

## AR and VR in cultural institutions

Loddo, M.

**Publication date**  
2021

**Document Version**  
Final published version

**Published in**  
MoMove Modern Movement and Infrastructure

### **Citation (APA)**

Loddo, M. (2021). AR and VR in cultural institutions. In U. Pottgiesser, A. Dragutinovic, & M. Loddo (Eds.), *MoMove Modern Movement and Infrastructure: Contributions to the Docomomo virtual exhibition - momove* (pp. 12-17). Technische Hochschule Ostwestfalen-Lippe.

### **Important note**

To cite this publication, please use the final published version (if applicable).  
Please check the document version above.

### **Copyright**

Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

### **Takedown policy**

Please contact us and provide details if you believe this document breaches copyrights.  
We will remove access to the work immediately and investigate your claim.

# momove

Modern Movement and Infrastructure

Contributions to the  
Docomomo virtual exhibition - momove

in collaboration with the  
18th Docomomo Germany Conference 2021  
Online from the Bauhaus Dessau  
26th February 2021

# AR AND VR IN CULTURAL INSTITUTIONS

MARZIA LODDO



Figure 1



Figure 2

The use of augmented, virtual and mixed reality (AR/VR/MR) to experience and perceive cultural heritage is less adopted by museums, libraries, archives and cultural institutions than other fields. There may be concerns that AR/VR have the potential to stop visitors from attending in person (Coates, 2020). However, in 2020, many museums have started to offer virtual tours of their collections during the global COVID-19 pandemic. This, in fact, has forced in different moments the closure of most museums and institutions. In the following reading, the difference between those digital technologies and why cultural institutions are using them now will be described.

Every day, many museums and libraries make available some of their digitised artworks and items through their websites and other platforms (e.g., Google Arts&Culture, 2011; Wikimedia, 2004). One thing is giving access to the traditional art in digital format, another is displaying digital art (i.e., artists use digital technologies to produce art). Only a few museums had done this and some have expressed no interest in showing digital art (Pokel, 2018). However, just like the use of certain technologies has characterised many different aspects of our lives, they have also slowly entered into the museum sector. The global pandemic has, through necessity, changed the way people access the heritage. Therefore, museums and cultural institutions have demonstrated a strong interest in finding engaging and interactive ways for showing the digitised collection to a wider audience. Hopefully, this will slowly happen for digital art as well. Nonetheless a few years before the COVID-19 pandemic, especially after 2014, technologies, such as VR, AR, MR, three-dimensional (3D) modelling, 3D capture techniques have become increasingly common tools in higher education and research (Lischer-Katz, Golubiewski-Davis, Grayburn and Ikeshoji-Orlati, 2019; Milgram and Kishino, 1994). It is not a coincidence that in 2014, the Google Cardboard VR viewer was released and made VR extremely accessible. Same as in the following years a series of fully functional VR headsets made possible to experiment VR in various academic fields such as architecture and design, humanities classes, etc. (Figuerola, 2018). Not to mention smartphones (used to access AR), which have become more and more available for everyone.

VR/AR/MR technologies have been used in museums for reconstructing historical environment and rooms (Modigliani VR, 2017; Rembrandthuis, 2017), for interacting with one or more objects of the collection (Skin and Bone, 2017; Hills-Duty, 2018; ViveArts, 2019), for creating interactive and immersive experience in the museum (Grande Galerie de l'Évolution, 2018) and as a virtual museum collection (The Kremer museum, 2019).

This new digital way of showing art, has destabilised the standard and traditional curatorial practices and, created new dynamics in storytelling and content creation (Kargas, Karitsioti and Loumos, 2020). Different museums had been investing in virtual reality for many years and interesting results can be shown. Moreover, following the launch of the Oculus Quest 2 VR headset (October 2020), many people think that VR could quickly become mainstream, especially in 2021 (Coates, 2020).

**Figure 1**  
Bone Hall. (2017). A hall through new eyes. Smithsonian Museum, Washington D.C. <https://naturalhistory.si.edu/exhibits/bone-hall>. (Retrieved 14 March 2020).

