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General Comments for "*Multi-scale virtual field experience, Grand Ledge, Michigan, USA*" a manuscript written by M.S. Marshall and M.C. Higley, gc-2021-10

The manuscript by Marshall and Higley describes a virtual field trip (VFT) for a classic sed/strat field trip site, Grand Ledge, in Michigan, USA. Given COVID and efforts to make geology more accessible to individuals who might have a physical disability, bringing field-based exercises "out of the field and into the lab or home" has become a critical issue. The work is especially appropriate for Copernicus special issue on Virtual geoscience education resources. I suggest modifying the title to include the words "sedimentology and stratigraphy" to catch the eyes of university sed/stratigraphy instructors.

The VFT contains materials intended to simulate an in-person visit to the sedimentary rock outcrops at Grand Ledge. The authors have used different types of technology to create 3D outcrop and hand sample images, photographs of different parts of the outcrops with multiple scales, and photomicrographs referenced to hand samples and the larger outcrops. These technologies are not new, but seeing these technologies applied to an exercise for undergraduate students is novel. In addition, the authors walk the reader through the entire exercise and explain student successes and challenges while working on the exercise. As a package, this VFT discussion is worthy of publication.

I have examined the article and the supplemental materials provided by the authors. I am impressed by the amount of work invested in this project and think it is useful to other geology instructors. In viewing the 3D models of the outcrops and hand samples, I would like to see more up/down reference points in the images. When I am in the field, I carefully observe the original orientations of samples. For an unexperienced student, I suspect they could literally "get turned around" as they rotate samples and outcrops in the 3D views. In addition, I wonder if the VFT might become less useful in several years after many cohorts of students are looking at the same images (work gets passed on to future students?).

Specific Comments

1. **Does the paper address relevant scientific questions within the scope of GC?**

Yes. The work is especially appropriate for Copernicus special issue on Virtual geoscience education resources.

2. **Does the paper present novel concepts, ideas, tools, or data?**

The authors have used different types of technology to create 3D outcrop and hand sample images, photographs of different parts of the outcrops with multiple scales, and photomicrographs referenced to hand samples and the larger outcrops. These technologies are not new, but seeing these technologies applied to an exercise for undergraduate students is novel and extremely useful as we prepare for the post-COVID world, the next pandemic, and making geology sites available to people who might have physical disabilities.

3. **Are the scientific methods and assumptions valid and clearly outlined?**

Yes.

4. **Are the results sufficient to support the interpretations and conclusions?**

Yes. The authors do not pretend to show in a quantitative way that their VFT is effective. However, they do offer student comments suggesting students have had a valuable educational experience.

5. **Do the authors give proper credit to related work and clearly indicate their own new/original contribution?**

Yes.

6. **Does the title clearly reflect the contents of the paper?**

I think the current title, "***Multi-scale virtual field experience, Grand Ledge, Michigan, USA***," could be improved.

This article would be of greatest interest to a teacher of sedimentology and stratigraphy in a college/university setting. I think the authors should somehow mention sed/strat in their title to attract the appropriate audience. Suggestions:

Multi-scale virtual field experience for sedimentology/stratigraphy, Grand Ledge, Michigan, USA

Virtual field experience for a well-known sedimentology/stratigraphy site, Grand Ledge, Michigan, USA.

7. **Does the abstract provide a concise and complete summary?**

Yes.

8. **Is the overall presentation well structured and clear?**

Yes.

9. **Is the language fluent and precise?**

In general, yes. However, in some cases the authors overuse personal pronouns, and this makes the text overly wordy in places. In other places lists do not follow rules of parallel construction. In addition, the authors should search for the word "that" and evaluate if the word is necessary or can be removed by rewording the sentence. Some specific areas:

Line 43—wordy

Line 40-47 – parallel construction for last item in their list

Line 67 – Wordy -- "First, they submitted ~~a copy of their field~~ notes,". This is just one example. The authors could delete personal pronoun elsewhere to tighten the text.

Line 150 – verb tense

Line 341 – ambiguous – reword

Line 340-345 – unclear

Line 364 – parallel construction with verb tense

10. Are the number and quality of references appropriate?

Yes. I am not an expert in geoscience educational research, but the references cited seem recent and meaningful.