



# 32 VIRTUAL, AUGMENTED, & MIXED REALITY

PROGRAMS FOR LIBRARIES

edited by ELLYSSA KROSKI



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# Preface

**V**irtual, augmented, and mixed reality—VR, AR, and MR—technologies are currently being implemented in libraries to provide engaging programming events and educational opportunities. Libraries are enhancing their exhibits, collections, and lessons as well as providing virtual field trips to landmarks and art museums, driver safety programs, 3D coding environments, and even simulated space exploration. They are organizing workshops, establishing lending programs, and teaching patrons how to utilize their own VR equipment.

*32 Virtual, Augmented and Mixed Reality Programs for Libraries* is an all-in-one guide to how to plan, organize, and run all types of new and emerging virtual events in libraries. Programs range from simple gaming activities utilizing VR headsets to AR tours, exhibits, and immersive experiences, to STEM educational programs. Programs encompassing new technologies, such as AR, VR, and MR, are all included.

Each program walks the reader through step-by-step instructions on how to prepare for and host these events. Every program includes a materials and equipment list, a budget, and recommendations for age ranges and type of library. Programs range in cost, topic, and difficulty; so, there is something for every size and type of library. The authors who describe these programs are all knowledgeable professionals from the library field and offer real-world programming ideas for public, school, and academic libraries.

I heartily thank all the knowledgeable librarians and experts who contributed their time and expertise to this book. It was a pleasure to work with all of you.

# Virtual Reality Is for Everybody

## Connecting with Harder-to-Serve Populations

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**V**irtual reality in public libraries is closer to reality than you may think. With a few VR headsets, empathetic and well-trained staff, and an 8 × 8-foot space, you can bring VR to your library patrons. Teen and adult patrons of all ages and abilities can experience VR, from swimming with dolphins to climbing Mount Everest to walking on the moon with Neil Armstrong and everything in between.

The North Olympic Library System (NOLS) offered these and other programs to more than six hundred participants over a ten-month period using four Oculus VR headsets. Participants were aged thirteen and older, with most of the participants falling in the sixty-plus age range. Though several participants had physical and cognitive disabilities, with support and simple modifications, they were equally as able to enjoy the VR experience as those without such disabilities.

A variety of program types are possible and can include in-library, community outreach, and outreach to the homebound through themed programs or introductory, drop-in, or reserved sessions. Through a variety of program offerings, attention to accessibility issues, and a willingness to think outside the box, you can introduce VR to nearly everyone.



Age Range	Type of Library Best Suited For	Cost Estimate
Young adults (ages 13–18) Adults	Public libraries Academic libraries	\$2,800–\$3,400 (\$3,800–\$4,400 with optional equipment)

## PROGRAM CONSIDERATIONS

This program is suggested for young adults ages thirteen through seventeen with parent permission and adults over eighteen of all ages and abilities. A signed health and safety release is recommended for all participants.

This cost estimate is based on purchasing four Oculus Quest and two Oculus Go headsets, plus the supporting equipment, applications, and consumable supplies. You can look to partnerships and technology grants to reduce program and equipment costs. Staff costs and desk chairs are not included in these estimates, which also do not include sales tax or shipping costs.



**Figure 1.1** North Olympic Library System patrons, staff, and volunteers accessing VR experiences through the library

## OVERVIEW

### The Virtual Reality Experience

Many kinds of programs can be offered in and out of your library that can all be tailored to fit your library's unique needs. Individual session lengths can range from fifteen minutes to an hour. Complete sessions can be two to three hours without backup batteries, longer if using supplemental battery packs or by allowing for time between each session for headset recharging. How long each participant remains comfortable with their VR experience will vary. How frequently you can offer such programs will vary and depend on such resources as staffing and the space available.

It is important to ask how a participant is doing throughout their VR experience. Be observant and pay attention to body language and verbal cues to maximize a positive VR experience and ensure the safety of the participant, staff, and observers. Provide seating for observers and keep chairs close at hand for participants who may need to sit during the VR experience. You can keep a safe space around each VR participant by placing blue painter's tape on the floor to mark the player's boundaries to replicate that of the play space provided inside the user's headset.

It is important to recognize that participants may require extra assistance for several reasons. Older adults are usually willing and may be eager to try new technology, though some may still feel apprehensive or uncomfortable when they start. Adults with cognitive or physical limitations may not be able to use the equipment on their own. It is important to make sure you are communicating clearly with the participant, and if they have a caregiver, that they are present and assisting during the VR experience. The headset can be set in different languages. However, not all applications have foreign language options; so, keep this in mind. Your goal is to give the best VR experience you can while accommodating each participant's unique needs.

