The Augmented Museum:

Essays on Opportunities and Uses of Augmented Reality in Museums

Edited by Dr. Brett Ashley Crawford and Elizabeth Kane

MUSEUMS & AUGMENTED REALITY

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A Collection of Essays from the Arts Management and Technology Laboratory

Editors: Dr. Brett Ashley Crawford & Elizabeth Kane

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ACKNOWLEDGEMENTS

THE WHAT AND WHY OF AUGMENTED REALITY IN MUSEUMS

Pokémon Go swept the world in 2016. Today, augmented reality is both an artistic choice and an experiential expectation for many patrons. Technology, overall, is adapting how museums conserve, create, educate and share. From the Smithsonian Institution's "Skin and Bones" app to various cities around the globe inserting historical overlays to city streets, augmented reality has become part of the lexicon of museum managers and audiences. To wit, the Knight Foundation analyzed how museums are adapting to digital demands and discovered that is "vast" and "complicated." [1] Technology is both an issue of an organization's infrastructure and its overall business and operational structure. The Knight Foundation report aptly notes that digital change is creating and reacting to the changing relationship between the museum and its community. The following collection offers short articles and longer essays to provide a perspective on how museums are using augmented reality and similar digital disruptions. These short articles and essays are culled from the work of contributors working for the Arts Management and Technology Laboratory, a Research Center of Heinz College at Carnegie Mellon University.[2]

1. Jayne Butler, "Five Takeaways On How Museums are Adapting to Digital Demands,"
   31 August 2017. https://knightfoundation.org/articles/five-takeways-on-how-
   museums-are-adapting-to-digital-age-demands
2. http://www.amt-lab.org

CHAPTER **1**

AUGMENTED REALITY IN MUSEUMS

MANDY DING

"AR is an attractive medium for use in museums because digital databases challenge existing archives with obsolescence, and the ever-growing tide of digital information can be reconciled with traditional, physical databases through the promise of AR."[1]

AR (Augmented Reality), a technology that imposes layers of virtual content on the real environment, enables a smartphone or tablet user to aim the device at a designated point and watch a still scene come into life. e ubiquity of mobile devices use has provided the public great opportunities to get familiar with AR applications in various spheres. For museums, the appeal of AR is clear – the technology allows rich media content such as graphics, animations, and videos to be layered upon real environments, which provides a way for museums to bring collections to life.

The following research provides a view intoAR technology and opportunities for its usein museums. To understand what kinds of AR applications are used in various types of museums in the United States, this report will first present the global trend of increasing AR use in museums and explore the benefits of using

1. Geoffrey Alan Rhodes, "Future Museums Now – Augmented Reality Musings," Public Art 59-29. 2015.

Image   1.1   Image   Source: Wikimedia   Commons
https://commons.wikimedia.org/wiki/
File:Augmented_reality_at_Museu_de_Matar%C3%B3_linking_to_Catalan_Wikipedia_(24).J

AR apps in museums' exhibition spaces. Three up-to-date case studies on the leading museums in the United States will show how to choose and make use of an appropriate type of AR app in a museum. The report concludes with some reflections and expectations regarding the future of AR in museums.

WHAT IS AR?

Augmented Reality, also known as AR, providesa live view of a real world environment with elements that are augmented by computer-generated   images.   Generally   speaking,   AR applications for smartphones usually include GPS (Global Positioning System) to pinpoint the user's location and detect device orientation by using the compass. Unlike Virtual Reality (VR), which provides an entire artificial environment, AR makes use of the existing environment and overlays new information

on top of it. It blurs the line between the reality and the computer-generated information by enhancing what we see, hear, feel and smell.

Pokémon GO, the popular game released by Niantic Inc. in the summer of 2016, is a great exampleof how location-based AR has transformed the gaming experience. Not only AR has found its place in gaming – it also has become a novel medium that offers new layers of interpretation to museum collections. According to the 2012 Mobile in Museums study, 1% museums in the United States have started embarking on AR as a mobile feature. [2]

AR AND THE MUSEUMS

According to the 2015 *Trendwatch Report*, digitally mediated personalization and personalized learning are two global prominent trends in museums in recent years.[3] A majority of museums with over 50,000 on-site visitors are using new mobile-only technology. Through mobile apps, museums can provide supplemental information about an exhibit or the museum itself; or as a personalized mobile guide through the museum collection or gallery spaces.

As QR codes, mobile phone guided audio tours, and smartphone apps have become widely used mobile features in museums all over the world, some museums are starting to explore ways to weave in more interactive and customized features that can enhance visitor experience. Already on a path of convergence with mobile technology, AR has become a portable tool for discovery-based learning that can enhance the information available to patrons when visiting gallery spaces, interacting with real-world objects, or even exploring outdoor installations.

2. American Alliance of Museums (US) and Museum Association (UK) Members. 2012. *Mobile In Museums Study.* Arlington: American Alliance of Museums.
3. 2015 American Alliance of Museums. 2015. *TrendsWatch 2015.* Center for the Future of Museums.

Over 1% of U.S. museums are embarking onAR as a mobile feature. A recent example of experimenting with location-based AR apps outof the museum space is the Chicago 00 Project, a partnership between the Chicago History Museum and filmmaker Geffrey Alan Rhodes. "Chicago 00 the Eastland Disaster" app offers a customized AR tour. When the users walking along the Chicago Riverwalk between Clark and LaSalle Streets, with a VR Gallery of images that can be viewed anywhere, the story of the disaster will be revealed in a visceral way.

Other museums are experimenting with AR apps inside the gallery spaces. For museum visitors,AR apps on mobile devices are very easy to use. According to the 2014 Digital Revolution report, 69% of people brought a mobile device with themto their last museum visit. People have already been accustomed to holding up their smartphone and other mobile devices to take pictures. us, scanning an AR object with the device can easily t into the museum experience. AR apps have bene ted both the museums and its visitors for the three main reasons:

1. A Stage for Endless Layers of Information

AR tools o er visitors the possibility to deploytheir own smartphones as pocket-sized screens through which surrounding spaces become a stage for endless extra layers of information. In addition, comparing with the widely used QR codes scanning mobile feature, which usually is a manual tracking system, the AR feature on museum apps work with automated image recognition to realize the scanning of real world objects.

2. A Powerful Tool of Engagement

By o ering location-based AR apps, museums enable visitors to explore information about the displayed artworks by themselves, and enjoy the live camera view when inspecting the details of

a work. Visitors do not only gain some basic knowledge of the displayed artworks or the exhibition itself by checking the labels and texts on the gallery walls, but also absorb layers of information on top of the work. When more information is provided lucidly, conversations among visitors is sparked more easily, and there is a strengthened connection between the museum and its visitors.

3. Creative Tool of Education

In addition, AR apps allow visitors to obtain knowledge of the displayed artworks through an engaging and informative way. It also inspires the visitors to discover the details of the displayed works and think beyond the works themselves. Meanwhile, AR can deliver a surprising outcome of kinesthetic learning. According to the findings by the Samsung Digital Discovery Centre at the British Museum, United Kingdom, young children might have trouble holding the phone or tablet steady with one hand while tapping the screen with the other to scan the displayed work. However, a er seeing the interaction modeled by adults, children will also easily master the scanning process. ey will enjoya sense of accomplishment when they succeed, and their imaginations and curiosities may expand when using the live camera view.

AR APPS IN U.S. MUSEUMS ART MUSEUMS

ART MUSEUMS

For art museums, an AR app is a wonderful tool that can add interpretive content to the displayed artwork. It also invites visitors to step inside the artworks by themselves. Several art museums have been utilized free AR apps developed by technology companies in their temporary exhibitions. For instance, in 2016, the Seattle Art Museum used the Layar AR app in the exhibition "Kehinde Wiley: A New Republic". ere are also art museums teaming up with technology companies to develop

so ware for their own AR apps. e partnership between San Diego Museum of Art and the local start-up Guru is a recent example.

CASE STUDY: ARTLENS 2.0, CLEVELAND MUSEUM OF ART
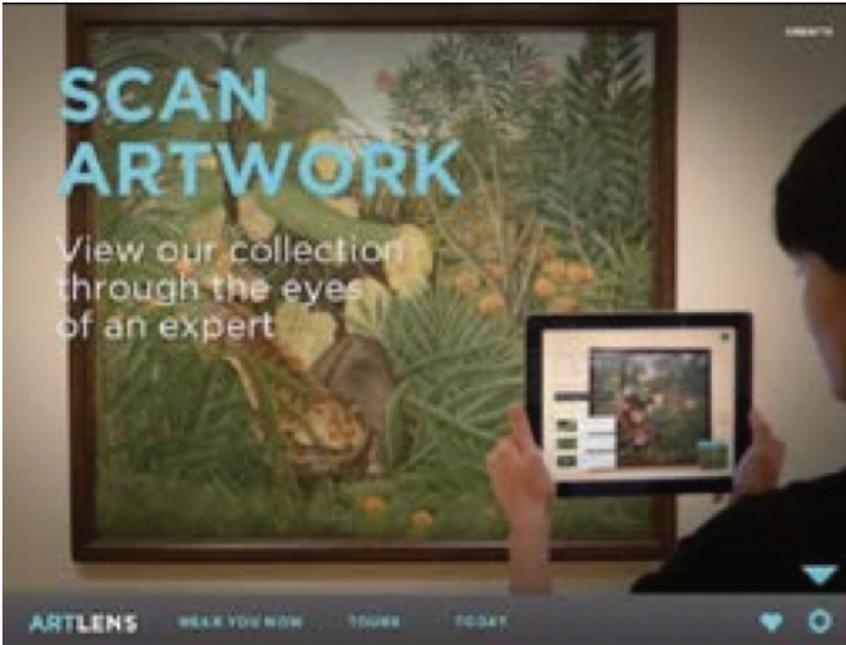
Image 1.2 ArtLens 2.0 is an AR app that uses image-recognition so ware to recognize a selection of two-dimensional pieces of art and aims to honor the museum's visitor preferences according to their interests. It was also designed to model and spark conversations among visitors as they respond to works of art in gallery spaces. Source: e Cleveland Museum of Art.

