

## Museums, Old and New, Traditional and Digital: Evolving Ideas and Scaffolding

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**Abstract.** This featured speech explored the evolving nature of museums to include new technologies to increase engagement, interaction, and learning of participants. Several examples are provided including a description of the Science Museum in London, the San Francisco Museum of Modern Art (SFMOMA), the Brooklyn Museum, the American Museum of Natural History, and the Gardens by the Bay. The speech concluded with an example of from the Smithsonian X 3D project and a discussion of future museum projects.

**Keywords.** Museums, interactive, digitization

We will explore the idea of museums old, and new, from brick and mortar to digital to the museum in your pocket to mass digitalization. Technology and new ideas have changed the conceptual framework of what a museum is. According to the ICOM Statutes, adopted by the 22nd General Assembly in Vienna, Austria on August 24th, 2007: A museum is a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment. This definition is a reference in the international community [1]. The definition of a museum has evolved, in line with developments in society. Since its creation in 1946, ICOM updates this definition in accordance with the realities of the global museum community. Fox [2] says boldly: “Everyone should have the opportunity to experience all that the arts has to offer, and technology can help make that possible by putting so much information right at our fingertips.”

The audio guide. The museum map. For years, these tools have led visitors on journeys through the world’s greatest cultural institutions. They’ve provided a one-way means of experiencing amazing artifacts and groundbreaking galleries. Now, it’s time for some new tools – tools made for the digital, social sharing age. The Cooper Hewitt Smithsonian Design Museum will equip all visitors with an interactive Pen to fully engage with the objects on view and create their own designs. The pen will also store these experiences, enabling visitors to share them online with their social networks (Figure 1).

Figure 1. Cooper Hewitt: Drawing in Visitors with Interactive Pen



Image source: <https://www.cooperhewitt.org/>

What better way to experience 200 years of innovation in communication and information technology than through high-tech, digital tools? The Science Museum in London contains a new Information Age gallery that will include apps, games, interactive screens, and more (Figure 2). The San Francisco Museum of Modern Art (SFMOMA) reinvented their entire digital program to coincide with the museum's building reopening in 2016. Their focus is on fostering creative responses to creativity, partnering with artists, game designers, and cultural commentators to create mobile and on-site experiences that are thoughtful, surprising, and irreverent (Figure 3). On any given trip to the Brooklyn Museum, you may miss the tour. Or you may want to know more after reading the sign next to a certain piece. With the Brooklyn Museum's expanded digital efforts, visitors will

be able to use their mobile devices to ask questions to experts in real-time and get suggestions on additional works of art to explore with help from location-based technology (Figure 4). The American Museum of Natural History has already pioneered location-based technology for a museum app with Explorer. New digital efforts will update this app with features like personalized journeys, exclusive content, and new ways to share experiences at each exhibit (Figure 5). The Gardens by the Bay mobile app will bring the natural beauty of this Singapore horticultural attraction into the digital space. With interactive trails and engaging stories, the app will connect visitors with the plants surrounding them in a new and more meaningful way (Figure 6).

Figure 2. The Science Museum, London: Creating Journey through Information Age



*Image source:* <https://www.sciencemuseum.org.uk/see-and-do/information-age>

Figure 3. San Francisco Museum of Modern Art: Reinventing the Digital Experience



*Image source:* <https://www.sfmoma.org/>

Figure 4. Brooklyn Museum: Bringing Experts to You



*Image source:* <http://www.brooklynmuseum.org/exhibitions/luce/>

Figure 5. American Museum of Natural History: Utilizing Location-Based Technology



*Image source:* <http://www.amnh.org/exhibitions/permanent-exhibitions/biodiversity-and-environmental-halls>

Figure 6. Singapore's Gardens by the Bay Connecting Nature with Digital Space



*Image source:*

<https://www.facebook.com/gardensbythebay/photos/pb.361992263834380.-2207520000.1409778802./782180058482263/?type=3&theater>

### **Cultural Involvement**

Google has a set of cultural resources that people can share and curate to a specific subject, country or object [3].

#### **Involving the audience**

There are several ways in which digital museums can involve audiences. New platforms are allowing museums to break free of the confines of the academic ivory tower and engage with their communities like never before. They engage the audience, they open the dialogue and involve the participant, they break down the walls of inaccessibility, they have and cultivate a global following, there are user generated content campaigns, they utilize crowdsourcing, and there are emerging cultural aggregations. Museums break the cultural bubble. Museums integrate mobile tools into their exhibit or learning space. I will share some of these tools.

Some museums allow you to use a tool to take some contents of the museum home with you. Museums initially used social media just to advertise events and exhibits, but quickly jumped into a world of interactive education and user generated content.

#### **Digitalization, Personalization, National, Cultural and Mass Digitalization, and Global Sharing**

The Smithsonian has engaged in a special initiative that is a part of digitalization of museums [4]. Smithsonian X 3D launches a set of use cases which apply various 3D capture methods to iconic collection objects, as well as scientific missions. These projects indicate that this new technology has the potential not only to support the Smithsonian mission, but to transform museum core functions. I will share examples of this project. Researchers working in the field may not come back with specimens, but with 3D data documenting a site or a find. Curators and educators can use 3D data as the scaffolding to tell stories or send students on a quest of discovery. Conservators can benchmark today's condition state of a collection item against a past state – a deviation analysis of 3D data will tell them exactly what changes have occurred. All of these uses cases are accessible through the Beta Smithsonian X 3D Explorer, as well as videos documenting the project. For many of the 3D models, raw data can be downloaded to support further inquiry and 3D printing. The Digitization Program Office is the hub for the Smithsonian's inquiry into 3D. It support all 19 museums, nine research centers and the National Zoo in their quest to increase the quantity and quality of Smithsonian digital assets. The team uses a variety

of 3D scanning methods and tools to capture the geometric and sometimes color information of Smithsonian objects and scientific research sites: laser, structured light, photogrammetry and Computer Tomography (CT). A 3D scan is essentially nothing more than millions or billions of points of measurement of an object's surface, or in some cases density. Once an object or research site is scanned you are able to use that data in many different ways, including:

- Deliver content online using the 3D Explorer [4]
- Allow schools to freely download and 3D print iconic Smithsonian objects in the classroom
- Provide new measurement tools for research
- Provide conservators a condition report for Smithsonian objects

#### References

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