Deepening Engagement and Learning Impact through Virtual Reality Activations

Case Study Project: *On the Morning You Wake (to the End of the World)*

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This report is available at
https://www.gamesforchange.org/xr4c/

Cover Image Credit: Archer's Mark and Atlas V

About Games For Change

Since 2004, Games For Change (G4C) has empowered game creators and innovators to drive real-world change — using games and immersive media to help people learn, improve their communities, and make the world a better place.

About XR for Change

XR for Change (XR4C) is a G4C initiative that focuses on how XR can address real-world challenges and drive social change. There is a wide range of use cases that prove XR technologies are effective for social impact — particularly in areas like education, healthcare, and workforce development. There are also new possibilities in the use of immersive and interactive storytelling to create empathy, encourage dialogue, and shift perspectives or even behaviors.

Foreword

DEAR READER,
For 20 years, Games For Change (G4C) has supported a global community of creators and innovators who are using games and immersive media to help people learn, improve their communities, and make the world a better place.

In 2017, we launched the XR for Change initiative to explore how extended reality technologies like virtual reality and augmented reality can be used to address real-world challenges and drive social change. Around the same time, Princeton University's Center for Science and Global Policy approached G4C to collaborate on the production of an immersive media project that would inspire people to take action to shape the future of nuclear weapons policy. That project led to the creation of *On the Morning You Wake (to the End of the World)*, an award-winning virtual reality documentary that premiered at the Sundance Film Festival in 2022.

Since its worldwide premiere, G4C has produced screenings and exhibits of *On the Morning You Wake* as part of a wide-reaching impact campaign that has taken us to museums, cultural institutions, schools and universities, policy convenings, and public spaces all over the world. During these activations, our research team conducted pre- and post-experience surveys to understand the impact of the experience on audiences. By comparing survey data from 2D and 3D versions of the experience, this research aims to investigate the unique potential of virtual reality to inspire learning, engagement, and behavior change.

By capturing the data and insights gleaned from research, as well as the processes and best practices developed over the course of producing a global impact campaign, this white paper aims to provide a field guide for XR creators and producers, educators, cultural leaders, policymakers, and nonprofit leaders interested in exploring the power of immersive media beyond entertainment.

This white paper highlights the opportunity for further innovation and investment in XR for social impact. Technology doesn't achieve positive social change automatically—collectively, we have a responsibility to ensure it is leveraged responsibly and equitably in support of impact goals. In this way, XR presents a remarkable opportunity and a challenge. We hope this paper inspires you to accept that challenge.

Sincerely,

Susanna Pollack
President, Games for Change

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Executive Summary

To address the lack of research data on the success of VR activations, especially in the growing field of VR for education, we conducted research to determine audience learning and engagement during Games for Change's extensive impact campaign for *On the Morning You Wake (to the End of the World)*. [1]

Results of this research are presented below for sixteen venues that screened *On the Morning You Wake* (OTMYW), along with results from a comparison of the VR-based experience with a 2D tablet-based experience that explored the added value provided by VR.

Participants in the VR group reported experiencing more positive emotions than the 2D group. Furthermore, participants in the VR group reported experiencing more intense emotions than those in the 2D group.

More participants in the VR group (41.0%) reported feeling inspired than in the iPad group (22.7%). We also found that more participants in the VR group (20.5%) reported feeling energized than in the iPad group (5.7%).

There were also differences in the reported sense of immersion, with those in the VR experience reporting a greater sense of immersion than those in the iPad experience.

The overall impact analysis shows that participants' enjoyment of using VR predicted their self-reported learning and that age was not a determining factor associated with either enjoyment or learning.

The research reveals that, when best practices are followed, VR activations can be successful in impacting and engaging audiences in varied venues and at many different events.

Research also shows that content screened in a VR headset has a greater emotional impact on participants than when screened on a 2D interface.

These findings are significant as they highlight an important affordance of virtual reality: VR can affect emotions more strongly than flat screens, and participants experience more positive emotions in VR than in a 2D experience.

Experiencing positive emotions during learning has been linked to increased learning outcomes, and these findings show that VR can provide conditions that are conducive to learning.

Through interviews with Games for Change staff and leadership, we identified best practices for different aspects of producing VR activations in different venues. Questions addressed include how to approach strategy and partnerships, producing a VR activation from pre-production to post-production, the ideal length of a VR activation based on audience and venue type, and how to adapt to different environments.

This report aims to be a resource and support for other creators, production companies, NGOs, and mission-oriented organizations to use learnings from the campaign.

From the XR for Change impact and research team, we hope that these studies and practical guides will be utilized to showcase the unique potential of virtual reality to inspire learning, engagement, and behavior change.

IMAGE 1 A VR activation at the Museum of the Moving Image in Queens, New York. | Credit: Thanassi Karageorgiou

Introduction

What is Extended Reality (XR)?

This is an umbrella term that encompasses a range of technologies used to make digital reality feel more immersive and interactive. XR can include but is not limited to:

Virtual Reality (VR): uses a head-mounted display (HMD) to immerse the user in a computer-generated 3D world.

Augmented Reality (AR): uses pass-through glasses or cameras on devices to project computer-generated images into the physical reality.

Mixed Reality (MR): an umbrella term for an HMD/headset that allows for both VR and AR experiences that blend the border between physical and digital reality.

XR has been available as a technology for many decades, but it only recently gained popularity for mainstream applications, largely due to the availability of low-cost commercial HMDs/headsets. While many XR applications are entertainment or training focused, this technology has also been embraced by artists, educators, and documentary filmmakers.

What is a VR activation?

This is a screening of a VR experience at any level of formality.

- Examples include classroom, tradeshow, theater lobby, conference venue, art gallery, museum exhibition, and more.
- The heart of an activation is always the XR experience.
- In order to best serve the intended audience and venue, additional showcase elements such as lighting, soundscapes, fabrication, and other visual media/art can be added to an activation.

VR Storytelling for Impact

What is Impact?

Social impact can be defined in different ways. Previously, Games for Change developed a typology of impact to apply to games. This typology can also be applied to XR. Some types of impact include:

- Learning, transfer of knowledge;
- Building awareness around issues, empathy and perspective taking;
- Building stronger communities, creating a social space;
- Augmenting a program, for example, using citizen science;
- Behavior change; and
- Mindfulness and neuro training.

What is an Impact Campaign?

An intentional, coordinated distribution strategy for a project that centers on a topic or issue and engages targeted audiences to achieve social impact goals.

- Most impact campaigns are not revenue driven but rather impact/audience focused.
  - Impact focus: goal to shift or raise awareness around a current issue.
  - Audience focus: targeted approach to reach a specific population such as policymakers, students, or organizations.
- Michaela Ternasky-Holland (XR4C Impact Producer) describes an impact campaign as a *mobilization strategy* versus a *distribution strategy.*
- A successful impact campaign usually includes the creation and deployment of both the project and related wrap-around materials.

What are Wrap-Around Materials?

A suite of supplemental assets and activities that augment the project to enable the audience member to understand the topic or issues in a deeper way.

- These assets can include but are not limited to pre- and post-experience surveys, digital/physical toolkits, curriculum, facilitator/teacher guides, short films, photography, and/or physical artifacts, like artwork.
- Ternasky-Holland calls the wrap-around materials before an audience screens the project ***onboarding***, and the wrap-around materials after an audience screens the project ***aftercare***.

IMAGE 2 Examples of how games and XR can have different impact goals. | Credit: Games for Change

IMAGE 3 A project still from *On the Morning You Wake (to the End of the World).* | **Credit: Archer's Mark and Atlas V**

On the Morning You Wake (to the End of the World) is a three-part virtual reality documentary about the global threat of nuclear weapons. The experience immerses the audience in the 2018 Hawaiian false ballistic missile alert.

On the Morning You Wake (OTMYW) is at the center of a long-term impact campaign led by G4C with the goal of inspiring people around the world to take action to shape the future of nuclear weapons policy.

Building on the success of executive producing a series of impact games as part of the transmedia campaign for *Half the Sky*, G4C adapted its methodology to the XR space. In 2017, Princeton University's Center for Science and Global Policy approached G4C with the idea of creating an interactive media project to elevate the conversation around nuclear weapons risk. G4C then coordinated a team of experienced XR creative partners, Archer's Mark and Atlas V, to collaborate alongside the subject matter experts at Princeton University.

With its early involvement in the project, G4C was able to begin strategizing about the impact campaign early on with the goal of creating a model and best practices for such a campaign, including research designed to evaluate impact outcomes from a variety of activations:

- Fundraising for all aspects of the impact campaign rollout including staffing, asset creation, travel, headset procurement, and subject matter expertise.
- Hiring and managing an impact campaign team.
- Overseeing partner relationships, grant budgets, grant reporting, activation design, activation staffing.
- Material procurement, HMD/headset fleet management, tablet fleet management, physical and digital asset management.
- Creating and playtesting the audience experience pre- and post-screening OTMYW, which included: onboarding and aftercare, digital toolkits curriculum, and facilitator best practices to VR training.
- Collaborating with various subject matter experts and partners, which included forming a cohort of Impact Fellows to advise and represent the project from within the nuclear disarmament community.
- Producing XR activations with various United States and international partners such as conferences, film festivals, policy convenings, universities, high schools, cultural institutions, and museums.
- Collecting and analyzing data from these activations in order to produce this white paper of best practices.

About the Research

This research is presented by **Jan Plass** and **Bruce Homer**, who worked closely with XR4C Producers, **Michaela Ternasky-Holland** and **Erinn Budd**, to gather, compile, and present this document.

One of the unique elements of the VR activations for *On the Morning You Wake (to the End of the World)* is that the impact campaign strategies allowed for the collection of data that provided insights into the impact of the activation and the engagement of the audience.

Ecological validity is the concept that the research does not take place in a lab but rather within the real-world setting and context of what is being researched. In order to ensure that the research would retain the ecological validity and real-world authenticity of the study, the researchers and the XR4C impact staff established a shared values system, which includes:

- Research is an extension of the narrative and immersive/interactive experience.
- Participants should be recognized as individuals throughout their experience with the project.
- Audience engagement and completion of the research surveys is more important than the length and detail of the research surveys.
- On-site researchers are meant to observe, not interrupt or distract from, the impact-focused experience.

G4C collaborated with subject matter experts on the threat of nuclear weapons to craft an overall impact campaign that included calls to action for participants. Pre- and post-experience surveys were integrated as tools to understand how, and if, audience members intended to take action against nuclear weapons threat after watching *On the Morning You Wake*.

Onboarding and aftercare surveys were:

- Created to be flexible, easily duplicated, and localized for maximum audience engagement;
- Easily adjusted and refined to fit within the parameters of our research without sacrificing the narrative storytelling and audience call to action.

For the findings presented in this paper, the research and XR4C team used the following data sources:

- Reviews of experience reports from other producers of VR experiences.
- Interviews with key G4C staff and leadership involved in the VR activations.
- Survey data collected from the pre- and post-surveys conducted at the activations.
- Data from the platform Waitwhile, which G4C's impact team used for booking audience members into the VR activations.

