Fig. 1. A gallery view of the 2020 *Ofrendas: Celebrating el Día de Muertos* onsite exhibition.

Making Virtual Space

A 3D Exhibition Case Study from the Detroit Institute of Arts

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Since 2012, the Detroit Institute of Arts (DIA) in Michigan has annually celebrated the Mexican tradition of *Día de Muertos* (Day of the Dead). This holiday, observed October 31 to November 2, honors the memories of passed loved ones, primarily through *ofrendas* (altars). Objects important to those who died – such as favorite foods, drinks, mementos, and pictures – are collected and incorporated into elaborate displays that include *pan de muerto* (bread of the dead), sugar skulls, candles, flowers, *papel picado* (paper cutouts) and other decorations (fig. 1).

Born from a desire to strengthen relationships with nearby Mexican American communities, the DIA's celebration started as a single weekend program and has grown into one of our most popular annual exhibitions. *Ofrendas: Celebrating el Día de Muertos* ("*Ofrendas*" for short) features *ofrendas* artfully designed and built by local artists and community members who are solicited each year through an open call for submissions. A panel of Mexican and Mexican American community members and DIA staff makes the selections. *Ofrendas* allows visitors to forge a deeper connection with the Day of the Dead celebration and make cross-cultural connections between this Mexican tradition and their own traditions of remembrance.

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Of the 700,000 people the DIA connects with yearly, priority audiences are residents of three nearby counties who fund the museum through a regional property tax. Typically, tri-county residents make up just over half of *Ofrendas* visitors. But social distancing guidelines and other safety measures necessitated by the global COVID-19 pandemic meant that many visitors wouldn't visit *Ofrendas* 2020 (held September 26 to November 8) in person, even though the museum was open. And yet we recognized the exhibition would be especially relevant for collective mourning in our local community, which was especially hard-hit by the pandemic. Finding a way to connect everyone with the exhibition from wherever they were became a priority.

Shaping an Experience Beyond Walls

Two interpretive planners and a public programs specialist took the lead on pursuing the DIA's first virtual three-dimensional (3D) exhibition with support from colleagues across five departments.[1] Our purpose? To support visitors in their engagement with Day of the Dead traditions as presented in the 2020 *Ofrendas* exhibition, no matter where they were. Through this case study, we'll share our goals, pivotal decisions, processes, and findings from a rigorous evaluation plan that collected reactions from more than 200 people.

Goals and Key Decisions

We had four primary goals:

- Users will take away the exhibition's "Big Idea": *The DIA's ofrendas project celebrates the Day of the Dead tradition by inviting the community to honor the life and memory of their lost loved ones.*[2] There will be evidence that visitor outcomes were achieved.

- Users will include those who cannot go to the exhibition in person.

- Bilingual users will feel supported using both Spanish and English in tandem during their experience.

- Navigating the experience will be intuitive. What users receive will be congruent with what they expected.

More broadly, we wanted to deliver an online experience that would replicate an in-person visit as closely as possible for two reasons. Given our timeline, it wasn't feasible to create new content or significantly reconceptualize the exhibition for a digital context. Also, knowing that the virtual exhibition would replace many users' in-person visits to the museum, we wanted to ensure that these individuals felt they had experienced the exhibition fully.

We needed a platform that could replicate the physical exhibition installation, present exhibition content, and have intuitive user-navigation functionality. We also needed a platform that easily allowed for input and manipulation of content. After research and colleague consultations, we chose Matterport 3D, a three-dimensional camera and subscription cloud-service system that captures, stores, and processes photographs into digitally rendered 3D models. Because our project was experimental, we didn't want to commit to the up-front costs of a full system. So we partnered with a local photographer who used his own 3D camera and hosted our model on his account.[3] We decided to present exactly the content that was available in person – no more,

4. Abuelitos Márquez, Ortega y Saldaña

(Grandparents Márquez, Ortega and Saldaña)

Maria Saldaña
Livonia, Michigan

I was inspired to create this piece in honor of my grandparents who have passed away. At the top of the piece is

Ofrendas: Celebrating el Día de Muertos

no less. This meant we chose not to introduce any new, supplementary content, even though Matterport has the functionality to incorporate additional sound, video, and images.

The result was a digital twin of the onsite exhibition, visited by 53,400 unique users over six weeks. Users accessed it through the exhibition's webpage on DIA.org. They could navigate through the space by clicking hotspots on the floor, similar to the experience of using Google Street View. Label content was available via color-coded tags that were placed in the same location as the in-gallery labels. Using their mouse or their finger, users were able to choose when and where to move, stop, zoom, click, or read (fig. 2).

