# Laboratory Training: Virtual Reality (VR)

Hello, everyone. Welcome, and thank you for joining. We’re going to give additional guests just a second to join on here, so everyone hold tight for us, and we’re excited to get started. Thanks again for joining this OneLab network event.

All right. Hello, everyone. Thank you for joining. Happy Friday, depending on where you’re joining us from. Friday afternoon here in Atlanta, Georgia. My name is Chelsea Parsons and I’m a consultant with Guidehouse supporting CDC’s OneLab initiative.

I want to mention a couple notes before we get started with the presentation today. If you’re having any technical issues throughout the webinar, please contact the OneLab inbox for support. It’s at onelab@cdc.gov. That’s onelab@cdc.gov.

If you have any questions throughout the session for our presenter, please insert them into the Q&A function. You’ll see it in your little bottom ribbon in Zoom. You can add questions in there throughout the entirety of the presentation. We’re going to have some time at the very end to do a little Q&A where we’ll try and get through as many questions as we can.

Final comment. If you need closed captions today, you can see that inserted in the chat right now, a link to those closed captions. Just important to note that you’ll need to keep that closed caption link open while also keeping this Zoom open.

So let’s go ahead and talk about our agenda for today. So we’re going to get into some new and relevant resources for the OneLab Network, introduced by our OneLab Network lead, Alicia Branch.

We’re going to introduce you to our presenter for the session. We’ll get into the main session today, our VR presentation. Very exciting. We’ll have that Q&A like I mentioned earlier. And then we’ll close on out and give you an update on our next session. So now I’ll turn it over to our OneLab Network lead, Alicia Branch, to share some of our new and relevant resources.

Thank you, Chelsea. Before we begin the presentation, I’d like to take a moment to share with new participants and remind our returning participants of the OneLab Education and Capacity-Building Hub, or REACH, a targeted and customized learning management system for laboratory professionals. Consider this a laboratory professional’s one-stop shop for all relevant laboratory resources in various formats, including videos, downloadable and printable job aids, full courses, including courses for PACE credit.

I’m excited to introduce our presenter for today, Mr. Joe Rothschild. Mr. Rothschild comes from a background in video and film, working on TV shows such as COPS, National Geographic, and Oprah. He has over 17 years of work experience at CDC.

Currently, he leads a team of virtual reality developers who develop VR laboratory training for clinical and public health laboratories. He’s considered an agency specialist in virtual reality and Section 508 compliance, leading the development of several firsts at CDC, Section 508-compliant Flash widget, VR laboratory training course, the first e-learning syndication system, and the first live-to-web microscope training webinar. Our presenter for today, Mr Joe Rothschild.

All right, everyone. Thank you very much for that, and happy holidays. Can everyone hear me well? See me well? See this amazing holiday jacket I’ve got on?

So yeah, good afternoon. My name is Joe Rothschild, and I work for the CDC as a health communication specialist in the Division of Laboratory Systems. But really, to be honest with you, I’m an innovator and a teacher at heart, and I’m lucky enough to be in a branch where that innovation and creative approach to learning is appreciated and utilized. And we use it to train clinical and public health laboratory professionals, and we’re going to be talking today about virtual reality.

As a note, I’ve dropped in QR codes in the top corner of the pages. So if you use your little– your cell phone and camera app, you’ll be able to get links directly to the pages that I’m talking about on the CDC website.

So I’m not really going to go too much into the benefits of VR, but really, something to keep in mind from sort of my opinion is that VR really– it offers consistent, on-demand learning and training that really doesn’t require prepping a physical training area. I think in COVID we’ve learned that all of our training labs and all the training labs across the country are suddenly very busy doing actual laboratory work.

So a little background. Our branch, the Training Workforce Development branch, we really specialize in everything laboratory training-related. We have an amazing creative team, and we pack as many videos and 3D animations, graphics, and really eye candy where it’s appropriate into all of our e-learning courses and training materials really with the goal of making them more engaging, entertaining, and ultimately more effective.

We’ve been chasing virtual reality since around 2014. And in 2019, we finally got our chance to start developing CDC’s first ever virtual reality training course, a laboratory training course. So we pilot tested this course with internal CDC staff, both active laboratory professionals, as well as staff with no laboratory experience, and discovered through that that it was universally accepted as actually a really valid training modality for everyone.

The neat thing was most of our pilot testers had no video game, no VR experience. And really, within a minute or so, they just– they got it, you know? They’d drop a beaker in VR and just instinctively reach down and pick it up without us having to really hold their hand and walk them through it.