Impact & Engagement Research

THIS CHAPTER SHOWCASES THE RESEARCH ON AUDIENCE IMPACT AND ENGAGEMENT:

1. Describes the three different types of activations
2. Describes the participants and their characteristics
3. Shares how we measured impact
4. Shares how we measured engagement
5. Showcases the results of this research

IMAGE 4 Participants in Vienna, Austria attending the International Campaign Against Nuclear Weapons' NuclearBan Forum complete their aftercare surveys. | Credit: Axel Stasny

Type of Activation

In order to identify audience impact and engagement based on venue and type of activation, the team has identified three major categories: **Open to the Public, Private Events, and Museums.**

An open to the public VR activation was a free experience that would be similar to a pop-up. Public screenings would often have mixed audiences who had no previous interest in OTMYW or nuclear weapons, as well as those who had heard about the screening through word of mouth or social media and came to experience it.

Private events were VR activations where OTMYW was one of many programming offerings happening throughout the one day or multi-day event. The audience for these private events had to have a ticket to the event itself in order to experience the programming. Oftentimes these private events were connected to tech, policymaking, or storytelling.

Museums were placed within their own category, due to their VR activations having added production value and ticket sales directly to the museum or directly to screening OTMYW. Also during these exhibitions, the XR4C staff screened OTMYW for open to the public museum hours and private events that happened after museum hours.

List of Activations

On the Morning You Wake's impact campaign was featured at the following locations and events:

Open to the Public

- Aupuni Space | Honolulu, Hawai'i
- Times Sqaure | New York, New York
- ***Oregon Shakespeare Festival | Ashland, Oregon****
- ***Media Immersive Experience (MIX) Center | Mesa, Arizona****

Private Events

- South by Southwest, Austin, Texas
- United Nations New York's Meeting of State Parties on the Non-Proliferation Treaty | New York, New York
- Doc Edge Festival | Auckland, New Zealand
- ReFocus Film Festival | Iowa City, Iowa
- Stanley Center Peace & Security Convening | Chicago, Illinois
- Peace BoatWorkshop | New York, New York
- Liminal Collective | New York, New York
- International Campaign Against Nuclear Weapons' Nuclear Ban Forum | Vienna, Austria
- Conference on the Humanitarian Impact of Nuclear Weapons | Vienna, Austria
- First Meeting of State Parties on the Treaty on the Prohibition of Nuclear Weapons | Vienna, Austria
- Youth Meeting of State Parties on the Treaty on the Prohibition of Nuclear Weapons | Vienna, Austria
- G4C Festival | New York, New York
- G4C Asian Pacific Festival | Melbourne Australia
- Bucheon International Fantastic Film Festival | Bucheon, South Korea
- Multiple Universities | United States of America
- Multiple High Schools | United States of America
- The Museum of the Moving Image Exhibition Reception | New York, New York
- ***PlayNYC | New York, New York****
- ***Techonomy | Sonoma, California****

Museums

- Nobel Peace Center | Oslo, Norway
- ***The Museum of the Moving Image | Queens, New York****

The venue and events marked with * are venues where the surveys were specifically designed for this research-focused portion of the white paper, thus the results provided below are based on these specific instances in order to showcase overall trends.

IMAGE 5 A participant in Queens, New York answers a survey during the activation at the Museum of the Moving Image. | Credit: Thanassi Karageorgiou

Revisions of Surveys for Research

Although over 4,300 people completed a survey throughout the On the Morning You Wake impact campaign, most of these surveys were not optimized for quantitative analyses.

The number of participants that completed the research-optimized onboarding survey was 1804 and the aftercare survey was 1297.

Audience

In order to better understand the audience and their characteristics, the research team asked the participants about the following items:

- Where they are from
- Demographics (age, gender, ethnicity)
- Reason for attending the activation
- Prior experience with VR (on a 1-7 scale)
- Prior knowledge of nuclear weapons (on a 1-7 scale)
- Interest in topic of nuclear arms disarmament (on a 1-7 scale)

The percentage of participants for each type of event:

- 41% booked an open to the public VR activation
- 49% visited a museum and screened the VR experience
- 10% attended a private event and screened the VR experience

The places that the participants indicated as their home (**see more at Figure 3.1**):

- 68% were from North America
- 17% from Europe
- 9% were from Asia
- 2% were from Africa
- 2% from South America, and 2% "other"

Figures Pt. 1

A majority of participants attended a VR activation due to curiosity and interest. For activations at events and museums, a lot of participants experienced the VR activations because they were already visiting the venue or attending the event.

A moderate number of participants also answered that they attended the VR activation because they had time and/or heard about it from a friend or family member.

Only a handful of participants answered that they booked the OTMYW activation specifically for learning/education/peace/activism motivations, and even fewer answered that they came to the activation for work, **see Figure 3.2.**

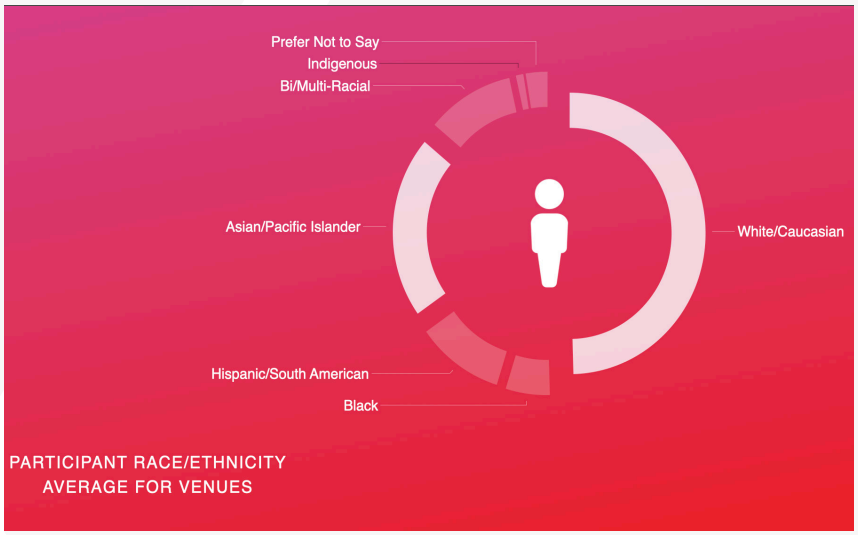

FIGURE 3.1 Participant ethnicity distribution by venue type.

FIGURE 3.2 Participant reason for attending a VR activation.

Figures Pt. 2

For the self-reported age of participants by venue type, **see Figure 3.3**
For the self-reported gender identification of participants by venue type, **see Figure 3.4.**

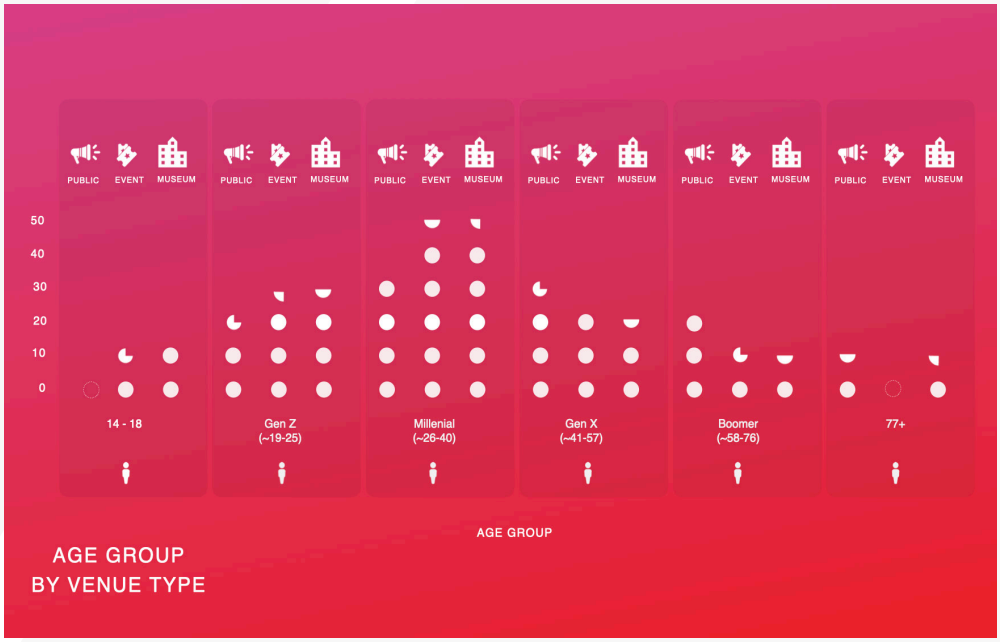

FIGURE 3.3 Participant self-reported age by venue type.

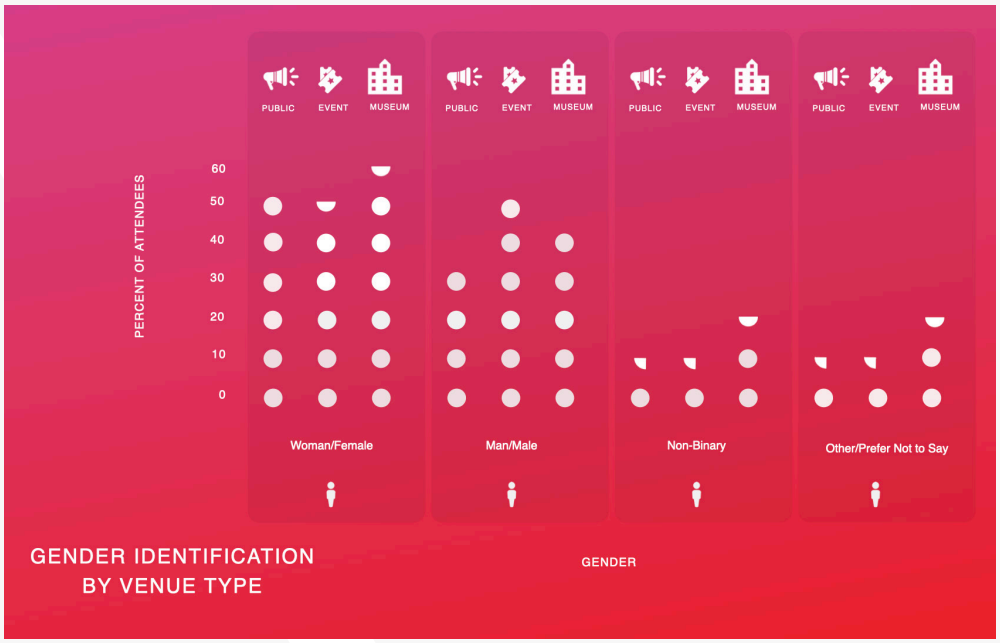

FIGURE 3.4 Participant self-reported gender indentification by venue type.

