage Karma and Kh Coder as analysis tools, with their advanced algorithmic analysis functionalities, allows us to better manage and exploit the information resulting from the volume of content.

After coding on the basis of the established categories, a level of agreement between two coders of 93% was obtained. The Cohen's kappa coefficient (k) was then calculated to obtain the probability of agreement between two coders. This probability is defined as the agreement statistic between two researchers corrected for chance (Cohen, 1960). As the result obtained was close to 1 ($k=0.86$), the goodness of fit of this statistic was considered.

3. Results

In response to research questions 1 and 2, and with the aim of exploring the content management strategies of each of the museums, an initial analysis was carried out to identify the main themes of their publications and then to analyse the tone of the messages.

3.1. Patterns of content strategies on Instagram

3.1.1. Classification of images

Most of the content of the five museums revolves around paintings and artworks, collections and exhibitions, artists and their own events, and institutional information about the museums, followed by

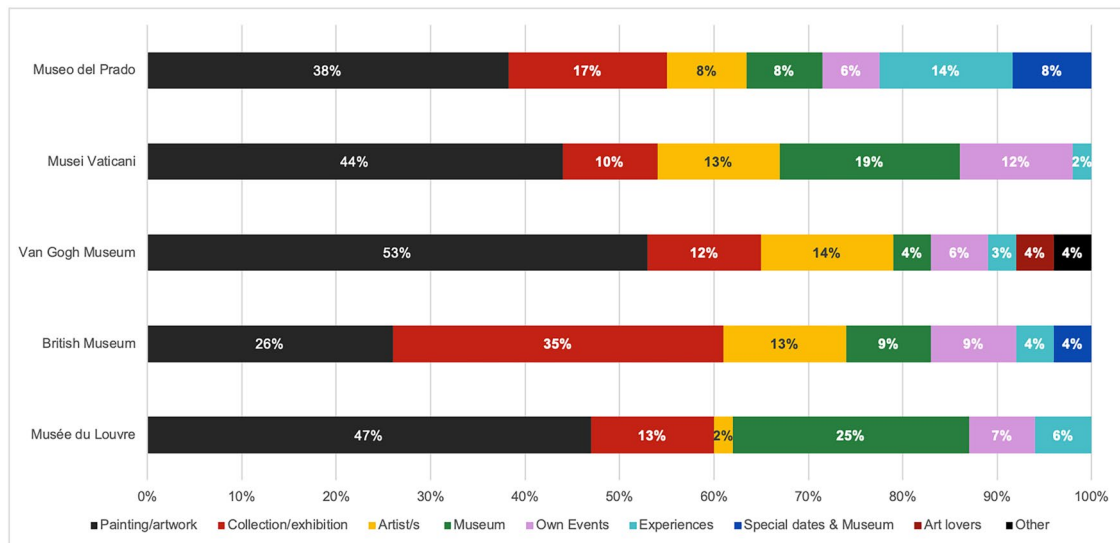


Figure 1. Classification of posts on Instagram for each museum.

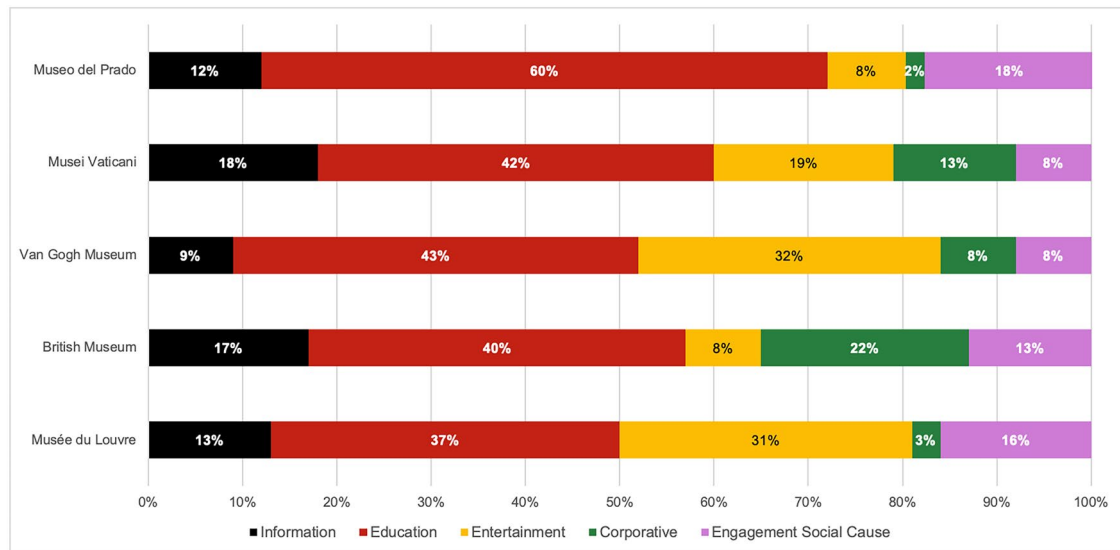


Figure 2. Domain representation.

information about experiences and art lovers. Although 55% of the content in the five museums relates to paintings/artworks and collections. The Van Gogh Museum stands out with 53% on paintings/artworks. On the other hand, the British Museum focuses its content on collections/exhibitions with 35% of its posts (Figure 1). The museums focus their strategy on creating participatory content. To this end, they are creating content that was hidden and that will attract the public's interest. An example of this is the Museo del Prado, with a large number of workshops on techniques, trends or curiosities related to the restoration or conservation of works of art, or also connecting with the public through conferences on works of art, artists or even launching challenges such as #GuessTheArtist, sharing experiences in the museum or reproducing a work of art themselves.

Although it is true that most of the museums studied give priority to their paintings, artworks or collections in their strategy, they always explain the content of the images. Another noteworthy aspect, especially in the Musei Vaticani and the Musée du Louvre, is institutional information or information about the museum itself. In the case of the Museo del Prado and the British Museum, an attempt is made to engage with the public by celebrating international days such as Mother's Day, Earth Day, Father's Day or Women's Day.

3.1.2. Content domain

Figure 2 represents the Domain, showing how museums have a common pattern in their communication strategy on Instagram in the Education category. All of them dedicate at least 40% of their posts to educating their followers. Entertainment plays a very important role, especially in the Van Gogh Museum (32%) and the Musée du Louvre (31%). The British Museum (22%) stands out for its corporate communication about the museum itself. On the other hand, the Museo del Prado (18%) and the Musée du Louvre (16%) stand out for the difference in the existence of messages focused on raising awareness of social causes.

Informative communication has been relegated to the background in all the museums. Looking at their strategies, it can be concluded that museums have taken an active role in educating their visitors and followers on social media.