So in 2020, we completed and launched the course LabTrainingVR: Biosafety Cabinet Edition, and that was for the HTC VIVE headset. And we loaded it on the train.org as well as the Steam platform. And if you have kids, you probably know what Steam is. It’s essentially like an iTunes but for video games.

So last year, we really ramped up our virtual reality production team and increased our virtual reality offerings. We developed and added multiplayer components to all our VR courses where really you can have multiple people in the environment at the same time, all able to see each other and interact with each other. And we used that in our second VR course that was focused on personal protective equipment.

So in addition to this PPE VR course that we released in 2021, we’re currently in development of a VR course that’s designed for the $400 or so Oculus Quest headset. You don’t need a hefty VR laptop for it. This third course we’re calling OneLabVR is an open world, open lab environment where users can sort of get training, train others, and interact with subject matter experts all in these different laboratory environments. And I’ll show you that later. It’s something I’m really excited about.

This last year, we released a ported version of our original VR training course, Biosafety Cabinet, for the Oculus Quest as well. And it’s actually on the Oculus store. We’ve been piloting a Push Pack program. So what that was is we really listened to the laboratory community. We listened to you about the cost of VR hardware. And so we’ve been piloting this really cool program where we actually have been sending out these headsets to laboratories around the country. So really, really cool.

All right. So our first laboratory course, LabTrainingVR: Biosafety Cabinet Edition, as I said earlier, we put it on Train. We put it on Steam. It goes through sort of teaching the users how to set up, work in, and shut down a biosafety cabinet. I’m just going to just going to show a quick little 60-second promo video for it, so here we go.

 – Welcome to your–

Sorry. Hold on.

– Your virtual laboratory. Available on both Steam and Train, CDC LabTrainingVR: Biosafety Cabinet Edition creates a training space for learners to apply knowledge and build skills.

CDC has developed this course for clinical and public health laboratory professionals, and by the end of the training, learners will be able to identify the major parts, demonstrate how to maintain positive airflow, demonstrate how to prepare for work, apply safe work practices, demonstrate how to decontaminate and shut down, and conduct emergency shutdown procedures of a Class II Biosafety Cabinet, or BSC for short. We hope that you learn, enjoy, and benefit from CDC LabTrainingVR: Biosafety Cabinet Edition.

All right. Wow. That guy had– whoever that was had a great speaking voice. I don’t know. So as I mentioned earlier, we also did a VR training course on personal protective equipment, and we released that last year. It’s another amazing VR training course that was designed for the HTC VIVE headset. And in this course, users go through a museum environment and they learn about different types of PPE, when you would use them, risks that you might encounter in a laboratory that would require additional PPE to be donned. In this training, users can don and doff PPE.

And we even motion captured. I’m sure you know that’s– it’s sort of the suits with all the ping pong balls all over it. We motion captured real laboratorians working in a laboratory. So yeah, real quick here’s another little 60-second video that’ll sort of walk you through that VR training course.

 – Welcome to CDC’s second virtual reality training course. CDC LabTrainingVR: PPE Edition, takes place in a training museum and creates a space for learners to learn about personal protective equipment. CDC developed this course for clinical and public health laboratory professionals. By the end of the training, learners will be able to identify the routes of transmission of infectious agents, don and doff the appropriate PPE for daily use at the bench, and don and doff PPE during an emergency.

Broken into several exhibit halls, LabTrainingVR: PPE Edition features motion-captured laboratorians that demonstrate the correct and incorrect ways to utilize PPE and proper lab procedures in order to reduce the chances of exposure. Learners will be able to step into exhibits and practice what they’ve learned prior to entering a realistic anteroom and laboratory for a final exam. We hope you enjoy and benefit from CDC’s latest laboratory training in VR.

**JOE ROTHSCHILD:** All right. That one– it’s so cool. I hope everyone out there has a chance to test that one because it is just– it is neat. So next up on our current virtual reality development platter, we’re calling this one OneLabVR. Now before we really get into details of the course itself, we made some changes to our VR process that really, I think you’ll find interesting.

So our first two VR courses were developed for the HTC VIVE VR headset. This headset, it was around $800, but also, it required sort of a high-end gaming-style laptop or desktop that really would cost anywhere between $1,000 to $3,000 each. So we know– we’ve listened to the laboratory community and we know the limited budgets that everyone seems to have for training.