One of the most well-known AR apps that has been designed and developed by art museums is the ArtLens 2.0 by Cleveland Museum of Art. ArtLens 2.0 is an enhanced version of ArtLens that came out three years ago. ArtLens 2.0 was launched in summer 2016 over a six-month testing and implementing period. e app is both available on Android and iOS.

To put it simply, ArtLens 2.0 is an AR app that uses image-recognition so ware to recognize a selection of two-dimensional pieces of art and aims to honor the museum's visitor preferences according to their interests. It was also designed to model and spark conversations among visitors as they respond to works of art in gallery spaces.

Besides AR, the app contained mapping and beacon technology, enabling visitors to discover and create new pathways through the museum's collections. The integration of various technologies has made the museum visit experience more engaging and entertaining. The Navizon service, a company that provides indoor mapping technology, gives alerts to visitors when featured artwork on ArtLens 2.0 is nearby. Visitors can then scan the featured art to deepen their understanding and interpretation.

ArtLens 2.0 contains all the features provided in the original ArtLens app, and it is much easier to download. Comparing to the original ArtLens app, which took 5 to 10 minutes to download, the new Art Lens 2.0 takes less than a minute. It also takes up the same amount of memory. Moreover, instead of using RFID, the app is now taking advantage of Bluetooth technology for the Collection Wall, a 40-foot interactive, multi-touch, Micro-Tile wall that displays in real time all works of art from the permanent collection currently on view in the galleries at the Cleveland Museum of Art.

> "ArtLens is different than almost every other museum app available today because it is a dynamic catalogue of every artwork on display in the museum: pro- viding its name, date, medium, tombstone information, didactics, videos and gallery location, while being updated in real time so it is always accurate. If something is accessioned, moved, put on loan, etc., it will be updated in ArtLens. This is only possible because of the museum-wide backend integration. ArtLens also aims to be the first wayfinding option for museum visitors, rather than traditional paper maps."[4]

Since January 2013, the ArtLens app has been downloaded over 70,000 times on iOS and over 9,000 times on Android (which came out at the end of 2014). The remarkable success of ArtLens app is due to two main reasons:

1. Developers actively collect feedback and adjust components of the app accordingly

The ArtLens 2.0 app is designed to better cater to the museum visitors' needs. Meanwhile, the audience research team at the Cleveland Museum of Art has observed its functionality real-time and conducted interviews with visitors to obtain feedback. In addition, during the app's testing period, museum staff collected on-site feedback and gave it to developers, who still continuously adjust and update features.

2. A museum-wide backend integration

e Cleveland Museum of Art has made it apoint to integrate arts, audience engagement and technologies such as AR and Beacon technology. The museum has been experimenting with creative ideas by integrating and implementing emerging technologies, and also set up a mature system to test, implement, and examine the impacts of allnew applications. e institutional integration has assured the museum's communication efficiency and led to the ultimate success of a variety of museum technology applications.

NATURAL HISTORY MUSEUMS

Although art museums have traditionally been at the forefront of mobile offerings, natural history and science & technology museums are also using new mobile technology to attract and engage visitors.AR apps provide great opportunities for these

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4. Jane Alexander, Jake Barton, and Caroline Goeser, "Transforming the Art Museum Experience: Gallery One," Silver Spring: Museums and the Web, February 5, 2013.
   http://mw2013.museumsandtheweb.com/paper/ transforming-the-art-museum-experience-gallery-one-2/.

types of museums to bring still works to life and ignite visitors' imaginations.

CASE STUDY: SMITHSONIAN MUSEUM OF NATURAL HISTORY

Image 1.3. The "Skins & Bones" app designed by the Smithsonian's National Museum of Natural History serves as a great example of using AR app for museum engagement and as an educational tool. Source: The Smithsonian National Museum of Natural History.

The "Skins & Bones"[5] app designed by the Smithsonian's National Museum of Natural History serves as a great example of using AR app for museum engagement and as an educational tool. Released in January 2015, the app was developed for an exhibition called "Bone Hall," which was installed in the 1960s and had virtually no upgrades in the following 50 years. the app aims to share untold stories behind the museum's most iconic collections.

By holding up the phone's camera and simply scanning the featured specimens, visitors can see the skeletons of specimens come into life.

The app was made possible with a grant from Booz Allen Hamilton and is free to download on iOS. the 3D modeling work of featured specimens took place at the museum, and the

5. See Drew Porter's Essay for an update to the Skin and Bones App

animations were developed and supported by Virginia Polytechnic Institute and State University.

"The purpose for developing Skin & Bones was to make the exhibit more accessible to visitors, make it more enjoyable and memorable, unlock some of the rich stories these skeletons can tell and consequently increase dwell time, which was 1:34 min. You might say the app repairs the visitor experience." [6]

The percentage of visitors downloading the app is very small due to various reasons. For instance, free WIFI is not available throughout the entire building. Many visitors to the museum failed to recognizethat there was free within the "Bone Hall" and so did not think to download the app. In addition, there is little promotion of the app both inside and outside of the museum. Meanwhile, because of the app's size, visitors may find there is a lack of device memory when attempting to use the app.

It is not easy to gain visitors' attention at the "Bone Hall" and let them explore the exhibition with assistance from the app. However, the museum has received in-depth feedback from those who did use it. User responses are overwhelmingly positive, and the visitors' average dwell time at the "Bone Hall" increased from 1:34 min to 14:00 min, or over a 1,000% increase.

AR APPS IN UNIVERSITY MUSEUMS

University museums may have an easy road to increasing the use of AR technology in their gallery spaces. One major reason is that a large group of university museum visitors are college students, who are most likely to already have experience and are more prone to using new technologies. Additionally, university museums can utilize on-campus resources to better identify emerging technologies, and can even partner or collaborate with technology companies or research labs to develop their own AR

6. Robert Costello, Outreach Program Manager at the Smithsonian's National Museum of Natural History

Image 1.4. The "Skins & Bones" app aims to share untold stories behind the museum's most iconic collections. By holding up the phone's camera and simply scanning the featured specimens, visitors can see the skeletons of specimens come into life. Source: The Smithsonian National Museum of Natural History.

app. For instance, through partnering with Sid Lee, Stanford University launched an AR mobile application for the Anderson Collection in 2014 in order to provide its museum visitors with a new, immersive art experience. However, due to a variety of reasons, a lot of university museums may not be able to a ord to develop an AR app for gallery spaces. For this reason, utilizing free AR apps developed by technology companies is a good choice.

CASE STUDY: "LAYAR" APP, BLANTON MUSEUM OF ART

The Blanton Museum of Art at University of Texas in Austin is a university museum that places priority on implementing new technologies. From December 2015 to April 2016, the Blanton Museum of Art used the Layar AR app to provide interpretive

Image 1.5. From December 2015 to April 2016, the Blanton Museum of Art used the Layar AR app to provide interpretive information to visitors for its exhibition " The Crusader Bible: A Gothic Masterpiece. Source: Blanton Museum of Art.

information to visitors for its exhibition "The Crusader Bible: A Gothic Masterpiece.

Since Layar is an existing app available on both iOS and Android, the museum only ran tests for roughly two hours before implementation. e museumfelt it was necessary to tell stories of the artwork in an informative and engaging way, since each plate displayed in the show had descriptions in three different languages – Persian, Judeo-Persian, and Latin, and it would be hard for English-speaking visitors to gain deep understanding of the art by simply looking at the labels. The Layar free AR app provided a great platform for museum visitors to view English-language translations of the three narratives on the museum-provided iPads.

"The app definitely added an additional layer of interpretation that would have been almost impossible to delier via traditional labels. Given the subject matter of the exhibition, visitors were more eager than usual to engage with the narrative of the works themselves, and the app enabled them to do that." [7]

The museum found that about 20% of the 9,800 museum visitors used the Layar app during the exhibition. Additionally, they determined the average time spent on the Layar app through the dedicated iPads was around 2 1/2 minutes.

CONCLUSION

For all types of museums that are thinking about using AR apps in their gallery spaces, the following should be taken into consideration:

- **Museum's ability:** A museum should first consider their financial situation when deciding whether to develop their own AR app or use an existing one. A museum should also consider if the app requires free WiFi access throughout the exhibition space.

- **Museum visitors' needs: Th**e museum should collect information of visitor behaviors and visitor preferences to pre-examine the most effective way to implement AR technology.