**Figure 2**  
Force Field. (2017). Meeting Rembrandt: Master of Reality. Oculus Studios. [https://www.oculus.com/experiences/gearvr/1297352360374984/?locale=en\\_US](https://www.oculus.com/experiences/gearvr/1297352360374984/?locale=en_US). (Retrieved 20 March 2020).

**Figure 3**  
VOMA: The World's First Entirely Online Art Museum. <https://voma.space/about-us/>. (Retrieved 7 January 2021).

**Figure 4**  
Frame of the virtual storage facility of the Collection Centre Netherlands, Amersfoort, DIPOT, TU Delft, (see more on the project at: <https://dipot.altervista.org/>)

**Figure 5**  
Frame of the virtual archive of the National Library of the Netherlands-KB, DIPOT, TU Delft (see more on the project at: <https://dipot.altervista.org/>)

**Figure 6,7&8**  
The cabinet of virtual reality. Grande Galerie de l'Évolution. (2018). A permanent room dedicated to virtual reality housed in the gallery of evolution. <https://www.mnhn.fr/en/visite/lieux/cabinet-realite-virtuelle-cabinet-virtual-reality>. (Retrieved 3 April 2020).



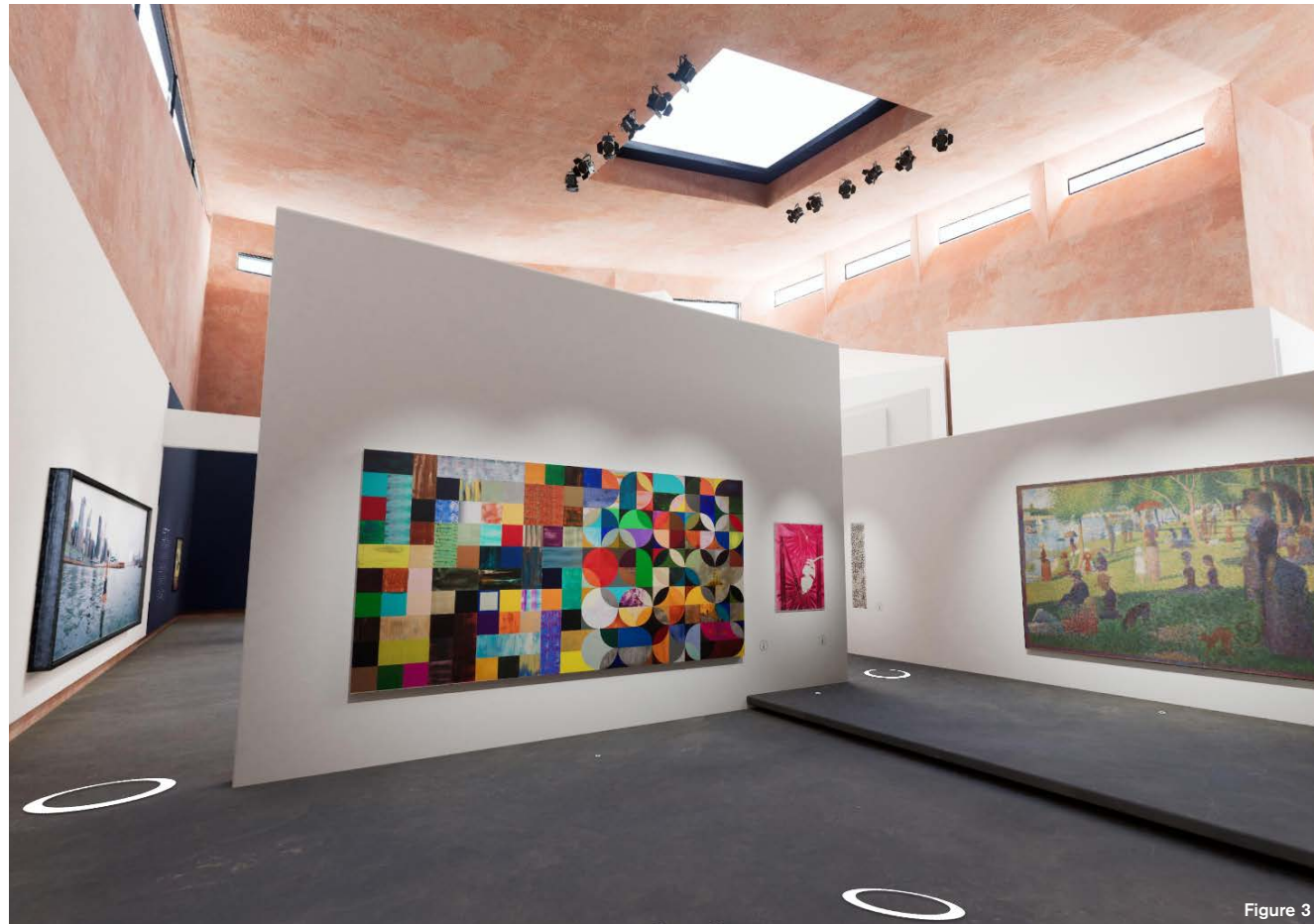


Figure 3

Initiated as a Kickstarter project, the Virtual Online Museum of Art-VOMA opened its virtual door in late 2020. It is the world's first virtual museum, which offers free access to the collection without the limitations of a physical location. VOMA aims to become a hub for debate and discussion around innovation through the digital, to the end of expanding access and enabling new approaches (VOMA 2020).

At the end of 2019, the project DIPOT: Digital Depot, has started at the Delft University of Technology, Faculty of Architecture and the Built Environment (Section Heritage and Architecture). This regards the creation of a 360° and VR tour of a museum storage facility. This area, which could be on-site or off-site the museum, is hosting approximately 90% of the collection and it is usually accessible to employees only. Therefore, the aim has been to show to the general public the storage area, and to launch educational projects together with the museums selected as case studies. Another aim, has been to teach students from architecture universities through the VR tools to improve the museum's design. During the first lockdown (March 2020), ICOM Belgium Flanders took advantage of the peculiar museum closure and offered support for museums interested in making their collections more digitally accessible. The Museum Turnhout, therefore, decided to 3D scan the storage facility and to create a VR tour (usable with Oculus Quest) with the aim of making the storage area of the museum visible to everyone (Depot Turnhout, 2020).

