How Museums Are Changing Their Visitors' Experience with New Formats and Approaches to Digital Storytelling

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Abstract. This study focuses on exploring new formats and innovative approaches to digital storytelling in museums, offering a critical analysis of existing formats and proposing new perspectives. Initially, current digital storytelling formats are examined, ranging from mobile applications and augmented reality to interactive and multimedia exhibitions. Next, new paradigms and strategies are discussed that aim to expand the possibilities of public engagement and enrich museum experiences. Using a detailed method, careful selections, in-depth analyses and presentation of results are made that highlight both the potential and challenges of these new approaches. The final discussion contextualizes these practices in the current scenario of digital culture and suggests paths for future investigations and developments in the field of digital storytelling in museums.

Keywords: Digital storytelling · Virtual Museum · Interactive museum

1 Introduction

Museum visitors often encounter digital storytelling cases. From animated tablets to virtual tours, we come across such experiences regularly. Yet, while some are becoming common, there are also innovative approaches.

In this paper, we sought to identify a panorama of those innovative approaches, by focusing on the actual changes to the format and approach of visiting the museum, rather than just considering the technologies that are used. Using as a starting point an earlier effort that identified overall use of digital storytelling in museums, we defined what could be considered a new format/approach and surveyed the literature for accounts.

As highlighted by [1], the process of digital transformation in museums is a transformative contemporary condition, where digital thinking, practices, and tools have assumed a normative presence that penetrates all levels of their operations and functions

A. Reis et al. (Eds.): TECH-EDU 2024, CCIS 2479, pp. 240–255, 2025.
https://doi.org/10.1007/978-3-032-02675-0_19

. This implies that digital transformation is not just about the adoption of new tools but the integration of these practices into the operational workflows and strategies of museums. We concur with [2], "digital technologies are not neutral tools in the service of museums; their technical minefield is interconnected with the values, subjects, culture, and concepts of museums".

The research revealed that although museums have adapted their practices with the inclusion of interactive technological resources, new formats and approaches to the visitor experience continue to evolve with the use of storytelling. These experiences can occur *in situ*, online or in a hybrid way. The research literature identified several innovative methods of modifying the visiting experience, highlighting those that involve interaction with artificial intelligence systems, multisensory interactive installations, emotion-based personalization, co-creation with visitors and the use of 3D objects and virtual spaces. These advances represent a new look at how museums provide immersive and interactive experiences to their visitors, adapting to the new demands and expectations of the contemporary public.

This paper is structured as follows: First, an overview of the current formats of digital storytelling in museums will be provided. Then, new formats and approaches to support the research question will be discussed. Based on the method that will be detailed, the selection, analysis, and presentation of the results will be carried out. Finally, there will be a discussion and conclusion.

2 Background and Theory

2.1 Current Formats of Digital Storytelling in Museums

Following the precepts of [3], a technological museum, or virtual museum, is one whose interaction experience integrates technological elements and interactive methodologies. This interaction can take place entirely online, through websites, mobile applications or virtual reality devices, as well as in person. For in person visits, interaction may include, but are not limited to, videos, animations, interactive maps, QR codes, audio guides, interactive screens, projections and other emerging technologies such as Augmented Reality (AR), which enhances physical spaces by superimposing three-dimensional virtual elements and contextualized information, and Virtual Reality (VR), which recreates lost historical environments and provides an immersive journey through time.

In Fig. 1, it is possible to observe the integration of augmented reality technologies, 3D images and geolocation to create an immersive visit experience at the Conciergerie in Paris. The experience allows not only access to additional information, but also the visualization of three-dimensional representations of areas in past eras and personalized routes based on the current location.

Among these emerging technologies, some have been occasionally successfully tested, such as gesture and voice recognition solutions to personalize the visit and offer routes adapted to individual preferences, or interaction with digitally recreated characters such as The Dalí Museum in St. Petersburg, Florida, where the figure of painter Salvador Dalí has been digitally recreated and interacts with visitors, answering questions and even participating in photo sessions (see Fig. 2).