### In-Library Programs

- *Drop-by events* are good for short, fifteen- to twenty-minute introductory VR experiences. While these events can work well for busier locations, they work best for low-volume and smaller branches with less demand.
- *Preregistered sessions* provide longer sessions for your participants that can be scheduled ahead. Such sessions work well with larger branches and high-demand locations and are preferred by returning participants.

- *Group events* are the perfect venue for students and small community groups. The NOLS examples provided include a group of Japanese exchange students and their host students, members of a local Chamber of Commerce, and a group of disabled adults from a local residence home.
- *Themed registered events* offer sessions centered around a particular VR application for patrons who register ahead. NOLS examples include an Apollo 11 VR experience, Guided Meditation, and Ocean Rift. Nearly any application can be adapted to a themed event.
- *In-library experiences* allow patrons to check out Oculus Go headsets.

## Community Outreach

Your events can be drop-in, preregistered, and/or themed, similar to in-library experiences. Some suggested community partners include senior centers, assisted living facilities, local Chamber of Commerce members, community centers, Upward Bound, and other college/middle/high school/student programs.

## Outreach to the Homebound

- Staff can provide orientation sessions on how to operate the Oculus Go headset and then check it out to your homebound patrons who are able to comfortably use a headset on their own.
- For those requiring assistance to use the equipment, library staff can work with a caregiver or additional library staff person/volunteer to assist your homebound patron with their VR experience. You should never be alone in a space with a participant for your and the participant's personal safety.

## Staff and Volunteers

The possibilities are limited only by your imagination when it comes to VR programs in and out of the library. Your staff and volunteers are key to your program's success. Identifying and recruiting staff and volunteers who are comfortable learning and using VR equipment, are willing to assist participants with the technology, show the ability to think and troubleshoot on the fly, and feel comfortable being in close physical contact with people will help you create a wildly successful program.

You can further increase staff and management support by encouraging them to try out the equipment themselves. This approach can also provide an opportunity for training and for your VR staff to build experience while working with participants they already know.

The optimal staff to participant ratio is one to one, especially for first-time participants. You can recruit tech-savvy volunteers to help decrease staff costs. As you and your staff become more experienced, this ratio may be able to be adjusted, especially if you stagger start times for other participants.

## Safety

There are several safety considerations to keep in mind.

- Obtain a signed release for all participants aged eighteen and older and one with both a parent and teen signature for those aged thirteen to seventeen. Based on the current recommendations listed by Oculus, the use of VR equipment is not recommended for those under thirteen. NOLS also provides a copy of the health and safety information from Oculus, and the release participants sign has been approved by our insurance company/risk management and the library director.
- Offer a wheeled chair and/or keep one close by for participants who are standing.
- Vertigo, while rare, was the most common issue our participants experienced. Ask beforehand if your participants normally have issues with balance or vertigo. If any do, depending on the severity of their symptoms, tailor the suggested application based on their response. It is always a good idea to provide a chair to someone who does experience vertigo or balance issues.
- Ask participants if they are sensitive to heights. The “elevation” VR users experience during certain applications can feel very real, and some applications (Everest VR, for example) can be particularly intense. Again, tailor suggested applications to each participant and keep a chair on hand.
- Tape the floor. This can go a long way as a visual reminder for all observers, volunteers, and staff to stay clear of the VR participant since the person can’t see you.
- Pay attention to where you are in the play space. When supporting participants, they can move suddenly, and you can (and probably will) get hit if you aren’t mindful of where you are in relation to your participant.

- Pay attention to your participant's body language, movements, and commentary. Ask how they are doing—whether they are quiet or talkative—to communicate the fact that you are there. Ask them to let you know if they are having any discomfort and remind them that you can end the experience at any time.
- Remind participants that the fastest way to end the experience is to close their eyes, state that they are done, and remove the headset.

## NECESSARY EQUIPMENT AND MATERIALS

- Four Oculus Quests
- Two Oculus Gos for outreach to the homebound and in-library checkout
- Application software from Oculus—there are many free apps to choose from, though paid apps can range from just a few dollars to up to \$30 each. One account can include multiple headsets, which can share the apps to lower your cost.
- Access to a computer, laptop, tablet, or smartphone for setup and care of devices
- A laptop computer or television display that can be connected via Bluetooth to support your participants with physical and/or cognitive disabilities requiring assistance in accessing their VR experience
- Wheeled desk chairs without arms for a 360 experience for your participants who need or prefer to sit
- A surge protector for recharging devices when not in use (it is a good idea to keep the headsets on chargers when they are not being used)
- Blue painter's tape for marking the players' play space
- Chairs for observers
- Non-alcohol antibacterial wipes (Sani-Cloth) for cleaning headsets
- Silicon hygiene masks—at least two per headset to change between users and disinfect
- Disposable hygiene masks
- Microfiber cleaning cloth for lenses—do not use disinfecting wipes. A small amount of water can be used for stubborn smudges.
- Compressed air to blow out dust and other particles
- For cleaning and disinfecting equipment, *don't* use UV light as it can damage lenses.