Over the past 30 years, also libraries, archives and documentation centres have been involved in the digitisation of books, periodicals and newspapers on a large-scale. They make their digitised items available through their website and other platforms (e.g., Microsoft Live Search Books project, Google Books Library Project, Open Content Alliance). Some interesting projects have taken place already, for instance, VR/AR/

MR technologies have been used in libraries for different educational projects in various fields (Gravbox in the wild, 2018; Dar M, 2018). Sometimes, they can provide space and services to develop projects and collaborate with other institutions, as universities and private companies.

The KB, National Library of the Netherlands, for instance, is testing the applicability of 360° imaging to support virtual access to the special collections storage, which will become less visible if plans to a new ASRS-Automated Storage and Retrieval System for the preservation of the entire physical KB collection will be executed (Loddo, 2020). They are also experimenting with VR interface and created virtual pop-up books. Novelty books are usually quite fragile and tend to become damaged or worn out when used frequently, particularly when they are children's books (Loddo, Boersma, Kleppe and Vingeroets, 2021).

As described, the reasons why cultural institutions are implementing digital technologies are different. Mainly, they are striving to digitize the cultural heritage to make it accessible for as many people as possible. The choice between one media and another is often dictated by the budget. VR/AR have different costs and creation times. Cultural institutions have always struggled with limited budget, so by nature they tend to direct it on priorities. However, the numerous examples of VR/AR that are becoming more and more popular every day in the field of cultural heritage, given the opportunity to be more cautious and to choose the medium more easily according with the need. In fact, VR and AR are very different. The first offers a total immersion in a virtual reality, while the AR shows reality and an altered digital version one next to the other. For instance, in the case of the KB, VR replaces the pop-up book in an alternate reality. A choice made by the library to avoid the risk of compromising the state of a delicate book. AR adds to