Fig. 1. Use of the HistoPad (2023) application (https://histopad.histovery.com/) in an interactive visit to the Paris Conciergerie - (Paris, France). Source: Leonel Morgado.

Fig. 2. Digital Salvador Dali (2019) - The Dalí Museum in St. Petersburg (Florida, US) Source: https://www.dezeen.com/2019/05/24/salvador-dali-deepfake-dali-musuem-florida/

The opportunities for technological interaction in museum spaces and historical sites had a positive impact on visitors' interest in artifacts. This phenomenon is also due to sharing on social networks, enriching the relationship between the public and the collections on display. According to [4], the emergence of this new museum paradigm expands the visitor's experience, starting even before they arrive at the physical space and extending beyond their visit. This approach, which involves both direct contact with artifacts and the sharing of these experiences, goes beyond the mere appreciation of physical objects. It people in the stories that these objects tell, which, according to [5], is the true essence and purpose of conservation.

In this context, storytelling (ST), or the art of telling stories, stands out as an essential complementary strategy, that acts as a guide in conjunction with interactive technologies in virtual museums. This approach not only enhances the visitor experience, but also gives meaning and depth to visitors' interaction with the collections [6], establishing a more intimate and meaningful connection with the historical and cultural heritage represented by the artifacts.

2.2 What Are New Formats and Approaches for Digital Storytelling in Museums?

As previously discussed, the museum visitor experience has changed with the adoption of technological artifacts, evolving from a passive visitor approach to a dynamic and diverse model. According to [7] museums are transforming into dynamic places of learning, engagement, and inspiration, moving beyond being mere collectors and exhibitors of artifacts. This indicates a fundamental restructuring of the museum experience, where new technologies are used to create more inclusive and diverse experiences for visitors. In this new paradigm, visitors take on active and even interventionist roles, participating significantly in the dynamics that shape and transform the museum experience.

These approaches, which originated even before the rise of digital technologies, took advantage of technological innovations historical periods. They ranged from the implementation of tangible replicas, that allowed for direct physical interaction, to immersion in meticulously decorated environments, accurately recreating historical contexts. Furthermore, these strategies incorporated guided tours with actors dramatizing significant historical events to enrich the narrative and educational experience of visitors. Additionally, as analyzed by [8], the integration of storytelling techniques enriched museum practices by incorporating playful elements, such as games, which enhanced the educational dimension and interactivity of the experiences offered.

More than the technology itself, which often serves only to renew traditional forms of visiting experience, the focus here is on ways to create innovative experiences in a deeper way.

Some new approaches to modifying the visiting experience were explored in "Digital Storytelling approaches in Virtual Museums: Umbrella review of systematic reviews" [8], whose thematic categorization process based on the different uses of storytelling in virtual museums was outlined.

Table 1 summarizes these themes, revealing a wide range of narrative practices, from creating in-depth knowledge about content to engaging external audiences and reinterpreting museum objects or spaces.

Among the emerging themes, the focus of this review is on "Experience Modification", which highlights storytelling adapted to new formats.

This theme covers not only the use of technology, but also innovative and different approaches from conventional ones, which may emphasize narratives or sharing them, the use of spaces for different purposes or even the experience of a virtual guided tour.

3 Method

The purpose of this review is to explore how creating and modifying the visitor experience in virtual museums can be achieved through storytelling, using new formats and innovative approaches.

The structure applied was based on Kitchenham's systematic review procedures [9], which encompasses some steps whose beginning is the formulation of research questions and the development of a review protocol that outlines the specific criteria for the selection of studies. The subsequent phase involves the selection of studies based on established inclusion and exclusion criteria and subsequently, the detailed extraction of

Table 1. Themes identified for formats and approaches to virtual museum visit experiences using storytelling.