So for that reason, we decided to switch over to the $400 Oculus Quest VR headset. It is much less expensive, significantly easier to set up, and more importantly doesn’t require any sort of VR computer or any kind of computer to run it. So really, instead of $3,000 to $4,000, you’re looking at around $400 bucks. And by moving to this much more accessible VR system, we really hope to further increase the reach and dissemination of our training. So let me give you– don’t tell anyone I’m showing you this, but let me give you a sneak preview of OneLabVR.

So situated on the fourth floor of a fictitious building, OneLabVR contains around 50,000 square feet of laboratories. Each laboratory has a different specialty, different hardware, different supplies, really all dedicated to training clinical and public health laboratory professionals. The environment provides a safe virtual environment. It includes 12 different laboratories. I think we’re up to maybe around 100 to 200 different pieces of laboratory-specific hardware and equipment.

We worked really extensively with laboratory architects, designers, safety experts, and members of the clinical laboratory community to create this virtual sort of sandbox, this training space for all your training needs. In this, everything from the physical size and location of the laboratory environments to really simple things like placement of fire alarms and sprinkler systems, they’ve all really been rigorously tested, researched, and reviewed for you, ultimately for you.

So we know that asynchronous and online training is helpful, but really nothing beats live, hands-on training with an instructor who could offer immediate feedback and guidance. So for this reason, OneLabVR, it includes a whole multiplayer component where trainers can create their own training within this OneLabVR environment, and then invite their learners to come and join and learn. You can see here, talk to each other in real time, throw Petri dishes at each other, but you guys never do that.

The plan for this really is to offer the option of single player or multiplayer. So users can meet in this environment, get trained live by CDC SMEs or even your local lab manager. You can see each other, hear each other, interact with each other, all in the safety of VR and in the comfort of your own home or your own home lab.

So really, I mean, imagine. With this, you could have a trainer in Germany working next to a student in Japan, offering guidance on properly pipetting a sample in a biosafety cabinet. The SME can actually be saying, hey, you didn’t eject your pipette tip. Hey, your arms are blocking air flow. And these multiplayer sessions, they could be one-on-one. They could be in large groups.

We’re currently in the production phase. And of course, everything is subject to change, but the plan is to have this environment through CDC clearance we’re hoping January, and release this environment where you could sort of walk around. You’ll be able to walk around, do some sort of– maybe some onboarding training, specimen handling, workflow, that sort of thing.

But we’re building this out to include several sort of three to five-minute VR training scenarios. We’ve listened once again to you and we know that you don’t want an hour-long VR training course, a little– the greatest hits of packing and shipping dangerous codes, centrifuge safety, my favorite, Biosafety Cabinet.

And then the plan is we’re going to add additional ones. We’re looking at autoclave safety, general laboratory safety, chemical waste cleanup, potentially rabies sample collection, PCR procedures, all that kind of great stuff. So as we continue building and adding to this environment, we’ll really try to load it with as many complex training scenarios, organism-specific training, and really rounding out the programming so you’ll be able to train yourself and other people on really a large variety of scenarios and skill sets. So super, super excited about this.

All right. So as I mentioned before, we’ve been working on this Push Pack program where we were sending laptops– we were planning on sending laptops, VR headsets, cable, stands, all the fixings, the HTC VIVE sort of mentality to a bunch of people. However, COVID changed that, and for the better. And during COVID, we made that switch from the more expensive and complicated VIVE to the more user-friendly, the more affordable Quest headset.

And because of that change and the reduced cost of everything across the board, so far we’ve been able to send out I think over 150 headsets to clinical and public health laboratories across the country for VR training in, I think, two different phases. We included handouts and videos that assisted our users in setting up these headsets and teach them how to access the currently available VR training.

And then last, we sent along evaluations so we could sort of really learn how to better meet their training needs. And we’re currently crunching all that data that we receive from these evaluations. And really, between you and me– surprise, surprise– it looks like VR is a great modality for training, and the labs really seem to like it.

So to conclude, I want to let you know if you’d like more information on VR and what we’re doing here at CDC and laboratory training in VR, you could always send an email to vr@cdc.gov, or visit our web page at cdc.gov/labtraining, and then click on the little VR tab. And I think with that, I am going to open it up to questions. Any questions?

Hey, Joe. We do have a question. Are there any plans to also do this in the metaverse?

So that is a good question, and that’s something that I’ve sort of been– I’ve been looking at it. And I think the metaverse is still– it’s still kind of in flux. You know, I think down the road there is going to be a metaverse.

