

AUTHOR REPLY ON COMMENTS Editor made on 9 May 2022

Steve Rogers (Editor)

Editor comment on "A snapshot sample on how COVID-19 impacted and holds up a mirror to European water education" by Benjamin M. C. Fischer and Alexandru Tatomir, *Geosci. Commun. Discuss.*, <https://doi.org/10.5194/gc-2022-5-RC2>, 2022

Editor, Comments to the author:

Dear Benjamin and Alexandru,

Many thanks for your constructive responses to the reviews. I agree with reviewer 1 that there are some major revisions required - which are outlined well in the review, and it looks like you are engaging with. I also agree with reviewer 2 that this paper will be a useful contribution to the scholarship around water education. In addition to responding to the reviewers comments, I think you should include more reflection/information on how the survey was a) designed (why no personal data collection, for example); b) delivered - explain a little more about snowball sampling, the positives and negatives (which you have started with your responses), which people are more or less likely to respond - did you have an idea about this when you sent the survey?; c) why are the responses low? Or are they for a study like this... (De Koning et al., 2021 and similar can help here) In addition to the comments of the reviewers regarding conclusions drawn from the study, consider including some additional reflection on the impact of the survey results - it is a small response rate, who was most likely to have responded? Were there not some exceptionally innovative practices during lockdowns that advanced water education delivery (and rather than lead to a generation missing out on process understanding - but an alternative to the traditional?)

Again, thanks for the responses and the revisions you have made already! I do think there is great potential here and the results (and response size) will be useful to science educators - some contextualisation of the survey design and distribution/response rates etc. would be a very useful addition.

Please let me know if you have any questions.

Cheers,

Steve

De Koning, R., Egiz, A., Kotecha, J., Ciuculete, A.C., Ooi, S.Z.Y., Bankole, N.D.A., Erhabor, J., Higginbotham, G., Khan, M., Dalle, D.U. and Sichimba, D., 2021. Survey fatigue during the COVID-19 pandemic: an analysis of neurosurgery survey response rates. *Frontiers in Surgery*, 8, p.690680.

Dear Editor, Dear Steve,

Thank you very much for your kind and constructive feedback. We are extremely happy that you appreciated our manuscript.

In the revised version we included your and both reviewers' suggestions and corrections. Please find below our responses to your individual comments and suggestions (your comment in **blue font**, with our response in black font). In addition, we included the anonymized response data as supplementary data and the MATLAB script (to make figure 2-8) is available on <https://github.com/hydrodroplets/COVID-19>

Thank you for receiving our manuscript and considering it for review. We appreciate your feedback and time, and look forward to your response.

Sincerely,

Benjamin and Alexandru

Individual comments and suggestions

In addition to responding to the reviewers comments, I think you should include more reflection/information on how the survey was a) designed (why no personal data collection, for example); b) delivered - explain a little more about snowball sampling, the positives and negatives (which you have started with your responses), which people are more or less likely to respond - did you have an idea about this when you sent the survey?;

Since the survey was designed to be anonymous and only having the University name and teaching position (presented in the manuscript in Figure 1 and 2) one would need to make too many assumptions to trace back which people likely responded. We found this too hypothetical by which we have not presented this in the manuscript either.

Instead we rewrote the method section and added more information on how the survey was designed, why no personal data was collected and information about the snowball sampling as:

“We based our survey on a survey by Fischer (2020) and extended it to investigate how COVID-19 might impact European water education. The survey consisted of three sections 1) Information on the respondent, 2) Water education in pre-COVID-19 and 3) Water education during COVID-19 (Table 1), which consisted of in total of 30 questions (Table A1) and should have taken approximately 10 minutes to answer. To reach as many people and obtain unbiased answers while respecting the privacy of the participants the survey was set up as an anonymous web form using Google Forms (a web application to create and share online forms and surveys, Google LLC). To have an unbiased result, a random sampling method reaching a high number of participants from the total population of hydrology teachers would be preferable (Gideon, 2012). However, to reach a large target audience, consisting of as many hydrologists involved in university education across Europe (including student assistants, Ph.D. students, lecturers/teachers, (assistant) professors, course administrators, and researchers) within a certain time frame to represent the COVID-19 Zeitgeist we adopted an ad-hoc snowball sampling approach.”

c) why are the responses low? Or are they for a study like this... (De Koning et al., 2021 and similar can help here)

In addition to the comments of the reviewers regarding conclusions drawn from the study, consider including some additional reflection on the impact of the survey results - it is a small response rate, who was most likely to have responded?

Thank you for the study of De Koning et al. (2021). We included this study and reflected on the impact of the survey results as:

“Unfortunately, only a few universities per country responded to the survey and some European countries were missing. The low response rate to our survey may be because the population of hydrology teachers was too-small, our e-mail with the survey link was flagged as spam or not forwarded within the respective departments. COVID-19 arouse the curiosity of many scientists and educators (including the authors) to study its effects on education in various scientific fields (Aristovnik et al., 2020; Eklund et al., 2022; Fischer, 2020; Bormann et al., 2021; Fox et al., 2021; Gonzalez et al., 2020; Haley et al., 2021; Keržič et al., 2021; Marzoli et al., 2021; Romeo et al., 2021; Salling Olesen et al., 2021; Wanigasooriya et al., 2021; Stracke

et al., 2022). The many surveys conducted in relation to COVID-19 might have caused certain survey fatigue, as de Koning et al. (2021), which may also have been the case in our study. Given the few respondents a more detailed investigations should be carried. However, the results are of interest as they provide a first impression, similar to a snapshot sample campaign (a common and useful method to infer spatial process within a catchment e.g., Likens and Buso (2006); Temnerud et al. (2007); Fischer et al. (2015); Floriancic et al., (2019)), on the state of hydrology and water education across Europe as a result of COVID-19 pandemic.”

Were there not some exceptionally innovative practices during lockdowns that advanced water education delivery (and rather than lead to a generation missing out on process understanding - but an alternative to the traditional?)

We discussed our findings in respect to different literature and highlight the importance of innovative practices e.g.

“Especially the range of practical and “exotic” teaching formats practiced during COVID-19 (Figure 4a), home experiments using improvised low-budget or high-cost materials similar to e.g., Hut et al. (2020) and Kinar (2021) or learn how to program e.g., Kelleher et al. (2022) taught at distance or could be an add-on to classical classroom teaching.”

In addition, we highlight the need to adjust the classroom lesson design to the online environment as:

“Generally, when teaching a course it is recommended to follow an integrated course design (Fink, 2013) which was described for hydrology classroom teaching by Wagener et al. (2012) as the pre-COVID-19 developed Modular Curriculum for Hydrologic Advancement (MOCHA) ABCD lesson design concept consisting of planning, delivering, and evaluating to improving for next time.

...

...

To learn from this COVID-19 experience and improve the online teaching and learning experience the MOCHA ABCD lesson design, proposed by Wagener et al. (2012), should be adapted for the online environment. Such a to be developed “eMOCHA” lesson design for the online environment should include suggestions from e.g., Ellis et al. (2009) and Berry (2019b) considering the online digital context in the lecture design, workload, interactivity, engage students through personal and professional interaction.”