Theme	Description
Provide deeper knowledge about content	This theme brings together ways of using ST to provide a deeper understanding of the museum's content, whether through descriptions or highlighting points of interest, or through the connection between objects from different museums depending on their meaning, or through the interaction provided by characters
Informal exposure[a]	This theme brings together forms of using ST only to present museum content, in an informal way, whether interactive or not, regardless of technical devices (mobile, fixed, etc.)
Serious games	This theme brings together ways of using ST to robustly present information related to museum objects/spaces in a pedagogical context and/or provide teaching through serious games, regardless of the type of platform (or even multiplatform) or technological device (smartphones, AR, etc.)
Modify the experience	This theme brings together ways of using ST to modify the experience by adapting to new formats and approaches to the visitor experience (e.g., entertainment or experiments in museums other than traditional ones), which may be with an emphasis on stories or their sharing, in the use of spaces for different purposes or a virtual guided tour
Engagement	This theme brings together ways of using ST to provide public engagement, including young people, through tourism promotion and forms of communication

[a]The term "informal exposure" refers to visiting experiences that occur in an unstructured or casual manner. This type of exhibition is characterized by the freedom of visitors to explore content and interact with the exhibitions at their own pace and according to their own interests, without the rigidity of a schedule or guided tour. Some initiatives are:

•New York's Museum of Modern Art (MoMA) frequently hosts informal events, such as live music sessions in the museum's sculpture garden, where visitors can enjoy outdoor concerts while exploring the artwork.

•São Paulo Museum of Art (MASP) holds events such as "CineMASP", where it shows films related to its exhibitions.

•Lisbon Museum of Art, Architecture and Technology (MAAT) offered a "night at the museum" visit. https://www.maat.pt/pt/event/uma-noite-no-museu Also in Lisbon, the Castle of São Jorge did it, and with workshops, etc. https://castelodesaojorge.pt/agenda/noite-europeia-dos-museus/

•At the "Lanifícios Museum" in Covilhã, Portugal, the description of the visit indicates that it is an informal visit. (...) Participation in this informal visit, led by the archaeologist (...) https://museu.ubi.pt/?cix=cartaz113

•Regarding visits to the botanical garden, the University of Coimbra offers two types of visits on its website: "Informal visit: free and without the need for reservation; Guided and school visit: more information about the programs available". https://www.uc.pt/en/our-uc/our-uc-projects-and-initiatives-of-our-community/episodio-15-jbuc/

•In other cases, "conversations" type events are promoted in historic centers and treated as an "informal visit", for example: https://averdade.com/resende-centro-historico-de-vinhos-recebe-iniciativa-conversas-sobre-o-patrimonio-local/

•The museum/enoteca in Borba, Portugal refers to "informal exhibition": https://odigital.sapo.pt/borba-autarquia-investe-cerca-de-400-mil-euros-na-criacao-de-um-museu-e-uma-enoteca/

•With this term "informal exposure", UNESCO refers to the interaction with intangible heritage. As an example, the tradition of making lace in the village of Lefkara in southeastern Cyprus: https://ich.unesco.org/en/decisions/4.COM/13.37

relevant data from the selected studies takes place. This process culminates in in-depth analysis and structured presentation of results, ensuring a comprehensive and reliable synthesis of available evidence.

The research question of this review is:

[Q1] What are the new formats and approaches to the visitor experience in virtual museums that modify it with storytelling?

3.1 Inclusion/exclusion Criteria

To systematize the selection and extraction of data, some qualitative analysis questions related to the research questions were created. Tables 2 show the inclusion and exclusion questions that were asked before analyzing the articles.

Table 2. Themes identified for formats and approaches to virtual museum visit experiences using storytelling.

Inclusion Criteria	Exclusion Criteria
IC1: The article is about virtual museums	EC1: The document is gray literature
IC2: The article addresses modifying the visitor experience with storytelling and/or creating this experience	EC2: Does the document merely measure effects, without describing the ways in which the visitor experience can be modified (influence, impact, engagement, trends, etc.)?