Therefore, it could be said that the museums analysed have opened their 'virtual doors' in order to educate and entertain. The posts on Instagram no longer only include photographs or virtual realities of their exhibitions or artworks, but also show the public more unknown aspects that cannot normally be seen during in-person visits, such as restoration work.

3.1.3. Narrative style

The way posts are written is paramount for reaching audiences. For this reason, the style of the text can be essential. At this point, the researchers wanted to analyse whether the posts are descriptive, narrative or persuasive. The text of the posts is examined to identify key elements that indicate the type of discourse used. For example, descriptive posts tend to include sensory details and factual data, while narrative posts focus on telling a story and persuasive posts appeal to emotions and logical arguments to convince the reader.

As in other forms of advertising, descriptive communication has given way to narrative and persuasive communication. In the case study, in most of the museums, there is a greater concentration of persuasive and narrative messages in the style of the messages published (Figure 3). Only in the case of the Museo del Prado did they use 25% to describe their messages as opposed to 17% which were persuasive. Therefore, 58% of their communication is narrative. The museums that prefer a more persuasive style are the British Museum (48%) and the Van Gogh Museum (44%). The Musei Vaticani prefers narrative messages (69%) followed by the Museo del Prado (58%). The Louvre uses narrative messages the least (38%). In fact, the Paris Museum is the most balanced in its use of communications, with 38% using persuasive messages, 24% descriptive and 38% narrative.

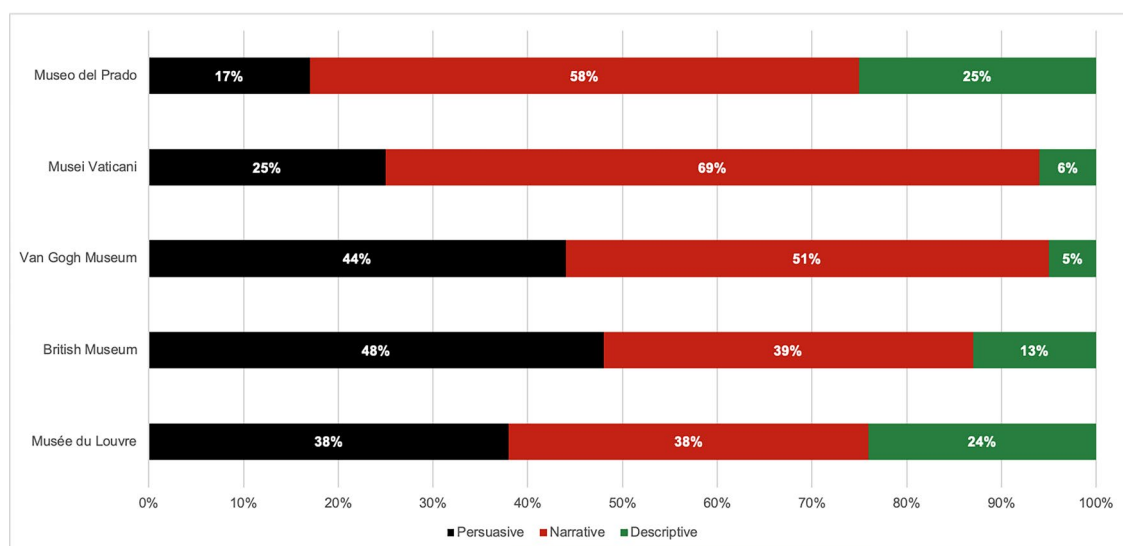


Figure 3. Narrative Style of posts on Instagram for each museum.

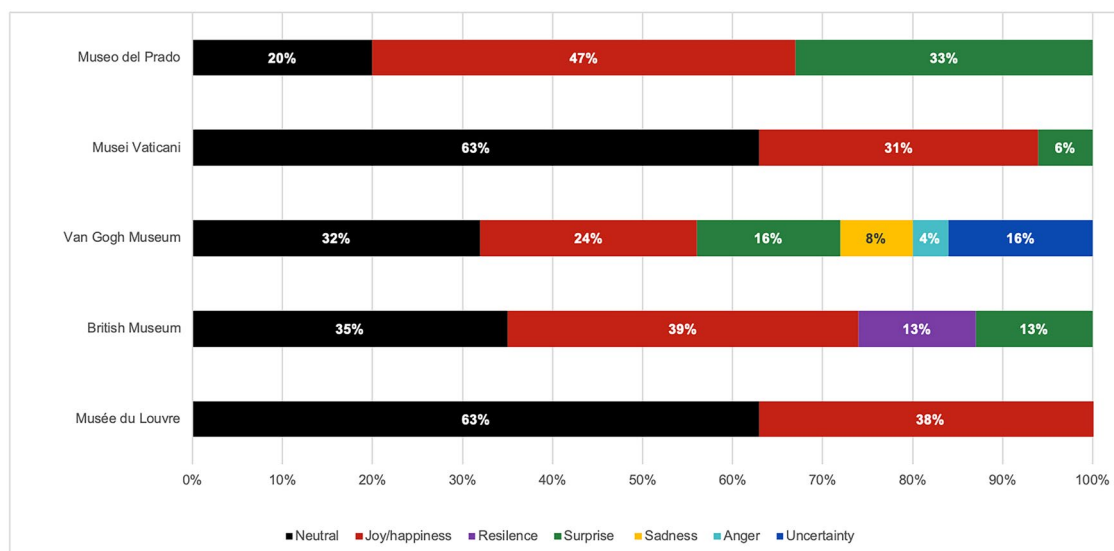


Figure 4. Emotions and feelings conveyed in posts.

3.1.4. Emotions

Another fundamental aspect to determine the quality of the content is the emotions and feelings that the museums convey in their posts. Seven emotions have been selected: joy/happiness, neutral, surprise, sadness, anger, uncertainty and resilience.

As can be seen in [Figure 4](#), the Musei Vaticani and the Musée du Louvre have a predominance of neutral feelings with 63% of their publications. As for the Museo del Prado, the predominant emotion is happiness (47%), followed by surprise (33%), as most of its publications, which are videos, tell interesting facts about the work and the author that the public does not usually know.

Therefore, in relation to tone, a common approach is maintained, concentrating on a positive and very positive tone. The weight of the neutral tone is also notable and makes sense when it comes to messages describing a work of art, an artist, the celebration of an event in the museum. The representation of negative or very negative tone is almost non-existent and only in the Van Gogh Museum are emotions such as sadness, anger or uncertainty observed. An additional issue is the significant relationship between the most positive tone with the highest volume of comments and likes. Followers seem to expect messages with a positive tone depending on the type of activity to which their digital or physical enjoyment relates, for example leisure. Resilient messages are under-represented and only used by the British Museum with 13% and all are related to gender equality through exhibitions, women artists, coinciding with Women's Day, 8 March.

