

Ozone measurement practice in the laboratory using Schönbein's method

Ramirez-Gonzalez et al

Summary

Thank you to the authors for a complete set of responses to two sets of comments. I look forward to sending the revised manuscript out for review again. This is a 'major' revision in *Geoscience Communication* terminology.

Please do not forget to include a version that include tracked changes, references to changes in terms of line numbers etc ... to make your response easy to evaluate for reviewers.

In response to comments, the authors describe their aims as two-fold. Their first aim '*to develop a teaching approach for something that was not taught before*'. Therefore, as noted by Reviewer 1 and myself as editor in initial discussions, this is a pedagogical article and the approach, background, section structure etc ... should reflect this in order to avoid confusion in the presented work. This is why I believe Reviewer 1 finds the structure of the article '*somewhat jumbled*'. Thus, I hope that the authors have considered the structure of the article, although I acknowledge that it may not be able to be as robust in all elements as a study that was formally designed in advance to progress/advance pedagogy. For instance, this ozone measurement has not been taught before, the baseline for performance is low (i.e. non-existent), but the authors will have designed the session based on various elements of pedagogical theory (or if not, should be able to retrospectively fit it in to this). Also, various similar activities will have been conducted in the past, albeit on different elements of science, and I look forward to seeing the introduction/discussion of the work they have done in this context.

The key element raised by Reviewer 1 is evidence. It is important to note the editorial guidance for *Geoscience Communication* I referred to before.

'All research articles should include qualitative and/or quantitative evidence, and not solely anecdotal reporting.'

'What should a manuscript look like?' <https://www.geosci-commun.net/1/1/2018/gc-1-1-2018.pdf>

I acknowledge that this work was not designed as a pedagogical study, however I urge the authors to present the best evidence they have within an appropriate structure (i.e. likely resembling a pedagogical paper). Note a discussion of limitations and biases is strongly encouraged in the editorial (e.g. This was not designed as a formal pedagogical exercise but [the evidence it is useful/effective is]). In comments the authors assert that the evidence they will present of pedagogical effectiveness are '*reasonable and good enough*', and this needs to be elaborated on in the manuscript such that a reader can reach this conclusion (e.g. arguing how the non-standard/opportunistic evidence builds to be able to assert this).

In their comments, the authors define a second aim of '*perform a scientific outreach activity*'. This is related, but should not be conflated with the first aim, and evidence provided if possible.

John

p.s – link to the editorial advice referred to, and for transparency I include some comments below from our initial (i.e. pre-review) discussion.

(1) The work describes a pedagogical development. Usually, pedagogical papers are a study of a proposed method i.e. the research hypothesis being tested is something like: The proposed method/technique/lesson works better than previous ones. And, evidence is collected to justify this. This fits with the editorial's statement '*All research articles should include qualitative and/or quantitative evidence, and not solely*

anecdotal reporting. From this approach, (i) an introduction would contain something on previous approaches to doing the teaching, ideally setting this (perhaps briefly) in literature of teaching techniques (e.g. experiential learning) as well as specific attempt e.g. the technical paper mentioned. (ii) methods would be the research method used to assess the implementation of the teaching approach i.e. distinct from the methods within the teaching approach that the authors currently have under 'Methodology'. Such a restructuring might help with structural peculiarities such as 'As previously explained'

(2) Include a survey of students after the lessons, such as in Fig 2, to show an improvement? Admittedly, this will not compare to alternative possible teaching techniques, but it will (hopefully) show that the approach worked. Statements (e.g. from teachers) would also class as qualitative evidence.

(3) Could data be collected to support statements at the end of p7? e.g. survey of students – Did they think the lesson was good? Did it improve their knowledge of ? etc ...

(4) Discussion section could then be discussion of the effectiveness, cost, practicality of the method. The fact that students discuss the results would then be placed in a section about teaching method.