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Comment on gc-2021-37

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Referee comment on "Virtual Fieldtrips: construction, delivery, and implications for future geological fieldtrips" by Jessica Helen Pugsley et al., Geosci. Commun. Discuss., <https://doi.org/10.5194/gc-2021-37-RC2>, 2021

The authors seek to highlight the pros and cons of virtual fieldtrips over traditional fieldtrips using student evaluation data from two fieldtrips. Clearly, this is a timely case study given the forced move to more online delivery during the pandemic, which is likely to be maintained in either a blended or replacement form more rapidly than the assessment of pedagogic benefits can be assessed.

The manuscript has a simple scope, which also reveals how complicated a true assessment of benefits/disbenefits of different (combinations of) delivery modes geological fieldtrips can take. As a case study, the contribution has value, but I felt that there was too much crucial aspects considered 'beyond the scope', and that there is an opportunity to really critique the data collection methods and to present recommendations for future studies. In general, there is a need for more citation to source literature on different delivery.

Some specific comments/issues:

- There is no discussion of the flaws in post-course evaluations. These issues are well established in the literature (albeit largely ignored by universities in the UK). The big problem is that they do not in any real way assess deep learning – whether knowledge gained or skills developed. When subjects are asked immediately after delivery (although the timeframe is not stated here) the responses are strongly positive, but what of two or three years later? What about evaluation during the course when the subjects will more clearly benefit from changes? Some studies have shown evaluations of learning strengthen with time – although still with the issue of self-reporting.
- The relative pedagogic benefits of traditional, or VFT, or blended delivery is a thorny issue given the number of different parameters to consider, but you have a chance to raise and discuss this – which I have not seen elsewhere. It is crucial to have future delivery options underpinned by rigorous assessment of benefits that are not self-reported. What are the learning outcomes and skills that need to be assessed in both virtual and traditional environments? What forum is better to develop 3d thinking, or understanding of scales, or spatial relationships, and how do we assess this (and will this vary by subject – probably given different learning styles). These are things that

you haven't set out to understand. In real time during a pandemic this in-depth assessment is not feasible, but how are we going to do it in the future? But on reflection your insights and recommendations are crucial to an informed evidence-based debate on future field learning, and before it is assessed from a financial perspective.

- One thing I noticed is that you say that the questionnaires/evaluation documents are anonymous, but then seem to identify two students as having poor wifi and this being the reason for lower scores. You need to be really careful here – has an ethic approval process been completed? If it has, you need to state it.

In summary, although this is an interesting case study on the perceived pros and cons of virtual and traditional fieldtrips from participants, there are inherent flaws in the evaluation data. This is not surprising because a strong evidence base on this topic needs to consider a huge number of different parameters. However, to be a novel contribution, I recommend that the authors are clearer on the flaws in the evaluation approach used, and to recommend the key skills/learnings that need to be the focus of future investigations (e.g. 3D thinking, scales, time spend thinking deeply, challenging situations, etc.) to inform development of future fieldtrips.

It is such an crucial and pertinent topic for our science, and a highly complex issues to realise a strong pedagogic evidence-base. But this complexity needs to be teased out here. If the authors can bring this out in a discussion section, then it could be an influential contribution that triggers future research.

Minor typographic errors and additional comments ont he annotated manuscript.

Please also note the supplement to this comment:

<https://gc.copernicus.org/preprints/gc-2021-37/gc-2021-37-RC2-supplement.pdf>