

Review of: "Integrating Virtual Tools Into the Face-To-Face Teaching of Undergraduate Analytical Chemistry"

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Potential competing interests: No potential competing interests to declare.

This paper explores the pros and cons of face-to-face and virtual activities by surveying both instructors and students of a particular type of course where experimental skills are developed.

The paper is well written and well organized; however, the results are mostly qualitative in the sense that they interpret preferences of the participants.

The discussion and conclusions add to the idea that a good balance between three types of instruction and activities will be beneficial for instructors, TAs, and students; however, there are only subjective measurements of such. I would have liked to see data or comments about the learning outcomes or a comparison of the techniques under such a scope.

In Figure 2, I think that information would be clearer if it were presented as a bar chart rather than the way it currently is. Also, maybe a more precise definition of all three modalities would make for cleaner and faster reading.

In conclusion, I believe that the article gives valuable information on the subjective experience of people involved in the study, which is quite important for instructors and designers to rethink the teaching-learning process and incorporate new techniques to enhance the learning experience of students. I believe, however, that comparing the effectiveness of the instruction modalities would make a much stronger statement.