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Reply on RC1

Natalie Bursztyn et al.

Author comment on "Virtual strike and dip – advancing inclusive and accessible field geology" by Natalie Bursztyn et al., Geosci. Commun. Discuss.,
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Thank you for the constructive and positive comments. We agree with many and have noted a few main points as a result for which we need to improve the clarity of our manuscript.

Introduction section

We agree that the introduction is long and can be made more concise. We argue that virtual field experiences have the potential to help with people who self-select out of geology for a variety of reasons ranging from accessibility to being uncomfortable in the field all day or for multiple days. We do see the point that the motivation for our work presented in this manuscript was not actually the range of these accessibility reasons, however, if this work motivated by the Covid-19 pandemic can provide a mechanism to improve inclusion in the geosciences in the future, we count that as an important secondary and long-term motivation for our work.

While we think it is important to discuss these topics and have uncomfortable conversations, it is true that as it was not a direct motivation for the work, some of this material can be removed from the introduction and instead be discussed as outlook and applications later in the manuscript. Ultimately, we are interested in establishing virtual field trips as a way to address some of the many issues arising from the fieldwork tradition that currently plague the geosciences.

We will remove the personal communications reference and we verified that citing papers "under review" does comply with the journal policy.

Regarding software access and license, the PSU website at the time of submitting the manuscript only provided the demo of the tool in question. We have since updated the site where the demo and full playable dVR experiences are all publicly accessible. In discussion of this point, we are also working on making available the software download for the immersive VR version of the tool that can be utilized with Quest headsets. Allowing for access to virtual field trips through immersive technologies is our long-term goal (see also below).

Discussion section

We can (and will) add the suggested additional example references for 3D geo models,

thank you for providing them. This point also brought up an important discussion amongst the authors: the tool actually uses high-resolution 3D models that we downloaded from Sketchfab, and nowhere in our manuscript did we explain this. It is important to note that these high-resolution models were actually a major source of lag within the tool for users without high-powered computers. It was our troubleshooting of a digital twin for high-resolution models of real rocks and outcrops that lead us to explore texture simulators like Adobe Substance. We found that reducing the polygon count within the Sketchfab models resulted in virtual outcrops that, while not causing lag, were no longer identifiable by their appearance. Regardless, these points must all be made clearer in our manuscript so that the reader knows the full process.

Finally, regarding right hand rule, we created the exercises within the SaD tool as a set of direct (but virtual) replicas of a lab activity we would normally conduct in person that has the students use the RHR to map a set of staged "outcrops" in a classroom. We wanted to maintain a parallel between the real world exercise (and field trips that typically follow it) and the virtual exercise. While the geologists on the team disagree with the statement that RHR conventions add a level of complexity (we think that RHR allows for a user to intuitively think about strike and dip as a plane instead of an arbitrary line), to specifically address the reviewer question, the floating hand can easily be toggled off within SaD, thereby allowing the user to simply use the compass alone to complete their measurements.