## Recommended but Optional Materials

- Oculus Quest Storage cases or a heavy-duty (Pelican-style) storage bin with or without a padlock. Some type of storage bin is recommended; library totes can work in a pinch.
- 360-degree camera(s) for creating your own content and/or for class-type instruction
- Battery packs for the headset to extend battery life. Consider using a VR Power battery; it offers a counterbalance for the headset and is designed to work with the Oculus Quest.
- Soft, low-profile, no-trip mats for participants to stand on
- Additional Oculus Gos for classroom-style and content creation programs

## STEP-BY-STEP INSTRUCTIONS

### Preparation

- Recruit the right staff and volunteers. Get yourself and your staff and volunteers comfortable with the use and care of the equipment and applications. You can't be expected to know everything about each application, though the more time you spend in the headset before putting it on someone else, the more comfortable you will be.
- Identify the best space to offer the VR experience. Meeting rooms, conference rooms, and, really, any open space in your library can work. Don't be afraid to set it up in the middle of your library outside on a sunny day—anywhere you have an 8 × 8-size space.
- Let your staff try it out on the clock. The best marketing for your library will be the excitement and enthusiasm your staff, managers, and even your library board have for the program.
- Don't let tech challenges get you down—they will happen. Everyone is there to have fun, and being able to laugh it off, think on your feet, and go with the flow will lead to a successful program.
- Set up the event's registration, if needed, using meeting room software or other methods used by your library. Space fifteen minutes between each participant for equipment cleaning.
- Check headsets for updates for firmware and applications prior to the session or on a regularly scheduled basis.
- Keep the headsets fully charged.

## Program Instructions

- Set up the play space. Tape off an 8 × 8 area for each headset. Gather desk chairs. Each Go should always be used seated. The Quests can have participants seated or standing. Some applications recommend or require participants to do one or the other.
- Set up the equipment. A table can be used to hold the equipment when not in use, and headsets should be plugged in when not being used and between participants.
- When participants show up, go over the release form, then have them read and sign it before setting them up with the headset.
- Before having them put the headset on, show them the hand controllers and the headset and where the buttons are located. Explain that the controllers are universal and all applications can vary in what the buttons do since applications are created by different developers.
- Explain the application choices available to the patron before putting the headset on.
- Assist the participant with putting on the headset. When helping them put on the headset, explain what you are doing before you do it.
- For first-time users, provide a tutorial application in the headset to familiarize them with the controllers and what the VR experience is like.
- Launch the preferred application and assist the participant as needed throughout the experience.
- Ask participants to complete a short paper or digital program evaluation at the conclusion of the experience.

## RECOMMENDED NEXT PROJECTS

There are many directions VR programs can go. Explore partnerships in the community to expand your program offerings. Purchase optional equipment, extra Oculus Gos, and 360 cameras to support classroom-style programs, during which participants can create their own content. Contract with a game designer educator to teach VR game design. The possibilities are many.

# Creating Dynamic, Immersive Field Trips with ClassVR and ThingLink

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**C**lassVR is a stand-alone virtual reality (VR) headset designed for educational purposes only. Teachers and librarians can use the ClassVR educational platform to take users anywhere in the world, where they can experience different biomes and cultures and even outer space in a fully immersive, engaging manner! The ClassVR platform allows teachers and librarians to monitor all student activity while using the device; the platform also comes with the option for content to be delivered simultaneously to all users or for users to explore content at their own pace. ClassVR has partnered with ThingLink, giving teachers and librarians the ability to create deeper, more dynamic content. While the ClassVR platform does allow teachers and librarians to select premade content aligned with premade lessons, when used in conjunction with ThingLink, school and library staff can create virtual field trips that are fully immersive and can include sound, images, and web links all embedded within the VR content. Connections to curriculum are truly limitless with content created in ThingLink and uploaded into the ClassVR headsets!