3.2 Data Collection

3.2.1 Keyword Identification

To determine which terms to use when searching for the review questions, we used as a sample two international conferences in the area of museums, MUSEWEB [10] and MUSEUMNEXT [11] between 2018 and 2021. These conferences were chosen due to their longevity (1997 - MW and 2009 - MN), location (one in North America and one in Europe), but above all due to the recognition of professionals and academics in the areas of museums and technologies. From the analysis of the titles of published articles, 17 articles associated with the topic of this review were selected as a sample. They were analyzed in full to extract the keywords used in relation to the visitor experience (see Table 3).

This sample demonstrated to us that "experience" is the term currently used for what we want, covering a wide diversity of perspectives and facets of the visitor experience. Given that "experience" by itself would generate many other dictionary meanings, we will resort to this diversity of facets in the general search.

3.2.2 Keyword Search

The in-depth bibliographic research was carried out on Google Scholar using Harzing's Publish or Perish [12], essentially in the English language between the years 2015 and

Table 3. Terms regarding experience.

Conference	Terms
MUSEWEB	user experience, immersive experience, transformative experience, audience's experience, inclusive experience, integrated experience, emotional experience, informational experience, responsive experience, visitor experience, in-venue experience, digital journey experience, in-depth experience, viewer experiences, personalized experience, modern experience, commodified experience, audience experience, auditory experience, digital experience
MUSEUMNEXT	user experience, flow experience, friendly experience

2024, with the combination of terms in the title: "virtual museum" OR "virtual tour" OR "interactive museum", and in the keywords, "storytelling" AND keywords from Table 4.

For example:

Title words: "virtual museum" OR "virtual tour" OR "interactive museum"
Keywords: "storytelling" AND "user experience"
Years: 2015–2024

Fixed terms were chosen because they encompass a large part of the vast set of technologies used in museums today. The terms "virtual museum" and "virtual tour" focus on digital visitor experiences in different modalities, while "interactive museum" covers technologies that allow for more dynamic interaction within museums. Furthermore, the "storytelling" component was added as an essential part of the research, with interest focused on the practices of visits mediated by narratives.

The total number of articles found was 254, using all terms separately (see Table 4).

Table 4. Terms found for "modification".

Term	N. articles
user experience	89
visitor experience	60
immersive experience	67
emotional experience	9
digital experience	10
personalized experience	6
audience experience	5
in-depth experience	3
friendly experience	3
audience's experience	1
viewer experience	1

Based on inclusion criteria IC1 and IC2, the titles and abstracts of all articles were analyzed. Those that, although they dealt with virtual museums or addressed the theme of storytelling in this context, but which, according to exclusion criteria EC1 and EC2, limited them to measuring effects, impact or engagement, were excluded.

After the criteria exclusion process, articles that did not fit into the "Modify the experience" category were also excluded, as shown in Table 1.

In total, 164 articles were excluded, in addition to 79 duplicates, leaving 11.

4 Results and Discussion

The 11 articles were thoroughly analyzed to identify the essential elements to answer research question Q1. Table 5 displays the articles along with the topics covered by each of them.

Regarding question Q1, "What are the new formats and approaches to the visitor experience in virtual museums that modify it with storytelling?" 7 approaches were identified as can be seen in Table 6.

These approaches are divided into:

- Visit experience within the physical space of the museum (*in situ*)
- Visit experience independent of physical space (through a device connected to the Internet).

In Fig. 3 you can see this division:

Themes 1 and 4, "AI-assisted" and "Co-creation", although they were described based on physical experiences, can assume a transversal character, as underlying concepts that offer support to different approaches.

In the spectrum of *in situ* approaches, theme 2, "Multisensory Interactive Installations" stands out for its peculiar characteristics in the broad field dedicated to direct interaction. It lies at the intersection between art and technology, integrating itself into the so-called Interactive Installations[1]. These installations can bring together a variety of techniques in a single manifestation, allowing the visitor to experience various technological modalities in different aspects within a single exhibition.