Process-Related Takeaways

Among the most consequential process-related takeaways is that **designing a meaningful virtual exhibition experience requires time**. Although we would have preferred one week to input content into the rendered 3D model and publicly launch it, the installation schedule left us with just two days between photographing the exhibition and the exhibition opening. In anticipation, we tried several streamlining approaches. Due to character limits within Matterport, we prepped the text in advance to ensure clean and logical breaks where text would need to be split into multiple tags. Also, to save time, three team members tried to enter content simultaneously. But this approach was not effective; Matterport didn't consistently save concurrent changes.

Although it was a digital twin of the physical space, visitors experienced the virtual version differently. Things like peripheral vision and freedom of movement were restricted by a significantly narrower field of view and controlled navigation via hotspots. For example, in the physical exhibition, the introductory panel was placed to the left of the title wall, on visitors' sight line as they

turned into the gallery. But in the virtual exhibition, the landing "hotspot" was so close to the title wall that the introductory panel was out of view. It was easy to navigate to the first *ofrenda* without getting any context. In response, we relocated some of the intro panel's text to a tag on the title wall: the starting point for virtual users (fig. 3). Changes like this were difficult to predict until we received the 3D model and could situate ourselves as users. Furthermore, whenever we had to make a change, we had to make it in two languages – requiring editing, translating, and in some cases, reinterpreting. Given our restricted timeline,

this work would have been impossible without a Spanish speaker on the team.

A second critical takeaway is that **designing a meaningful virtual experience requires user testing, reflection, and iteration *before* it becomes publicly available**. Though we planned for and executed visitor evaluation, our quick turnaround could not accommodate pre-launch testing. Instead, we regarded the opening week as a "soft launch" and simultaneously distributed a user survey to staff and volunteers to gather feedback quickly and remediate where possible. This quickly uncovered a significant

Fig. 3. To accommodate virtual users who began their experience with this view, we relocated and reshaped parts of the introductory panel text to tags on the title wall, as shown here.
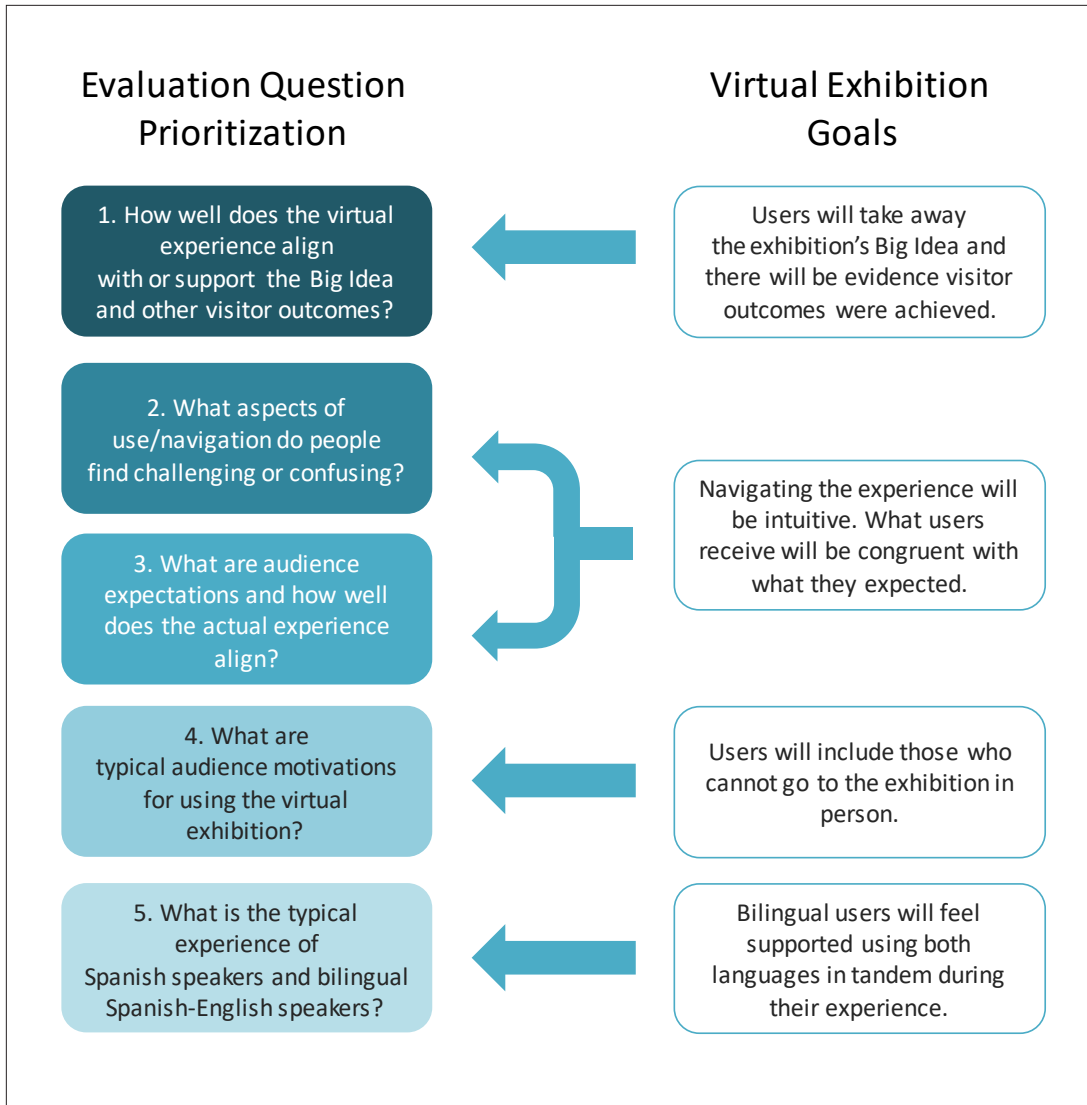
Evaluation Question Prioritization

