Transforming the Museum — New Directions

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Abstract: Museums need to adapt to a rapidly changing community to meet the needs of audiences. Some museums attempt to integrate digital technology into institutions, providing audiences with innovative ways to interact with artworks. This study examines specific cases to analyze how museums leverage approaches such as online access and handheld interactive devices to expand their audience beyond the museum. It evaluates the effectiveness and feasibility of these cases, providing insights for potential future applications.

***Keywords*:** museums; online digital technology; online access; handheld devices

1. Introduction

As pandemics spread worldwide, traditional museum engagement models have been affected, and blockades have brought about a proliferation of online activities, which has led many museums to finally realize the importance of online digital technologies in engaging off-site audiences. New technologies such as virtual exhibitions, online digital collections, mobile apps, and social media have broken the boundary of traditional museums in terms of time and space. Visitors can now enjoy the museum's collection resources without leaving their homes for cloud tours of galleries, collection exploration, creative interaction, and more optional information for a more in-depth experience.

Curators have also begun to seek a shift in identity actively and are now no longer authoritative interpreters and narrators but providers of experiences, and are experimenting with a variety of different technologies and platforms to connect with off-site audiences and customize unique experiences; museums are no longer holy temples and halls, but more like forums where curators will tell stories and co-create with audiences.

This paper will explore the use of new technologies through case studies, including online access and handheld devices by some of today's art museums, to reach out to audiences outside the museum and analyze the concrete practice and feasibility of this technology to inform the future use of new technologies in museums.

2. Digital technology in museums

It seems impossible to bypass digital technology in the Internet age, especially after the pandemic that traditional museum contact models have affected, with offline cultural activities declining and online technology becoming unstoppable. According to an ICOM report, digital activity in museums increased by 15% in 2020. This figure rises to almost 50% when considering channels such as social media, live events, or online education programs[1].

Curators realize that providing online access, digital collections, and social interaction to engage audiences beyond the museum will be essential to a museum in increasing exposure and enhancing user stickiness during closed periods. This digital revolution propels a shift in the identity of the curator. Historically, museums were object-oriented and didactic from the top down, emphasizing the authority and importance of their exhibition content. In this context, the curators are experts who carry out original research to elaborate on the artworks in the collection and select them for exhibition[2].

Today's museums emphasize the user experience, with the visitor becoming the new focus of museums. Audiences are placed at the forefront with exhibitions organized around their preferences, increasing loyalty through unique customization of the exhibition experience. Curators need to move away from the role of 'narrator' from treating the audience as empty jars to be filled and instead becoming 'providers' to supply effective tools that allow them to customize their explorations[2].

One of the most successful attempts has been online access to the collection. Unlike mobile programs that appeal to a more digitally savvy audience and projects aimed more at younger people, online access is aimed at almost any group worldwide. Usually, it includes panoramic virtual exhibitions and digital access to collections. It seems to be a more accessible technology than the development of handheld devices and apps that require long-term hardware maintenance and version changes[2].

Online activities can bring potential audiences into museums, expanding the audience numbers and broadening the museum's exposure and impact. Research has shown a correlation between the level of higher education and the use of art

museums and traditional performing arts. Those cultured in music, literature, and the visual arts may not be museum visitors because they prefer to stay in the house. Meanwhile, people without relevant literacy show high visitation rates[3].

3. Example application of digital technology museum

Louvre, a good example, announced that it would make its collection of over 490,000 works available online for free public access. It is the first time Louvre has brought together all its groups, including objects in the galleries, loans, and conservation artworks, for digital access to the collection to attract visitors who can only experience the museum online.

Room is limited in a museum, whereas online space is unlimited, and many artifacts in storage can be displayed. The website categorizes these collections by themes and years, such as paintings, sculptures, or masterpieces, and supports advanced search allowing visitors to access the collections of their interest directly by theme. It also provides an interactive map to optimize the online browsing experience[4].

Mona Lisa is a masterpiece you will want to see as soon as you enter the Louvre. The painting is often crowded with visitors, with spectators viewing it from afar through the fences. Now available on the Louvre's website is a high-definition detail of the Mona Lisa and its original frame in its entirety and 13 parts. It has been enlarged many times in high definition, and even brush strokes, peeling paint patches, and cracked varnish can be seen clearly.

The Rijksmuseum launched its first attempt at a virtual tour during the pandemic, 'bringing the museum to you,' with 56,000 free downloadable high-resolution collection images[5]. One of these interactive experiences, Rembrandt's Night Watch, allows audiences to follow a highlighting tool to explore various aspects of the painting's figures, structure, historical context, restoration experience, and derivative creations.

The Night Watch has set a record for image resolution and total size. It has a sampling resolution of 5 μm, which means each pixel covers an area of the painting more minor than a red blood cell. The team used a 100-megapixel Hasselblad camera to take 8439 single photographs measuring 5.5 cm x 4.1 cm. Artificial intelligence was used to stitch these smaller photos together to form the final large image. We can see the physical state of the painting very clearly: the protrusions of lead soap, the tiny cracks, the shape of individual paint particles, and the passing touches[6]. By zooming in on a photograph of the area above the dog in the picture, it is clear how the opaque brown and black retouching covering the knife edge can be distinguished from the cracked and often worn original paint around it.

