



Linking equations to scientific concepts in geosciences: A novel combined use of online polling and lecturing

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Many undergraduate students in geosciences find understanding mathematical equations challenging. The difficulty lies not only in the application of equations to solving numerical problems in unfamiliar contexts but also in explaining the scientific significance of equations and mathematical concepts. The latter is particularly important in the presentation of quantitative arguments, which is a key skill that geoscience students need to acquire and develop. In this presentation, I describe a case study involving the joint use of conventional lecturing and online polling, which was designed to encourage undergraduate students to develop their quantitative skills in an introductory geophysics module.

One of the key features of the online polling in this project is that through participating in an anonymous survey on the internet, the students were invited to reflect on their understanding of some key equations introduced earlier in the module. Specifically, the students were asked to assess how comfortable they were with some mathematical equations in the electronic survey. No preparation prior to the survey was required, and this is an important consideration for increasing the level of participation. The survey results allowed the lecturer to have a clearer idea about the students' needs, and this proved to be very useful in the planning of the revision lecture. In the second part of the project, the survey results were released over the course of the lecture, and the relationship between the equations and the related scientific concepts was discussed.

Quantitative and qualitative feedback has been obtained from the students, and an overwhelming majority of them thought that the combined use of online polling and lecturing had significantly enhanced their learning experience. In particular, the students liked the anonymity and simplicity of the survey as well as the chance to review and reflect on their learning before attending the revision lecture. This novel way of teaching and revising quantitative concepts in geosciences has improved the students' confidence in explaining the geological significance of equations. In this presentation, a detailed analysis of the evaluation of this learning-and-teaching project will be discussed.