Figures Pt. 3

For the level of VR experience that the participants self-reported, see, **see Figure 3.5.**
For the type of VR experience that the participants had self-reported as having done before, **see Figure 3.6.**

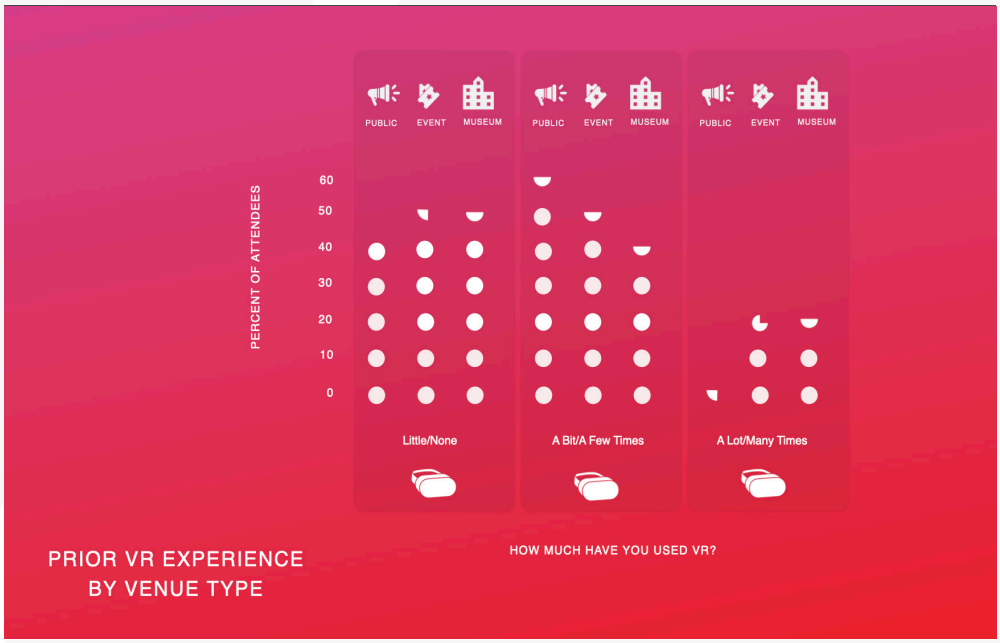

FIGURE 3.5 Participant's level of prior VR experience by venue.

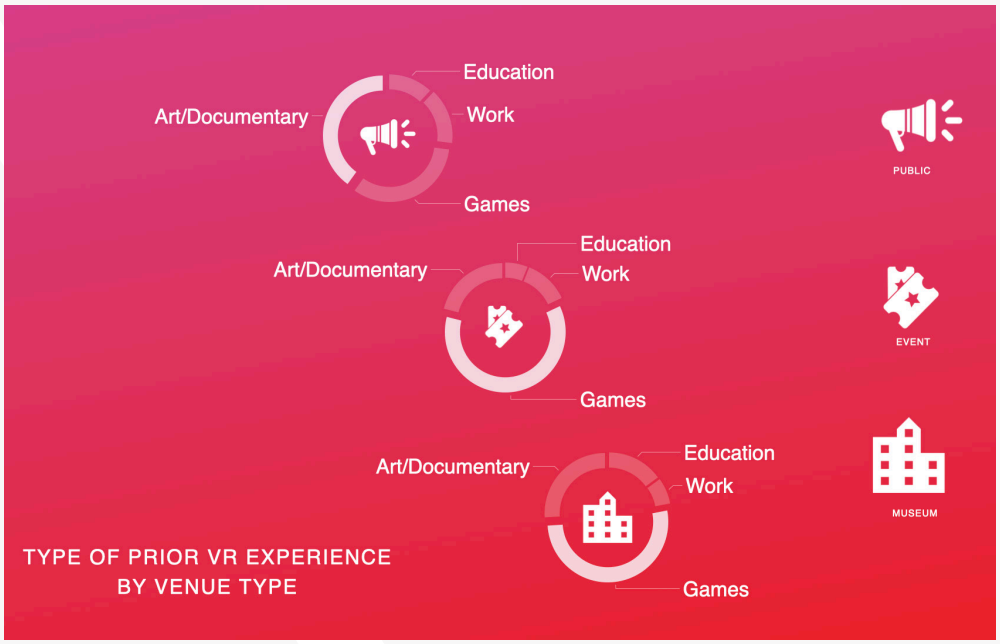

FIGURE 3.6 Participant's type of prior VR experience by venue.

Results

Impact

The research team measured the *impact* of the wrap-around materials by analyzing the responses from the aftercare survey specific to:

- Enjoyment of using virtual reality
- Learning something new about the topic of the project due to the VR activation

The overall impact analysis shows that participants:

- **Enjoyment of using VR predicted their self-reported learning.**
  - R (619) = .43, p <.001.
- **Age was NOT associated with either enjoyment or learning.**

Categorized by venue type, participants self-rated their overall enjoyment of using virtual reality as good or higher:

- 81% in open to the public activations
- 91% at private events
- 76% in museums

In all types of venues, a majority of participants learned something new about the topic of the project during the VR activation.

Categorized by venue type, participants who self-rating as high or very high when asked if they learned something new about nuclear weapons during the VR activation:

- 65% in open to the public activations
- 63% at private events
- 66% in museums

For participants self-rating if they learned something new about nuclear weapons during the VR activation, **see Figure 4.7**.

Engagement

The research team measured the engagement of the wrap-around materials by analyzing responses to the following questions from the aftercare survey.

- How likely are you to seek further information about the topic of the nuclear weapons threat?
- What type of action do you feel ready to take after experiencing this VR activation?
- What are you interested in learning more about?

Categorized by venue, participants self-reported that they were likely or very likely to seek out more information about the nuclear weapons threat:

- 67% at open to the public activations
- 61% at private events
- 63% in museums

For participants self-reporting that they were ready to take further action by venue, **see Figure 3.7**.

The overall engagement analysis shows that 2/3 of participants indicated their intention to seek more information.

75% of participants intended to take further action.

Enjoyment of using VR predicted participant's self-reported learning.

Figures Pt. 4

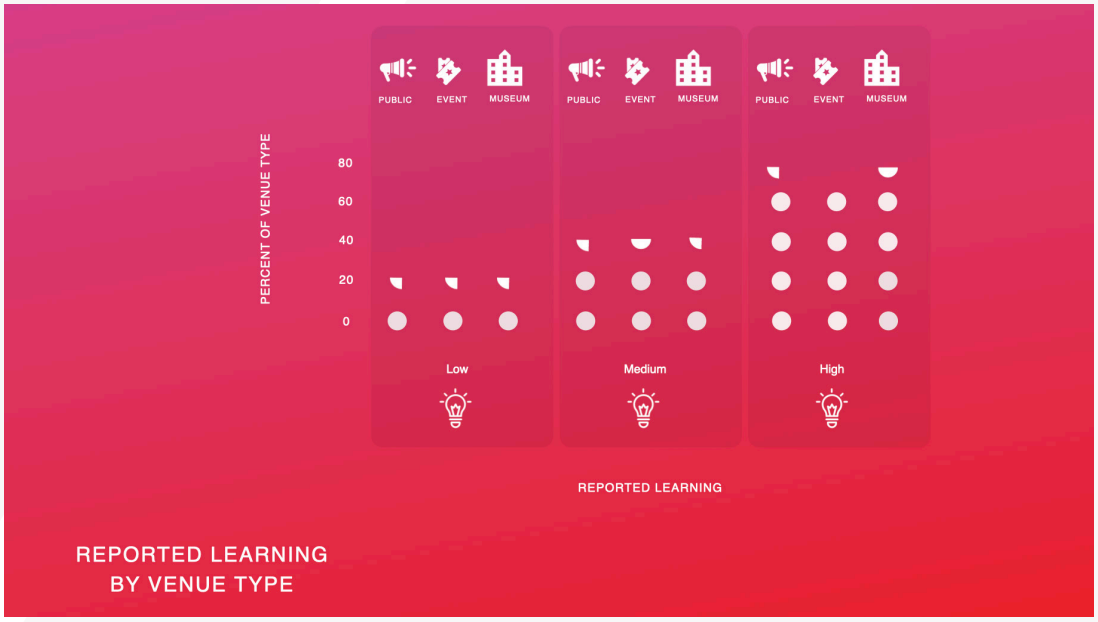

FIGURE 3.7 Participant rating that they learned something new about nuclear weapons due to the VR activation by venue.

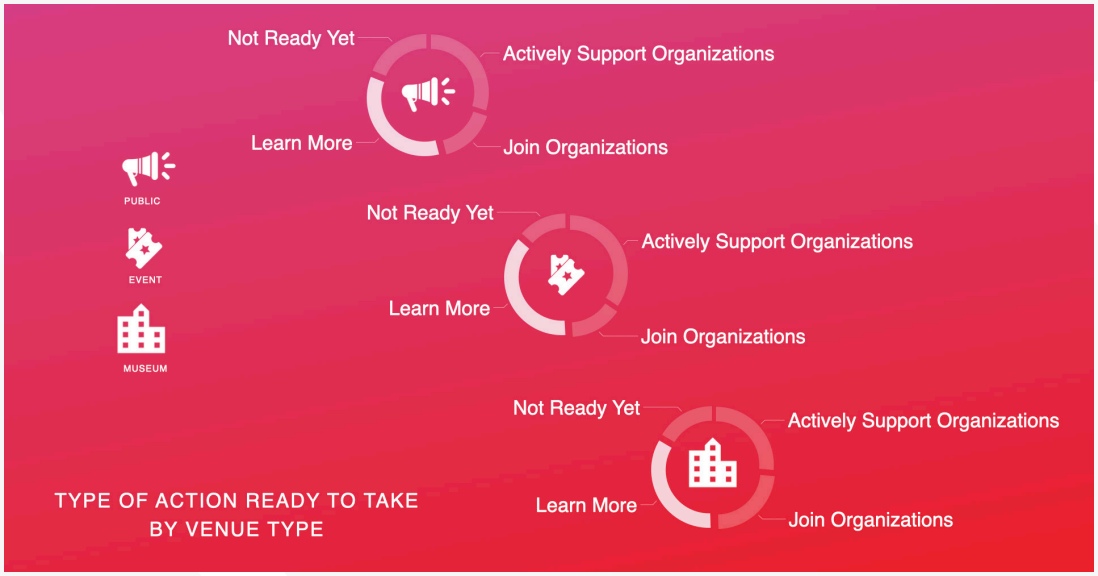

FIGURE 3.8 Type of further action participant is ready to take after VR screening by venue.
Note: that participants could select more than one type of action.

The Comparison Study

(2D Interface vs. VR Headset)

THIS CHAPTER DESCRIBES HOW THE RESEARCH TEAM ANSWERED THE MAIN QUESTION:

Does the level of impact and engagement of the content differ when it is experienced as VR using a head-mounted display (HMD) versus screened on a tablet device?

The research team hypothesized that:

The VR-based experiences would invoke stronger and more positive emotional responses in participants, which would lead to a higher level of impact and engagement.