1. How well does the virtual experience align with or support the Big Idea and other visitor outcomes?

2. What aspects of use/navigation do people find challenging or confusing?

3. What are audience expectations and how well does the actual experience align?

4. What are typical audience motivations for using the virtual exhibition?

5. What is the typical experience of Spanish speakers and bilingual Spanish-English speakers?

Virtual Exhibition Goals

Users will take away the exhibition's Big Idea and there will be evidence visitor outcomes were achieved.

Navigating the experience will be intuitive. What users receive will be congruent with what they expected.

Users will include those who cannot go to the exhibition in person.

Bilingual users will feel supported using both languages in tandem during their experience.

issue: we instructed users to press "play" to start, but two play icons were visible, and one activated a guided-tour feature that disabled navigation and automatically moved users from hotspot to hotspot. One person described it as "an uncomfortable experience," and another said it made them "a little seasick." Although the feature is editable for pace and presentation, we did not have time to make it user-friendly – nor did we intend for the button to be visible – so we turned it off. But pre-launch testing would have revealed this pain point before it caused frustration for staff, volunteers, and the public.

Evaluating the User Experience

Because this was just one of many directions a virtual exhibition could take, we shaped an evaluation plan to illuminate user navigation experiences, expectation alignment, and moments of personal connection. The evaluation team facilitated discussions and directed an activity for the team to prioritize the exhibition outcomes relative to the type of feedback they felt they needed most. This helped develop guiding questions based on exhibition goals (fig. 4).

Methodology

Due to our constraints – a short window of opportunity for data collection, other project demands, and a limited budget – we used the following methods to address the evaluation questions.

- **Online survey.** This method identified challenging aspects of navigation, alignment of expectations, and support of user outcomes. After 68 museum staff and volunteers reviewed the virtual exhibition and completed the survey during the "soft-launch" testing phase, the survey form was placed on the virtual exhibition landing page to collect public feedback. We heard from 127 public users.

- **In-depth video/telephone interviews.** This method examined the items covered in the online survey but in greater depth. Additionally, the interviews helped determine the typical experience of Spanish speakers, which was not explored through the English-only survey methodology. We recruited participants using a database of contacts and recent visitors maintained by the evaluation department. We also hired a bilingual data collector who recruited participants from her personal/professional network. Interviews typically lasted 30 to 45 minutes; participants received a $25 Visa Gift Card as incentive. We collected feedback from 16 people: 11 in English, four in Spanish, and one in both languages.

Findings

The following findings are organized by area of interest or evaluation question. "High" or "high scores" refers to the percentage of respondents rating an item 9 or 10 on a 1 to 10 scale.

Question: How well does the virtual experience align with or support the Big Idea and other visitor outcomes?