## Age Range

Kids (ages 3–7)  
Twins (ages 8–12)  
Young adults (ages 13–18)

## Type of Library Best Suited For

School libraries

## Cost Estimate

\$3,200–\$5,000



## PROGRAM CONSIDERATIONS

The content in ClassVR is adaptable to all age ranges. This project is adaptable for students both young and old. Older users will have more autonomy in exploring the accessed scene since they can manually navigate the controls on the side of the headset to access the content embedded into ThingLink. Younger students may struggle with using the controls. In cases of younger users, teachers can manually deliver the content to the device when they are ready, and all users can then view the same content concurrently. This prevents any distraction or frustration relating to control navigation for younger users while also preventing unsupervised exploration of the content.

ClassVR headsets come in sets of eight with a hard storage case that plugs into the wall. Each case includes a cooling fan that runs at all times, even when the sets are not in use. The case is fully padded on the top and bottom to protect the headsets and contains all the chargers pre-placed into each headset's storage location; so, there is no setup needed aside from plugging the case in. The case is designed to make transportation to classrooms easy and is similar to a small, rolling suitcase with a handle that can be stored inside the case when not in use. The cost of the headsets also includes a six-hour professional development session designed for up to twenty teachers. ClassVR flies a representative to your school at no extra cost to conduct this



**FIGURE 2.1** When uploaded into ClassVR headsets, the interactive content icons flash for users who are in a fully immersive, 360-degree setting. Standard headphones can be plugged into the headset to further the immersive nature of the content and prevent distractions.

session, which covers all the basic functionality of the headsets and content platform. The professional development session can be customized to the school's specific needs in terms of in-depth content creation and delivery. This is only offered upon initial purchase. Any additional sets bought after the initial purchase will not include this session.

There is a mandatory annual \$399 fee for ClassVR platform access, which is required to deliver the content to the headsets. This platform houses all curriculum created by ClassVR and all teacher/librarian-created content and is where content is loaded into the headsets for delivery to students. ClassVR will not function without this annual platform fee.

ThingLink offers several different levels of access, as follows: Free Teacher, Premium Teacher, and Schools and Districts. The Free Teacher option limits teachers/librarians to being the only content creators. There is no limitation to the amount of content a single teacher/librarian can create. However, there is a limited number of times the content can be viewed (one thousand times) annually on the free plan. A "view" in this sense occurs any time a user clicks on the interactive icons embedded in the content while in a VR headset. For example, if there are five interaction icons in your content, and you have ten students who each interact with all five icons, you have spent fifty views. Free plans are ideal for teachers starting out and wanting to practice. If using the plan with a full-sized class, however, the free views will run out quickly. The Premium Teacher plan allows teachers/librarians to create classroom groups and add students who can create their own content. This option is \$35 annually and allows teachers/librarians to create classes of sixty students. For an increased cost, more students can be added via a customized plan. The Premium Teacher plan allows for twelve thousand views annually. School and District plans start at \$1,000 per year. These plans allow unlimited classroom groups and students, unlimited content creation, and unlimited views, and are customized to the school district's needs.

A personal quote can be created upon contacting ThingLink. At any time, you can check how many views have been counted toward your account limit by viewing your account dashboard. Views are only applicable to content embedded as interactive icons in the content you've created. Feasibly, you could simply upload a 360 image with no embedded content, and it would not count against your total views regardless of how many times the content is loaded into ClassVR headsets because it is only a single image. "Views" only apply to the interactive icons you add to the 360-degree image.

## OVERVIEW

ClassVR offers a full platform of educational content to be used with their headsets. This content includes videos, professionally created ThingLink content, and still images. Additionally, ClassVR now has an “explorable scene” content option, which allows users to walk around within the headset by manipulating the controls on the side of the headset. The majority of content on the ClassVR platform is limited to a single video or image, but more explorable scenes are being released regularly. Content on the ClassVR platform often comes with premade lesson plans, which makes these sessions literally a click-and-go lesson for patrons.

By using ThingLink to create your own content, you can develop multi-layered, immersive VR content that is then uploaded into the ClassVR headsets and is tailored to your needs.

Teachers and librarians can create a free or paid ThingLink account, create deep, dynamic content, and then upload it into the ClassVR teacher portal. That content can then be delivered to users via the ClassVR headsets. ThingLink content is fully customizable and limited only by the requirement of a 360-degree image. Any image taken from anywhere online or taken by the content creator with a 360-degree camera can be used as the basis for a ThingLink project.

Once a 360 image has been uploaded into ThingLink, teachers/librarians can then add interactive points of interest. These points can be text-only, text and an image, image only, or audio. There is no limit to the amount of interactive content that can be added to a single 360-degree image. When creating the content, interactive icons can be made to flash to draw users’ attention to them, or they can simply be stationary icons users have to find before interacting. Background music can be incorporated to create a more immersive experience, or narration can be added by the creator to direct the user to the appropriate content and deliver any information desired while users explore the environment inside the headset. Because users are fully immersed in the content, any number of participants can access the content simultaneously.