The Focus

For this study, the main question for the research XR4C research team was:

Does the level of impact and engagement of the content differ when it is experienced as VR using a head-mounted display (HMD) versus screened on a tablet device?

In order to answer this question, the research team conducted a study that compared the virtual reality experience on a head-mounted display to the identical 2D tablet-based version of *On the Morning You Wake.*

This kind of a comparison study is known as A/B testing, sometimes described as experimental design.

In each of the two activations, the same content was screened to audience members with the same onboarding and aftercare materials, but one activation featured a virtual reality documentary, whereas in the other, audience members watched a traditional 2D documentary on a tablet.

The research team used a block design in which only the VR or 2D experience was offered at specific dates at each venue.

Based on the XR4C impact team's reports from previous activations, the XR4C research team hypothesized that the VR-based experiences would invoke stronger and more positive emotional responses in learners, which was expected to lead to a higher level of impact and engagement.

Participants

Participants in the A/B testing included visitors from four different locations within the United States:

- Mesa, Arizona
- Ashland, Oregon
- Los Angeles, California
- Tallahassee, Florida

171 participants completed the comparison study. Their ages ranged from 18 to 84 years old:

- 29% were between the ages of 18-24
- 29% were between the ages of 25-39
- 22% were between the ages of 40-59
- 20% were between the ages of 60-84

Participants self-identified their gender as follows:

- 36% female
- 27% male
- 7% nonbinary
- 1% as other
- 29% did not respond or "preferred not to say"

Participants identified their race/ethnicity as follows:

- 46% identified as White/Caucasian
- 8% identified Black/African American
- 8% identified as Hispanic/South American
- 7% identified as Asian/Pacific Islander
- 1% identified as Indigenous
- 2% identified as mixed
- 28% did not respond or selected "prefer not to say"

Overall Research Design

To better serve the comparison study, the research team revised the onboarding and aftercare surveys to include:

- Questions about the emotional impact of the experience
- The social connection participants felt with people depicted in OTMYW
- Their overall engagement during and after the experience

The research team also collected data on participants' responses while they were engaged with the experience. This data was collected using behavior observation forms in which research assistants noted the participants' level of engagement and emotional response throughout the experience in five-minute increments.

The research design integrated into the activation as follows:

IMAGE 6 A participant in Manhattan, New York screens OTMYW during the Times Square activation. | Credit: Erinn Budd

Research Design

- Revised Onboarding Survey
  - Prior knowledge of nuclear weapons
  - Interest in nuclear weapons
  - Attitudes toward need for nuclear weapons
  - Emotional state before experience (arousal, valence, type)
- During Experience
  - Behavioral observation of emotion
  - Behavioral observation of engagement
- Revised Aftercare Survey
  - Experienced emotion (arousal, valence, type)
  - Experienced social connection
  - Experienced immersion
  - Interest in nuclear weapons
  - Attitudes toward need for nuclear weapons
  - Perceived knowledge gain
  - Intent of taking action (incl. providing phone number)
  - Demographics (age, gender, ethnicity, level of education)

Activation Procedures

- After participants were greeted, they completed the A/B optimized onboarding survey via tablet.
- They were led to a seat and given a brief orientation to the theme and topic of the documentary.
  - For the VR group, this included instructions on how to use the Oculus 2 headset, how to use the handheld controllers to navigate the OTMYW experience, and how to put on the headset.
  - In the tablet group, participants used the same tablet they used for the onboarding survey to view the OTMYW experience.
- Each group viewed the OTMYW experience.
- After the experience, participants were given the A/B optimized aftercare survey on a tablet.

Average time spent:

- For the 2D participants, 30.1 minutes (Standard Deviation =14.4 minutes)
- For the VR participants, 28.15 minutes (Standard Deviation =12.21 minutes)

Results

Impact

Participants in both groups self-rated the overall experience of screening very highly, **see Figure 4.1**.

When analyzing the emotional experience more deeply, we found that:

- The VR group reported experiencing more positive emotions than the 2D group after completing their screening.
  - $F(1, 157) = 4.54, p = .035$.

Identifying the experienced emotions of each group during the screening:

- **A greater percentage of participants in the VR group (41.0%) self-reported feeling inspired than in the 2D group (22.7%).**
  - $X2 (1, N = 171) = 6.6, p = .01$.
- **A greater percentage of participants in the VR group (20.5%) self-reported feeling energized than in the 2D group (5.7%).**
  - $X2 (1, N = 171) = 8.4, p = .005$.

There were also differences in the reported sense of immersion:

- The VR group self-reported a greater sense of immersion than those in the 2D group.
  - $t(166) = 3.05, p < .001$.

Furthermore, there was also a difference in the intensity of emotions from before to after the screening:

- Participants in the VR group reported a greater increase in the intensity of their emotions after the screening compared to the 2D group.
  - $t(160) = 2.97, p = .003, d = 1.21$.

There were no differences among the groups in their reported social connection to the characters featured in the experience.

VR participants self-reported that they experienced emotions more intensely than participants in the 2D group by over 20%

Engagement

There was no meaningful group difference in how many participants provided their phone numbers:.

- 37% VR group
- 31% 2D group

There was also no meaningful group difference in how likely participants said they were to seek further information. Most participants reported negative opinions about nuclear weapons before their screening, and those opinions were strengthened after their screening.

Discussion

Participants rated both screenings highly overall. This satisfaction is also reflected in the high level of self-reported interest and emotion they experienced, and how much they self-reported to have learned from the screening.

However, the XR4C research team did find differences in the reported emotions. VR participants self-reported that they experienced more positive and activating emotions (inspired and energized), as well as those emotions being felt more intensely than participants in the 2D group.

One possible explanation for these differences is that the VR group reported a higher sense of immersion in the experience than the 2D group. These more intense levels of emotions and more positive responses to the VR screening show the potential of VR for impact storytelling. Experiencing positive and emotions intensely during learning has been linked to increased learning outcomes.

These findings are significant as they highlight an important affordance of virtual reality. VR can affect emotions more strongly than flat screens.

VR can increase learning outcomes.

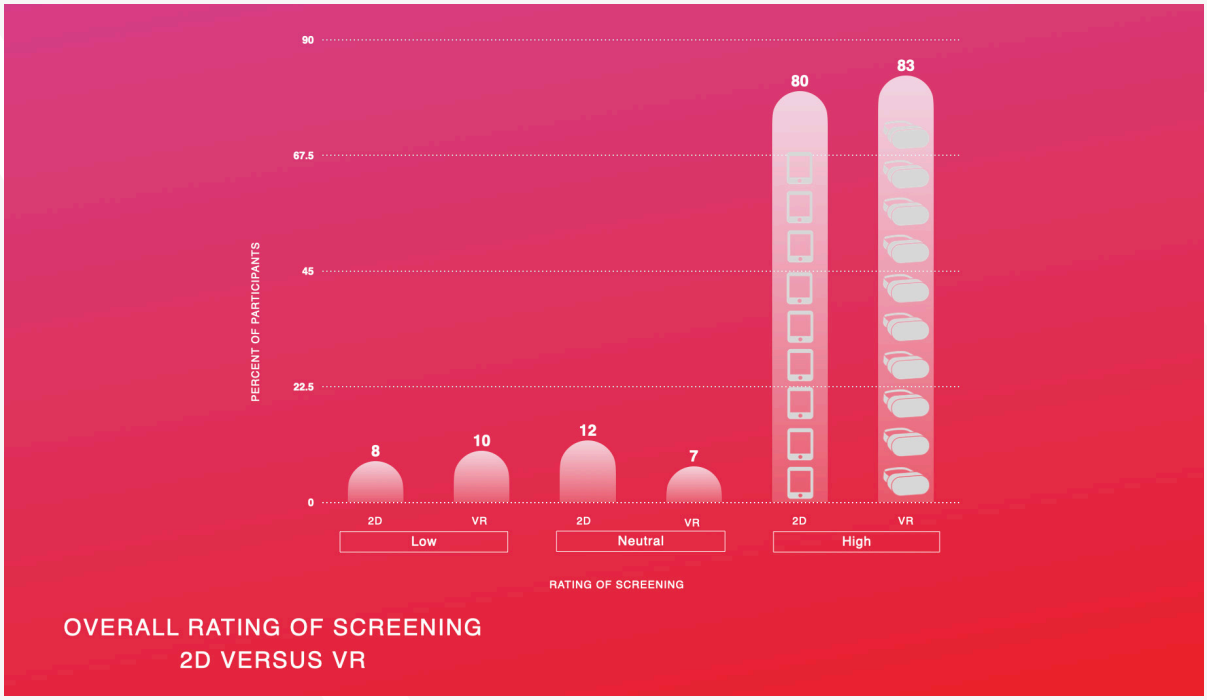

FIGURE 4.1 Overall rating of experience 2D screening vs. VR screening.

Best Practices: VR Activations for Learning and Impact

THIS CHAPTER OFFERS A FIELD GUIDE ON HOW TO:

1. Approach a VR activation based on the physical environment where it will be presented
2. Create wrap-around materials for a VR experience to achieve informal learning goals through audience engagement
3. Onboard audience members in a way that encourages them to explore subject matter that may be challenging and make them uncomfortable; make audience members feel at ease using headsets
4. Prepare, set up, and manage a seated VR experience in different environments, such as museums, galleries, pop-up venues, policy convenings, private events, and festivals

These best practices were compiled from interviews and production materials from the XR4C impact team.

Context

VR experiences are growing in popularity for a range of events from marketing and product release to art and education. This growth mirrors a projected dramatic increase in worldwide shipments of VR headsets, **see Figure 5.1**.

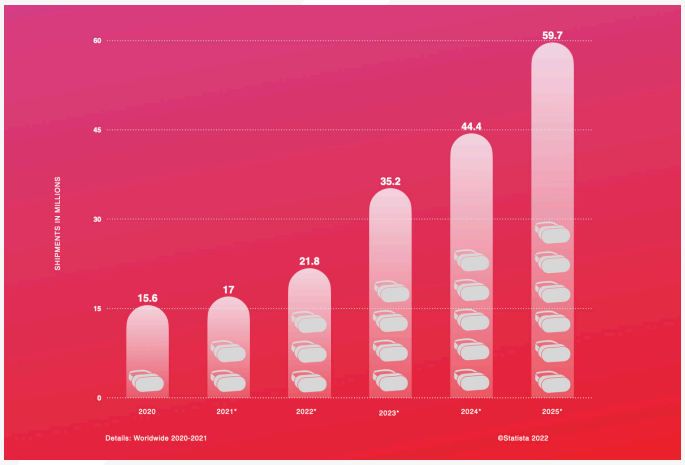

FIGURE 5.1
Expected increase in worldwide shipments of VR HMDs 2020–2025. [2]

1. Types of HMDs

Different types of head-mounted displays (HMDs) can be considered for events:

1. Standalone/Untethered: Self-contained VR headsets that are portable, powered by internal batteries, and use built-in processors (often based on mobile devices such as Android). No computer is required to operate.

