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Comment on gc-2021-37

Ryan Petterson (Referee)

Referee comment on "Virtual field trips utilizing virtual outcrop: construction, delivery and implications for the future" by Jessica H. Pugsley et al., Geosci. Commun. Discuss., <https://doi.org/10.5194/gc-2021-37-RC4>, 2021

A considerable amount of work has clearly gone into this project. All that effort also took place during a stressful time, rife with uncertainty. I hope my criticisms and feedback do not come across as diminishing that effort. I hope that this work can eventually be published and recognized in some fashion.

My opinion is that this paper requires additional work or significant modification of scope to be accepted. My overall conclusions, as well as many of my specific concerns, are consistent with the previous reviews by Glenn Dolphin (<https://doi.org/10.5194/gc-2021-37-RC1>) and David M. Hodgson (<https://doi.org/10.5194/gc-2021-37-RC2>). I won't belabor the points they've already made, and well referenced. Suffice to say, that I agree with the points they make.

I do want to expand on some of those points, and bring up a couple more points not previously mentioned. I also want to add the questions that I had in reading this, questions that I felt were unanswered or could be directions to reframe or modify the scope. These questions should not necessarily be taken as "required," but hopefully they are useful in guiding next steps.

My overarching concern about this work is the scope. The diversity of different types of virtual field trips, how they're made, how they are presented, and the variety of goals (many of which are mentioned) make blanket conclusions about VFTs seem akin to trying to make conclusions about the value of photographs in teaching. Simply narrowing the conclusions could make this a strong contribution.

Specific Comments

Defining virtual field trips

While examples of different types and classifications are given, this work stops short of assessing the “pros and cons” of the different VFTs, as it is “beyond the scope of this study.” However, as previously mentioned by other reviewers, the conclusions are applied to the entire scope of virtual field trips. This seems an issue of overstated conclusions however, and not an inherent flaw in the work.

As no definition of virtual field trips is, as of yet, universally accepted, I don't think that this paper requires a global definition. However, it would be helpful to see a definitive “local” definition of how this paper is using the term. “Digital alternative” to field work is mentioned, but this is not clearly stated or expanded on. If that is the working definition here, the paper would benefit from a discussion on why they are using this definition and the potential limitations. For example, if the goal is to compare virtual field trips with in-person field trips or lectures, more distinction seems required. I would argue that many of the “activities” listed in figure 9 are not necessarily “virtual field trips” but rather sophisticated multimedia lectures. Without more clearly differentiating between multimedia lectures and virtual field trips, it is difficult to assess the value of virtual field trips. That is not to say that multimedia lectures are bad, or even inferior. Just that the comparison requires distinction. Is a video of a location a virtual field trip? Where does “lecture” end and virtual field trip begin? To be fair, this is not an entirely settled argument as it pertains to in-person field trips either. Is a road-side lecture a field trip? Or is it just plain-air lecturing? The argument for in-person field trip vs lecture is usually just a matter of whether a student left campus, but that distinction is not so simple with virtual field trips.

Virtual Field Trip Activities

I would love to see a much more detailed description of the activities and how they were designed. The paper mentions the following activities:

- separate projects
- group activities
- exploration play mapping exercise
- field development exercise
- major student exercise dealing with exploration in salt basins
- new assessed exploration exercise

- group exercise
- independent work in LIME
- Atlas of sedimentary systems

None of these activities are described in detail. In my opinion, that is the most interesting part of this work. I would love to know more about them. How did you design the activities? What factors did you design for? Were you able to test-run them? How did students complete them? How was the group work facilitated? Were they working collaboratively in LIME or Google Earth? Were they assessed individually or as a group? How effective was the VFT in teaching outcrop interpretation, for example? Or in facilitating correlation of well log data with outcrop data? How is the "atlas" assessed? Is it given a grade? Could that be matched with evaluations as a measure of actual performance? What else is the student grade based on? The details of how those exercises were constructed and delivered, along with the analysis of how well each approach worked, would be extremely interesting and valuable. I think this would be a possible direction to reframe this work.

Learning Objectives

The learning objectives mentioned are almost exclusively in the form of "To study X". Setting aside the student learning implications of objectives framed in that fashion, I think they are compromising the ability to measure or assess success. Both Dolphin and Hodgson noted the issues with using student evaluation of teaching (SET) data (well referenced in Dolphin). I would echo that here, and add that without objectives that clearly state a measurable result (, it may be impossible to gather more reliable data. I think much of the challenge in data analysis for this paper stems from the way the learning objectives have been articulated. While the data you have, with its associated caveats, is interesting for discussion, I don't think it presents compelling evidence in support of the stated conclusions.

Clarity

There is a lot of information contained in both the body of the work and in the tables. However, it's not clear how much of it relates to the narrative. For example, Table 1 shows that a great deal of content went into this project, but there is little discussion of this in the text. Was that enough material? Could it have been less? Were students overwhelmed with the amount of content? What content would you change in future iterations? Without additional discussion it seems extraneous.

Section 5.1 and 5.2 seem extraneous to the topic of "construction, delivery, and implications" of virtual field trips as well. As the paper's conclusions are intended to be widely applicable, general information on the type of information being taught is certainly useful (sequence stratigraphy, fluvial architecture, outcrop interpretation, etc), but the detailed geologic content and location information detracts from the overall narrative.

There is a lot in this work that is relevant, timely, and valuable. I hope that this feedback, and the feedback from other reviewers, is useful. I'm excited to see where this goes next.