## NECESSARY EQUIPMENT AND MATERIALS

- An active ClassVR portal membership

- ClassVR headsets (one per participant or fewer—participants can take turns viewing the content)
- A free or paid ThingLink account

## Recommended but Optional Materials

- Headphones or earbuds for each user
- An SD or USB storage device to expand the amount of content you can run on the ClassVR headset

## STEP-BY-STEP INSTRUCTIONS

### Preparation

- Charge ClassVR headsets fully.
- Create a ThingLink account (either paid or free depending on your needs). Since ClassVR offers a fully developed platform with premade lessons and content, a Free Teacher account is a great way to start practicing without paying until you are ready to push content out to the headsets for use by others.
- Find and download a 360-degree image. ThingLink offers 360 images on their site. You can also use Flickr; simply search on the Flickr website for a “360 image.” Or you can download images from Google Street View, take your own 360-degree images with a specialized camera or via an app on your phone, search for images on Dreamstime.com or photopin.com, or just search Google for 360 images based on an applicable keyword or phrase. Truly, the options for finding 360-degree images ideal for your patrons are limitless as ThingLink has only a two-to-one size requirement ratio.

### Program Instructions

#### How to Create Content in ThingLink

- Log in to ThingLink and click the blue *create* button at the top of the dashboard.
- Click *Upload 360/VR image*.

- Upload your image.
- Click *Add tag* from the left-hand menu.
- Select what you would like to add. Below are the various options available:
  - *Add text and media* allows you to upload an image as well as type in anything you would like users to learn about that image.
  - *Add text label* is an option that is limited to one hundred characters and is meant to be a quick label for an aspect in a larger image.
  - *Add content from website* allows you to add in video and audio files as well as anything created in the Google suite (Docs, Forms, etc.). For audio files, the embed code needs to be copy/pasted into your ThingLink creation. You can also upload images and videos directly from your device. Any site that offers an embed code can be embedded into your ThingLink creation. However, while ThingLink does allow you to add in videos and Google suite content, this content will not work in a ClassVR headset. It can be viewed via a computer for a less immersive experience, but ClassVR does not support third-party platform content outside of ThingLink.
- Add as many interactive icons as you like! Bear in mind that each student who interacts with each icon will count toward your total account views (see the costs listed in the section).
- As you add tags, you can select *change icon* to suit your needs. You can number your icons so users view them in a certain order. You can also select icons that will indicate whether they are images or audio or even upload images to be used as icons.
- When you have added all your interactive content, you can adjust the overall settings of the ThingLink project. Here, you can adjust icon colors, make interactive icons flash so users can more easily find them, remove ThingLink branding from the final product, and upload audio. Audio uploaded in the overall settings will continuously run as soon as the ThingLink content is opened. This audio can include ambient sound effects, music, or even a voice lecture that will pause when users interact with the icons. Background audio does not interfere with any audio from the interactive points of interest you create.

## How to Upload Content into ClassVR

- Log in to your ClassVR portal and pen your ThingLink account dashboard.

- Click the three dots at the bottom-right side of the project you want to load into ClassVR.
- Select *Publish*, *Share Link*, and then *Copy Link*.
- Go back to your ClassVR portal.
- Select *ThingLink* from the bottom-right side menu.
- Paste the link into the search bar at the top of the ClassVR dashboard. You will see your content appear as lessons you can now deliver to users via the ClassVR headsets.

*Note:* You can follow the above steps to copy content from ThingLink that is premade for VR as well.

## How to Deliver ClassVR Content to the Headsets

- Drag the content to the left-hand playlist bar.
- Either download or send the ThingLink content to the headsets at the bottom of the left-side menu.
  - If you plan to download the content, be forewarned that this course of action will take quite a while. So, it is best to do it the day before. Depending on the size and number of ThingLink(s) downloaded, it may take more than an hour. Downloaded content will go straight to the headsets and be stored on the internal memory, which can be expanded by an SD or USB storage device. Once downloaded, the content will play even if internet access is unavailable at that time.
  - Content can then be sent to the device relatively quickly, depending on the speed and reliability of your internet connection, though it will not work if the internet goes down or is too slow.

## RECOMMENDED NEXT PROJECTS

If your students enjoy this method of learning about new places, the following sections of this book offer similar, alternative projects you can use to keep them engaged:

- Chapter 20: “Designing in Virtual Reality: Using Apps to Create and Make”
- Chapter 22: “Google’s Tour Creator: Bringing Library and Classroom Tours to Life”
- Chapter 23: “Creating Immersive VR Library Tours with CoSpaces Edu”

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