



Comment on gc-2021-9

Thomas Birchall (Referee)

Referee comment on "Virtual mapping and analytical data integration: A teaching module using Precambrian crystalline basement in Colorado's Front Range (USA)" by Kevin H. Mahan et al., Geosci. Commun. Discuss., <https://doi.org/10.5194/gc-2021-9-RC1>, 2021

The manuscript rating explanation:

Scientific significance: 3 – There is nothing state-of-the-art in this article, but it does provide a nice case study of data integration using a newer platform. The lack of any real results or reflection also makes it difficult to assess whether this method is useful.

Scientific quality: 3 – The method is well-described and refers back to learning objectives in a good way. A little more balance with respect to chapter 6 would be useful to others in the same field. The use of the term “virtual outcrops” needs to be addressed/clarified.

Presentation quality: 2 – The article is clear and well-presented. I would like to see a figure showing the finished product of one of these maps.

General Comments

This article provides an overview of a digital mapping activity designed out of necessity, due to the COVID-19 pandemic, to enable students to continue developing their field-mapping skills. The article is well-written and structured with good reference to the learning objectives defined in Table 1.

While the paper provides an interesting case study, I find it very difficult to assess how effective the teaching method actually was. The authors mention questionnaires sent to students but then provide no results, which I feel would be fascinating. I feel the advantages/disadvantages is more of a sales pitch (after the first paragraph) rather than providing useful information to other geoscience lecturers. It would also be useful to see an example of a completed map project here.

In my opinion, the main weakness of the paper is the overuse of the term “virtual”, when in reality the only virtual geology here is in the use of Google Earth projects. The “virtual outcrops” are really Microsoft Word documents with field observations, interpretations and measurements provided to the students. A “virtual outcrop model” (e.g., 3D photogrammetry, lidar etc.) will allow students to perform their own observations and

measurements (the most important skill to all geologists). However, I think this weakness is also the biggest strength; it demonstrates how good geological record keeping and data management can be, quite quickly, integrated using more modern software to great effect and is something that should be highlighted.

While I am critical of the use of "virtual" in individual elements, the overall package and delivery method is virtual, and it fits well with the Special Issue theme. I also think the authors should be commended for providing the course material to enable others to virtually take this course or gain more specific insights.

Specific Comments

Line 31: A specific reference with respect to the "improved mapping tools" would be useful for the reader.

Line 51: As mentioned in general comments: these are not virtual outcrops, they are field observations, measurements and interpretations from the outcrops or "stations".

Line 82-84: I still don't quite understand what StraboSpot is from this description, and it is clearly quite an important tool for this article based on wordcount. I know the Walker et al. article addresses this, but it would be useful to know if it is a mapping platform, data management and storage, or a field tool? (or all of these?). A figure showing an example map would be useful.

Line 144: What is the resolution of the "Google Earth Web project"? What is its purpose? Do the students carry out any larger scale analyses on it or is it simply for planning and visualizing the station locations?

Line 164: A little more information on why you prefer StraboSpot over other alternatives would be interesting. But this would probably be resolved with my comments re: line 82-84.

Line 167: Please clarify a little. This sounds like students are simply asked to copy as much data from a word file into a different piece of software? That seems to contradict the "filter" data part 2 lines prior.

Line 220: What do you mean by "recreating" a plot?

Lines 233-235: Explain the abbreviations/concept for structure types and their generation (e.g. F2 is folding 2nd gen.).

Chapter 4.2.3 - 4.2.6:

Although these are clearly good datasets for the students, there is a lot of superfluous information with respect to the context of this article. I also struggle to see the integration with mapping with some datasets – this would probably be resolved by simplifying and/or showing a completed map.

Chapter 5

Do you have any results from these questionnaires?

Chapter 6

As mentioned in general comments: I think this chapter would be nice with some of the results of student feedback and a bit more balanced reflection.

I am interested in how this differs to how the module was run prior to COVID when fieldwork could occur. Also a little about the future of the course beyond COVID would be interesting, have learnings helped to develop the field-based? Do you plan on turning any of the stations into 3D models?

Technical Corrections

Line 17: remove hyphen from "on-line"

Line 314: I guess "4" should be "four".