- **Special requirements for the exhibition:** A museum should consider the necessity of using an AR app for its permanent collections or a temporary exhibition. Artwork that requires curatorial and interpretive information, other than the text panels and labels, might be best to feature in an AR app.

Museums that have already embarked on using AR apps in gallery spaces should consider the following:

7. Koven Smith, Director of Digital Adaptation, Blanton Museum of Art, Interview by author.

- **An effective evaluation process:** A museum should collect data and feedback for their AR app use, and adjust or update various components accordingly. e feedback from visitors can also indicate areas for improvement.

- **Create awareness among patrons:** A museum should establish and maintain an effective operation and communication system that supports AR app use. In addition, promotion of the AR app both inside and outside the museum is important to attract new app users.

Effective use of AR apps in gallery spaces canhelp museums achieve various goals and drive institutional changes. AR apps are not just toolsfor informational and engagement – they are also educational platforms that encourage observations, spark conversation and ignite imaginations. Besides adding additional interpretation for museum collections, AR apps may also bring surprising value to museums' educational programming. Finally, they may even add value to children's museums and encourage kinesthetic learning.

ADDITIONAL RESOURCES

American Alliance of Museums (US) and Museum Association (UK) Members. 2012. *Mobile In Museums Study.* Arlington: American Alliance of Museums.

Falk, John H. 2009. *Identity and the Museum Visitor Experience.* Walnut Creek: Le Coast Press.

Furht, Borivoje. 2011. *Handbook of Augmented Reality.* New York: Springer.

Geroimenko, Vladimir. 2014. *Augmented Reality Art: From an Emerging Technology to a Novel Creative Medium.* Heidelberg: Springer International Publishing.

Mannion, Shelley. 2012. "Beyond Cool: Making Mobile Augmented Reality Work for Museum Education." *Museums and the Web 2012.*

Parry, Ross. 2003. *Museums in a Digital Age.* Florence: Taylor and Francis.

Pitman, Bonnie, and Ellen Hirzy. 2011. *Ignite the Power of Art: Advancing Visitor Engagement in Museums.* Dal las: Dallas Museum of Art Publications.

Rhodes, Geoffrey. 2015. "Future Museums Now – Augmented Reality Musings." *Public Art 59-79.*

Yoon, Susan A., Karen Elinich, Joyce Wang, Christopher Steinmeier, and Sean Tucker. 2012. "Using Augmented Reality and knowledge-building Scaffolds to Improve Learning in Science Museum." *International Journal of Computer-Supported Collaborative Learning 7,* no.4 519-541.

HAPTER 2

CHANGING THE WAY YOU SEE WITH AUGMENTED REALITY

THOMAS HUGHES,

W hen looking ahead at what will be the most exciting technology for the arts in the coming year, augmented reality is bound to pop up in the conversation. You may be familiar with augmented reality already. The National Football League has taken advantage of this technology for years to project lines of scrimmage and game time information onto the field in real-time during television broadcasts. So what exactly is augmented reality (AR)? According to Wikipedia:

> **Augmented reality** (AR) is a term for a live direct or indirect view of a physical, real-world environment whose elements are augmented by computer-generated sensory input, such as sound or graphics.
>
> AR layers digital elements on top of our view of the everyday world. This overlay can be done in a number of ways: through the use of handheld devices like smartphones, through desktop computers with a webcam, by wearing specialized headsets, or by projecting a digital images/animations onto a real world location.[1]

Since AR has the possibility to create such a unique visual experience, it naturally has attracted adopters from the creative community. Here are just a few projects taking advantage of AR:

1. https://en.wikipedia.org/wiki/Augmented_reality

DIY Day MoMA – Augmented Reality Art Invasion! On October 9th, 2010, Sander Veenhof and Mark Skwarek decided they would circumvent the traditional art world and host their own exhibition at the Museum of Modern Art using AR.[2] The artists took advantage of the augmented reality viewer app Layar, currently available only on iPhone and Android devices, to create a virtual exhibition of digital works. By downloading the Layar app and loading the "AR Exhibition" layer, anyone with a camera-enabled smartphone or mobile device can view numerous digital artworks throughout MoMA. This includes both 2-D and 3-D images and animations and an additional 7th floor that only exists in the world of AR. The digital artworks have continued to be on display since DIY Day wrapped up in October.

The Virtual Public Art Project Also utilizing the Layar app (https://www.layar.com/), the Virtual Public Art Project (VPAP) takes the idea of AR artworks one step further by placing pieces around the globe.[3] The artworks can be viewed in the round and from multiple perspectives, just as you would be able to with a real piece of public art. Check out some of the current works on display on VPAP's website . If you're interested in creating your own piece of AR artwork for the public, VPAP puts out multiple calls for submissions.

The Macula Project – Mapping 600 years of history The Macula Project is comprised of a group of artists exploring the relationship between image, sound and the viewer.[4] The city of Prague was searching for a way to celebrate the 600th anniversary of the astrological clock tower situated in the center of the city and turned to the Macula Project for a creative solution. The artists at the Macula Project turned to AR for the project and projected this stunning work that took the audience

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2. http://www.sndrv.nl/moma/?page=invitation
3. http://www.virtualpublicartproject.com/Virtual_Public_Art_Project/
   Virtual_Public_Art_Project.html
4. http://themacula.com/index.php?/projection/old-town/

Image 2.1 Screenshot of the Virtual Public Art Project

through the 600-year history of the clock tower. Macula was able to achieve this by digitally mapping the building beforehand and tailoring their animation so when it ran through a digital projector, the perspective lined up perfectly with the real-life clock tower.

The Getty Museum – Exploring the Augsburg Display Cabinet in 3-D If there is one frustrating roadblock shared across the gamut of art lovers, it's the frustration over not being able to personally handle and explore a piece of art in a museum.[5] The Getty Museum (http://www.getty.edu) understood this burning desire and took advantage of AR technology to let their visitors have a more in-depth exploration of one of the pieces from their decorative arts collection. Using an online program launched

5. http://www.getty.edu/art/exhibitions/north_pavilion/ar/index.html

within a web browser, a computer's built-in webcam, and a printed out "AR tag", an art lover can handle a 3-D model of a 17th century collector's cabinet. By rotating and tilting the AR tag, the cabinet will spin 360 degrees and various doors can be opened and explored.

Image 2.2 Source: The Getty Museum

The University of Gronigen – Giving students X-ray vision
Part of a permanent exhibit in their Hall of the Bernouilliborg, the University of Gronigen teamed up with Science LinX and Nanopodium to create a unique science experience for their students.[6] The exhibit is comprised of multiple boxes covered with AR tags. By wearing a special set of glasses containing display screens and a camera, the boxes' walls suddenly disappear for the user. The user can then tilt and turn the now 'hollow' box that contains various types of 3-D science-related models, such as a model of a chain of molecules.

6. http://www.rug.nl/news/2010/06/powersoften?lang=en, http://www.rug.nl/sciencelinx/,

The types of projects that are now possible with augmented reality are rapidly growing and the technology is some pretty exciting stuff to play with. But beyond the wow factor that comes with AR, what are some of the ways that arts organizations can use this technology in worthwhile and innovative ways? Can AR extend to projects beyond the visual arts? Are there ways that this technology can be used to engage with large audiences as well as the individual? I don't think it is too far a stretch of the imagination to envision actors on stage reacting to digital props or musicians playing digitally created instruments. As with any new tech, it will be exciting to see how AR develops and continues to merge our reality with a digital one.

A GUIDE FOR EXPERIMENTING WITH TECH IN MUSEUMS

THOMAS HUGHES

There has been a lot of buzz lately about mobile technology with the release of mobile apps by some major museums like MoMA, The Brooklyn Museum, and the Museum of Natural History. Reviews have been mixed, but the discussion about the way mobile technology should be used in museums has definitely picked up speed.

The popular view of mobile technology seems to be focused (a little too much?) on one main format – having a downloadable, mobile application. While developing your own app can be a good way to deliver content to your visitors, it is definitely not the only approach. I decided to take a look at four different ways that some museums have been experimenting and implementing mobile tech in their institutions.

Providing not just an app, but also the device itself – TAP at The Indianapolis Museum of Art[1]

The IMA (http://www.imamuseum.org) wanted to include all their visitors in their mobile tech program, not just those who own a smartphone. So, they took the extra step of providing

1. http://www.imamuseum.org/page/tap

Image 3.1 Source: The TAP home screen and numeric input screen via the Indianapolis Museum of Art blog

gallery goers with an iPod Touch for the duration of their visit. By placing the device in the visitor's hands, everyone has access to the digital content the IMA provides and no user is alienated for not owning or having an incorrect mobile device.

The iPods cost five dollars to rent and only contain the TAP app and an instructional video on how to use both the iPod and the app in tandem with the galleries. The app works on a numeric input system, a 3-digit code is associated with every piece in the tour that presents users with different content such as video interviews with artists, text files, pictures, and audio files explaining the artwork.

By sticking to one type of device, the IMA was able to tailor the user experience exactly the way they wanted, which was their main goal for developing a mobile program. This approach circumvents the need for an app store and allows for all content to be controlled in-house. The content management system is the same one used for their website and allows IMA to instantly edit and update their content without needing to go through a third-party developer. The devices also have built-in polls and can provide both museum staff and TAP users with the real-time results.