2. Tethered: VR headsets that are connected to a VR-capable computer via cables or Wi-Fi. There is no on-board computing. They act purely as a HMD. Eventually these could be fully powered by edge computing solutions over 5G or 6G cellular networks.

3. Hybrid: Some VR headsets have processing and storage capabilities but also allow input from external devices.

2. VR HMDs for Events

Different kinds of experiences may require a different type of HMD. Two factors determine this:

1. Does the experience require walking around, or is it seated? [3]
2. What level of interactivity does the experience have?

For example, *On the Morning You Wake* runs from the untethered Quest 2 headset. The creators for *On the Morning You Wake*, Archer's Mark and Atlas V, wanted the experience to be as accessible as possible. They viewed the Quest 2 as the most commercially viable and easiest headset to set up on the market of VR headsets in 2021.

On the Morning You Wake is a seated experience that still requires tracking in the Quest 2 headset. It can be run from both stationary or room scale boundaries. Impact Producer Michaela Ternasky-Holland recommends a room scale boundary, as the stationary boundary can be too small for some audience members.

Top Tips from XR4C Staff

- Any staff member that is managing a VR activation must be very familiar with the devices and VR experience in order to help troubleshoot when participants run into problems.
- It is also important to check the lighting as it may interfere with the operations of the VR headset.
- Untethered devices are recommended in most situations, as they do not contain wires that participants could trip over or need extra computing power that could require more floor space.

VR Headset Fleet Management

1. Device Management

A challenge in scaling to multiple VR activations is the number of devices that need to be maintained.

Device Management System

While most headsets require individual account information and purchasing of in-store apps, some companies offer solutions for managing multiple VR headsets that include but are not limited to:

- account syncing;
- side-loading;
- customized home screens;
- remote management;
- lockdown capabilities for multiple VR headsets;
- streaming the content inside of the VR headset onto a mobile device like a tablet or cellphone.

Headset Fleet

These device management systems allow a large group of headsets (usually more than five) to be dedicated for a specific purpose that can be scaled across corporate settings [3] and for schools [4, 5, 6].

XR4C's staff emphasized the need for such a device management system to manage a headset fleet. They specifically use their device management system to:

- track updates across headsets;
- track headset locations;
- activate a "kiosk mode" that doesn't require multiple steps to screen the experience.

They also emphasized the need of periodic total recalls for a clean reset of all headsets.

> Doing that total recall once a quarter allows you to just have a level set playing field so that you know, "Okay, at least going into the next few months, this is the latest update and everything is completely updated."
> *—Erinn Budd*

2. Transportation

VR Kit

VR activations in various locations means shipping everything that is required. For example, for *On the Morning You Wake*, a checklist of essential items for all types of VR activations was created.

Checklist for VR Kits

- VR HMDs
- Controllers
- Chargers with cables
- Surge protectors
- Tablet devices
- Noise-canceling headphones
- Disinfectant wipes
- Microfiber cloth(s)
- Promotional materials
- Postcards, pop-up banners, QR codes, etc.
- Production hard case that rolls
- Tracking device

IMAGE 7 The first layer of an XR4C VR Kit. | Credit: Jesse Mechanic

Top Tips from XR4C Staff

- Use Pelican cases: Along with many other industry professionals, we recommend production cases from a company called Pelican; these are sturdy plastic cases available in various sizes with internal padding and separators. Different models also offer wheels for rolling heavier cases.
- Always do a quality control check before and after any activation to troubleshoot any issues before the next activation:
    - Check battery levels
    - Check your headphone wires
    - Check how many wipes and batteries you have left
- Hide a small tracking device within your Pelican when shipping, so you aren't relying on tracking numbers as your sole connection to your VR kit. (The XR4C Impact Team uses Apple's AirTags for this purpose).

"Once, our headsets were sitting in customs for a week and a half and we didn't know what the status was. After that, what we did is put AirTags in all of our Pelican cases. So at any point in time I can track exactly where they are, even when the carrier doesn't know."
—Erinn Budd

IMAGE 8 The exterior of the hard case that houses an XR4C VR Kit. | Credit: Jesse Mechanic

Optimizing VR for Participants

1. Audience

Participants are audience members, visitors, or guests at a VR activation.

For ethical reasons, the XR4C staff do their best to avoid the term user. User is often associated with an inequitable relationship between the product and the person using the product. G4C wants to recognize a more equitable relationship and power dynamic between the audience member and the VR experience.

Many participants may be experiencing virtual reality for the first time, so it is best to always assume that this is the participant's first time experiencing VR.

Different locations and types of events will change the number of first time VR participants. VR onboarding is key to a successful experience and needs to be well designed.

2. VR Onboarding

VR Onboarding is the process of familiarizing participants to virtual reality and preparing them for expectations before they put on the headset.

XR4C staff recommends using a script that can be used as a foundation for the VR Onboarding process.

XR4C staff recommends:

- The extra time spent onboarding your participants will allow for a much more pleasant experience and less interruptions due to problems.
- VR onboarding experiences for experienced VR participants is very similar to novices. Even those who say they are experienced need to know how this specific experience will work and that their headsets fit comfortably.

Here is a speech you can say in less than one minute

Hey, is this your first time in VR?

I am going to ask you for two things: patience and communication.

1. Patience because it may take us a few tries to get the headset to fit comfortably.
2. Communication because I don't know how you feel. Please let me or my staff know if the headset is too tight, too loose, or if what you see inside the headset is blurry or clear."

Additional VR Onboarding Content

If your experience has a start menu

"Once you're in VR, you're not going to be able to see what I see. Please see this photo of the menu, because I want you to see where you're going to be experiencing it." (Show a photo via a tablet or piece of paper as you say the speech)

If your experience has a hand controller

"This is how we control the inside of the headset. Move your hand controller inside the headset. Point your controller like this and use this finger to push this button and select." (Demo the steps as you say the speech)

— Michaela Ternasky-Holland & Erinn Budd

Checklist & Cuing Guide for VR Onboarding

1. Participants complete experience onboarding survey
    - See wrap-around materials section
2. Ask about prior VR Experience
3. Explain how they will interact with/control the experience
4. Mention how they may need to look around to see content or controls
5. Ask them to put on the headset
    - Example Script: *Pull the band and put the headset on front to back like a pair of swimming goggles*
6. Adjust headset
    - Find the optimal strap length for participant
    - Always check for comfort
    - Position of headset on face
    - Always check for image clarity
7. Explain how to signal for help
    - Example Script: *Raise hand*
8. Explain what to do at the end of the experience
    - Example Script: *Raise hand, and we will come help take off the headset*
9. If needed, give participant hand controllers
    - Example Script: *Show me your right hand* (give right controller) *Show me your left hand* (give left controller)
10. Cue them to begin the experience
    - Example Script: *What do you see inside the headset? Use your controller and point it at Chapter 1. Now use the button on the controller to select it.*
11. Put on headphones
    - Ask if they are comfortable
    - Ask if the volume level needs to be adjusted
12. Adjust volume if requested

IMAGE 9 XR4C staff facilitating a VR headset onboarding at the activation in Vienna, Austria for the Nuclear Ban Forum hosted by the International Campaign Against Nuclear Weapons. | Credit: Axel Stasny

IMAGES 10 & 11 XR4C staff work with each participant to find a secure and comfortable VR screening. | Credit: Axel Stasny

3. Comfortable Fit

Most participants are comfortable when their headset is fitted as shown in the accompanying reference image.

- Strap A is below the second half of their head.
- Strap B is flush to the top of their head.

If the participant wears glasses, the XR4C team recommends:

- Using a glasses spacer that is made for the headset.
- Placing glasses inside the headset first, then gently helping the participant place the glasses on with the headset before putting the straps over the participant's head.

If participants has a bulkier hairstyle or is wearing headwear of any kind, the XR4C team recommends:

- Loosening the side and top straps before helping the participant put the headset on.

VR onboarding is complete once the participant is wearing the headset and enjoying the experience. It includes but is not limited to:

- Headphones are fully situated on both ears.
- Controllers are held in both hands.
- Participants are not raising their hands requesting assistance.

Even if it seems tedious and time consuming—especially when your VR activation is experiencing a high volume of interest—a patient and thorough VR onboarding will:

- Save staff time and energy throughout the VR activation;
- Require less troubleshooting and mid-experience headset adjustments;
- Avoid participants from struggling, becoming frustrated, or otherwise having an uncomfortable experience.

If a participant gets motion sickness or feels unwell in headset, the XR4C team recommends:

- Allowing any participant at any point to take the headset off.
- When possible, having a 2D version or recorded version of the project so that audience members can still enjoy the experience, even if they are not in a headset.

Creating Wrap-Around Materials

1. Types of Assets

Wrap-Around Materials are supplemental items, such as activities, toolkits, and/or questionnaires that encourage learning, reflection, engagement, and deeper understanding before and after the VR experience. Wrap-around materials should be considered an integral part of the overall learning experience. Materials should be designed for:

- Flexibility: wrap-Around materials can be adjusted and localized for a variety of audiences such as students, diplomats, organizers, teachers, and the general public.
- Scalability: wrap-Around materials can be repeated, duplicated, and utilized by many participants at the same time.

For example, a digital toolkit of hyperlinks on a platform like Linktree or Flowcode can be duplicated, which allows links to be changed and text to be translated into different languages (flexibility). It can also be accessed in many different ways by participants via a QR code or on a provided tablet (scalability).

Top Tips from XR4C Staff

High Scalabilty and Flexibility

- Pre- and post-VR experience surveys
  - Recommend using iPads and Typeform
- QR Code that links out to a digital toolkit
  - Recommend using Flowcode

Mid Scalability and Flexibility

- Individual analog activity
  - *Example*: Select a card and answer the prompt by writing on the paper, then tie your paper onto the collective mural
  - Used in appropriate VR activations with adequate space/staffing/time

Low Scalability and Flexibility

- Group analog activity
  - *Example:* Pair up with somebody and discuss what home, safety, and security mean to you
  - Used in classroom settings

IMAGE 12 A scaleable aftercare activity developed by Impact Fellow Lovely Umayam. | Credit: Jhad Villena

2. Subject Matter Expertise

Impact Fellows are subject matter experts selected to collaborate with the XR4C impact team throughout the course of a year. These Impact Fellows advised within the following areas:

- Overall experience design;
- Creation of the wraparound materials;
- Suggestions and guidance concerning partnerships and VR activation opportunities.

For example, with Ray Acheson, the XR4C impact team created pre- and post-experience surveys. With Lovely Umayam, the XR4C impact team solidified the overall theme and topic to highlight in the top to bottom experience design for participants. Cynthia Lazaroff was featured as a voice that connected policymakers and students to the survivors' Hawai'i experience through a first-person account.

Top Tips from XR4C Staff

- OTMYW Impact Fellows advised the XR4C Impact Producer on how to craft wrap-around materials that had an appropriate tone, up-to-date information, and relevant calls to action.
- Wrap-around materials were designed with the same branding as the VR experience, so the participants never fully leave the story/experience.
- We conducted most of our wrap-around materials on tablet devices.