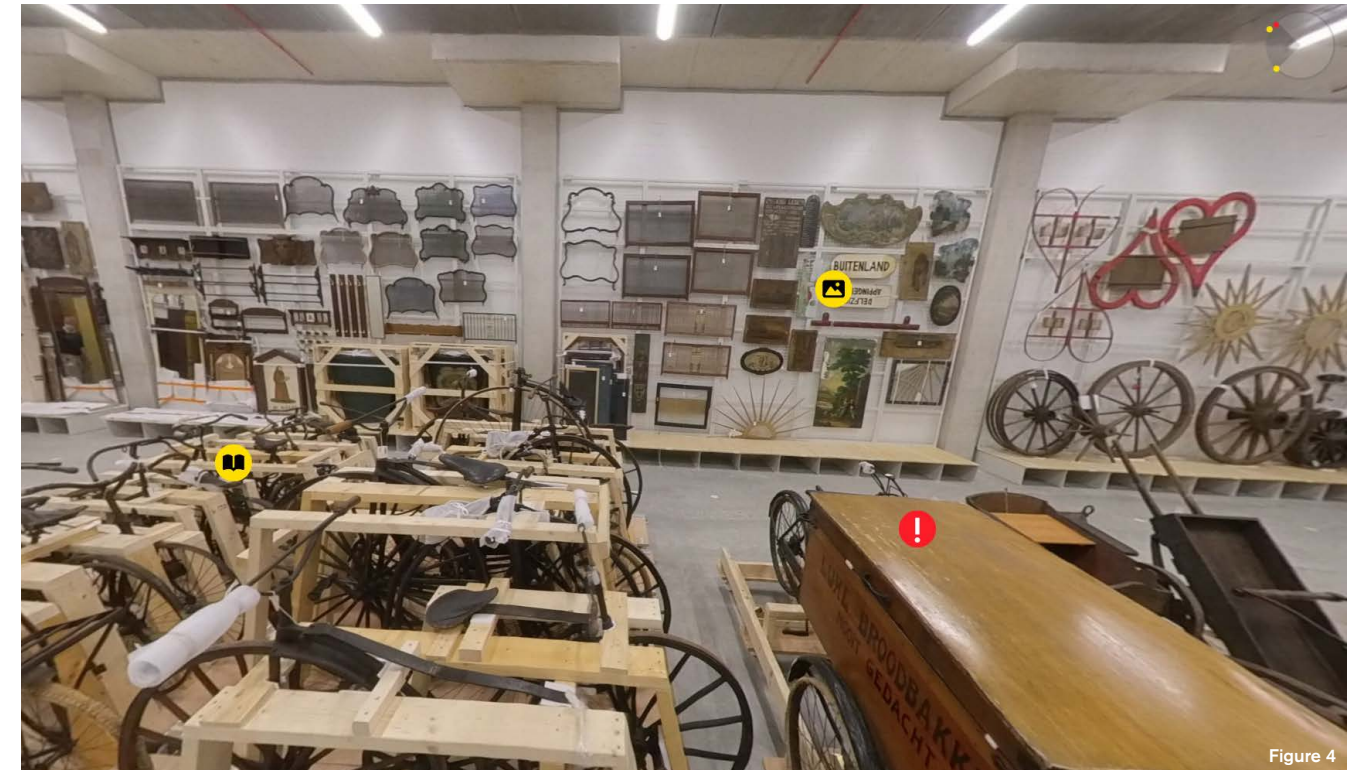


Figure 4



Figure 5

what the user can already see. At the museum's Bone Hall (The Smithsonian Institution, Washington D.C.) some skeletons can be "brought back to life" by using AR (through the app Skin and Bone, 2017), which overlaps images of the animals. This can help visitors understand new concepts and help contextualise history by blending the old and the new (Coates, 2020). To do so, one needs a smartphone or tablet and to download the apps. For the VR, one requires special tools, such as headsets, controllers and sensors, that's why it is still costly, so prohibitively in some cases. While VR captures completely the visitor's attention and brings him/her into another reality, AR can capture people's attention and keep their focus on exhibitions for longer. For this exhibition, students were asked to choose one of the digital

tools, which could better describe his/her project. Students applied storytelling to films, implemented with the use of AR, VR and mixed arts. Each of these students' choices helps visitors to immediately connect with the stories and to be virtually transported into some of their projects' locations around the world such as Jordan, Lebanon, Kosovo, Algeria and Iran. This young generation of students has worked with these media remarkably spontaneously and naturally, which makes one wonder if, in a relative short period of time, these media would be completely accessible and easy to use to everyone, included to cultural institutions.