The parameters obtained are consistent if we look at other studies (de las Heras-Pedrosa et al. 2022) of communication in the social media of museums, where neutral publications or those promoting joy and happiness were the most numerous, with 37.5% and 27%, respectively. This is in line with the results obtained for this period, where neutral or joy/happiness messages predominated (42.6% and 35.8%, respectively).

3.1.5. Words and hashtags

The word and hashtag frequency tables used to configure the word clouds ([Figure 5](#)) and hashtags ([Figure 6](#)) were extracted using Fanpage Karma and Kh Coder software. The 50 words or hashtags most frequently used by the five museums were selected to determine the total impact obtained.

In the top 50 words closely related to art stand out. For example, 'painting' is the most used word for the five museums, followed by 'art' and 'artist'. This is followed by the museum names 'Vincent Gogh', 'Vatican', 'Louvre', 'Prado' and 'British'.

It is worth highlighting the priority use of English as the international language for their commentaries; clearly aimed at an international audience. The use of words with a strong technological accent

As a result of using these names without a clear criterion as to what their brand is, their impact has been divided, with the Museo del Prado outranking them in all three cases. Finally, there is the British Museum, which uses a single brand like the Museo del Prado, although in this case with the advantage of coinciding its native language with the international one, but with less impact because it does not use the hashtag #BritishMuseum in all its publications, preferring to add one that is related to the publication it is making. For example: #Stonehenge or #AncientEgypt.

A common element in all five museums is the promotion of specific activities through their hashtags. Examples in green are #LouvreAnecdotes, #LouvreDetails, #vangoghinspires and #SistineChapel.

Finally, with the exception of the Van Gogh Museum, which refers to #amsterdam in its hashtags, the other museums do not regularly include the cities or countries in which they are located in their top hashtags.

3.2. Descriptive analysis

In order to answer question 3 of the research, and with the aim of exploring the communication management strategies of each of the museums, a quantitative study was carried out, analysing each museum's posts, followers, likes, engagements, interactions, etc. The evolution of each of these variables of museums during the analysis period was studied and a comparison was made between them to see how their communication strategies influenced the results.

The results obtained provide a clearer view of the interaction carried out during the study period, with regard to the content they propose and the reaction they obtain from their audiences. Together, the data found is related to the level of commitment acquired by the museums in terms of two-way communication with their audiences.

Table 4 shows the main indicators for museums over the period analysed.

The timing and commitment of when and how many posts to make in a day has always been one of the concerns of those responsible for digital communications. For them, it is important to know the behaviour of users of social networks, especially Instagram.

Figure 7 shows the interaction rate of the publications, which shows the success of each post in getting users to interact with it. The size indicates the number of posts and the colours indicate the number of interactions, with red indicating the least and green the most. The data represent the publishing moments of the five museums.

On weekdays, museums tend to publish mainly between 12:00 and 14:00 or 16:00 and 18:00. At weekends, the time slot is reduced to the morning, with museums using the hours from 10:00 to 14:00. However, although the number of posts decreases, the number of interactions increases extraordinarily. For example, on Sunday from 10:00 to 12:00, with 34 posts, the interaction of their publications is 166% compared to Thursday from 16:00 to 18:00, with 98 posts but only 58% interaction. An interesting day to analyse is Friday, where from 10:00 to 12:00, there are 110 posts and 89% interactions, from 12:00 to 14:00 there are 109 posts and 95% interactions, from 14:00 to 16:00 the number of posts drops to 53 but interactions rise to 113% and from 16:00 to 18:00 with 55 posts there is an interaction rate of 129%. It can be concluded that the best days to publish for museums are Fridays, Saturdays and Sundays.

In the specific case of each museum, neither the Museo del Prado nor the Musei Vaticani publish at weekends. This may be due to a communication strategy or simply because they are not working days. There is also a preference for publishing on certain days of the week, such as Thursdays for the British Museum or Wednesdays for the Museo del Prado.

In terms of the timing of these publications, the Museo del Prado releases its publications in the same time slot, between 9.30 and 12.30. This may be mainly due to the fact that most publications are live. The British Museum follows a similar trend, producing most of its publications between 12:00 and 14:00. The other museums have more varied schedules, with releases occurring in both the morning and afternoon.

Figure 8 shows the market share of interactions by museum describing which profile got the highest number of interactions on their posts (number of reactions, comments and shares). In the period under review, the Van Gogh Museum leads with 49.4% and the Vatican Museum is at the bottom with 4.8%.

Table 4. Main metrics of museums on Instagram.

Museums	Post interaction rate	Posts per day	Number of posts	Engagement	Follower growth (absolute)	Follower Growth (in %)	Fans	Number of Likes	Number of comments	Number of reactions, comments & shares	Page performance index
Van Gogh Museum	1.48%	0.991776316	603	1.47%	352,991	16.82%	2,454,926	20,376,781	74,086	20,450,867	31.0%
Musée du Louvre	0.75%	0.503289474	306	0.38%	276,850	5.83%	5,075,887	11,262,048	70,051	11,332,099	5.0%
Museo Nacional del Prado	0.86%	0.881578947	536	0.76%	273,512	31.28%	1,150,307	4,557,592	87,444	4,645,036	16.0%
British Museum	0.39%	0.588815789	358	0.23%	138,495	6.74%	2,196,020	2,905,933	45,535	2,951,468	9.0%
Vatican Museums	1.93%	0.613486842	373	1.18%	128,819	59.2%	347,157	1,973,301	15,768	1,989,069	32.0%
Sum	5.42%	3.578947368	2176	4.02%	1,175,102	119.87%	11,224,297	41,075,655	292,884	41,368,539	93.0%



Figure 7. Interaction rate of publications.