Visit the IMA's blog to check out the development process of the Tap Program and some of their ideas about developing a successful mobile standard for museums.

Integrating mobile websites and mobile apps: The Brooklyn Museum

A mobile website is the mobile-friendly version of an organization's existing website. In a recent post, we examined the differences between mobile websites and mobile applications.

The Brooklyn Museum (http://www.brooklynmuseum.org) has developed a mobile website that is accessible from any web-enabled mobile device. In addition to sharing information about the institution, users are encouraged to get involved by recommending pieces of art work and apply descriptive tags through the Brknlynmuse and Gallery tag! features of the mobile website.[2]

To create a more accessible experience for those with more app-friendly devices, Brooklyn Museum also created downloadable

2. Shelley Bernstein, "BklynMuse: Going Mobile with a Gallery Guide Powered by People," 26 August 2009. https://www.brooklynmuseum.org/community/blogosphere/2009/08/26/bklynmuse-going-mobile-with-a-gallery-guide-powered-by-people/; Shelley Bernstein, "Gallery Tag!" 25 March 2010. https://www.brooklynmuseum.org/community/blogosphere/2010/03/25/gallery-tag/
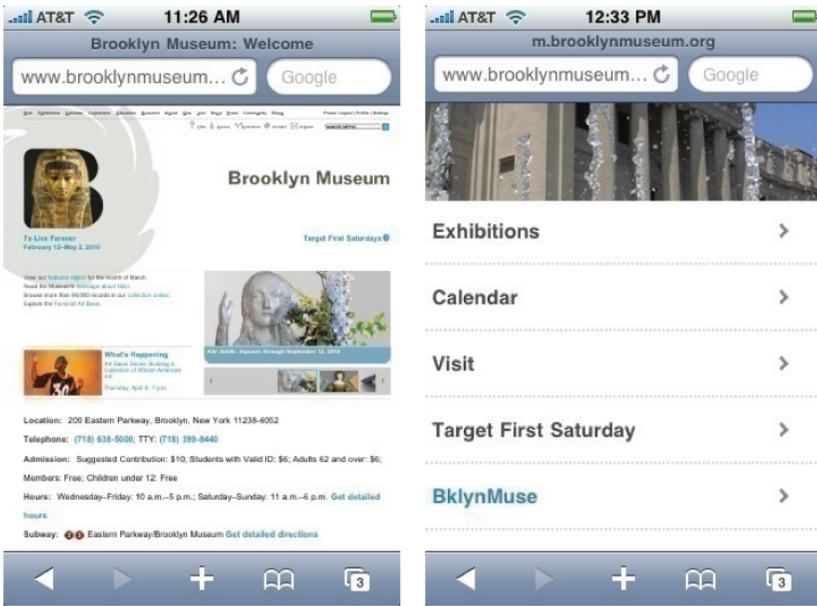
Image 3.2 Brooklyn Museum's main website (left) and their mobile site (right). Via the Brooklyn Museum blog

apps for both iPhone and Android that simply wrap the current mobile website. The same functionality and features of the mobile site are there, the apps just act as a different port of entry. This has proven to be a more sustainable approach to their mobile strategy than building each app up from scratch.

You can find more info on Brooklyn Museum's blog for their approach to their mobile website and their mobile applications.[3]

Connecting to content with QR codes: The Mattress Factory

3. Shelley Bernstein, "Brooklyn Museum Mobile Web on iPhone and Droid," 17 July 2010. https://www.brooklynmuseum.org/community/blogosphere/2010/07/27/brooklyn-museum-mobile-web-on-iphone-and-droid/

The Mattress Factory, (http://www.mattressfactory.org) an installation art museum in Pittsburgh, has been experimenting with implementing QR codes in their exhibits in an effort to reduce the number of brochures in their museum as part of a green initiative. QR stands for "Quick Response", connecting users to content within seconds of scanning the code with your phone. A QR code is a two-dimensional barcode that is readable by mobile devices with 3G access, a built-in camera and a barcode reading app.

A developer is not required to create QR codes; and with this method, a museum can start immediately experimenting with mobile technology.

The codes are free to generate and contain text information. Once you generate a code online, it can be printed out and placed next to the piece in your collection. For more media based content such as pictures, audio and video, the content must be uploaded to sites like YouTube or Flickr. The QR code will link users directly to that content.

More info on the Mattress Factory's use of QR codes can be found on the Mattress Factory blog.[4]

Taking advantage of an existing app: Augmented Reality with the Andy Warhol Museum

Augmented Reality (AR) refers to using a mobile device to view digital images overlaid onto real locations. AR apps use a

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4. "QR Codes: A Visitor's Resource Guide." http://artyoucangetinto.blogspot.com/2009/04/qr-codes-visitors-resource-guide.html

Image 3.3 QR code placement in the Mattress Factory's exhibition space. Source: the Mattress Factory blog.

smartphone's built-in camera and GPS to identify where the user is and overlays the content for that location.

The Andy Warhol Museum's (http://www.warhol.org) AR layer places images of Andy Warhol's face over real-world locations in Pittsburgh and New York that were historically relevant to his life. Touching each icon provides users with pictures of artwork and/or content associated with each location and the way it played a part in Warhol's career. The Andy Warhol AR project is not an app itself, but a filter layer that is installed on an existing AR app Layar, available for Android devices and iPhones.

Image 3.4 Warhol, Warhol, Everywhere! A typical street view using the Andy Warhol layer. Source: The Andy Warhol Museum.

CHAPTER 4

GPS INDOORS

BYTELIGHT'S INDOOR POSITIONING SYSTEM AT BOSTON'S MUSEUM OF SCIENCE

ELIZABETH QUAGLIERI
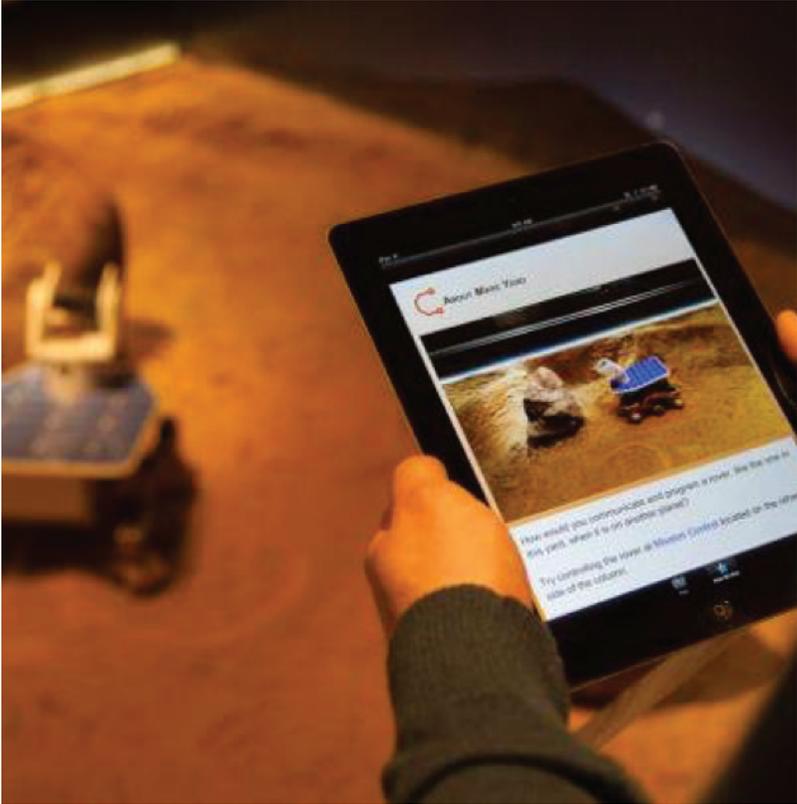
Who: Dan Ryan and Aaron Ganick, the founders of ByteLight, a Cambridge, Massachusetts start-up.

What: **A positioning system using LED lights** enabled with the capacity to broadcast location data in indoor spaces, in real time, and without WiFi or GPS. Little satellites, if you will.

Why: The LED positioning system benefits both museum participants and the museum administration. Firstly, the positioning system can **detect a museum goer's location in the museum** and provide additional information on the object, exhibition, or installation the individual is viewing. Secondly, it allows museum administration to access valuable **data about patron traffic and engagement with exhibitions**-information staff may previously not had been able to collect or collect with such ease. It is a rather tempting technology because for most venues, the infrastructure for ByteLight bulbs already exists. If you have light bulb sockets, then you can have ByteLight. The question is not *how* to implement the ByteLight bulbs, but *why*.

Image 4.3 Source: ByteLight

How: See that flash? No? I didn't either. Within each LED light bulb is a chip that flashes a pattern, pulsing too fast for humans to see but the perfect speed for the camera lens of a mobile device. Users must download the ByteLight application to their mobile device in order to access the technology. The mobile device, such as the iPad in the case of the Museum of Science, **picks up the light signal transmitted by the LED bulb and tracks the user's location with incredible accuracy and speed–** within one meter and in less than a second, according to the company.[1] In the ComputerPlace, visitors can borrow one of the Museum's programed iPads to take a guided tour of the space, to seek additional information on the objects before them, and to discover other installations in the museum of interest. With this new technology, visitors can explore the space they occupy with a heightened sense of place and in greater detail.