# References

Coates, C. (2020). *Virtual Reality is a big trend in museums, but what are the best examples of museums using VR.* <https://www.museumnext.com/article/how-museums-are-using-virtual-reality/>. (Retrieved 4 March 2020).

Dar, M. (2018). *3 Steps for Introducing Teens to Virtual Reality.* <https://www.slj.com/?detailStory=3-steps-introducing-teens-virtual-reality-ala-midwinter-2018>. (Retrieved 13 May 2020).

Depot Turnhout. (2020). Presented by ICOM Belgium Flanders. <https://my.matterport.com/show/?m=Pm4cFdDpC6P>. (Retrieved 13 September 2020).

Figuerola, M. (2018). *In a Virtual World: How school, academic, and public libraries are testing virtual reality in their communities.* American Libraries. <https://americanlibrariesmagazine.org/2018/03/01/virtual-world-virtual-reality-libraries/>. (Retrieved 10 March 2020).

Google Arts & Culture. (2011). *Google Arts & Culture.* (Retrieved 13 April 2020).

Grande Galerie de l'Évolution. (2018). *A permanent room dedicated to virtual reality housed in the gallery of evolution.* <https://www.mnhn.fr/en/visit/lieux/cabinet-realite-virtuelle-cabinet-virtual-reality>. (Retrieved 3 April 2020).

Gravbox in the wild. (2018). The Department of Physics and Astronomy at the University of Iowa. <https://astro.physics.uiowa.edu/gravbox/>. (Retrieved 15 May 2020).

Hills-Duty, R. (2018). *National museum of Finland offers virtual time travel, VR Focus.* <https://www.vrfocus.com/2018/02/national-museum-of-finland-offers-virtual-time-travel/>. (Retrieved 16 March 2020).

Kargas, A., Karitsioti, N., & Loumos, G. (2020). *Reinventing Museums in 21st Century. Implementing augmented reality and virtual reality technologies alongside Social media's logics.* USA. <https://www.igi-global.com/gateway/chapter/241598>. pp. 117–138.

Lischer-Katz, Z., Golubiewski-Davis, K., Grayburn, J. & Ikes-hoji-Orlati, V. (2019). *3D/VR in the Academic Library: Emerging Practices and Trends.* Council on Library and Information Resources. <https://www.clir.org/pubs/reports/pub176/>.

Loddo, M. (2020). 3600 images of the KB's Special Collection storage. [https://www.youtube.com/watch?v=9IEEK44G\\_7Q](https://www.youtube.com/watch?v=9IEEK44G_7Q). (Retrieved 10 October 2020).

Loddo, M., Boersma, F., Kleppe, M. & Vingerhoets, K. (2021). Experimenting with 360° and VR representations as new access strategies to vulnerable physical collections: two case studies at the KB. National Library of the Netherlands, *IFLA Journal*.

Milgram, P. & Kishino, F. (1994). A taxonomy of mixed reality visual displays. 77(12). *IEICE Transactions on Information and Systems*, 1321–1329.

Modigliani VR, The Ochre Atelier. (2017). <https://www.tate.org.uk/whats-on/tate-modern/exhibition/modigliani/modigliani-vr-ochre-atelier>. (Retrieved 14 March 2020).

Uglow, T., Pokel, N. & Tutton, S. (2018). Film: How can museums use Virtual reality. Museum Next. Australia. <https://www.museumnext.com/article/how-can-museums-use-virtual-reality/>. (Retrieved 4 March 2020).

Force Field. (2017). Meeting Rembrandt: *Master of Reality.* Oculus Studios. [https://www.oculus.com/experiences/gear-vr/1297352360374984/?locale=en\\_US](https://www.oculus.com/experiences/gear-vr/1297352360374984/?locale=en_US). (Retrieved 20 March 2020).