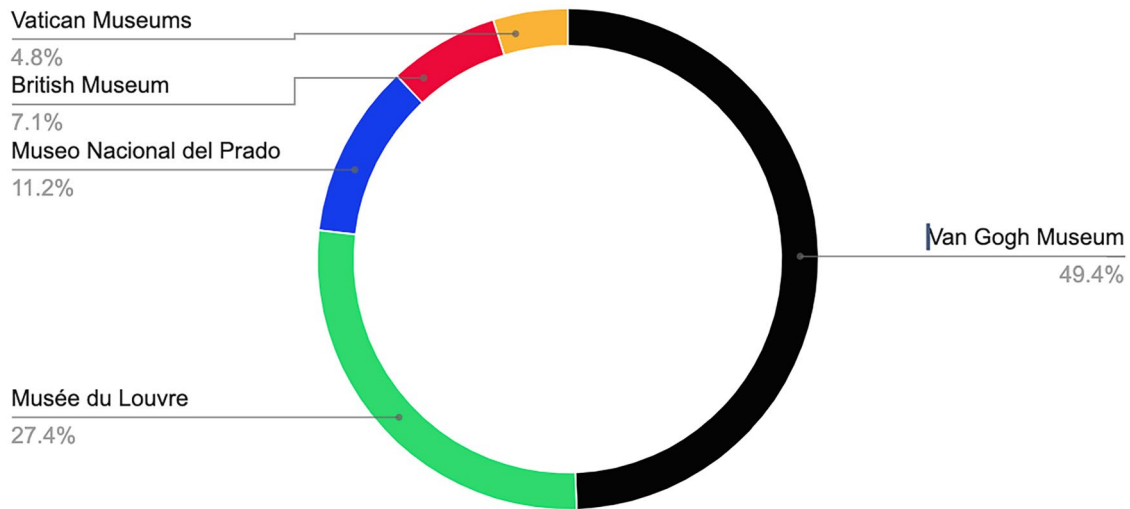


Figure 8. Market share of interactions by museums.

Therefore, the Van Gogh Museum receives the highest number of responses to its posts, as it generates the most comments, reactions and shares. This clearly shows that this museum's Instagram communication management is the best of the five museums.

It is followed by the Louvre with 27.4% and the Museo del Prado with 11.2%.

Instagram is changing and evolving when it comes to installing new types of posts on the social network. Currently, only the Van Gogh Museum is traditional in its use of images on Instagram. The other museums consider the use of videos, carousels and reels in their communication strategy (Figure 9).

With the exception of the Museo del Prado, the use of carousels is one of the most common activities among the museums studied. This is because museums prefer to delve into the history and details of the work of art. They try to show aspects that cannot be seen with the naked eye from a single photograph. In addition, a carousel is usually the contribution with the greatest positive impact, as more information on the same subject can be included in a single publication, making it easier and more convenient for the user.

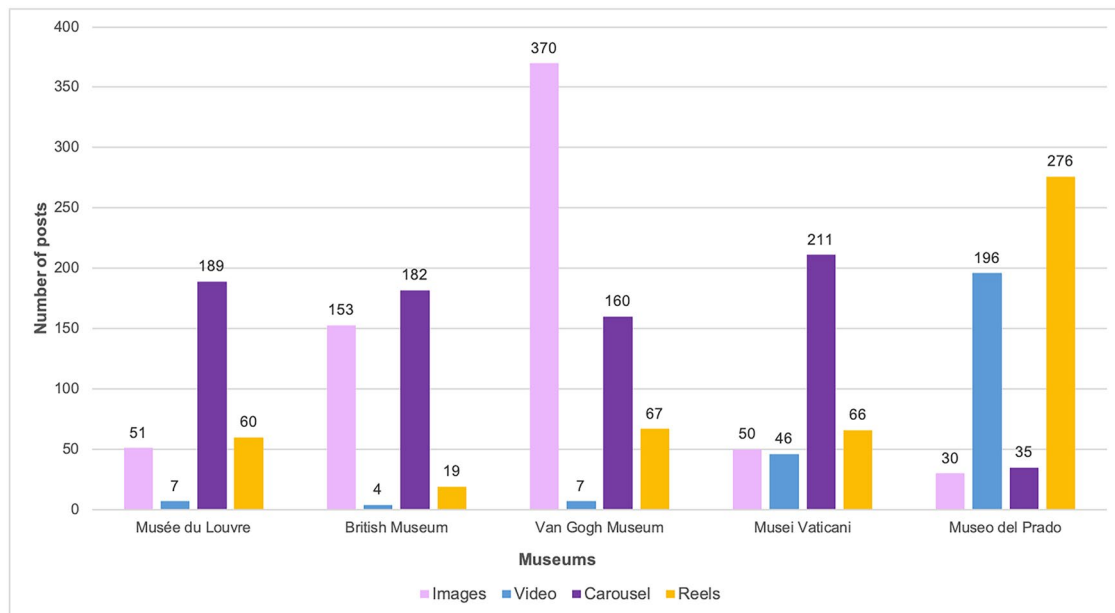


Figure 9. Types of posts used on Instagram.

The British Museum and the Van Gogh Museum make greater use of images. In the case of the British Museum, it tends to make more references to exhibitions or photos of the museum in its publications, though when it decides to show a work of art, it tends to use a carousel. The Van Gogh Museum bases its strategy mainly on the use of single images, generally showing a painting or referring to museum installations.

Finally, the Museo del Prado has decided to adopt a completely different strategy to the other museums, focusing on the use of reels and videos in its publications. This is striking because, unlike the other museums, it has adopted a strategy that is much more focused on this type of format, limiting the use of images to very specific cases. These videos are mainly dedicated to the direct presentation of works or painting/restoration techniques.

Figure 10 shows the most significant peaks in the increase or decrease of followers for each of the museums. In first place is the Prado Museum with the highest peak of followers in July 2023, with 76,256 new followers in a single month. It is followed by the Van Gogh Museum with 62,396 new followers in April 2023. In third place is the Musée du Louvre with 44,779 followers in March 2023. In fourth place, unlike the other museums, the Musei Vaticani has its highest peak in March 2022 with 20,714 new fans. Finally, the British Museum has 5,664 new followers in January 2023.

A notable aspect of this graph is the negative values for the Musée du Louvre and the British Museum in June 2022, where they lost more followers than they gained.

The new digital communication techniques are producing results and this can be seen in Figure 11, as in the case of Instagram, all the museums managed to increase their number of followers during the period studied. The Van Gogh Museum has the highest growth with 352,991 followers. The Musei Vaticani came last, with 128,819 followers. Although this is not significant in absolute terms, in relative terms the Musei Vaticani is the museum with the highest growth, at 59.2%.

It is very important to take into account the number of reactions, comments and shares of the posts published by the museums. In the case study, the posts with the best data were published in 2023, except in the case of Musei Vaticani.

In the case of the Van Gogh Museum, the best publication was a carousel discussing the highlights of the artist's best and most famous work, 'Starry Night' (Figure 12).

Second, the Musée du Louvre also used a carousel to talk about one of the museum's most famous sculptures: 'The Winged Victory of Samothrace' (Figure 13).