It is possible to perceive the richness of the visit experience from the details of the creation:

[1] Interactive installations are art or technology projects that involve active public participation. These installations often combine physical and digital elements to create an immersive and immersive experience. They can be found in art galleries, museums, public spaces, events and even online. Interactive installations can range from simple games of light and sound to complex experiences that respond to participants' movement, touch or voice. Often, these installations aim to stimulate creativity, promote social interaction, or convey a specific message through sensory experience. Notable examples of interactive installations include spaces adapted specifically for this purpose such as the interactive experience Living Van Gogh (https://livingvangogh.com/porto/) and teamLab (https://www.teamlab.art/), as well as works by contemporary artists like Olafur Eliasson (https://olafureliasson.net/) and Rafael Lozano-Hemmer (https://www.lozano-hemmer.com/).

"(...) a digital ecosystem integrating different scenarios and levels of visualization, multi-layered models, storytelling, tools of visualization and interaction, in order

Table 5. Articles analyzed.

ID	Author	Year	Title	Themes
ID1	Z Wang, L Yuan, L Wang, B Jiang, Z Wei	2024	VirtuWander: Enhancing Multi-modal Interaction for Virtual Tour Guidance through Large Language Models	AI-assisted
ID2	Y Wu, Y Huang, W Guo, X Li, Z Chen, Z Feng	2023	Multi-sensory Interactive Experience Design of Museum Musical Instrument Collections	Multisensory Interactive Installations/3D objects
ID3	Altieri, A. et al.	2021	Affective Guide for Museum: A System to Suggest Museum Paths Based on Visitors' Emotions	Emotion-based personalization
ID4	Zidianakis, E. et al.	2021	The invisible museum: a user-centric platform for creating virtual 3D exhibitions with VR support	Virtual museum spaces/Multisensory Interactive Installations/Co-creation
ID5	Morse et al.	2021	Virtual masterpieces: Innovation through public co-creation for digital museum collections	Virtual museum spaces/Co-creation
ID6	B, Biedermann	2021	Virtual museums as an extended museum experience: Challenges and impacts for museology, digital humanities, museums and visitors–in times of (Coronavirus) crisis	Virtual museum spaces/3D objects/360° panorama
ID7	U Güleç et al.	2021	İnandırıcı Öğeler ile Sanal Kültürel Müze İçerisinde Dijital Hikaye Aktarımı Digital Storytelling on a Virtual Heritage Museum with Believable Agents	3D objects

(*continued*)

Table 5. (*continued*)

ID	Author	Year	Title	Themes
ID8	Y Jianqiang	2021	Research on the Narrative Design of Human-Computer Interaction in Network Virtual Museum	360° panorama/ 3D objects
ID9	E Pietroni, D Ferdani, A Palombini	2016	Lucus Feroniae and Tiber Valley Virtual Museum: From documentation and 3D reconstruction, up to a novel approach in storytelling, combining virtual reality	3D objects/Multisensory Interactive Installations
ID10	M Shehade, T Stylianou-Lambert	2015	A contextualized educational museum experience connecting objects, places and themes through mobile virtual museums	3D objects/ Virtual museum spaces
ID11	E Pietroni, M Forlani, C Rufa	2015	Livia's Villa Reloaded: An example of re-use and update of a pre-existing Virtual Museum, following a novel approach in storytelling inside virtual reality environments	3D objects/Multisensory Interactive Installations/ Virtual museum spaces

to create a performative space where all the information is connected (...).". (Paper ID9)"

And the impact on the visitor:

"(...) the impact of multisensory 4 stimulation on the visitor's experience of the exhibition and its use in the design of museum interactions (...).". (Paper ID2)"

Theme 3, "Emotion-based Personalization", is described as an approach that uses the recognition of facial expressions and body movements to allow visitors, through natural gestures, to access and control information and content, in addition to allowing them to define their own routes during the visit. Although it emerged in the context of physical visits, it is possible to imagine an online visit scenario in which cameras recognize movements and expressions.

"(...) to suggest to visitors the exhibition path that could best meet their expectations, based on their emotions. Providing personalized paths, can play an important role in improving visitors' satisfaction.". (Paper ID3)"

Table 6. New formats and approaches identified for modifying the visiting experience.