IMAGE 13 OTMYW Impact Fellows (from left to right) Lovely Umayam, Founder of the Bombshelltoe Policy and Arts Collective | Ray Acheson (they/them), Director of Disarmament, Women's International League for Peace and Freedom | Cynthia Lazaroff, Founder of Women Transforming Our Nuclear Legacy and NuclearWakeUpCall.Earth. | Credit (from left to right); Minesh Bacrania, Tim Wright, Natalia Knezevic Photography

3. Surveys

Onboarding Surveys are provided to participants before they begin the VR onboarding process.

The survey includes questions such as:

- Where is the participant from?
- How do they feel?
  - This acts as a way to prepare the audience to turn inward to their emotional state before the VR experience.
- How much do they know about the topic/theme of the VR activation?
  - For OTMYW, the topic was nuclear weapons disarmament.
- What is their prior experience with VR?

The onboarding survey also prepares participants by:

- Describing how long the VR experience is;
- Providing both a content and trigger warning;
- Telling participants that they may be photographed or filmed while in the VR headsets.

Aftercare Surveys are provided to the participants after they complete the VR experience.

The survey includes questions such as:

- How much they enjoyed the experience;
- What kind of emotions did they experience;
- How much they learned about nuclear weapons threat;
- What would the participant do if they were in the situation showcased in the VR documentary.

The aftercare survey also provides participants with ways to get involved by:

- Asking them if they are ready to take action;
- Recommending organizations specifically tailored to their interests and identity to learn more about.
  - OTMYW used an automated system (through Superphone and Zapier) so participants could text themselves an organization to follow up with.

IMAGE 14 A participant completes the aftercare survey at the Oregon Shakespeare Festival activation in Ashland, Oregon. | Credit: Bob Palermini

Aftercare is especially important with sensitive topics like nuclear threat.

It is important to give people time for reflection and self-expression after they complete a VR experience.

4. Curriculum

Curriculm Wrap-Around Materials are supplemental items, such as resources for teachers, mini decks, and assignment prompts that are specifically provided for teachers to utilize within a classroom environment.

- Example: After students complete a VR experience, the teacher may assign them to create their own piece of media to explore, express, and better understand the theme and topics of the VR experience.
- VR is not recommended for students below the age of thirteen.
- OTMYW is only showcased to students and youth who are high school or college aged.

> We wanted to empower students to use their own special skills or superpowers to achieve something...using writing exercises, prompts to use the pen, to use an art form, to use different things."
> *—Susanna Pollack*

Producing a VR Activation in Different Venues

1. Strategy

The success of a VR activation is built on the engagement of the producers and their staff involved.

The XR4C impact team has identified layers of teams that are needed for every VR activation. Often the most time consuming part of VR activation preparation is to liaise with all of the parties involved.

Impact Layer: Impact fellows/subject matter experts help with the impact strategy, establish connections to the community, and make introductions that can lead to a partnership.

Partnership Layer: The external teams who manage the venues, events, or organizations and are partnering with the core impact team on the activation.

Core Impact Team: Requires skill sets akin to event production; they manage overall impact strategy, creative strategy, marketing strategy, and are the VR activation's lead producers.

Production Layer: On the ground at the VR activation; includes production assistants/experience docents, photographers, and videographers.

> At Games for Change, we don't see entertainment and learning as two separate buckets. We always see them as intertwined."
> *—Michaela Ternasky-Holland*

2. Partnership

A partnerhip usually requires the partner to be engaged/invested in the success of the XR activation.

- Examples: festival, conference, university, high school, humanitarian organization, museum, general screening venue

Top Tips from XR4C Staff

Subject matter experts and project advisors can be key to unlocking partnerships with organizations/communities/events concerning the topic or theme your project discusses.

- OTMYW's Impact Fellows connected the XR4C Impact Team to key partners for VR activations such as the United Nations, International Campaign to Abolish Nuclear Weapons, Global Zero, Peace Boat, and Stanley Center

On your first call with a potential partner, ask these three questions:

- Do you have a budget for this VR activation?
- What is your ideal timeline/date for this VR activation?
- What can you provide in support of this VR activation? *Example: venue, furniture, staff, funding*

IMAGE 15 Participant screens OTMYW at the G4C Asian Pacific Festival in Melbourne, Australia. | Credit: Erinn Budd

3. Production Phases

Once a partnership is established, the XR activation production has begun. XR4C staff usually breaks a production down into three phases:

- Pre-Production: preparation leading up to the VR activation
- Production: loading in and prepping equipment at the venue as well as managing the VR activation itself
- Post-Production: wrapup tasks once the VR activation is completed

VR Activation Production Timeline

Can take anywhere between 2-6 months depending on the scale of the activations and scope of the partnerships

- Private Event Screenings: 1-3 months
- Open to the Public Screenings: 1-4 months
- Museum Exhibitions: 4-6 months

Here are the most common milestones for each of the three phases of a VR activation that includes the partnership discussion phase.

Checklist for VR Activation Production

Partnership Discussion

- Discussion on the feasibility of working alongside the impact team to produce a VR activation
- Details and responsibilities of all parties are outlined within partnership agreements

Pre-Production

- Certificate of Insurance for on-site team and equipment
- Create a floorplan of how the VR activation equipment and furniture will be laid out
- Tailor wrap-around materials to the event, location, region, or partner
- Curate event-specific digital assets
- Layout a marketing, outreach, and PR strategy around the VR activation
- Set up a booking system (if needed)
- VR headset set-up/check
- Ship equipment and marketing assets to venue (if needed)

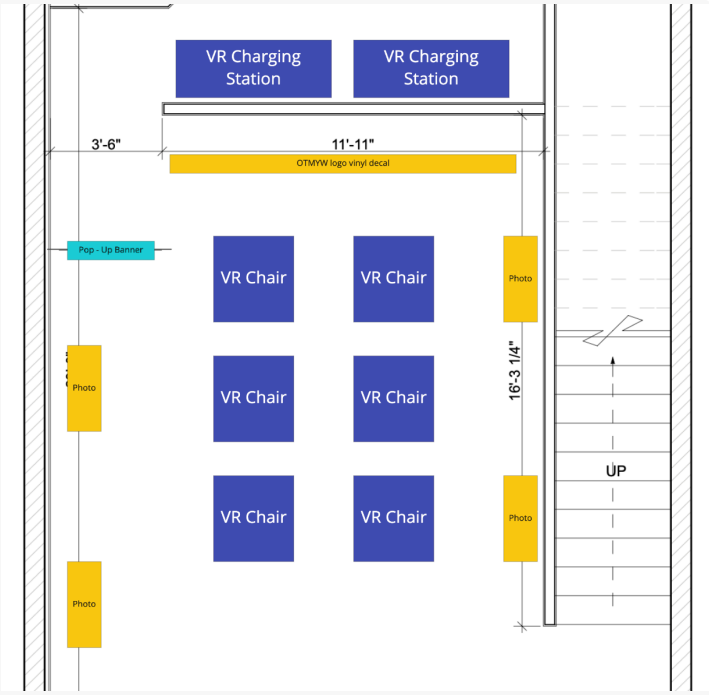

IMAGE 16 Floor plan for VR activation at Aupuni Space in Honolulu, Hawai'i. | Credit: Erinn Budd & Michaela Ternasky-Holland

- Hire local staff to support the VR activation
- Hire photographer/videographer to document the VR activation
- Create a Run of Show or call sheet for each day of the VR activation

Production

- Load equipment into the venue
- Set up equipment and furniture in the venue
- Train staff to help run the XR activation
- Handle fabrication/painting/construction of venue or exhibition (if needed)
- Execute marketing, outreach, and PR strategy

Post-Production

- Ship equipment and marketing assets back to office (if needed)
- Fulfill invoices
- Wrapup budget/finances
- Complete documentation
- Recap deck, recap video, recap photos
- Complete marketing/outreach strategy
- Quality check headsets and equipment

4. Pre-Production

Checklist for a VR Activation Producer

Floorplan

- A way to lay out and account for the furniture needed for the VR Activation
- Number of VR screening chairs or playspaces
- Tables for check-in, surveys
- Chairs for staff & waiting audience members
- A personal belongings area for audience members to drop bulky coats, backpacks, and other items that may encumber their VR experience
- XR4C-recommended platform for a floor plan layout: Miro

Booking System

- This is for the overall experience of your audience members as well as a management method for your VR activations staff to control demand and traffic flow.
- Walk-ups are still welcome when a booking system is in use, but it is always nice to have a booking system to give potential audience members accurate information for wait times and VR screening availability. Sometimes XR4C leaves one open spot in the booking system to accommodate walk-ups and press.
- Having a booking system also signals to your audience that you feel their time is valued, because your VR activation is trying to alleviate extensive wait times and the need to stand in a line.
- XR4C-recommended booking system: Waitwhile
  Link to Demo Waitwhile

Run of Show

- Similar to a movie set that sends out a call sheet each day of filming, a run of show lets the ground staff, partners, and photographers/filmmakers know and understand the schedule for each day of the VR activation.
- It includes but is not limited to call times, locations, lunch breaks, tasks, audience screening times, wrap times, and travel time (if needed).
- Link to example of XR4C's Run of Show

Top Tips from XR4C Staff

When designing a floor plan
Be sure to ask your partner for a site walkthrough.

- If your team cannot do a site walkthrough, then ask for the floor plan and dimensions of your allotted space.
- If they cannot provide exact dimensions or a floor plan, photos of the space can also be helpful.

Allocate a clear check-in area/entrance as well as a clear exit in your floor plan.

- This allows the audience to easily navigate the space, and your staff can easily guide the audience to where they need to be.

Make sure there is ample spacing between VR screening stations to avoid collision by audience members in headsets.

When creating a booking system
Book your VR screening stations in sections so your staff won't get overwhelmed with large groups of people showing up at once.

Leave a five minute reset between your VR screenings in your booking system.

- This will allow VR activation staff to sanitize, reset, and check battery life on headsets between screenings.

When building a run of show
List both emails and phone #s of staff and partners whenever possible.

More detailed information is always better than vague information.

Request an email confirmation from everyone you send the call sheet to.

IMAGE 17 Participants screening OTMYW at the Aupuni Space activation in Honolulu, Hawai'i. | Credit: Erinn Budd

5. Production

Checklist for VR Activation Setup

- Experience signage
- Check-in area for audience members
- Waiting area for audience members who have checked in
- VR screening stations, includes ready to screen headsets, controllers, and headphones
- Area for wrap-around materials, can be broken up into two areas to delineate onboarding and aftercare
- Device charging area
- Lighting check
- Staff training

> You're allowing the space and time for people to have an experience, where if they say the reservation system is their preferred way, they get a great experience. If the walk-in system is their preferred way, they get a great experience"
> *—Michaela Ternasky-Holland*

Top Tips from XR4C Staff

- Stay flexible!
  - Floor plans from the pre-production phase may need to change or be adjusted once the team is on-site.
- Stay safe!
  - Make sure you don't set up any trip hazards or any potential ways for someone to collide with someone else.
  - This is especially important when creating the charging stations.
- Create a dedicated area
  - Create a clear separation of space for those who are experiencing the VR activation and those who are not.
  - Because of the content of OTMYW, XR4C staff try to keep the VR screening area as private or separate as possible.
  - Use stanchions or pre-existing tables, chairs, or rooms to create this separation.
- Charging Station
  - When possible, hide the charging station in an area away from the audience's view. It helps the space not feel as cluttered or disorganized.
  - In some cases, specific cables, power strips, or adapters are required for charging stations, especially when you are doing international VR activations that are not readily available in a local store.
  - Try to purchase these cables, power strips, and adapters ahead of time.