Next, the Museo del Prado, unlike the previous two, used a video to present a new technology and experience to the public by explaining one of the aspects of a work of art: 'AirParfum', which recreates

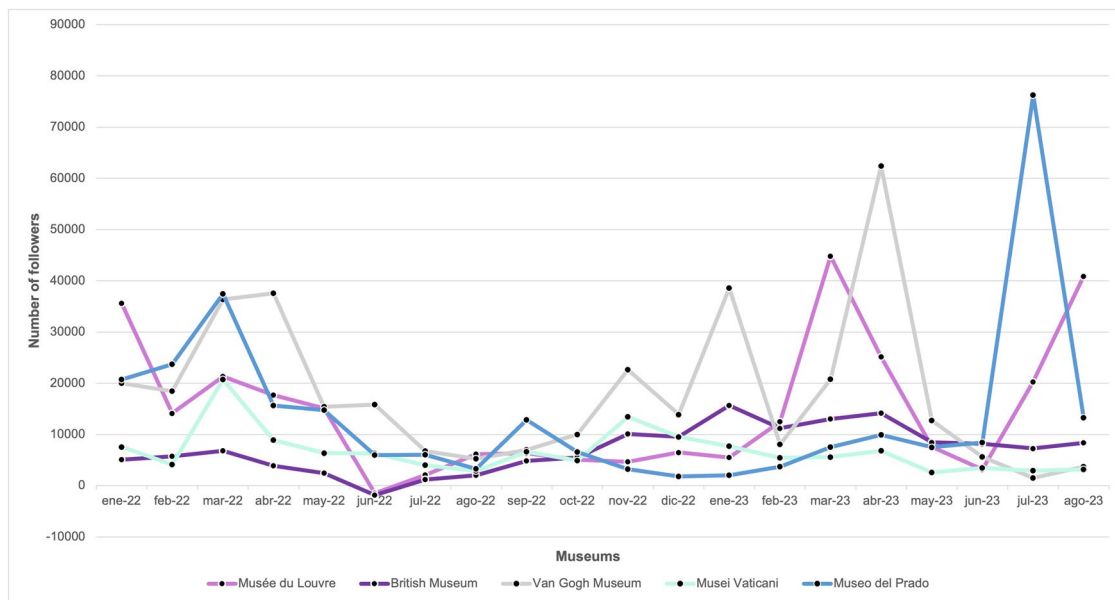


Figure 10. Increase or decrease of followers for each museum.

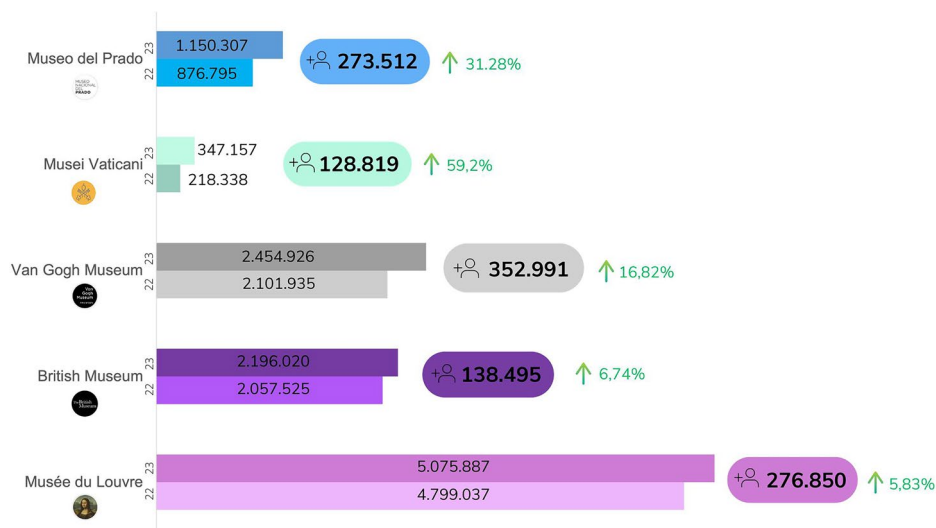


Figure 11. Growth of followers over the study period.

the perfumed smell of the gloves in the painting for the visitor. Finally, the British Museum, which achieved its top release with the presentation of a 10th-century cup depicting scenes of male lovers, as a justification for LGBTQ Month. The Warren Cup is one of the most famous LGBTQ-related objects in the collection (Figure 14)

Unlike these four previous museums, we can see how the Musei Vaticani achieves its best publication in the year 2022, by using a video that shows the most popular and well-known works of the museum through a reel.

One of the aspects that we consider relevant after a publication is the reaction of the visitors, and the most common and the one that requires the least effort on the part of the user is the 'like'. Figure 15 shows the evolution of the number of likes for the five museums. It can be seen that the Van Gogh Museum received the most likes for the month of January 2023. This museum is the one that receives the most likes, but the months from June to October 2022 are particularly noteworthy, with a sharp drop, with the worst figure in August. It is followed by the Louvre in March 2022. Third place goes to the Prado Museum in July 2023. Fourth is the Musei Vaticani in March 2022. Finally, the British Museum in January 2022.



Figure 12. Top post Van Gogh Museum.

vangoghmuseum Van Gogh at night 🌙 Vincent had been keen to create a night painting for some time. But not in a conventional way, using black and grey tones. He preferred to use warmer colours like yellow, green and orange, and deep blue tones.

A fun fact about 'Terrace of a Café at Night (Place du Forum)' (2) is that Vincent actually painted it in the dark, only having gas lanterns as a light source while painting. To his sister Wil, he wrote: 'I enormously enjoy painting on the spot at night'.

We know that Van Gogh was a great observer, and this was confirmed by later astronomical research. Vincent managed to paint the constellation of stars exactly as it looked on the night of 16 or 17 September 1888.

- 1 'The Starry Night', [@themuseumofmodernart](#)
- 2 'Terrace of a Café at Night (Place du Forum)', [@krollermullermuseum](#)
3. 'Nuit Étoilée sur le Rhône', [@museeorsay](#)
4. 'Starry Night over the Rhône', Van Gogh Museum [#vincentvangogh](#) [#starrynight](#) [#art](#)



Figure 13. Top post Louvre Museum.

museelouvre 🇫🇷 Inspectons les œuvres du musée avec [#LouvreALaLoupe](#) ! Aujourd'hui, focus sur l'une des œuvres les plus célèbres du musée : La Victoire de Samothrace.

🗿 Très tôt en Grèce, la représentation de la victoire a été personnifiée sous les traits d'une déesse ailée, descendant sur terre pour faire honneur au vainqueur.

🏛️ Fidèle à cet esprit, le monument érigé dans le sanctuaire des Grands Dieux de Samothrace au début du 2e siècle av. J.-C. représente une Victoire se posant sur l'avant d'un navire de guerre, pour commémorer sans doute une victoire navale.

•• Par la virtuosité de sa sculpture et par l'ingéniosité de sa construction, la Victoire de Samothrace est un chef-d'œuvre inégalé de la sculpture grecque d'époque hellénistique !

