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Sizing Opportunities - give a handle, please.

Martin Bohle (Referee)

Referee comment on "Teaching with digital geology in the high Arctic: opportunities and challenges" by Kim Senger et al., Geosci. Commun. Discuss., https://doi.org/10.5194/gc-2021-6-RC1, 2021

In the paper *"Teaching with digital geology in the high Arctic: opportunities and challenges",* Kim Senger and co-worker report a fascinating experience. The text reads very well, and the supplementary material (online) is rich; also, the supporting bibliography is extensive. As it stands, the paper is publishable – as reporting experiences. However, it is a choice whether the paper's (technical) detail is suitable given a critical limitation regarding the reproducibility of the experience.

The authors communicate how modern tools (such as Digital Outcrop Models and Virtual Field Trips) can be used to teach Bachelor students about Svalbard's geology, to horn some technical skills (e.g. data management and software integration) of the students, and to educate them to prepare (and report from) geological fieldwork. The overall account is optimistic but not overblown. The joke ('rattlesnake' in line 312) is charming. However, the noticeable preference for the word 'exponentially' (line 80, 89. 323, 422) should be scaled down – using a logarithmic scale in Fig.1 likely show that the increase is not exponential.

The authors rightly stress that the particular requirements at Svalbard caused the early development of a set of tools and practices that are of much broader applicability, now as the COVID-19 pandemic forces to alter (traditional) teaching modes in favour of remote modes.

The 'open access' to a significant part of the course material will allow many lecturers, students and 'aficionados' to learn about Svalbard's fascinating geology. That is an additional strength of the paper. However, the buck stops there. The article lacks vital information to allow other teams to build similar tools (for their preferred location). Hence, the paper lacks the necessary information to reproduce how to teach and educate using modern communication tools.

The material gathered in the paper is impressive. However, the reader misses part of the 'methodology section', for example, the information about necessary preconditions for success (e.g. lasting cooperation with mining companies, public and private funding, skill-full individuals, limited legal concerns about privacy or access). Such information is essential to allow other institutions to set up similar schemes. Likewise, to learn about insights into probable causes of failures would be helpful; this, as well for technology choices, supporting (IT)-infrastructure, advisable management structures, or required interpersonal skills.

Hence, teaching Svalbard's geology may cope with some 'shocks of the COVID-19 pandemic', as the experiences of the authors show. However, to teach the 'know-how' to cope with such shocks needs more than to report about events (= reporting observations). To illustrate the perceived lacuna, when seen from an educational / communication perspective: the paper shows an impressive 'educational outcrop' but does not analyse it, or the paper shows findings of an outcrop model but does not share the model code.

Drawing on the above, it is advisable to enrich the paper by reporting about 'preconditions for success & risks to fail' (before line 290) and discussing these preconditions (before line 410). Such a minor amendment seems mandatory for the benefit of the profession (and the reader); also, it would justify publishing the given detail. Finally, it would be 'nice to have' that the authors reflect a little about further opportunities of their experiences, e.g. for more open and participatory education, content accessible for anybody, and, tentatively, having a comprehensive outreach to non-professional communities.

Please also note the supplement to this comment:
https://gc.copernicus.org/preprints/gc-2021-6/gc-2021-6-RC1-supplement.pdf