IMAGE 18 XR4C Production Coordinator, Malk Brice, trains local staff for the activation at the Media Immersive Experience Center in Mesa, Arizona. | Credit: Tim Trumble

6. Staff Training

Training your VR activation staff is an essential step in ensuring a successful activation, especially if your staff has never worked in virtual reality.

- Teach them how to operate and troubleshoot the VR headsets used in the VR activation.
- Teach them the VR headset onboarding process.

The end goal of training is to get the staff to embrace the values of the impact team, so they can facilitate the experience as an extension of the impact team.

- Be mindful of the audience's time.
- Give the audience a sense of agency and belonging.
- Make sure audience members are cared for.
- It is important for event staff to be very familiar with the experience as well as with all wrap-around materials such as the onboarding and aftercare surveys.

A site walkthrough of the VR activation is useful for staff to understand the flow of visitor traffic.

The XR4C impact team prepares a detailed instruction manual that covers all aspects of staff members' responsibilities.

- Include photos of everything as well as step-by-step instructions.
- Sometimes it will even include information on how to pack equipment for shipping.

VR activation staff are the people who represent the impact team during the VR activations.

- Empowering them to troubleshoot and make decisions to improve the VR activation is also a huge part of the training process.
- For example, when audiences were in a rush, they didn't press the submit button on the surveys. In response, the activation staff began to ask audience members to return the tablet to the staff member who would, if necessary, press submit to save the responses.

Checklist for Event Staff Training

- Overall impact philosophy and approach
- Staff training manual with photographs and step-by-step instructions
- Guest experience values
- Familiarity with the VR experience
- Familiarity with questions on onboarding and aftercare surveys
- Familiarity with adjusting, operating, and troubleshooting VR headsets
- Familiarity with their specific tasks and the overall visitor flow

7. Number of Staff

Tethered (desktop-based) HMDs

Usually requires one staff per headset [3].

The number of audience members to activation staff depends on:

- Size of the activation space
- Duration of the VR experience
- Level of interactivity of the VR experience
- The wraparound materials

Untethered HMDs

XR4C impact staff recommends one activation staff for every four participants in standalone headsets. Staff are also assigned to different tasks, such as facilitating wraparound materials, checking people in, or disinfecting headsets.

The usual OTMYW VR activation has:

- One staff member to greet and hand participants the onboarding survey on a tablet device.
- At least one staff member to direct participants to an open seat and handle onboarding with the headsets.
- One staff member responsible for after care, which consists of walking participants to a debriefing area and giving the after care surveys

Top Tips from XR4C Staff

1-2 staff members can handle 12 HMDs.

If you are trying to optimize the amount of headsets to staff members, utilize a waterfall-style of screening scheduling, for example, when using a total of 12 VR stations

- 4 people arrive at 4p.m.
- 4 people arrive at 4:10p.m.
- 4 people arrive at 4:15p.m.
- This allows only 2-4 audience members to arrive to screen the VR experience at the same time.

Also allow five minutes of reset time to clean and reset the headsets in between each screenings.

Often VR activations require flexible responses to specific situations.

- Sometimes the VR activation will be in high demand and your staff can respond creatively to enhance the visitor experience, such as by adding more seats and headsets if space is available or by adding more times that can be reserved in the booking system.

IMAGE 19 Nobel Peace Center staff assist diplomats throughout a private screening of OTMYW during the activation at the Nobel Peace Center in Oslo, Norway. | Credit: Johannes Granseth

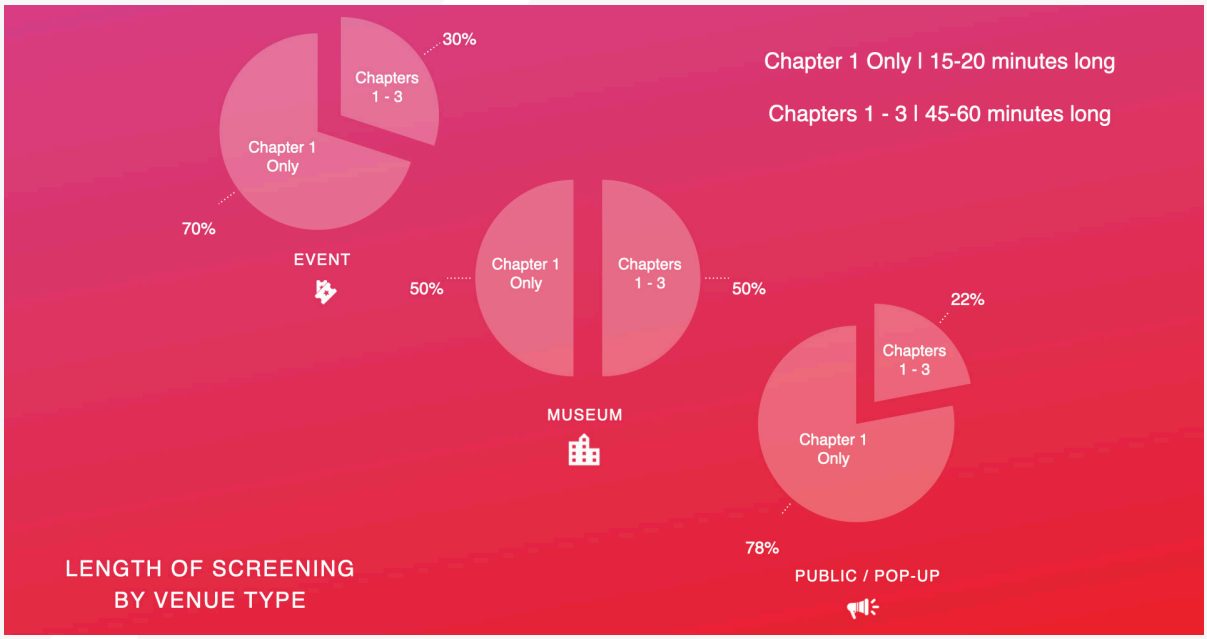

FIGURE 5.2 Preferred duration of VR experience by venue type.

On the Morning You Wake is a 45-minute long VR experience that is broken up into three chapters. The XR4C Impact team offers two booking options:

- Chapter 1 Only (15–20 minutes)
- Chapters 1–3 (45 minutes)

XR4C staff found that providing options for different durations of the VR experience is preferable to all audiences no matter the venue or event.

For one-day events, field trips, or high capacity VR activations, the "Chapter 1 Only" booking option of the VR experience is recommended.

For multi-day events, the XR4C impact team found that audience members would book the "Chapter 1 Only" booking option but then have the tendency to return to the VR activation to complete Chapter 2 and 3 at some point during the event.

For museum-based experiences, the XR4C team has successfully used both booking options. Many factors determine which booking option to select for the museum audience:

What is the museum known for?

- Example: If it is a film-focused museum, a 45-minute long version of the experience will be successful.

What type of capacity does the museum expect?

- Example: If the museum would like to have more people accommodated in the VR experience throughout opening hours, then the 20-minute version of the experience will be successful.

Is the VR experience an additional ticket separate from museum admission?

- Example: If there is an additional ticketing cost to access the VR experience at the museum, a 45-minute long version of the experience will allow the patrons to feel more value in purchasing an additional ticket.

We conducted an analysis of signup data for those venues that offered a choice of different durations of the experience, a short one (Chapter 1, 20–30 min), and a longer one (Chapters 1–3, 45–60 min). Based on 802 bookings, we found that for events, 68% preferred the shorter experience; for museums, 71% preferred the shorter experience; and for public pop-ups, 78% preferred the shorter experience, **see Figure 5.2.**

Adapting to different environments

When the XR4C impact team approaches a new XR activation partnership, they design something that is audience-centric to maximize both impact and learning.

The benefit of having a flexible education and impact model is that it allows questions to be asked, such as:

- What type of audience will be attending this VR activation?
- How can we adjust the wrap-around materials to be specific and appropriate for the audience that are more
  - Age specific, usually concerning students;
  - Career specific, usually concerning government policymakers & diplomats;
  - Region specific, usually concerning the primary language spoken in the location of the VR activation.
- What type of audience will be attending this VR activation?
  - Private Event, Classroom, Open to the Public, Museum, Diplomatic Convening
- Will XR4C staff be fully present at this VR activation, or will this be a pop-up that is being handled by a partner?

This flexibility allows the XR4C team to easily service different types of events, locations, and experiences with an impactful and engaging VR activation.

8. Location Trends & Patterns

Media or Film Festivals & Single-Day Events
Audiences often have tight schedules and are less inclined to complete the aftercare survey, though some are very interested in getting involved after taking the aftercare survey.

Multi-Day Events, especially with Policymaking or Humanitarian Focus
Audiences often have flexible schedules, are open to learning in an immersive or interactive way, and are eager to get involved after taking the aftercare survey, even recommending the experience to their colleagues.

Museum
Similar to multi-day events, audiences often have more open and flexible schedules, are very open to trying anything, and are often eager to get involved after taking the aftercare survey, even recommending the experience to their colleagues.

9. Audience Trends & Patterns

Students, such as high schoolers

- Engagement tends to be more successful when the VR onboarding takes place in a more succinct manner.
- XR4C staff members engage students by being a little bit more lively and enthusiastic.

Activation attendees, such as conference attendees

- Engagement tends to be more successful when the overall experience is relaxed and laid back.
- XR4C staff members are calm, collected, and patient and don't have to be as animated.

Diplomats and government officials

- It is especially helpful to have the 15–20 minute version of the experience, as these types of people often have tight schedules.

> "It is important to flag that for certain events you might have more accessibility needs than in others, and to plan accordingly."
> *—Erinn Budd*

Accessibility
Closed captions are a standard way of making your VR experience more accessible, as some participants will prefer having closed captions to read as a supplemental part of the audio. The XR4C impact team recommends having a build of your experience that features closed captions or an option to toggle on closed captions within the start screen of your virtual reality experience.

The types of language that should be closed captioned will be dependent on the project's audience and screening region and should be decided strategically amongst your team.

Another aspect of accessibility is that both seated and standing virtual reality experiences can trigger people's discomfort and may not be possible for certain participants to enjoy. The XR4C team recommends having back-up screening options, such as a 2D recording of the experience, that takes into account this possibility.