🌐 Let's inspect the museum's works with [#LouvreALaLoupe](#)! Focus on one of the museum's most famous works: The Winged Victory of Samothrace.

🗿 Very early on in Greece, victory was personified in the guise of a winged goddess descending to earth to honour the victor.

🏛️ True to this spirit, the monument erected in the sanctuary of the Great Gods of Samothrace at the beginning of the 2nd century BC depicts a Victory alighting on the bow of a warship, no doubt to commemorate a naval victory.

•• The virtuosity of its sculpture and the ingenuity of its construction make this monument an unequalled masterpiece of Greek sculpture from the Hellenistic period!

📍 © Musée du Louvre / Nicolas Bousser

[#Louvre](#) [#MuséeDuLouvre](#)

Figure 16 shows the number of comments for each museum publication. Unlike the previous figures, in this case the variable with the highest number of comments is the British Museum with a publication from January 2023, with a total of 15,419 comments.

The museum tries to entertain virtual visitors by encouraging them to 'Swipe to see a clue 🗨️' to draw attention to it, and also takes the opportunity to explain the piece and tell visitors where to find it in the museum (Figure 17). Thanks to this, the participation in comments is the highest of the period.

The museum with the second highest number of comments on a publication is the Prado Museum in the month of September 2022, with a total of 8,204 comments. In third place is the Van Gogh Museum with a total of 6,523 comments in March 2022. This is followed by the Musée du Louvre with 5,763 comments in December 2022. Finally, the Musei Vaticani with a total of 2,608 comments in March 2022.

Analysing the engagement of each of the museums. In first place is the Musei Vaticani with an engagement of 3.45% in the month of March 2022. Here we can see that, despite being one of the



britishmuseum February is [#LGBTQHistoryMonth](#) 🏳️‍🌈 The Warren Cup is one of the most famous LGBTQ-related objects in the collection.

Made around AD 10, this silver drinking cup is decorated with two scenes of male lovers. It couldn't be displayed publicly for most of the 20th century, as homosexuality was illegal in England and Wales until July 1967.

However explicit sexual images were not unusual in the Roman world, and objects like this one remind us that the way societies view sexuality can differ widely.

The Warren Cup was acquired by the Museum in 1999 and, except for short periods of time when it has been loaned to other institutions, has been on display ever since.

🏛️ You can see the cup in Room 70 of the Museum, and it is part of our 'Desire, love, identity' tours and trails in the Museum, examining objects with LGBTQ connections. Find out more via the link in our bio.

🔍 The Warren Cup. Roman, c.10 AD.

[#BritishMuseum](#) [#DesireLoveIdentity](#) [#LGBTQ](#)

Figure 14. Top post British Museum.

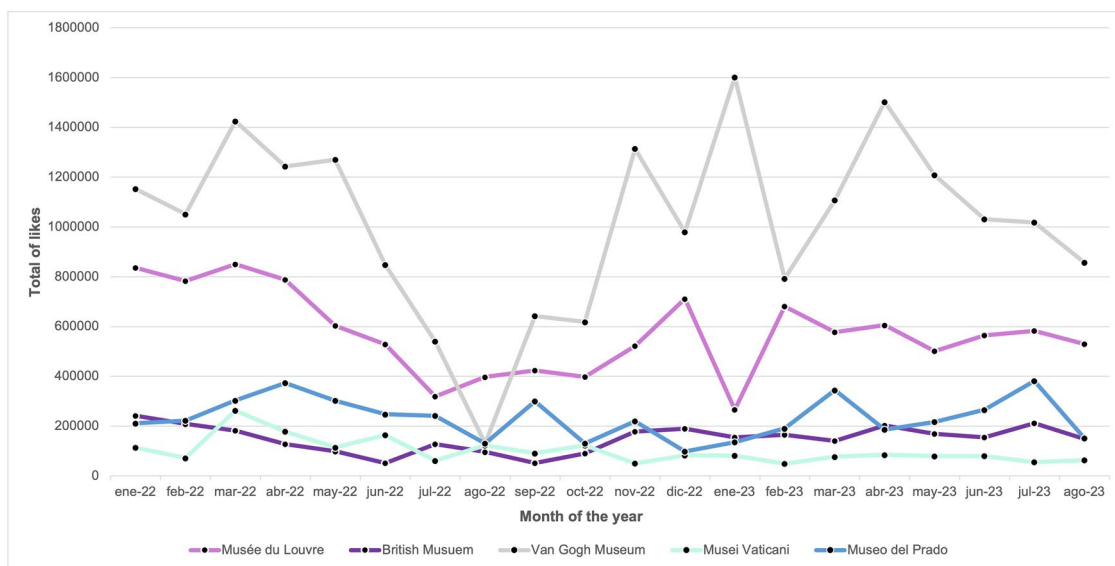


Figure 15. Evolution of total number of likes for each museum.

museums with the fewest likes or comments due to the lowest number of followers, it manages to have a strong engagement throughout the period, together with the Van Gogh Museum.

In second place is the Van Gogh Museum with an engagement total of 2.16% in January 2023, but it also manages to maintain a very high level of engagement throughout the period. In third place is the Museo del Prado, which had an engagement of 1.11% in July 2023 and remained in third place throughout the period. In fourth place is the Musée du Louvre in February 2022, with an engagement of 0.56%. Finally, the British Museum is the museum with the lowest engagement of the five. The publication that achieved the highest engagement on its profile in January 2022 reached an engagement of 0.37% (Figure 18).

The digital communication strategy used by museums can determine the degree of follower loyalty to the social network. Therefore, it is not the number of fans or followers that an account has, but the degree of involvement and interaction that followers have with the type of post used (images, videos, carousels or reels), but also with the type of message that is communicated.

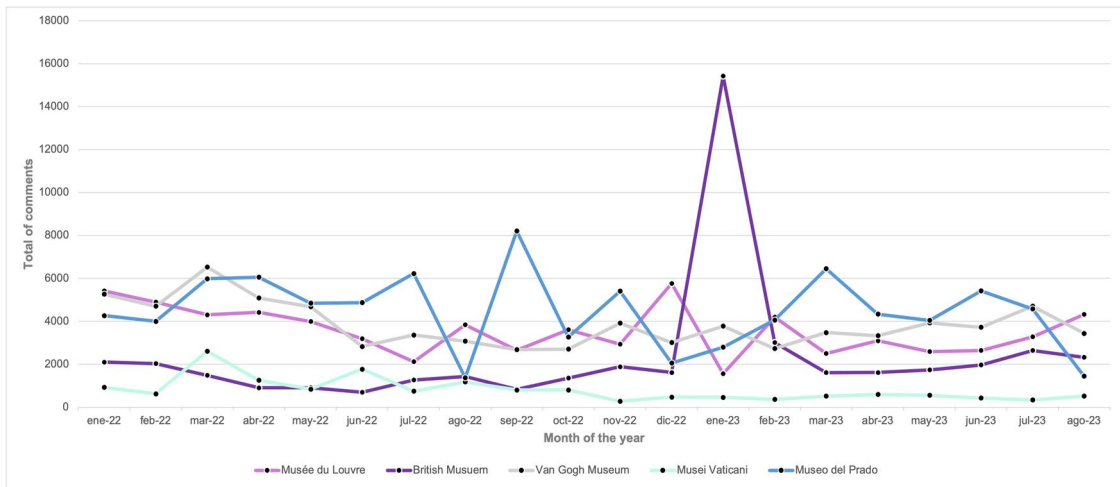


Figure 16. Evolution total number of comments for each museum.