BIG IDEA: The DIA's *ofrendas* project celebrates the Day of the Dead tradition by inviting the community to honor the life and memory of their lost loved ones.

> Percentage of high scores ranged between 73 and 88 percent for the public, DIA staff, and interview participants. They were much lower (61 percent) for DIA volunteers.

Outcome 1: Participants will become familiar with *ofrendas* and the Day of the Dead celebration.

> High scores ranged from 63 to 74 percent. They were much higher among the public and DIA staff than volunteers and interview participants. One public survey respondent remarked, "I really liked the experience, and it was a great way to understand the cultures and traditions that surround the Day of the Dead."

Outcome 2: Participants will feel a sense of community as they identify with the reasons and ways people honor the deceased.

> Performance was lower relative to this goal. Only 50 percent of staff and
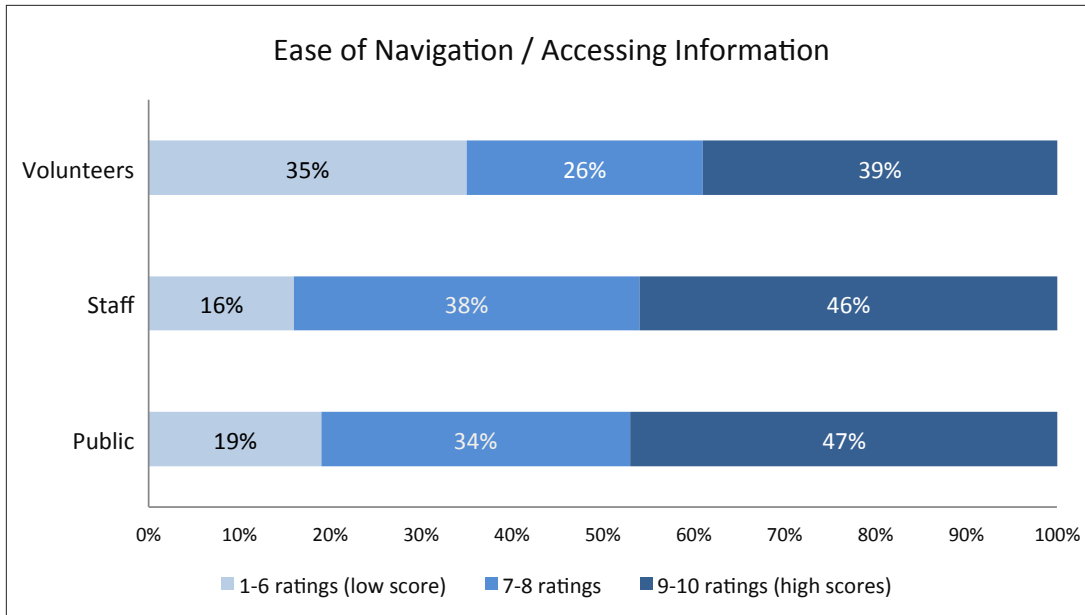
Ease of Navigation / Accessing Information

	1-6 ratings (low score)	7-8 ratings	9-10 ratings (high scores)
Volunteers	35%	26%	39%
Staff	16%	38%	46%
Public	19%	34%	47%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

■ 1-6 ratings (low score) ■ 7-8 ratings ■ 9-10 ratings (high scores)

Fig. 5.

This chart visualizes the scores given by surveyed members of the public, DIA staff, and volunteers in the category of Ease of Navigation/Accessing Information.

volunteers scored the experience high in supporting this outcome. Rankings were higher among the public (66 percent) and interview participants (81 percent).

Outcome 3: Participants will take part in the act of remembering.

Performance was lowest relative to this goal. The percentage of high scores approached 50 percent for the public, staff, and volunteers; it was higher for interview participants (75 percent). For example, one interview participant said: "It brought me memories about my loved ones and about the social conscience as well. As a Latina, I have been a victim, and so has been my son. I identified with a lot of things. I'm 73 and it's very important that something like this helps new generations."

Question: What aspects of use and navigation do people find challenging or confusing?

Nearly half of public and staff survey respondents scored the experience high for ease of navigation and accessing information.

Detroit Institute of Arts volunteers, the majority of whom were 65 and older, were more likely to score ease of use and navigation low (fig. 5). Additional research would be needed to determine the reasons for this difference.

Participants cited these challenges:

- instructions unclear and lacking necessary detail;
- difficulty moving between virtual rooms;
- difficulty moving around *ofrendas* and approaching from desired angles;
- limited zoom function, inability to see object details; and
- difficulty transitioning from reading label text to navigation.