A smartphone/tablet device demodulates the visible light signal via the existing cameras. The mobile device then consults a cloud-based server, which maintains an association of light identifiers, content, and physical location. -Bytelight.com

As with any new technology, there are a number of issues museum administrators must address before moving forward and implementing ByteLight. Consider these possible obstacles before pre-ordering your Bytelight Bulbs:

1. Even though this is an "opt-in" technology, how will museum visitors react to the "tracking" feature of the bulbs? Their concerns may include but are not limited to:

- Why do you need to know my whereabouts in the museum?

- To whom are you selling the data?

- Am I being audited by the IRS?

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1. http://www.acuitybrands.com/solutions/internet-of-things/indoor-positioning-systems

- Am I the newest contestant on the *Amazing Race*?

2. The light signals emitted from the LED bulb will not reach a mobile device located in a visitor's purse, pocket, diaper bag, backpack (oops here comes security, you almost made it through the museum without storing that bag in a locker).

3. There is no doubt this is a game-changing technology, but does it fit with the museum's aims, culture, needs, resources, and goals for the visitor's experience? Will the need for a mobile device in order to access this technology exclude certain patrons?

Dan Ryan, co-founder, writes, "What is exciting about the potential we're seeing with indoor technology is around **engagement**. I think there's something very interesting about delivering **highly relevant digital content that's targeted to your location**. Location based gaming, social networking, photos, and augmented reality are all spaces that can benefit from better contextual awareness enabled by ByteLight."

While ByteLight certainly offers museum visitors *and* administrators greater access to information and a more accurate alternative to other location-based services (WiFi and QR codes), it comes at both a hefty price and risk. Is the museum setting a promising environment for this technology? Or should it be marketed toward supermarkets and retailers like Target? Do visitors need digital navigation assistance while wandering through galleries? Have similar systems for providing location-specific information proved successful in the museum setting (think QR codes)? Will museum visitors be motivated to download the mobile application if they have an iOS or Android device? While it is clear museum administrators will benefit from increased data on visitor behavior and traffic, the advantage for museum goers may require a closer look.

AUGMENTED REALITY

A SHORT STORY

MANDY DING

Augmented Reality, also known as AR, provides a live view of a real world environment with elements that are augmented by computer-generated images. Generally speaking, AR applications for smartphones usually include GPS (Global Positioning System) to pinpoint the user's location and detect device orientation by using the compass. Unlike Virtual Reality (VR), which provides an entire artificial environment, AR makes use of the existing environment and overlays new information on top of it. It blurs the line between the reality and the computer-generated information by enhancing what we see, hear, feel and smell.

Pokémon GO, the popular game released by Niantic Inc. in the summer of 2016, is a great example of how location-based AR has transformed the gaming experience. Not only AR has found its place in gaming – it also has become a novel medium that offers new layers of interpretation to museum collections. According to the 2012 Mobile in Museums Study, 1% museums in the United States have started embarking on AR as a mobile feature.

> "AR is an attractive medium for use in museums because digital databases challenge existing archives with obsolescence, and the ever-growing tide of digital information can be reconciled with traditional, physical databases through the promise of AR."[1]
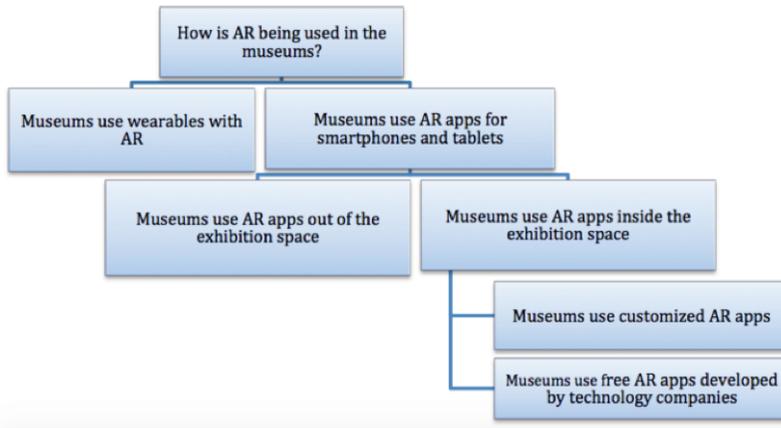
Figure 5.1 Flow Chart of AR Uses. Source: Author.

Museums are experimenting with location-based AR apps both in and out of the exhibition space. A recent example is the Chicago 00 Project, a partnership between the Chicago History Museum and filmmaker Geoffrey Alan Rhodes. The newly developed "Chicago 00 The Eastland Disaster" app offers a customized AR tour. As the users walk along the Chicago river walk between Clark and LaSalle Streets, a gallery of images appears, allowing users to experience the story of the disaster viscerally.

A lot more museums are using AR apps or apps with AR feature as an engagement tool inside exhibition spaces. For instance, the Smithsonian's National Museum of Natural History's AR app -"Skins & Bones", exposed the story behind the skeletons using AR.

Some museums have not created AR apps by themselves, but have utilized free AR apps developed by technology companies in order to attract and engage visitors in temporary exhibitions. In early 2016 at the "Kehinde Wiley: A New Republic"

1. Geoffrey Alan Rhodes, "Future Museums Now – Augmented Reality Musings," *Public Art 59-29. 2015.*

Exhibition, Seattle Art Museum utilized the Layar AR app so that visitors could enjoy a free AR smartphone experience.

Living in a digital age, people have already been accustomed to holding up their smartphone and other mobile devices to take pictures. Thus, scanning an AR object with the device can easily fit into the museum experience. AR apps allow museum visitors to gain information in a more convenient, efficient and entertaining way. AR tools offer museum visitors the ability to deploy their own smartphones as pocket-size screens through which surrounding spaces become a stage for endless extra layers of information. In addition, comparing with the widely used QR codes scanning mobile feature in the museums, which usually is a manual tracking system, the AR feature on museum apps work with automated image recognition to scan real world objects.

For museums that are willing to embrace the technology trend, developing an appropriate kind of AR app can be a way to achieve various organizational goals. AR can be an expensive and challenging technology for museums, but it is well worth the effort. We can expect that AR may soon become a standard, so those who are early adopters of the technology will be rewarded for their foresight. In the coming months, I will review case studies on museums that have used AR apps inside their exhibition spaces, and provide guidelines for how to choose an appropriate AR app for a museum.

AUGMENTED REALITY AND OTHER FUN TECH

DREW PORTER

This past April, several AMT Lab staff members attended the Museums and the Web Conference in Cleveland, OH.[1] The four-day event highlighted the work of individuals and organizations in the field in regards to the implementation of new and innovative technologies aimed to enhance user experience or bolster a museums data collection methods. The event also featured numerous panels dedicated to the discussion and critique of current methods. While there were dozens of thoughtful topics covered over the four days, AMT Lab has chosen to present five of the most thought provoking topics and the organizations behind them.

Graphic Interfaces & Accessibility

The San Francisco Museum of Modern Art (SFMOMA), inspired by the previous efforts of the Canadian Museum of Human Rights, set out to bring inclusivity and accessibility to its new Painting and Sculpture Interpretive Gallery. [2] With outside help and consultation, the SFMOMA created a large touchscreen graphical interface for the vision-impaired. This "Touch Wall"

1. https://mw17.mwconf.org/
2. https://humanrights.ca/
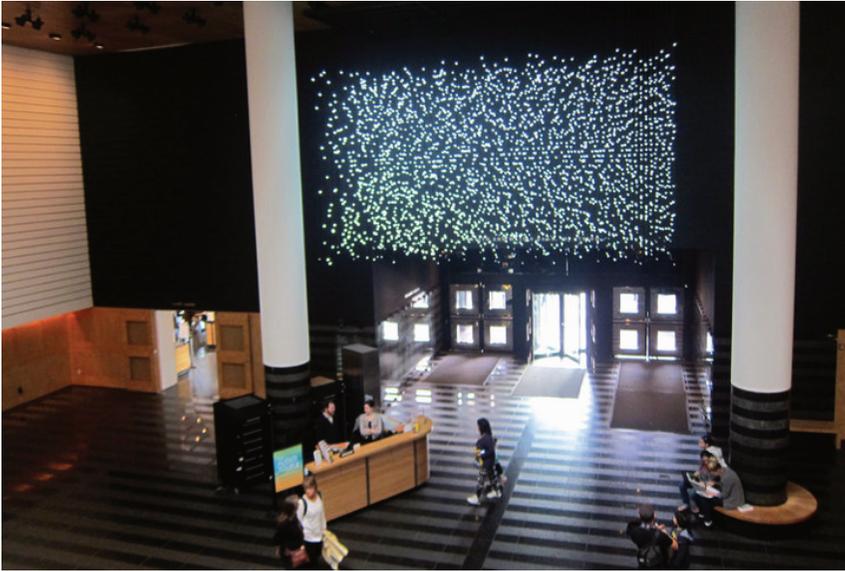
Image 6.1 Source: SFMOMA (http://www.sfmoma.org)

is adaptable to each patron, and can switch user modes through a simple button press. The aim of this device was to provide detailed verbal descriptions of over 100 artworks on display. The full documentation and bibliography of the gallery is provided on the conference website.[3]