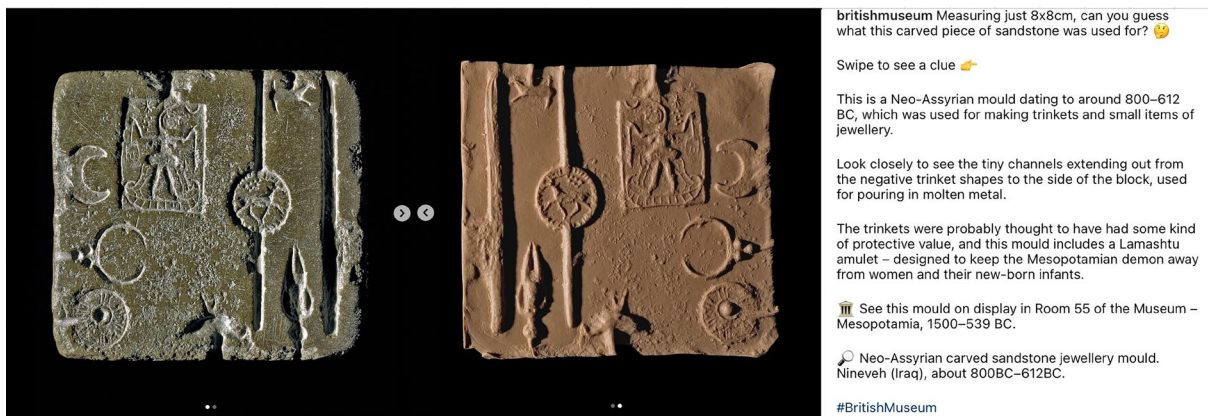


Figure 17. Example of entertaining virtual visitors. British Museum.

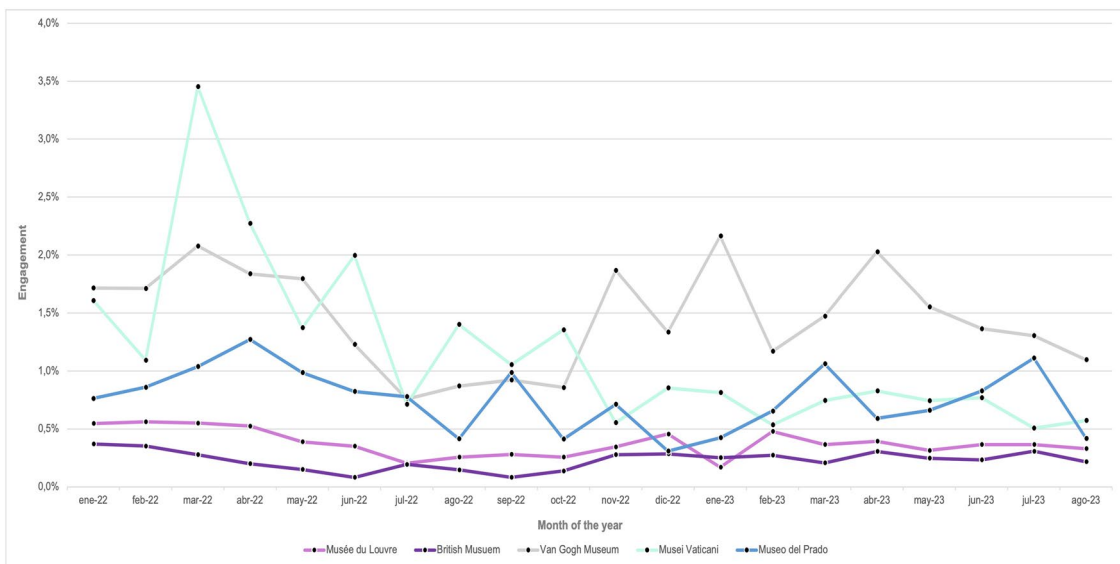


Figure 18. Evolution of the total engagement for each museum.

4. Discussion

In recent years, museums' communication strategies have placed greater emphasis on social networking and reaching out to their audiences (Cicerchia and Solima 2021; de las Heras-Pedrosa et al. 2022; Chagas da Silva Almeida and Batista 2023), aspects that coincide with the analysis carried out in this paper. The interest of these institutions in intensifying relations with their followers and maintaining a digital link for the benefit of knowledge and the image of the museum has been highlighted in studies such as Antón et al (2018).

From the point of view of managing the digital strategy of museums, it is important to emphasise greater creativity in digital content and experiences that go beyond information about their collections or works of art, as indicated in the works of Suess and Barton (2022) and Chang et al. (2022).

The contribution of this study has shown that digital communication strategies based on entertainment, education and the search for two-way communication are still in force and virtual visitors are an active part of this strategy, as already pointed out by Pouloupoulos and Wallece (2022). Similarly, Agostino Arnaboldi, and Lampis (2020) highlighted that virtual visitors have become experts in the selection of cultural offerings and that museums can offer content to their visitors both in person and online.

There is certainly a relationship between engagement and interaction with followers on museums' Instagram accounts, in response to question RQ3. This engagement is seen through actions such as likes, and comments, among others. The more followers interact with the content, the higher the engagement. This relationship is fundamental for the success of communication strategies since a high level of interaction indicates that the content is relevant, interesting, and attractive to the audience.

In relation to RQ1 and content management strategies, museums have explored new ways of disseminating their artworks and collections. These have included narrative or persuasive approaches with a focus on education and training. The adoption of persuasive and narrative messaging on Instagram suggests that museums are leveraging this platform to tell stories, make connections with their audiences and encourage participation, all in order to promote their mission and engage their community of followers.

Furthermore, the use of Instagram as a medium for sharing knowledge, information and educational resources reflects the museum's commitment to providing learning opportunities beyond its physical location. The institution's specialisation in digitisation, as seen at the Museo del Prado, where experts show videos of artworks and restorations, provides greater transparency into the museum's work. This transparency can strengthen audience trust and engagement by giving them an inside view of the behind-the-scenes processes.