The Rijksmuseum has also considered special groups by adopting a speech-synchronized inclusive design to assist sight-loss people. They have textualized the images and stories, which are read aloud automatically using embedded audio files, complemented by sound effects. In the Milkmaid, a painting in the virtual gallery, the viewer can hear the sound of milk being poured. In the Night Watch, we can hear the sound of the wind, a wooden door, a polishing weapon, and the clash of blades. The general audience gets a visual and auditory immersion experience, and visually impaired or blind users can better imagine the artwork.

These museums have seen a surge in website visits and searches after adopting technologies such as virtual exhibitions and digital collections[7]. It breaks through time and space constraints and efficiently consolidates resources, allowing viewers to browse works of interest in a biased and targeted manner — resources are instantly available at the click of a mouse. Avoiding the rush and away from the crowds, there is no need to struggle through the chaos to have an intimate and quiet communion with art. Even more pleasing is that online resources did not 'steal' offline visitors and reduced ticket revenue. Two-thirds of those who browse online were eventually drawn offline for further exploration[8]. A high-quality online experience has numerous benefits but cannot substitute for an in-person experience. Websites have a limited ability to convey 'wonder and resonance.' When people compare their memories of visiting online and offline, it is obvious that an in-person museum visit leaves a stronger impression than a virtual experience[9]. Museums should combine those respective characteristics and strengths, making virtual tours a standard accompaniment to exhibitions and complementing the physical experience with digital technology.

There are some worrying issues of counterfeiting in digital collections. The high-definition images and artwork data can create an opportunity for the unscrupulous to take advantage of the situation - faking details of forgeries based on images is better for profit.

While art museums pay attention to new technologies and develop online collections, they should also ensure the security of their digital collections and guard against illegal copying and misappropriation, to protect the interests of artists.

Online access requires curators to attract a new audience that can only experience museums virtually, and a multicultural society needs them to stand out from the rest of the cultural organization[10].

Today's museum visitors no longer passively absorb the knowledge organized by the curators but rather encompass an integrated intellectual, aesthetic, and social experience. It is essential to personalize the learning experience for visitors.

Giving them tools to mark and annotate specific artworks or places for later reflection and sharing can foster loyalty to the museum and stimulate a willingness to revisit.

The Lens in ACMI is a free handheld device. It collects artworks and objects found in the exhibition. Eventually, these collections are collated into an online group where visitors can continue to explore the stories behind their favorite collections when they return home. By extending the exhibition experience, visitors can be inspired to discover new films, video games, and art to see and play.

The Lens focuses more on ongoing personal engagement and interaction than a purely online exhibition. As visitors self-curate and explore the playful museum, The Lens allows them to listen and talk back. These experiences can be shared to stimulate return visits and enhance visitor stickiness. As the dynamic user engagements are enriched, a media library of connections is created outside the exhibition space, known as 'The Constellation.' It connects the collection to its audience, forming a community that has become an ACMI icon and has developed a loyal following.

However, these new technologies tend to target younger audiences. The figures perform poorly with older audiences, and their relevance to the subject matter remains to be seen.

According to the ACMI pilot study report, 16 people were interviewed with the audience, primarily young people and families with children, and only one person over 55 years old was also using new technology to follow the exhibition activities. Furthermore, these digital activities presented a less than satisfactory relevance: 44 of the 124 images posted by the audience were not directly related to the physical space or the project at ACMI, and of the remaining 80 images, only six were related to the cinema[11].

It suggests a lack of diversity in the groups that engage with digital experiences. There are inconsistencies between the digital engagement experiences it develops and those developed by its audience members. Museums should carefully map the customer journey to identify specific pain points that can be improved through digital solutions and experiment with simplified forms of operation, designing interaction into the exhibition and stimulating participation with prizes to provoke deeper thinking about the show, which may broaden group participation and increase thematic relevance.

4. Conclusion

The boom in digital following the pandemic has brought new audiences to museums. It has successfully extended museums beyond their premises, allowing visitors to enjoy exhibitions and collections from the comfort of their homes. Personalization options and interactive facilities also give visitors a great experience. Curators are no longer a single authoritative voice but have been replaced by new concepts for 'co-curation' and 'co-creation' and enhance visitor stickiness by customizing messages. Behind the success of these exhibitions using new models are the public's aspirations for individuality and freshness.

Nevertheless, virtual experiences cannot replace the real thing, and all interactive experiences must be based on actual content. Museums should be vigilant of potential problems posed by new technologies: digital rights, counterfeits, quality of engagement, and thematic relevance. To identify the complex digital sociality, explore it carefully, and actively offer services to meet a larger group of people's growing spiritual and cultural needs.

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