Now, whether that’s the Facebook Meta metaverse or Apple or whoever, I have a feeling there’s going to be some sort of metaverse. So yeah, I think we’ll probably be looking into doing that. But I think if you’re talking about the specific Meta trademark logo metaverse, I don’t think we’re planning on it at this moment, but it’s something that we’re definitely looking into.

OK. Thanks. We have one additional question. Do you know of any medical laboratory science programs that have used the VR training?

So OK, we have– the people handling our Push Pack program would probably be better answering that, and they could say, here are all the names of people who have used it. I do know that there are lots of laboratories and hospitals that have used our training. And I think also, just if you look at VR training as a whole, tons of it from– I don’t know. Knee replacement surgeries in VR to sort of the more corporate Delta Airlines and Walmart using VR for training.

Let’s see. With OneLabVR’s support community workshop development, can end users request or develop training specific to their needs or the needs of their facility?

So the plan is– and all these plans are subject to change. I have this sort of great, grandiose idea of how this OneLabVR is going to work and sort of be set up. But yes, hypothetically you could have your sort of laboratory supervisor create training inside this OneLabVR environment.

Let’s say, for example, hey, it’s your first day working in a lab. And almost like a lab supervisor could take you on a tour of a laboratory, pointing out safety things of, hey, you need to pay attention to– look. All these different areas have different sort of signs on the outside of the doors that may require different PPE or different warnings. Specimen handling. Here’s where specimens normally come in. When it comes in, you’re going to take it over here. And so yeah, I think that the hope is sort of opening it up to the general laboratory community so you can create your own training in it, in addition to the training that CDC is going to be providing in that environment.

This participant has a question about, are there plans to have basic– planning a basic and molecular methods course? They actually have some objectives ready to go.

Oh, OK. So here’s what you need to do. Send those to vr@cdc.gov because I think we’re always wanting to hear what everyone else needs. I think there’s some hopes that we sort of start creating some more basic– that sort of core skills, you know? How to safely use a centrifuge, how to Gram stain, use a microscope, that kind of stuff. And so I think the more input we get, I think the better decisions we can make as to what training courses we in particular develop.

I’d like to ask this question. If any of the users or participants for today have any concerns, I know for myself– as you can see, I wear glasses. I actually wear a different type– two types of glasses, one for the computer and then everyday glasses. Can I wear my glasses in the VR when I’m using the headset?

Yeah, so great question. Yes. So there’s a couple of different ways to handle it. If you had your own personal headset that wasn’t your laboratory headset that everyone shared, you could actually get lens inserts for your VR headset for your specific prescription. So that’s kind of cool. That said, yes, VR, you can wear a VR headset over glasses. There’s different sort of inserts, little spacers you can get that sort of push it away from your face a little to give you room. So yes, glasses should not be a problem.

So I would like for any of the participants to put in the chat if they actually have any concerns about VR itself, whether it’s the availability, the motion sickness, the learning curve. I know for myself, as you know, I had to download something and that was a little bit of a challenge. [LAUGHS] And just kind of walking through the VR, creating this boundary and this space. I mean, the first time I did it, I ran into a wall.

Yeah, and that’s a really good point. And so what we’ve sort of suggested to people is Facebook/Meta, they are fantastic at user interface stuff. And so with the Oculus Quest headset, they have a program called First Steps that really takes you through, hey, here’s how to move around in VR. Here’s how to set things up. And that, I would suggest go through that because that really sort of helps acclimate you to that environment.

And then yeah, motion sickness is something that we hear a lot about. Usually– OK. In the early days of VR, motion sickness was an issue. As the technology has evolved, we’ve found methods and ways to prevent motion sickness. For example, having it where you can’t move around. You just have to sort of teleport from spot to spot.

That being said, there’s still– if you get motion sick watching movies or watching someone play a video game or something, you kind of know coming into it that there might be a chance to have motion sickness. But we have sort of– we’re super aware of that. And so everything that we build, we’re very intentional about, how do we make this the optimal experience to prevent motion sickness, or really any kind of discomfort?

Yeah, I can say that the head– the Oculus– actually, that headset is much better than that first headset. The other one was kind of heavy on your head.

Yeah, absolutely. And it’s– we’ve had VR for, what? Five, six years really? It’s just going to continue getting smaller and less expensive and more lightweight. And really, my guess is it’s all going to be in a phone somehow and track your hands automatically. But yeah.

Let’s see. Will the ELC support requests for VR headsets?

ELC. Do we know what that is?

Ask the question again and I’ll make up a good answer.