Finally, in response to RQ2, it is highlighted that museums have used Instagram in a variety of ways to popularise knowledge and culture, thus providing a complete digital experience that encourages active user participation through educational and entertaining posts. On the one hand, museums have been observed to share images of artworks from their collections, allowing followers to explore and learn about different artistic styles, movements and artists. They also announce events, talks, workshops and educational programmes, allowing followers to take part in cultural and learning activities. They share fun facts, anecdotes or interesting stories related to the artworks and the history of the museum, engaging the audience and stimulating curiosity and learning. On the other side, exhibition visitors use Instagram to interact with the content of the exhibition, achieving a two-way communication between the museum and the visitor. Coinciding these results with the studies by Budge (2020) and Melcher and Zuanni (2021).

This paper explores this role of the visitor as a co-creator of experiences. Prior knowledge and interest allows the visitor to participate and interact during the visit, essentially allowing them to construct a more intense experience in those areas that require their involvement (Chagas da Silva Almeida and Batista 2023). It is these more active experiences, and only these, that drive the individual's intention to remain actively engaged after the visit, seeking information and returning to the museum, following it on social media and recommending it on opinion sites (Valtysson 2022).

In their study, Antón et al. (2018) have already analysed the visitor as a co-creator of the experience, for which it is necessary to maintain the relationship with the public in order to have prior knowledge and maximise their interest to interact later during the visit, and to motivate them to continue to

actively participate after the visit by following them on social networks and making recommendations and comments. Along the same lines of prolonging the experience after the visit, the work of Wong et al. (2020) or Ebrahimi et al (2020) stands out, where the digital experience is in itself a relationship with the museum.

The content analysis shows that social media, and Instagram in particular, have become a fundamental tool for co-creation with their public, making them an active part of their activity thanks to this two-way communication which coincides with Taylor and Gibson's (2017) studies. Finally, it is important to point out the importance of feelings and the management of emotions, which, through happiness, makes it possible to educate and entertain the population.

5. Conclusions

Content analysis through Instagram monitoring of the five main museums in Europe, by country, shows the relationship between variables (image classification, domain, style, and emotion) with active listening and the tone of the messages with the interactions provoked in the public. Engagement, based on interactions, number of comments, likes, or followers, provides valuable information to define and manage museums' digital communication strategies. In addition, factors such as the frequency of publications or their timing contribute to gaining a more complete understanding of the behavior of our audience. It is important to highlight that the most important relationships with interactions are likes and active listening, which in turn are crucial for success on Instagram, prioritising posts and content that generate meaningful interactions, such as likes, comments and shares. On the other hand, the evolution of followers and comments have a high impact on engagement. About hashtags, it is considered appropriate to improve how they are being used, as it is considered that they can be used more optimally.

Museums have found new ways to disseminate their exhibitions or collections by combining types of post with persuasive and narrative communication formulas. Combining different types of posts, such as images, videos, stories or carousels, and varying the content to keep the audience engaged, can offer a complete digital experience that combines entertainment and education. In addition, the digitisation of institutions has increased. As a formula for disseminating knowledge and culture, museums are creating a complete digital experience with entertainment and educational activities, encouraging physical visits, and maintaining a long-term relationship with the virtual visitor beyond the occasional visit. Taking advantage of digitisation to create a complete experience that goes beyond physical visits to the museum is reflected as a positive action. Offering online entertainment and educational activities that complement the exhibitions and collections encourages both physical visits and the continued engagement of the virtual visitor.

Messages that seek two-way communication through entertainment and education achieve greater interaction and engagement from virtual visitors.

Digital ecosystems are redefining the sphere of influence of museums. It is no longer limited to the local sphere or to their ability to interact with national or international tourists. Today's post-pandemic museum is a museum without borders, capable of imagining new ways of relating to the public.

Museums have rethought their communication strategies and their attractiveness to visitors, taking into account not only visitors in person but also virtual visitors through their virtual experiences designed for social media. This represents a rich field of knowledge and learning of great value for these institutions.

6. Limitations and practical implications

The study is not without limitations; the analysis of other museums outside Europe and the knowledge of their visitors' behavior could give a holistic view of the phenomenon studied. In addition, it could be interesting to enrich this information with in-depth interviews with communication or marketing managers to get their points of view and explanations of their use of social media in the overall communication and marketing strategy of the museum. A more global analysis could also be proposed, considering the new social networks that are becoming more relevant among younger audiences. In terms of the practical implications of this research, it should be noted that the analysis has highlighted the current relevance of social networks in the case of museum organizations and their capacity to become active

communication tools and a lens through which to reflect the vision of their audiences. Those responsible for communication will have to face the challenge of getting to know their audiences better, creating valuable content that is not only informative but also entertaining and educational, and putting these messages at the service of society in order to promote greater knowledge of these cultural spaces.

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About the authors

Ainhoa del Pino Rodríguez-Vera, Personal Research Training Programme Grant from the Spanish Government. Degree in Tourism from the University of Las Palmas de Gran Canaria and graduated in the Master of E-Tourism: Applying Technology to Tourism Management and Sales from the University of Malaga. She is currently a PhD student of the Interuniversity Degree in Tourism at the University of Malaga. She had worked in a technology company specialising in tourism, as an account of hotels and hotel chains on a price intelligence tool, as well as updating periodic reports to tourist destinations.

Carlos de las Heras-Pedrosa, PhD degree in Advertising and Public Relations. He is a professor in the field of Audiovisual Communication and Advertising from University of Málaga. For eight years he has held the position of Vice-President for Institutional Relations and President's Cabinet at the University of Málaga. Currently, he is Coordinator of the Postgraduate Program Strategic Management and Innovation in Communication. His research production revolves around Institutional Communication, Health Communication, and Tourism Communication. He has been a visiting researcher at the University of Miami (USA), the University of Sheffield, the University of Cardiff, the University of Leeds (UK) and University of Furtwangen (GER).

Carmen Jambrino-Maldonado, She received the degree in Business and PhD degrees in Marketing field from the University of Malaga, Spain, in 1994. She is a Professor of Communication and has been the managing director the Doctoral programme "Research and Marketing" and of the research team "Marketing for SMEs" of Malaga University. It receives a grant from the Andalusian Regional Government. Carmen is the coordinator of a postgraduate studies and Research Vice-Dean of the Faculty of Business and Management. Her research interests are focused on Digital Communication, Open innovation, strategies of fundraising, spin-offs and collaborative learning.

ORCID

Carlos de las Heras-Pedrosa  <http://orcid.org/0000-0002-2738-4177>

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