

Teaching crystallography for all

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Evolving from learning to teaching structural chemistry has made the last decade an interesting journey. The advantages of the popularization of technology, access to internet, data processing capabilities of mobile devices have deeply affected the way we learn today. This, coupled with the external pressure and need to reconvert teaching during the COVID pandemic has promoted an extensive use of several tools to uphold virtual learning-teaching environments. On this context during the 3rd LACA School on Small Molecule Crystallography, our first 100% virtual teaching event a mixture of zoom and google classroom was used. Specifically, during the use of the CCDC tools for structural analysis we experimented with an active learning approach. The attendees, after an introductory class which highlighted some of the most used applications, would work in small groups in zoom where they would decide on a structure to work with and an analytical study to perform to be presented at the end to the rest of the participants. The results were, as expected, surprising. All groups decided on different things to study on the molecule they had chosen making it super rich in the sharing part of the session. By introducing the presentations to their peers, the level of compromise with the task is higher. We were able to see people working with simple aspects as measuring distances and angles, calculating symmetry elements to more complex ones like developing Aromatic Analysis depending on the function of the chosen molecule. Most importantly, this last section enabled the opportunity of learning from each other. As educators we must encourage students to take responsibility on their own learning process.

On the other hand, through the National Crystal Growing Competition a project-based learning approach is used. For the last 9 years, the group of structural chemists organizing the competition have developed numerous didactic materials, proposed and dictated workshops both for teachers and young students, participated in several dissemination initiatives. Teachers in different educational levels are able to use the process of growing crystals as a project on itself or applied to different fields of study. The project would normally take within 4 to 8 weeks to grow a crystal garden in primary school or single crystal in high school. During the pandemic the competition turned into a series of virtual proposals from finding crystals at home to some more elaborated like constructing a simple crystal structure (NaCl). The activities were to be carried out at home and had kids and adults equally involved in the process.