	APPROACHES	MODALITY	DESCRIPTION
1	AI-assisted	*in situ*/online	Modification of the visitor experience in which the visitor interacts with an artificial intelligence system, whether through voice, text or otherwise. The dialogue is not just one-way, but rather an exchange, where both the visitor and the AI contribute to the experience. For example, AI acting not only with specific feedback, but with suggestions of different routes or works based on this interaction
2	Multisensory Interactive Installations	*in situ*	Modification of the visitor experience, whereby the experience takes place through the physical manipulation of the visitor with objects, which trigger other visual and sound elements. This theme includes all experiences created for the manipulation and active interaction of users using physical elements integrated into digital systems created or adapted for this purpose. This could be through cameras, sensors, projections, multi-touch or audiovisual surfaces. It may include, but is not limited to, visual, auditory, textual, interactive, tactile/haptic aspects
3	Emotion-based personalization	*in situ*/online	Modification of the visitor experience, where the recognition of emotions is decisive. Regardless of whether it is done through facial expression or gestures or other indicators. For example, when it is used to personalize visit routes

(*continued*)

Table 6. (*continued*)

	APPROACHES	MODALITY	DESCRIPTION
4	Co-creation	*in situ*/online	Modification of the visitor experience, focusing on the participatory involvement of the public in the design and development of the museum experience or the museums themselves. This modality can include various forms of participation, from the contribution of ideas and feedback in early stages of development to the joint creation and production of content and experiences
5	3D objects	*in situ*/online	Modification of the visitor experience by displaying 3D objects, 3D spaces, scenes with people or animals in 3D are displayed, using various technologies, regardless of whether by modeling or scanning. This modality of experience modification is not restricted to any viewing device or display location (physical or digital), including either virtual 3D objects or physical 3D objects (e.g., through 3D printing). It also includes visualization cases with animation
6	360° panorama	Online	Modification of the visitor experience regarding virtual visits using 360° panoramic images or videos, whether navigable or not. Examples: Google Arts & Culture and Matterport. It does not include cases in which this visualization takes place in the physical space of the museum, as these cases belong to theme 2, about multisensory interactive installations

(*continued*)

Table 6. (*continued*)

	APPROACHES	MODALITY	DESCRIPTION
7	Virtual museum spaces	Online	Modification of the visitor experience characterized by the presence of the visitor in a navigable 3D space, not only in 360° panoramas. The visit can be based on the manipulation of 3D objects, but inserted in a contextualizing virtual space, not by itself. It does not include cases where this virtual visit takes place in the physical space of the museum, as these cases belong to theme 2, on multisensory interactive installations

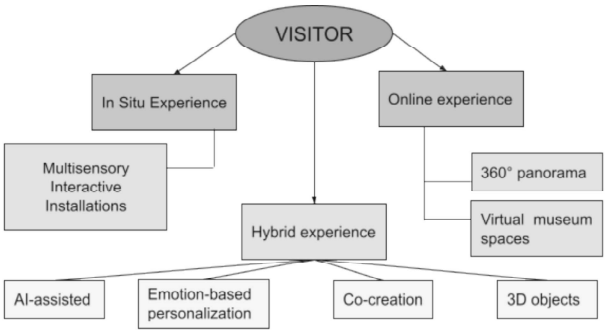

Fig. 3. Division of virtual museum visit experiences by modality.

Theme 5, "3D Objects", allows three-dimensional models to be used in both digital and physical environments. These objects can be explored virtually through computer devices or materialized through 3D printing for physical manipulation.

> *"(...) 3D techniques expand the field of digital museum features in virtual space (...) which is not possible in the case of original museum objects (...) enhance the user experience in physical museum space, because of the possibility to touch and handle them.". (Paper ID6)"*

Themes 6 and 7, "360° Panorama" and "Virtual Museum Spaces", stand out for offering immersive experiences exclusively in the digital environment, accessible through devices connected to the internet or, in some cases, through offline interactive applications. These experiences are generally presented through specialized websites or applications.