Will ELC support requests for headsets? I’m not sure–

So I’m going to guess that that’s–

The cooperative agreement

The cooperative agreement. Thank you.

It’s a different one than you all might be familiar with. Hi, everyone. This is the branch chief of the Training and Development branch. Just thought I’d pop in and share some insight. I think what the question is is around whether there would be an opportunity to fund headsets through a different cooperative agreement than we have classically. So I think they’re speaking of the Epidemiology and Laboratory Capacity coag.

So we actually have a great relationship with APHL, through our cooperative agreement with APHL, the Association for Public Health Laboratories. And they have been assisting us in providing these headsets to public health and clinical labs. We have about 40 labs now to whom we have sent VR headsets and are monitoring that from a data and evaluation standpoint. So I think the simplest answer would be if others have suggestions on labs that we might want to consider for the next round of that dissemination of headsets to just please email vr@cdc.gov. Thanks.

Thanks, Kelly.

I will say if you or your spouse or your children happen to have an Oculus Quest headset, you can get our Biosafety Cabinet training. Of course, it’s free. Everything that we do is free. You just need to search for LabTrainingVR colon Biosafety Cabinet Edition and it will pop up, and you could download it and install it straight through the headset.

Oh. Let’s see. This participant said she absolutely loves this. It’s brilliant. Are there any plans to use this or something like this in elementary, high school to promote laboratory science careers?

Ooh, that’s a good one. That’s another one that I love the idea. So I have three kids. I have 18, 15, and 11. And all of them love playing with it. Obviously, they’re just like, hey, I want to throw test tubes and break things and cause damage in the laboratory environment.

But it has introduced them to, wow. This is what it’s like working in a lab. I didn’t realize it. So yeah, I think I would love to see some sort of promotion or something like that that really helps get this in the hands of the youngsters of our next upcoming generation of laboratory workers.

I think our division, our branch in particular, we’re really focused on that clinical and laboratory workforce. But I think absolutely, I think there are actually some things in the works on, how do we expand the awareness and get this into younger folks’ hands?

Let’s see. This participant wants to know if it’s going to be offered in multiple languages or just one language.

Ooh, that’s a good question, and that’s something that I think initially, I’ll say probably not. I think translating– because in almost all our trainings we have videos and audio prompts and things like that. Getting that sort of translated stuff really isn’t that big of a deal, but it’s more on a lot of the 3D models for a centrifuge, the buttons and all the information to operate the centrifuges in English. And so making that sort of multiple languages is going to be– would be challenging.

I think it’s something that we want to do. It’s on our roadmap of, hey, here’s something that we would like to do. But I think if you’re talking in the next year or so, I kind of don’t think so. But it’s something we want to do, and we will do eventually.

Well, the next one is about deconning methods if you have multiple users for the headset.

Yeah.

I can answer if you want.

Yeah, go for it.

Yeah, you can use your basic household disinfectant. You don’t want to, of course, wipe into the lens or spray. I would say use more of a cloth method and just wipe it down. And let it sit and let it dry. Of course, you always want to follow the manufacturer’s time and the concentration as well, because some of the concentrations you do have to adjust. But I definitely would not spray the headset. I would just do more of a cloth wipe of the headset. Let it sit and then move on to the next user.

And one of the things that we have done where we have sort of community headsets where multiple people will share them is they have sort of silicone face shield covers for these headsets where literally it’s, the red one belongs to Bobby. The blue one belongs to Sue. And you could sort of swap those out for each user, and as Alicia said, still obviously do some basic wipe downs. Follow all your SOPs and the manufacturer instructions.

I think that’s all of the questions that we have for today.

OK. I will hand it back over to you.

Thanks again, Joe. In closing, we would like to invite you– invite you to our next OneLab event that’s being held January the 19th. It’s called Build Your Laboratory Onboarding Template. It’s scheduled at 1:00 PM. That’s, again, 1:00 PM, January the 19th.

During this event, we will guide participants through using the laboratory onboarding template and how laboratory managers and staff can use the fully customizable template to provide new and staff with a centralized orientation manual. And you can actually include all your SOPs, any other documents, but I highly suggest that you actually join us on January the 19th at 1:00 PM Eastern Standard Time. The link has been provided in the chat.

And as a reminder, today’s slides with the links will be posted at cdc.gov/onelab within the next two weeks. And all I can say, again, thank you, Joe, for the great presentation. Thank our participants for joining the event today. And have a great rest of your day, and as well, have safe and happy holidays. See you January the 19th at 1:00 PM Eastern Standard Time.