Inclusive Audio Guides/Location Aware Storytelling

Another featured accessibility initiative was presented by members of The Andy Warhol Museum, who gave insights from and explained the process of developing their inclusive audio guide "Out Loud". After an eight-month user design process, The Warhol debuted an iOS based audio guide that utilizes Bluetooth beacons to push content to users based on their location within the museum. Throughout the design process, the Warhol staff encountered and answered many design questions about app structure, language, and consistency. Creating guides that are location-aware allows for a user centered experience, providing

3. https://www.museumsandtheweb.com/bibliography/?bib=4651

Image 6.2 Source: The Andy Warhol Museum (http://www.warhol.org)

patrons with only the information they want or need given their personal journey through the museum space. The Andy Warhol Museum's work serves to outline the intensive research design, and content development process and stands as a blueprint for other organizations interested in access and inclusivity initiatives. Further insight in The Andy Warhol Museum's design process are included at the conference website.[4]

Location-Based Understanding/User Activity Tracking

In recent years, large and small-scale museums have started designing apps aimed at enhancing the user experience by serving as a companion to existing exhibitions or as an aid in museum navigation. The National Museum of Natural History (https://naturalhistory.si.edu/) created its "Skin and Bones" app to enhance its antiquated Bone Hall exhibit. Through further engineering of the app and the use of Google Mobile Analytics, NMNH gleaned insights about how users navigate the space, how much time they invest in the exhibit, and the types of devices they use, among other points of interest. Countless data

4. https://www.museumsandtheweb.com/bibliography/?bib=4651
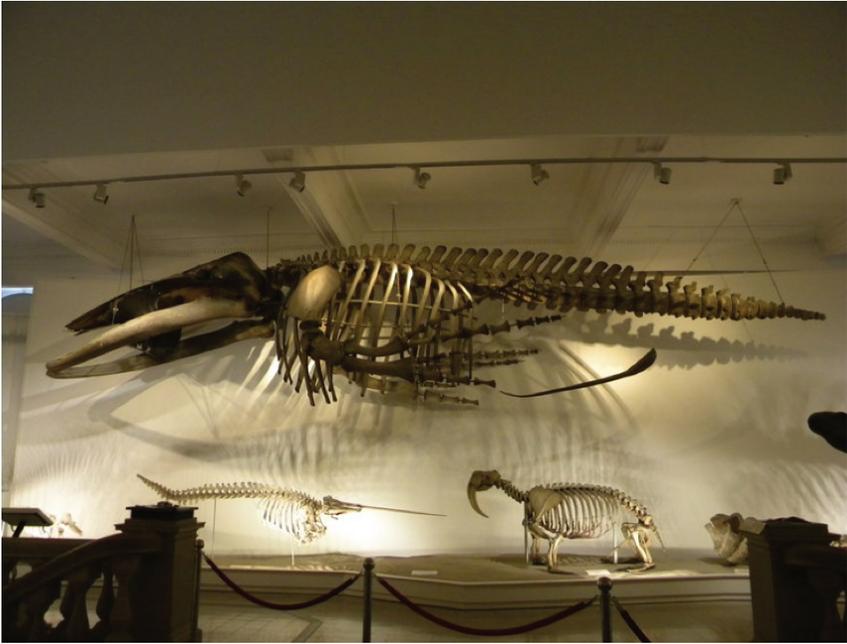
Image 6.3 Source: Natural Museum of Natural History

points can be derived from an organizations app with the proper amount of knowledge and engineering. Similar organizations have begun to utilize users Bluetooth devices to monitor their movements through a given space, enhancing the layout of their museums. Insights such as these help museums better understand the ways in which patrons experience exhibitions, allowing them to adjust their offerings accordingly. Further information on the Skin and Bones app can be found on their website.[5]

E-Commerce Experience/Website Design

In October of last year, the Corning Museum of Glass (CMoG) hosted a summit on E-Commerce in the Cultural sector, led by experts in the field. This event set out to determine a more strategic approach to E-Commerce, influenced by data-driven

5. http://naturalhistory.si.edu/exhibits/bone-hall/

Image 6.4 Source: CMoG

insights. The findings of this summit were then presented at Museums and the Web 2017 as a continuation of the conversation. Five themes were derived [1] Mission-centric strategy, [2] Holistic approaches to retail, [3] Mobile first focus, [4] Data driven decision making, and [5] Resource allocation. Read the complete paper on these findings on their website.

VR & AR in Transformative Storytelling

The newest forms of technology, Virtual Reality and Augmented Reality, serve to connect patrons to the oldest form of human interactive experience, storytelling. The Canadian Museum of Human Rights leveraged these two technologies to present patrons with two exhibits aimed at transporting the user to new environments, placing them at the epicenter of real life stories of human strife. Organizations who utilize this technology have discovered that it serves to create dialogue from visitors as they relate their own lives to exhibition experiences. Using VR, AR,

Image 6.5 Source: Canadian Museum of Human Rights (https://naturalhistory.si.edu/)

and other cross-media techniques serves to deepen the relationship between a museum and its patrons.[6]

6. You can read a bibliography from the presentation at
   https://www.museumsandtheweb.com/bibliography/?bib=4673

CHAPTER 7

POKÉMON GO TAKES OVER

DR. BRETT ASHLEY CRAWFORD

A s someone who worked from 1999 – 2012 in a theatre that included a robust arts education program and an Equity Theatre for Young Audiences, I can say that I have witnessed a lot of Pokémon obsession. Then the obsession waned. I admit, I was a little happy. But today Pokémon is back to entertain many and torture some. Pokémon GO has exploded over the last month (fun fact: It started as an April Fool's joke in 2014 at Google.[1] Niantic spun off to become an independent company).

As an augmented reality game, Pokémon GO is noted as actually getting generation Z out of their houses using the geo-location feature on their digital devices to play the game. The game is also heralded as the first "nostalgia" product for millennials. It seems to be almost everywhere. Just today I have read five Pokémon GO articles, two of which address the arts.

According to an article in the *Washington Post*, the Holocaust Museum in Washington, DC asked Pokémon GO to please remove the museum as a pokéstop.[2] Yet other organizations are

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1. Om Malik, "Pokémon Go Will Make You Crave Augmented Reality," *The New Yorker,"* 12 July 2016. https://www.newyorker.com/tech/elements/pokemon-go-will-make-you-crave-augmented-reality.

Image 7.1 Pokémon GO logo Source: http://www.pokemongo.com

taking advantage of traveling packs of Pokémon hunters. According to an article in Nonprofit Quarterly, several museums are highlighting their pokéstops in their social media and a Food Bank is mobilizing volunteers by offering by linking to a pokégym location to a volunteer recruitment incentive.[3] In Sydney, Australia, a Facebook event was created to walk "together through the Royal Botanic Gardens and around the exterior of the Opera House. This event attracted over one thousand people under the hashtag #PokeGoWalk." Yet it was not coordinated by the Botanic Gardens.

This makes one wonder what opportunities exist for intersecting Pokémon GO with arts and cultural institutions and how to ensure these opportunities will actually engage the

2. Andrea Peterson, "Holocaust Museum to Visitors: Please Quit Catching Pokémon Here," *Washington Post,* 12 July 2016. https://www.washingtonpost.com/news/the-switch/wp/2016/07/12/holocaust-museum-to-visitors-please-stop-catching-pokemon-here/?utm_term=.07329cb24bb3

3. Amine Creedon, "Pokémon Go to the Opera?," Nonprofit Quarterly, 14 July 2016. https://nonprofitquarterly.org/2016/07/14/pokemon-goto-opera-nonprofits-made-game/?utm_source=Daily Newswire&utm_campaign=eadb0b4af7-Daily_Digest_23497_14_2016&utm_medium=email&utm_t

visitors with the content of the arts and cultural institution. Bringing them in means nothing if it is ancillary to the mission.

CHAPTER 8

POKÉMON GO

## WHERE DID IT GO? 5 MAJOR TAKEAWAYS FROM ITS RISE AND FALL

KATHLEEN GRENNAN
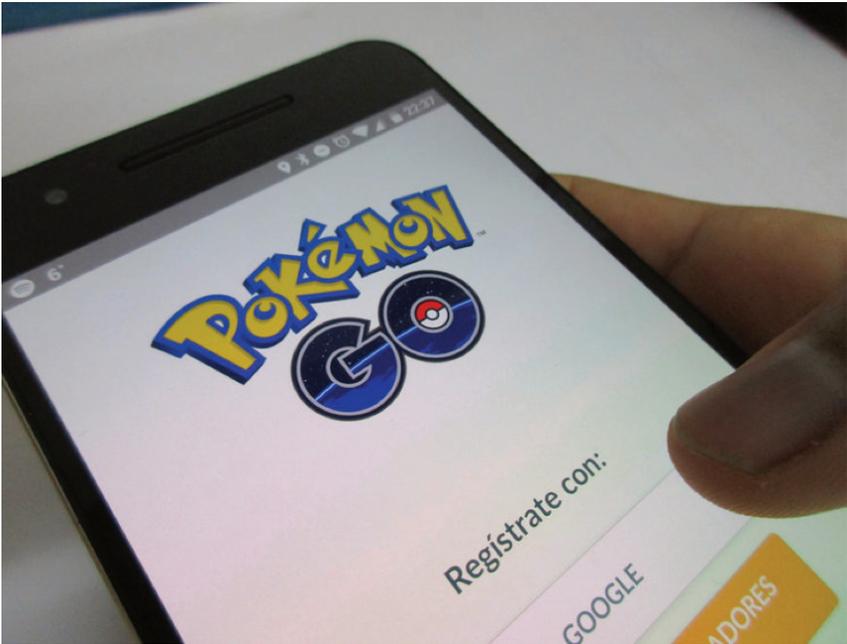
Image 8.1 App Cover Image Source: https://www.flickr.com/photos/edowoo/27541296473

Today marks the one year anniversary of the augmented reality game that took the world by storm. The app that overlays little monsters on top of real world images using

geolocation technology that was originally started as an April Fool's joke in 2014 quickly broke records and became an immediate phenomenon when it was released to the public on July 6, 2016. It is estimated that the app made over 4 million dollars within 24 hours of release and has been said to be the fastest game to make more than 600 million dollars in revenue within the first 90 days. In its first week, it had more downloads from the Apple Store than any other app in history, and to date, it's been downloaded over 750 million times.