IMAGE 20 The OTMYW activation at the Museum of the Moving Image in Queens, NY featured an exhibition space dedicated to never-before-seen wrap around materials. | Credit: Thanassi Karageorgiou

10. Designing a VR Activation & Museum Exhibition

In 2022, the XR4C impact team produced two museum activations. Throughout the one month run of each of these exhibitions, the XR4C impact team learned a few key items:

- Museum exhibitions will always take more production time, energy, and resources than a public/pop-up activation or private event activation.
    - This is usually because museums as a venue and museum audiences hold a higher expectation around the production quality of the wrap-around materials that contextualize the project.
    - Museums will often work for multiple months or even years on a long-term exhibition, so their understanding around production is more prolonged.
- Main exhibition spaces are usually reserved for exhibitions that will run over the course of a season or even for the unforeseeable future.
    - VR activations work best in museum spaces that are more flexible than a permanent or long term exhibition area. These flexible spaces usually host a higher turnover of content.
- When working with a museum, try to partner with their education department to create curriculum and offer field trips. This can also be a way to unlock additional funding for the VR activation.

International Museum Exhibition at the Nobel Peace Center (Oslo, Norway)

- A single space primarily dedicated to the VR screening with an extended aftercare space
- VR screening was free with museum admission
- Showcased the 20-minute VR experience (Chapter 1 Only) to patrons and field trips
- Hosted a supplemental event focused on government delegates and the threat of nuclear weapons
- Capacity of sixteen people in the VR screening area that hosted both members of the public, group tours, and field trips due to its expanded capacity
- Three to four dedicated staff members to manage the VR activation
- Over 400 people screened Chapter 1 of OTMYW
- One new piece of digital content was created for the museum exhibition, a film that highlighted past Nobel Peace Laureates who worked against nuclear weapons threat and how their work connected to OTMYW
- One new piece of physical content was created for the museum exhibition, a side-by-side proliferation and disarmament timeline of nuclear weapons

IMAGE 21 This fabricated wall featured information that was localized in both English and Norwegian. It also acted as a divider between participants waiting to screen and participants who were actively screening. This allowed the activation staff to better control the overall traffic flow through the activation. | Credit: Johannes Granseth

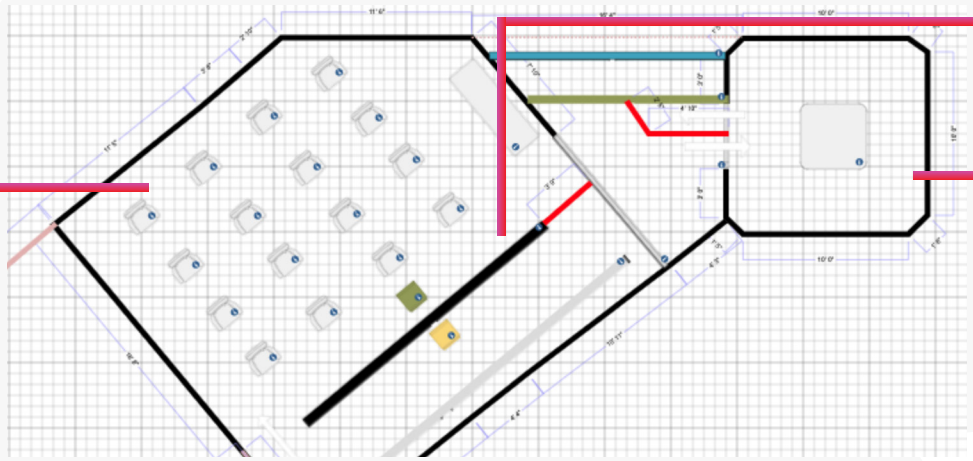

IMAGE 22 The VR screening area of the Nobel Peace Center activation featured 16 VR stations. | Credit: Erinn Budd

IMAGE 23 There was a dedicated aftercare area where additional wraparound materials was displayed. | Credit: Johannes Granseth

IMAGE 24 This was an exhibition space at the Museum of the Moving Image that was dedicated to the production, creative, and impact process of OTMYW. This area was free to patrons with museum admission. | Credit: Thanassi Karageorgiou

U.S. Museum Exhibition at the Museum of the Moving Image (Queens, New York)

Two separate spaces:

1. An exhibition space dedicated to the production, creative, and impact process of OTMYW. This area was free with museum admission.

2. A gallery space dedicated to full 45-minute VR screenings (Chapters 1-3). The VR screening and this area was an additional ticket to purchase.

- Showcased the 20-minute VR experience (Chapter 1 Only) to field trips
- Hosted supplemental event focused on the creation and production process of the VR experience
- Capacity for only eight people in the VR screening area
    - For larger field trips, screenings were hosted in the larger exhibition area
- Two dedicated staff members to manage the VR activation
- Over 450 people screened Chapters 1–3 of OTMYW
- Many new pieces of digital content were created for the museum exhibition
    - A reel of clips for each chapter from OTMYW
    - Short documentary about the making of and impact of OTMYW
    - Short film about volumetric video capture
    - Short film about the overall impact campaign
    - Interactive audio experience that featured never-before-heard interview excerpts from the creators, people featured in the virtual reality experience, and nuclear weapons experts

IMAGE 25 Never-before-seen wraparound materials allowed museum patrons to learn about OTMYW without having to purchase an additional VR screening ticket. | Credit: Thanassi Karageorgiou

IMAGE 26 Exhibit elements like lighting, projections, and vinyl created an experiential space for participants to enjoy when screening OTMYW. | Credit: Thanassi Karageorgiou

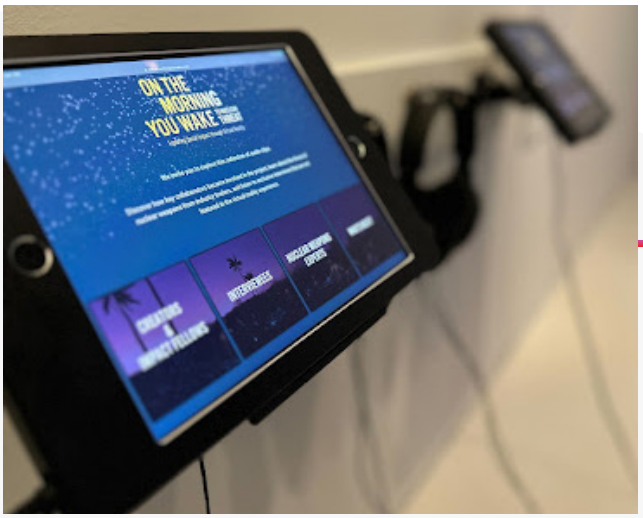

IMAGE 27 The XR4C impact team produced an audio library that featured interviews with the creators and nuclear disarmament experts. | Credit: Thanassi Karageorgiou

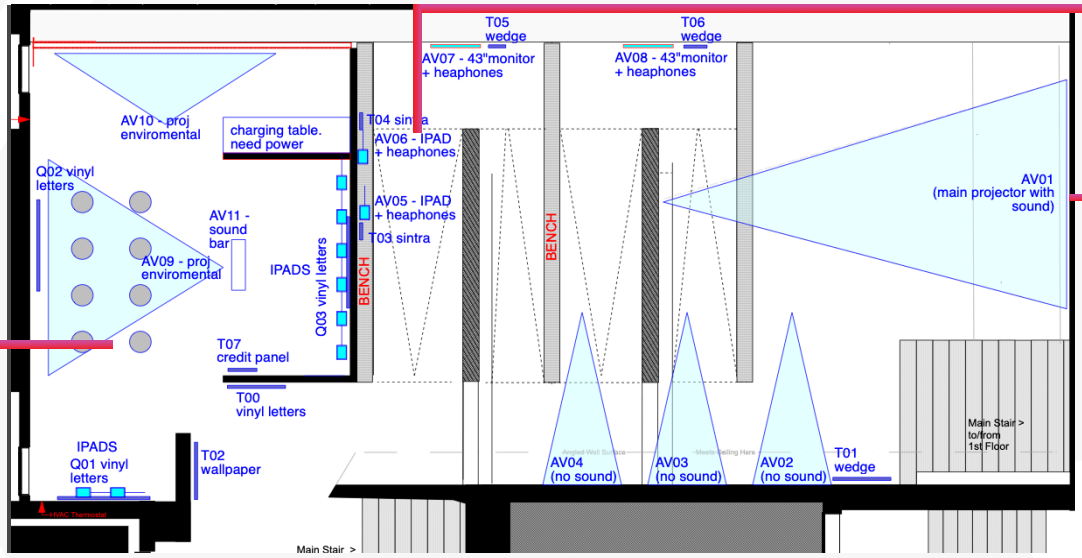

IMAGE 28 A short documentary about the impact campaign and making of OTMYW played on the main wall of the exhibition space and provided context and key information about the project. | Credit: Thanassi Karageorgiou

Conclusion

THE GOAL OF THIS REPORT is to document and share what G4C learned from studying and reflecting on the extensive impact campaign conducted for *On the Morning You Wake (to the End of the World)*.

The research conducted reveals that the VR activations in many different venues and at many different events were very successful in both impacting and engaging the audience. In self-reported surveys, participants revealed that they felt that they had learned something new about the topic, despite most of them having previous knowledge about the topic. Over 70% of the audiences, at every type of venue also self-reported that they would like to take further action concerning the topic.

In addition, a study analyzed content screened in a VR headset in comparison to content screened on a 2D interface for differences and similarities on their emotional impact on participants. The results suggest that the VR screenings induced stronger and more positive emotions than the 2D screenings, which the XR4C researchers speculate may be due to the higher level of immersion self-reported by the VR screening participants.

This document also serves as a resource of practical information and insights, for a variety of people who are interested in producing successful VR activations.

First, this report includes a field guide on how to produce XR experiences in a scalable, sustainable, and manageable format, either as individual activations or as part of a more expansive campaign.

Second, this report is a resource for venues, events, and organizations such as policy convenings, museums, conferences, and libraries that serve lifelong and underserved learners to aid them in hosting and curating VR activations.

Finally, for XR creators, this is a toolkit on how to plan their own VR activations and create wrap-around materials to achieve social impact and facilitate informal learning.

From the XR4C impact and research teams, we hope that these studies and practical guides will be utilized to showcase the unique potential of virtual reality to inspire learning, engagement, and behavior change.

References and Further Resources

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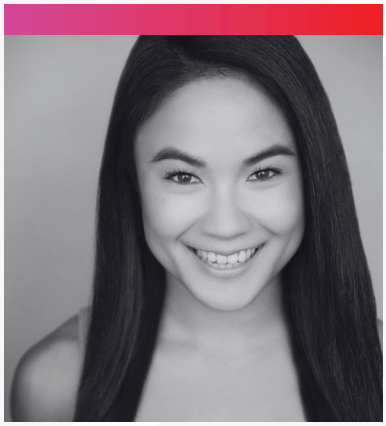
Credit: Kelvin Wallace



Credit: Billy Bustamante

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Credit: Frank Pitchford

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