AR and VR in cultural institutions

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AR AND VR IN CULTURAL INSTITUTIONS

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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. (Figueroa, 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. (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'Evolution. (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).

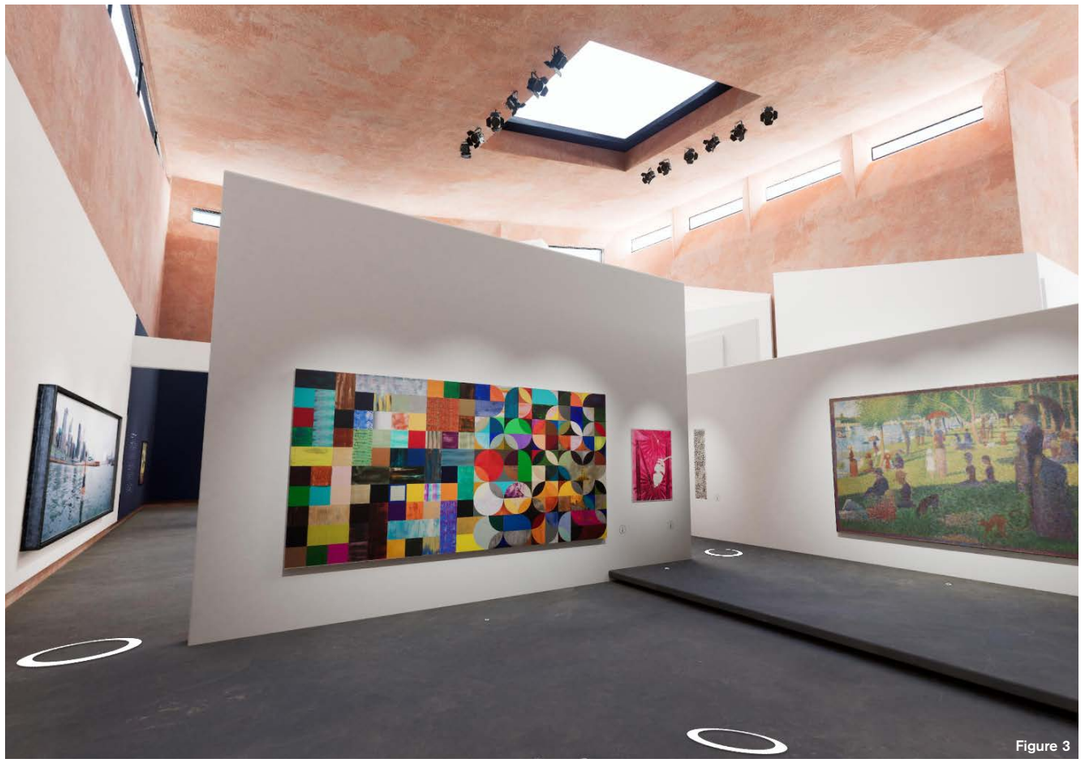

Figure 3

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 lock down (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 360^0 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 Vingerhoets, 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

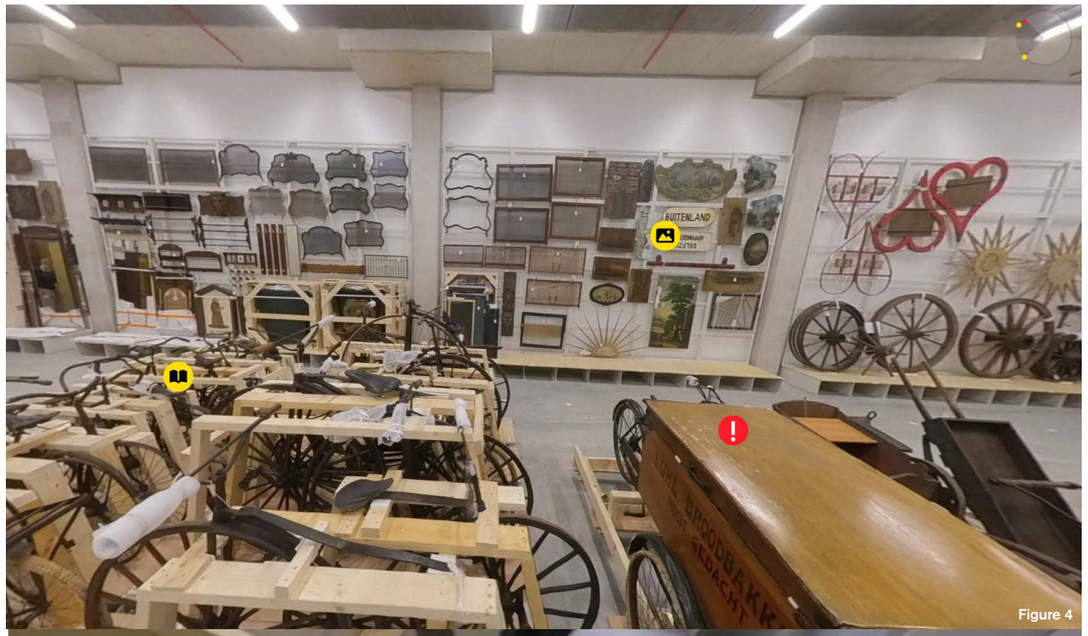

Figure 4

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 need 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 is still costly, so prohibitively in some cases. While VR capture completely the visitor attention and bring him/her in 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' choice, help 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 generations of students have 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.

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Figure 6

Figure 7

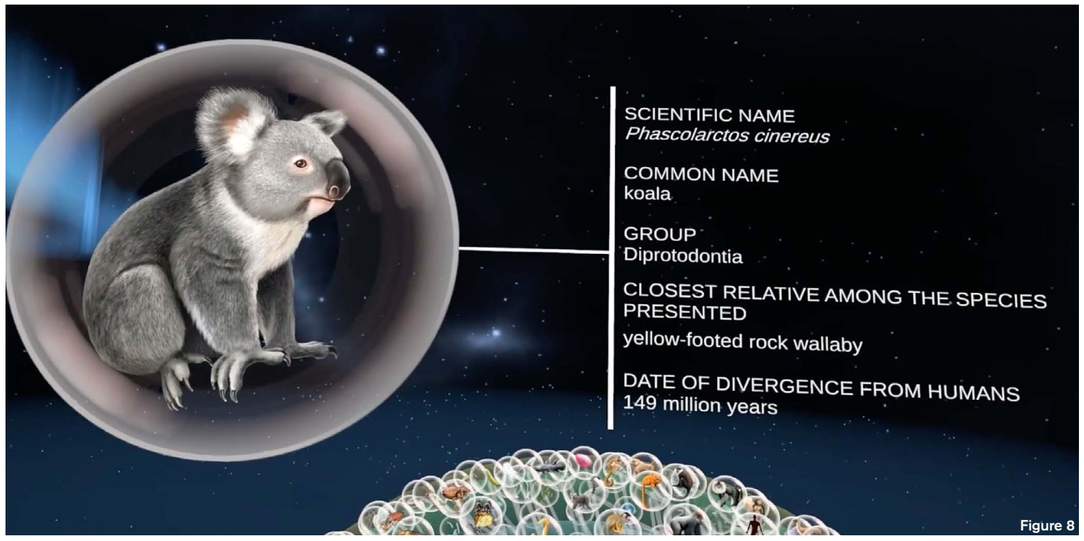

Figure 8