But – how many of you are still playing? Probably not many. This app could be considered a "fad" in every sense of the word. While it was an instant sensation for a short period of time, its popularity dropped quickly. In fact, as of April 2017, the number of daily players sat at about 5 million. This might still seem like a lot, but is less than 1% of the total downloads. Although this this phenomenon of drop in usage is fairly common for game apps (the average shelf life of most games sits at about 2 months), one would think that showed so much promise would have weathered the storm better than the average game app.

While AMT Lab has provided extensive recent coverage of AR in the arts, such as contributor Mandy Ding's recent publication on AR in Museums as well as how it has been featured at conferences we attended in the past year such as Museums and the Web and the National Arts Marketing Project. Yet, further evaluation and analysis of Pokémon Go's story can lead to many lessons learned for arts organizations who are currently using or thinking of attempting augmented reality apps of their own. As an arts manager, perhaps you could try to "catch 'em all":

ONLY LAUNCH YOUR GAME ONCE IT IS READY, AND CONTINUE TO ADD ADDITIONAL FEATURES ONCE TO KEEP USERS ENGAGED.

Pokémon Go was arguably ill prepared for its popularity from the start. Many players had issues even launching the game in the beginning, it was missing a significant number of important features for those who could, and it then took the developers

Image 8.2 Wearable Pokémon Go Device. Source: https://en.wikipedia.org/wiki/Pok%C3%A9mon_Go

more time than users to add more than users were willing to wait. This caused a sharp decline in usage, because players became bored and once they move on, it's hard to win them back. By the time additions to the game were made, such as wearable device integration, much of the user base had already became disengaged with the game as demonstrated by the drop in daily use. Arts organizations should plan strategically when releasing an AR app for their patron base and already have new features in

the works upon release so that the app does not quickly become stale.

COMMUNICATE WITH AND BE OPEN TO APP FEEDBACK FROM YOUR USERS.

App developer Nitanic was criticized for changing the rules to the game overnight without any clear communication to its users. While some video game developers will give players months of advanced notice, there was simply a single tweet from the Pokémon Go Twitter account about a significant change to the game. This angered players and spurred negative social media commentary amongst fans, however, the developers barely acknowledged the feedback and when they did, were slow to respond. When launching your own app, be sure to let your users know in advance about important functionality changes and respond quickly when there are issues or concerns.

DON'T CHANGE OR REMOVE POPULAR FEATURES UNLESS NECESSARY.

As mentioned, the game was not perfect, and in order to make it easier for players, third parties developed certain add-on features to make the game more usable. Instead of acknowledging the game's flaws and developing similar in-house upgrades to improve the user experience, Niantic did the opposite. They issued cease and desist letters to those third party vendors without offering similar or better replacement features within their own app. If your game is popular enough to have third party vendors creating work arounds, take this as a positive sign, and either work with these vendors, or create your own better features to remove the need for external technological support for your own app.

DO WHAT YOU CAN ON YOUR END TO HELP YOUR APP TO GO VIRAL.

Pokémon Go achieved such instant success in part thanks to social media integration. The app allowed and encouraged users to share what was happening on their screen on their social

Image 8.3 Sample Game Source: https://www.flickr.com/photos/iphonedigital/27630103064

media accounts. In fact, within the first seven days of the app's launch, there were nearly 650 million interactions on social media relating to Pokémon Go. There were also more tweets about Pokémon Go for this same time period than about Brexit for a seven day count around the same time frame. For better or worse, we live in a world of constant communication. Do not discount the impact that social media has on the success of an app, as it is essentially free word of mouth advertising among your patrons, enhances their engagement, and can easily build community.

CONSIDER YOUR AGE DEMOGRAPHIC AND INCLUDE PERSONALIZATION.

Pokémon Go allows users to customize their avatar, play on their own or on a team, and even name the Pokémons that they capture. This allows for increased user engagement and makes the game seem more real and relevant. Additionally, whether intentional or not, Niatanic used the fact that millennials, an age group that is inclined to use AR technology more than older generations, grew up with the Pokémon brand with more beta technology. This increased the level of nostalgia among these

players and although the game in its current form was brand new, the concept and characters were not. Consider who will be using your AR app and be creative with how you allow users to engage their own creativity and identity creation.

POKÉMON GO

RECENT WOES PROVIDE A VALUABLE LESSON IN EVENT PLANNING

KATHLEEN GRENNAN

Image 9.1 Source: https://pixabay.com/en/photos/pokemon go/
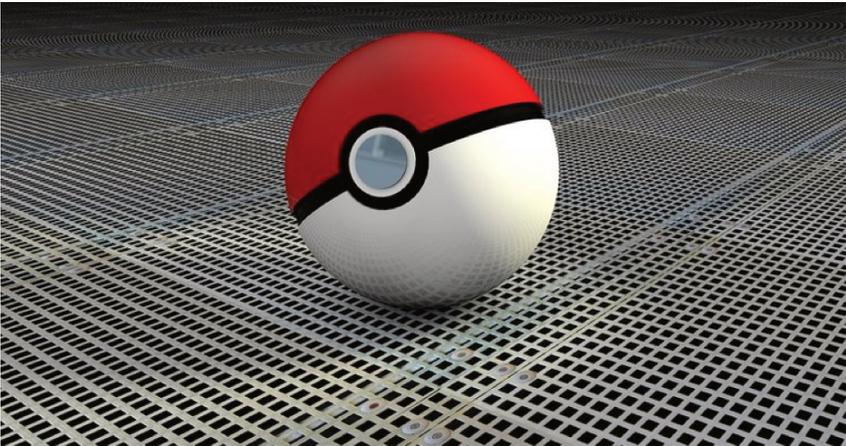
J ust last month, AMT Lab took a look at "Pokémon Go" on its one year anniversary and gave some lessons that arts organizations can take away from its success and failures. Niantic, the augmented reality game's developer, might have benefited from looking at our takeaway list before they planned and launched a comeback event for the game in Chicago just last week.

In an effort to reengage users and bring new ones on board, the company planned a festival event centered around the game in

downtown Chicago that gained traction among fans, as about 20,000 people ended up attending. Unfortunately, the festival ended up setting Niantic even further back on their quest to revive the game to its initial popularity.[1] The very bulk of the apathetic people Niantic hoped to win over were now enraged, as demonstrated by the crowd's booing of CEO John Hanke when he took the stage later in the afternoon.[2]

The "Pokémon Go" saga continues to teach arts managers more valuable lessons:

1. **Estimate the scale of your event and the external and internal implications of its size:** Niantic was clearly unprepared for the mass interest in their event. Lines to enter the festival and once inside were uncomfortably long, and the game didn't work for the majority of the day because both the game's servers and local cell towers crashed. Arts managers should ensure they have a reasonable idea of the interest among the public and have the bandwidth within applications or exhibits themselves, enough onsite personnel, and appropriate wifi coverage at their facilities.

2. **Plan in advance to avoid further financial setbacks:** In order to mitigate anger among attendees and negative sentiments about the game from spreading, Niantic promised to refund all admission costs and give each user $100 in credit to keep playing the game. At about 20,000 estimated attendees and $20 dollars a ticket, that is nearly a 2.5 million dollar setback! Additionally, there has been a class action

1. David Their, "'Pokémon GO' Was The Year's Greatest Success And Biggest Disappointment," *Forbes,* 16 Dec 2016. https://www.forbes.com/forbes/welcome/?toURL=https://www.forbes.com/sites/davidthier/2016/12/16/pokemon-go-was-the-years-greatest-success-and-biggest-dissapointment/&refURL=&referrer=#2424b478363e
2. Chris Snyder, "Pokémon Go's First Real World Event Was a Complete Disaster," *Business Insider,* 23 July 2017. http://www.businessinsider.com/pokemon-go-fest-chicago-video-niantic-john-hanke-booed-lugia-2017-7

lawsuit filed for the travel expenses for those who traveled from across the world to attend this well hyped up event.[3] Clearly, these are not the results the company hoped for. Learn a lesson from the outcome of this event and ensure that you do not over promise and under deliver to your patrons.

