

## VR in STEM Education and Outreach – Brown, et al. Appendix C. Focus Group Interview Themes

Tables are organized by question, and include responses from both mentors and students, as themes were mirrored between populations.

### Question #1: Describe your first experience using VR. (Students only)

<b>Initial Impressions</b>	<b>Intuitive/ user friendly</b>	<p>“Once you learned how to use the controllers and get the headset on, it was pretty simple and easy from there.”</p> <p>“It was pretty straightforward.”</p>
	<b>Learning curve</b>	<p>“In VR, it’s a completely different way of [teaching] that I wasn’t familiar with myself. And so starting out on VR, I think was just a big learning curve.”</p> <p>I think [starting in VR] was a really big learning curve, [but] it definitely improved throughout the semester.”</p>
	<b>Initial technical difficulties</b>	<p>“I had some technical difficulties, but it’s to be expected. VR is new.”</p> <p>“It was a little dizzy at first, but then once I like got used to it, I thought it was really cool.”</p>
	<b>Very fun!</b>	<p>“I think it was pretty fun [and] really nice to visualize things.”</p> <p>“I thought it was super cool!”</p> <p>“I was like super excited to get more involved in it!”</p>
	<b>Loved active/interactive learning</b>	<p>“I thought it was a really, really excellent way to like get to know the structures”</p> <p>“It was really cool... being able to see [structures] in front of you and being able to move [structures] and not just looking at something on an iPad or paper.”</p>

### Question #2: How did VR/online interactions promote connection between student groups and mentors?

<b>Connecting in VR</b>	<b>In-person feel</b>	<p>“It was the closest thing that we could get to in-person”</p> <p>“It was like we were in a room together in completely different cities.”</p> <p>“I think VR feels more personable once you get to know each other because it feels like you’re standing right next to [your student groups].”</p> <p>“I thought that it felt more like you were in the room with your mentor. And then if you asked a question, they could kind of show you on the VR and pointed things and you could move around and it just felt more like you were with them.”</p>
	<b>Audio-only interaction</b>	<p>“[In online meetings] we got to see her face and like hear like see her talking and like pointing stuff out when in VR you just see this little like little Lego head.”</p> <p>“VR was harder because, again, you’ll hear [the mentor’s] voice but [only see] a little person.”</p> <p>“It was really interesting being in the headset, just hearing their voice, but not being able to picture their face.”</p>

**Question #4: How did you/your students approach the case study differently in VR and online?**

<i>Approach to Learning</i>	VR	<b>Focused on content/anatomy</b>	[It was] really helpful to build the foundation of [basic concepts] like muscle actions, and then bring that back into VR to have [students] actually walk through [structures] and get really excited about it. “For VR, we were more focused on the actual parts of the body.” “[VR] was less about the actual questions [and] less about the actual solution. It was [about] having an understanding of the body.”
		<b>Focused on making connections</b>	“[We] learned on zoom, and then connected [material] in VR.” “I liked the VR because I could see [structures] right there, and that helped me like make connections and realize how [structures] were actually working.” “...VR was much better because you can just sit there and connect things.” “I felt more confident personally when I was doing VR and not zoom because I could really see what how [structures] correlated with [each other].”
		<b>Using knowledge to solve a problem</b>	“It made me feel good that [my student group] was using their knowledge to answer questions that they didn’t know the answer to [in VR].
		<b>Active role in learning</b>	“For me, VR was more hands-on and I was able to understand the content [better].” “I feel like VR enables you to learn and experience [the material]. It’s like an experiential type of learning where you’re in it.” “VR scratches that kinesthetic part of your brain, and really helps in understanding spatial relationships.”
		<b>Higher accountability/more prepared</b>	“Our students never took notes when we were in VR. So I think they knew that we were going to be asking them questions, so they made sure to know their stuff when they came.” “Our students came more prepared with their case study and anatomy knowledge to VR, because they knew that we were going to be interacting with the body.”
		<b>Higher retention</b>	“[During online meetings], [students] just kind of write down notes don’t really like think about what they’re writing down or what they’re learning. But in VR, it’s a little more difficult to do that. So they have to listen and kind of process it, learn it more.” “What I do find when we’re in VR is that [our students’] retention of information seems to be much higher.”
	Online	<b>Focused on assignment requirements</b>	“[Learning online] was a lot more focused on the actual questions we had to answer.”
		<b>Solution-oriented</b>	“[Learning online] was focused on the actual solutions we had to find.”
		<b>Focused on baseline knowledge</b>	“You learned on zoom, and then connected it in VR.”
		<b>Focused on transmission of information</b>	“When we [were online], we could take notes and stuff and learn the structures by themselves.”
<b>Students were less prepared</b>		“Just today, we [met online], and it almost seemed like they had not even read the case. But the last week when we were in VR, [our students] were very prepared.	
<b>Diversity of learning materials</b>		“[During online learning,] our mentors created presentation, and went through to break everything down for us, step by step.” “[During online learning] our mentor would make drawings for us that were more simplified and were catered to what we were doing.” “[During online learning] our mentor made mini quizzes for us to make sure that we were actually learning this stuff.”	