Complementing lectures with videos depicting case studies in instrumental element analysis

Gunnar Schwarz, Monique Kuonen

Laboratory of Inorganic Chemistry, Department of Chemistry and Applied Biosciences, ETH Zürich, Vladimir-Prelog-Weg 1, CH-8093 Zürich, Switzerland.
schwarzg@ethz.ch

During the pandemic, much lecturing was done via videoconferences or recorded lessons and experiments. The latter have now become so widespread that they will likely be used more continuously for the planning of and as a support of courses dealing with instrumental techniques in particular. Even if videos do not provide hands-on experience, they can make places and processes tangible in a lecture hall. Particularly in analytical chemistry classes, it is often impractical to bring either the instruments to the students or all students to the instruments to explain them. Similarly, some procedures may take too long or take place in different locations: field sampling, sample preparation, instrumental analysis, etc.[1] Still, the selection of videos available for teaching analytical chemistry is limited, especially for advanced topics. Here we present our experience with videos complementing analytical chemistry lessons with examples to familiarize undergraduate students with instrumental techniques. Furthermore, we provide a more detailed account on how we planned, produced, and utilized a video to review course content at the end of the semester. The analytical case study presented focused on the determination of magnesium in two well water samples with emphasis on flame atomic absorption spectroscopy, while also comparing results with inductively coupled plasma optical emission spectroscopy and titration measurements. During the lecture, we engaged students by asking them for suggestion on how to carry out the measurements before showing the respective video sections. A survey among the students revealed a remarkably positive response to this approach. We conclude with practical advice for planning and producing similar video to visualize case studies.

[1] G. Schwarz, D. Bleiner, D. Günther, *Anal. Bioanal. Chem.* **2022**, accepted manuscript.