3. **Do not be afraid to postpone or cancel events that you are not prepared for:** Due to the financial implications and negative perceptions that this first revival event lead to, Niantic took a step back and postponed a series impending planned events in Europe to prevent another similar disaster.[4] If your arts organization's event does not go as planned, whether it is an initial launch or an attempt to reboot an exhibit or audience engagement tactic that was once popular, learn to recognize when it is time to take a step back and regroup in order to prevent your organization from digging a deeper hole. In the long run, patrons will appreciate your honesty and that you did not host a subpar event that wasted their time and money.

Has your organization experienced a similar situation to Niantic's recent Pokémon Go debacle? If so, how did you navigate it and what advice do you have for other arts managers? We'd love to hear about it in the comments below.

3. David Z Morris, "Frustrated Pokémon Go Fans are Suing Niantic Labs," *Fortune*, 30 July 2017. http://fortune.com/2017/07/30/pokemon-go-fest-lawsuit/
4. Sarah Perez, "Niantic postpones its Pokémon GO events in Europe after its Chicago festival ended in disaster," *Tech Crunch,* 31 July 2017.https://techcrunch.com/2017/07/31/niantic-postpones-its-pokemon-go-events-in-europe-after-its-chicago-festival-ended-in-disaster/

CHAPTER **10**

THE FUTURE OF INTERACTIVE MEDIA

AN INTERVIEW WITH DREW DAVIDSON

YINGCHONG WANG

Image 10.1 Entertainment Technology Center at Carnegie Mellon University

DREW DAVIDSON

Drew Davidson is a professor, producer, and player of interactive media. His background spans academia, industry and professional worlds, and his work is concerned with stories and transformational experiences across texts, comics, games and other media. He is currently the

Director of the Entertainment Technology Center at Carnegie Mellon University (http://www.etc.cmu.edu/). As a passionate advocate for games, arts, and technology, his views on the future of interactive media will inform museums and their work.

INTERVIEW

Yingchong Wang (YW)*: Your background is in interactive media, which is an incredibly broad field. Could you give an overview of interactive media and its many parts?*

Drew Davidson (DD): It's broad. There's a nice range of possibilities in interactive media. There are certainly games, which is a very specific category, even though within that bubble there's a lot of variety—particularly now, with digital distribution and mobile platforms. It used to be that people wanted to go and work at big companies, like Electronic Arts or Activision, and now Tencent, which is huge. But there are other opportunities as well. You can make a living doing smaller games at smaller companies now, where it's just a hundred people or so, just designing mobile games, or releasing games on Steam. And these small companies always need people who understand management. Because you have artists, programmers, musicians and a huge team working on a game, and somebody has to care about keeping things on time and on budget. Managers also help teams communicate with each other.

Interactive media also includes digital components at places like museums, which allow kids to interact in new ways. What's crazy right now is how hot virtual reality is. Five years ago, who knew it would come back? And now it's everywhere, along with augmented reality. It's become much more mainstream; now you can buy the first generation of the headsets which has created a whole group of early adopters. But how do you make those experiences better? It could just be, "you put on a headset and whisk me away to some virtual world," or another application might be in a museum in which physical objects are augmented with something like the HoloLens.

So these are opportunities that are burgeoning now, since everyone is predicting it's going to be big. The technology is good enough now, and the price point is low enough. Eventually it won't be wearing a big, hunky headset, but instead wearing a nice pair of glasses. There are lots of applications of interactive media in theme parks, with immersive arts experiences at places like Disney's Imagineering. People are thinking about ways to incorporate all kinds of technology, not just the physical. A new thing in theme parks are virtual rides where visitors are put into a black box and either put on a headset or everything around them are screens and they're sitting a machine that has hydraulics. It's more cost effective, and it's easier to update.

And of course, the web isn't going anywhere. So online interactive media is still very important, ranging from entertainment to just clean, clear, website design. Advertising is heating up too, with transmedia campaigns popping up everywhere.

My background comes out of that intersection of using technology to help with storytelling, enabling us (as players, or guests, or users) to feel like we have an immersive and engaging experience.

YW*: Since you mentioned virtual reality and augmented reality how do you perceive the future VR or AR in arts organization?*

DD: It will certainly be interesting. I know right now, with some of the terrorism in the Middle East, there are a lot of people trying to document spaces before they get destroyed. There are a lot of passionate art historians using technology like virtual reality to quickly scan a space and capture it. So that's one opportunity: providing people with experiences of places where they can't go.

There are also more commercial opportunities. For example, we have an alum who started a company called Modsy. Her idea is to use virtual reality to help consumers do interior design.

So people can sit down and get a sense of a room, and then rearrange furniture and other design elements to see how it fits before you buy it.

And some people are wondering what if you could do that for a honeymoon? What if I could put on a headset and get a sense of the views from my room? So you can see something before you purchase.

And of course there's straight up entertainment. Which is only new-ish. Back in the eighties they were definitely exploring virtual reality, but the technology was so limited at the time, and only the most dedicated technologists thought "this is awesome!" Everyone else was like "I feel nauseous!" The newer headsets have a good enough frame rate and track motion well enough to not make you nauseous.

As virtual reality becomes less expensive, now people are starting to create unique experiences. People are starting to wonder what makes VR special and different from watching a movie on a screen. I think part of that will start with the intersection of interactivity and storytelling. I think the future of VR includes a lot of entertainment which will be adjacent to games, but also some more traditional commercial applications.

YW: *I know some arts organizations recently are really passionate about new technologies, but for most of the arts organizations, their ambition may be restricted by their financial conditions. So do you have some suggestions for these arts managers?*

DD: Financially what's tricky is that you can easily get the technology for less than $1,000, but it's more expensive to get the expertise. Some places might be lucky enough to have a university nearby, and might be able to forge a partnership.

As organizations grow, they might be able to afford a full IT department that can help out. But that's also part of the biggest hurdle: maintaining technology. We partner with a non-profit

theme park in Florida called "Give Kids the World" (http://www.givekidstheworld.org/) which is affiliated with Make-a-Wish. It's an organization for children that are really sick, and might not be able to go to normal theme parks. Give Kids has medical facilities, so parents can bring their ill kids. It's the most fun place in the world, because the kids are thrilled to be there. But that organization's biggest challenge is maintaining the technology, because it's all volunteers. Same thing with theatre; on top of all the complexities of putting on a show, integrating technology can really overwhelm people with logistics, across time.

Organizations need to plan for these complexities, and realize that they will need to continue to invest across time.

YW: *From your description, it seems that interactive technology is a "fast-changing" sector. Do you have any advice for arts managers in terms of "keeping up-to-date technology information"?*

DD: The web is your friend. There are great websites, like Museum 2.0, which provides a lot of great opinions on the future of museums. But it also aggregates information as to what the technology sector is up to. There are tons of discussion lists, newsletter lists, and institutions that collect newest information for users. Somewhere, someone can help you with your technology problems, and someone is curating very good information.

It's important for leaders of all kinds to keep being curious, keep adapting, and keep searching for information.

ABOUT THE ETC PRESS

The ETC Press was founded in 2005 under the direction of Dr. Drew Davidson, the Director of Carnegie Mellon University's Entertainment Technology Center (ETC), as an academic, digital-first (but not digital only), open access publishing imprint.

What does all that mean?

The ETC Press publishes academic and trade books and singles, textbooks, academic journals, and conference proceedings that focus on issues revolving around entertainment technologies as they are applied across a variety of fields. Our authors come from a range of fields. Some are traditional academics. Some are practitioners. And some work in between. What ties them all together is their ability to write about the impact of emerging technologies and its significance in society.

In keeping with that mission, the ETC Press uses emerging technologies to design all of our books and Lulu, an on-demand publisher, to distribute our e-books and print books through all the major retail chains, such as Amazon, Barnes & Noble, Kobo, and Apple, and we work with The Game Crafter to produce tabletop games.

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This is definitely an experiment in the notion of publishing, and we invite people to participate. We are exploring what it means to "publish" across multiple media and multiple versions. We believe this is the future of publication, bridging virtual and physical media with fluid versions of publications as well as enabling the creative blurring of what constitutes reading and writing.

ABOUT THE ARTS MANAGEMENT AND TECHNOLOGY LABORATORY

The Arts Management and Technology Laboratory (AMT Lab) answers the "how" and "why" of implementation for particular technology solutions. These ideas are presented via case studies of best practices, product reviews, interviews, and national surveys. Our researchers do the deep dive for you providing a unique and in-depth understanding of where technology is going in the arts management sector.

MISSION

A research center of Carnegie Mellon University's Master of Arts Management program, AMT Lab serves as an exchange, a catalyst for innovative ideas, and a conduit for knowledge circulating at the intersection of arts, management, and technology.

IMPACT

AMT Lab provides current and future arts managers, technologists, and researchers with existing best practices and emerging technologies that allow for a direct impact on their work and their organization. Through online and off-line engagement, AMT Lab is a resource that leads to the innovative, effective and efficient integration of technology in the cultural and creative enterprise space.

VALUES

Knowledge | Dialogue | Innovation | Rigor | Creativity | Open-Mindedness | Curiosity | Relevancy | Practicality