"(...) To deliver reasonable immersive virtual tours, high-fidelity visuals were of the utmost importance.". (Paper ID4)"

In Table 7, you can see the distribution of approaches in the articles analyzed, as well as in Fig. 4.

Table 7. Division of new formats and approaches identified by the articles analyzed.

APPROACHES	N. articles
AI-assisted [Paper: ID1]	1
Multisensory Interactive Installations [Papers: ID2, ID4, ID9, ID11]	4
Emotion-based personalization [Paper: ID3]	1
Co-creation [Papers: ID4, ID5]	2
3D objects [Papers: ID2, ID6, ID7, ID8, ID9, ID10, ID11]	7
360° panorama [Papers: ID6, ID8]	2
Virtual museum spaces [Papers: ID4, ID5, ID6, ID10, ID11]	5

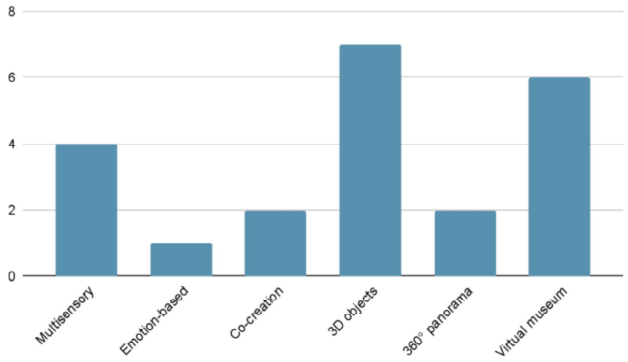

Fig. 4. Division of new formats and approaches identified by the articles analyzed.

5 Conclusion

This systematic review revealed how museums are adapting to contemporary expectations and an increasingly digital audience, using storytelling to enrich and transform the visitor experience. Through the analysis of several studies, it was possible to identify some new formats and approaches are changing the way visitors interact with collections and understand art and history.

Although some museums have adopted new approaches to modifying the visiting experience, [13] note that online modalities still exist as mere extensions of the physical museum. Furthermore, there are barriers to the use of storytelling resources that make it difficult to focus on the visitor experience. These challenges include the lack of tools for creating narratives that integrate knowledge with digital representations of objects, the lack of a unified platform for presenting virtual exhibitions on different devices, and the lack of mechanisms for personalized interaction with knowledge and digital information. These limitations compromise the ability of museums to provide immersive, visitor-centered experiences in the virtual environment.

Some emerging technologies, such as multi-sensory interactive installations and facial expression and gesture recognition, are practical examples of how museums can offer more immersive and personalized experiences. These techniques not only improve accessibility and engagement through more dynamic and interactive storytelling, but also promote a deeper understanding of the content on display.

Furthermore, co-creation and interactivity emerge as crucial elements in redefining the museum experience, allowing visitors to not only consume content, but also to actively participate in the creation and interpretation of narratives. This approach transforms visitors from passive observers to active participants, increasing their emotional and cognitive connection to the exhibits.

The findings also indicate a growing trend toward the adoption of hybrid approaches, that combine elements of both physical and virtual environments, enabling museums to expand their reach and impact beyond geographic limitations. These hybrid approaches are particularly valuable in a world where physical and temporal barriers are increasingly diminished by digital technology.

The incorporation of storytelling adapted to new formats and approaches in virtual museums is an expanding segment, which promises to revolutionize the way knowledge is communicated and experienced in the field. Continued research and development of these technologies will be essential to fully exploit their potential and ensure that future generations of visitors can enjoy an even more enriching museum experience.

Acknowledgments. This work was developed under the project Frontowns - Think big on small frontier towns: Alto Alentejo and Alta Extremadura leonesa (13th - 16th centuries). Project No.: PTDC/HAR-HIS/3024/2020 and by National Funds through FCT - Foundation for Science and Technology, I.P.

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