Feedback from interview participants illustrate these navigation issues. "It lost something in not being able the get in close to the art. Couldn't zoom in enough," commented one respondent. "Felt like I had difficulty finding my way. There were confusing parts. I ran into dead ends several times. Got lost a few times," said another.

Question: What are typical audience motivations for using the virtual exhibition?

We attempted to answer this question using brief audience discussions during four virtual artist talks. Unfortunately, the method (Facebook comments) and level of audience participation did not provide the information needed.

Question: What are audience expectations and how well does the actual experience align?

Roughly one third of volunteers and the public had no prior expectations for the virtual exhibition. Roughly 60 percent of volunteers and the public indicated that the experience closely or exactly matched their expectations of what a virtual exhibition experience would be. Some appreciated being able to move through the exhibition at their own pace without concern for other visitors. A few said the navigation features made the experience feel like an in-person exhibition, while others said the experience felt similar to using Google Street View or a virtual home tour. For instance, one interview participant said: "I assumed [the virtual exhibition] would be a walkthrough situation and it was. I liked that you could click on the plaques, to not just zoom in but expand what it said" (see fig. 2).

Question: What is the typical experience of Spanish speakers and bilingual Spanish–English speakers?

We found no major differences between Spanish-only, bilingual, and English-only participants' experiences or their satisfaction. Most interviewed participants reported positive experiences.

Reflection: How Can These Findings Inform Our Approaches to Future Virtual Exhibitions?

We still have a lot to learn about the strongest and most impactful ways to plan, develop, and assess virtual exhibitions at the DIA. As we write this article months after *Ofrendas* 2020 has closed, several lessons remain top of mind.

We need to prioritize long-term user testing and evaluation so that, as an institution, we can begin to build a body of knowledge that will inform future projects. Internally, we also need to identify more specific performance targets to provide greater context for analysis. To ensure broader organizational learning, we need to include all staff involved in developing any kind of digital content in our evaluation debriefing discussions.

Although we felt *Ofrendas* 2020 could be an especially relevant exhibition for people to reflect, remember, and feel a sense of community, users didn't rate these outcomes as highly as we expected. We're confident that virtual experiences have the potential to create community and support meaning making. Going forward, we should consider platforms that can engender more participatory or dialogic engagements and formats that depart, if necessary, from related physical installations.[4]

The findings underscore that virtual exhibitions don't need to be an exact replica of their physical counterparts. For *Ofrendas*, each altar stood on its own; sequence and thematic groupings were not essential to this exhibition's story. Users expressed a desire to see the smallest details of the altars up close

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and with the virtual exhibition you could only zoom in so far before beginning to lose image quality. These considerations, paired with the frustrations caused by navigation, suggest other formats – such as high-resolution images or 3D scans of each individual ofrenda – may have served our goals and the users' desires more appropriately for this kind of exhibition.

The virtual exhibition saw 53,400 unique users, exceeding the 2019 on-site attendance by nearly 4,000. Additionally, views of the *Ofrendas* exhibition page on our website were three times higher in 2020 than 2019. These numbers suggest that our audiences were interested in this virtual exhibition. But our experiment with a virtual replica is just one of *many* possible ways to respond to this interest, and even if we try it again, our conceptualization and execution needs strengthening. Ultimately, we hope these findings not only inform future online exhibition projects at the DIA but can also contribute to an emerging body of data in the broader museum field and support others who are called to go beyond their museum's walls. ▮

1   The Public Programming and Interpretation departments were supported by colleagues in DIA'S Research & Evaluation, Information Technology, Exhibitions, Marketing & Communications, and Education Programs.

2   A "Big Idea" is a sentence – a statement – of what the exhibition is about, and guides exhibition development. For more about the big idea as used by the DIA, see Beverly Serrell, *Exhibit Labels: An Interpretive Approach*, 2nd ed. (Lanham, MD: Rowman & Littlefield, 2015), 7–18.

3   At the time of research, up-front costs included $3,400 for Materport's propriety camera and $69 per month for a software subscription to host the tour.

4   For thoughtful considerations about developing more participatory online exhibits, see Isabel Singer, "Giving Visitors Control Over Virtual Exhibit Content," *American Perceptionalism*, December 15, 2020, https://itsallhowyourememberit.wordpress.com/2020/12/15/giving-visitors-control-over-virtual-exhibit-content