Bone Hall. (2017). *A hall through new eyes.* Smithsonian Museum, Washington D.C. <https://naturalhistory.si.edu/exhibits/bone-hall>. (Retrieved 14 March 2020).

Lierop Van, J. & Kremer, G. (2019). *Kremer Museum.* <https://www.thekremercollection.com/the-kremer-museum/>. (Retrieved 18 February 2020).

Vive Arts. (2019). *Mona Lisa: Beyond the Glass.* Musée du Louvre, Paris. [https://arts.vive.com/us/articles/projects/art-photography/mona\\_lisa\\_beyond\\_the\\_glass/](https://arts.vive.com/us/articles/projects/art-photography/mona_lisa_beyond_the_glass/). (Retrieved 17 March 2020).

VOMA: *The World's First Entirely Online Art Museum.* <https://voma.space/about-us/>. (Retrieved 7 January 2021).

# Acknowledgments

Marzia Loddo's project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 707404. The opinions expressed in this document reflect only the author's view. The European Commission is not responsible for any use that may be made of the information it contains.



Figure 6



Figure 7

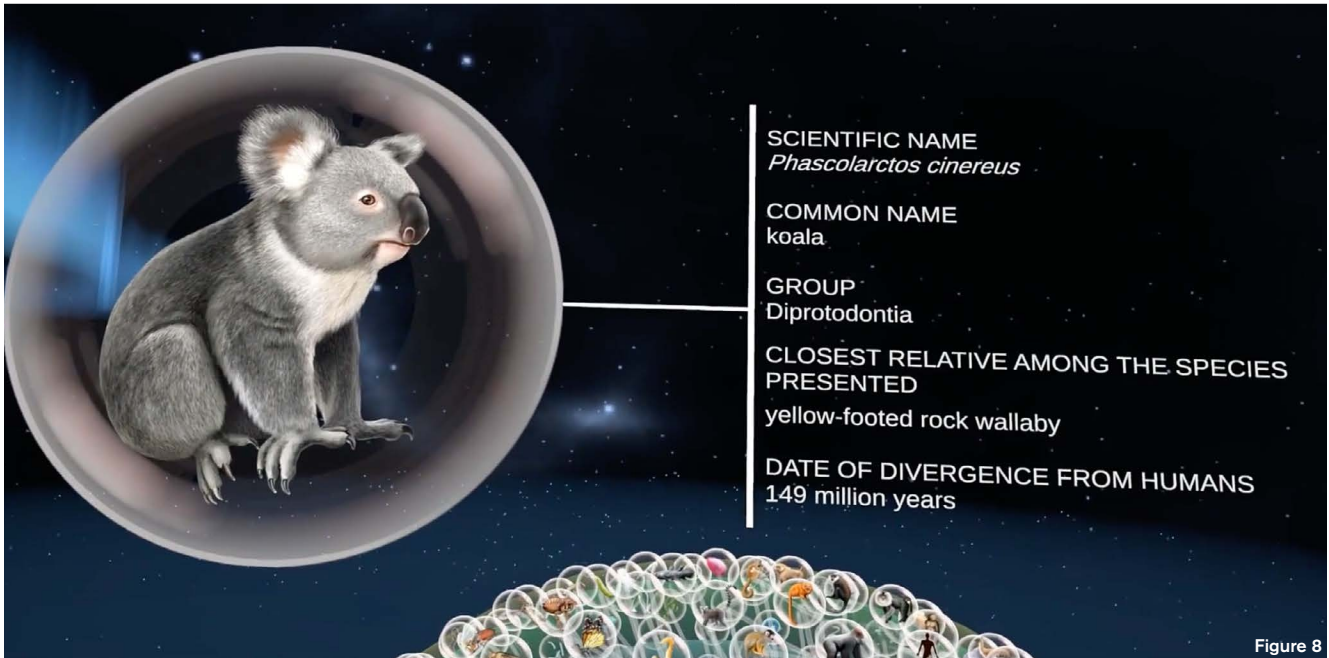


Figure 8