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Comment on gc-2021-16

Anonymous Referee #2

Referee comment on "Virtual strike and dip – advancing inclusive and accessible field geology" by Natalie Bursztyn et al., Geosci. Commun. Discuss., https://doi.org/10.5194/gc-2021-16-RC2, 2021

The authors present here an original and well-written paper that discusses the importance of field learning in geosciences by raising important questions about accessibility and difficulties in including different groups into field environments. The authors provide several references as to why these activities are important and that they should continue to be part of the teaching curriculum of geoscience courses. However, it points out that most field learning activities cost money, time, and are only accessible for those who are physically able to stay outside for long hours. The authors then come up towards the development of new digital technologies to solve place-based learning during COVID time, this digital solution supposably remotely teaches the geological concept of Strike and Dip and improves spatial thinking skills through a virtual desktop-based active learning exercise. The tool is entitled the Strike and Dip Tool (SaD). The authors assess its effectiveness through students' questionnaires combining quantitative and qualitative questions.

Few comments suggestion/reformulation) goes as follows:

Introduction part. I found it a bit too long, following I highlight some off topic sentences or arguments with suggestions where it could be shorten out.

L54-68: The whole paragraph calls the attention to why field-based learning may impose challenges in accessing field locations. In between financial and mobility issues the authors points out to Marin-Spiotta et al. paper that properly approaches harassment

issues targeting minorities and female geoscientists. However, it seems to me a bit off topic as I doesn't seems to be this the major motivation to bring access to field locations in a virtual format. I think this issue is related to a step prior to that. Even though these people would definitely benefit from virtual experiences it's not the issue itself that prevent the access to certain field locations.

L82-83: *"virtual and remote learning in the geosciences has remained a niche product belittled by many "real" geoscientists."* I would try to rephrase this part as it seems to me that "Virtual" is already referring to remote learning, plus it looks that it is your personal opinion rather than a fact that *"it remained a niche product belittled by "real" geoscientist",* as you can also have many "real" geoscientists that are really interested in digital field learning experience especially after the COVID-19.

L92-107: "*Many studies remain anecdotal (e.g., Marshall et al., under review) but it is time to establish research frameworks and to connect place-based education with established assessments and practices in virtual and immersive learning"*. It is confusing to me the way it is phrased, isn't immersive also virtual, or you are making reference to being in the field? Please clarify. Also you make many references to iVR, however, isn't the SaD tool in this paper only desktop based. How mentioning iVR is relevant to the development of the tool, can this be shorten out? It build the expectation that the SaD is a iVR tool, only to find later that is not.

L208-210: *"With this tool, students can learn what strike and dip measurements are, learn the basics of field mapping using strike and dip, as well as practice taking measurements using a variety of geological structure types."* I think the students learn what Strike and Dip measurements are in the tutorial video or in previous lectures, only by using SaD tool itself the student cannot understand this concepts. Wouldn't you agree? Maybe clarify here the pedagogical approach of watching the tutorial video, lectures and the reading activities prior to the dVR experience, as it is on the Procedure section.

- Here is a general question/comment to the authors;

In many ways, you approach iVR as a new digital tool that can provide place-based learning, different from the tested dVR in the paper (which can also be immersive). Does the hardware being use is the only thing that limits the immersive experience? Do you only consider iVR the type of visualization obtained through the use of VR goggles? If so, why exhaustively point out the differences and benefits of a technology that is not being tested in this paper?

The SaD tool in the text is often discusses as this dVR experience, but in the discussion

L506-508 you say the tool is *"an entirely remote introductory field mapping exercise that was successfully completed by students during the COVID-19 pandemic"* from which they improved they learning according to your results, do you consider the SaD tool the software or the entire method? If the entire method, don't you think it should be clearer in the introduction the whole prodedure?.

Also, in the procedure section you describe that "Be*fore the related laboratory lecture, students were assigned homework readings. During the lecture they were presented the standard introductory material on geologic maps and mapping, such as how to interpret the geologic rule of v's, measuring and plotting strike and dip on a map, drawing contacts, and constructing basic cross-sections...".* How do you know that they didn't learned through this previous activities when comparing to the SaD tool/method ?