

Comment on hess-2021-30

Anonymous Referee #2

Referee comment on "Teaching hydrological modelling: illustrating model structure uncertainty with a ready-to-use computational exercise" by Wouter J. M. Knoben and Diana Spieler, Hydrol. Earth Syst. Sci. Discuss.,
<https://doi.org/10.5194/hess-2021-30-RC2>, 2021

This manuscript explains a module prepared by the authors to teach students the concept of the model structural uncertainty. Along with description of the module, results of the survey designed by the author are discussed to show that the amount of time and effort put toward teaching this concept has been minimal among teachers in the earth and environmental sciences. I found the manuscript very well-written and easy to understand. Moreover, making the teaching module ready for other teachers is a big plus, making the work a potentially popular study among the community of hydrology teachers. However, the manuscript does not appear to fall under the scope of HESS that looks for studies that "contribute to the advancement of hydrological modelling, hydrological monitoring and data analysis, process concepts, experimental design and technology, or theoretical foundations".

Moreover, I have the following two major comments can help authors improve their manuscript and making it more easily adaptable for other teachers.

- Students require clear directions on how to evaluate the models, but the manuscript does not discuss which directions should be given to students to evaluate the uncertainty. It is mentioned on page 8 line 25 that qualitative plots are used to visualize the results, but it is not clear what those plots are. Also, KGE was used as the calibration objective, but calibration is inherently a multi-objective optimization task. Therefore, I encourage the authors to discuss with more in-depth information about what directions should be given to students in this course to be able to evaluate the uncertainty.
- I believe the big missing pieces of puzzle in the module are:
 - What should students do when they learn the fact that the model structural uncertainty exists? For example, should they discard all models but one? Or, should they select a sub-set of the models?
 - How could students incorporate the estimated model structural uncertainty in their

studies? For example, could they come up with a probabilistic estimation of the system response to hydrologic events?