# Teaching crystallographic symmetry in Latin America. A 10-year review and perspectives.

L. Suescun

Crystallography, Solid State Chemistry and Materials Laboratory/DETEMA, Facultad de Química, Universidad de la República, Montevideo, 11800 URUGUAY

leopoldo@fq.edu.uy

From December 2010 till December 2020, I have been involved in over a dozen schools and short courses in different countries of Latin America where I -alone or as part of a group of Lecturers- have been teaching crystallographic symmetry and the *International Tables for Crystallography Volume A: Space Group Symmetry* (ITC-A). I was not new to teaching symmetry in 2010 since I have taught an undergraduate course of Crystallography for Chemists at my institution since 1995. However, the first of these international schools, and the one I have been involved in more times (the International School on Fundamental Crystallography with MaThCryst Commission [1]), has pushed me to teach symmetry in many other schools devoted to single crystals and/or powder X-rays and/or neutron diffraction, that have recently evolved to virtual schools (such as the 3rd LACA School on Small Molecule Crystallography [2]). This lecturing has allowed me to meet all sorts of students/researchers of very different backgrounds from most of the countries of the region, as well as interacting with many colleagues working in different areas of crystallography, solid-state physics/chemistry, and materials science. With the aim of improving the learnings of students over the years, I have tried to make systematic observations of the background, difficulties, and outcomes of participants in the different kinds of schools. It is significantly different to evaluate the outcome of learning symmetry in very different course formats having a total time of symmetry lectures of 40, 15, or 4 hours. Moreover, it could be argued that nobody could learn any significant concept about crystallographic symmetry in 4 hours. However, the need of students and users/practitioners of crystallography coming from different disciplines, of having at least the minimal rudimentary tools to deal with symmetry in everyday work makes it worth it. Figure 1 shows two extracts of the many evaluation forms I have collected in the last decade. In this presentation, I will show the main conclusions of the evaluations regarding the fundamental part of the courses, and more specifically symmetry and the ITC-A, and share some of the strategies I have developed to give students with common or varied background the best tools I consider could make a difference for their understanding of symmetry, even in the very unfavourable conditions of teaching 2 hours of theoretical and 2 hours practical sessions. Luckily this will help other colleagues improve their teaching work, as well as giving me feedback for my next 10 years of teaching symmetry.
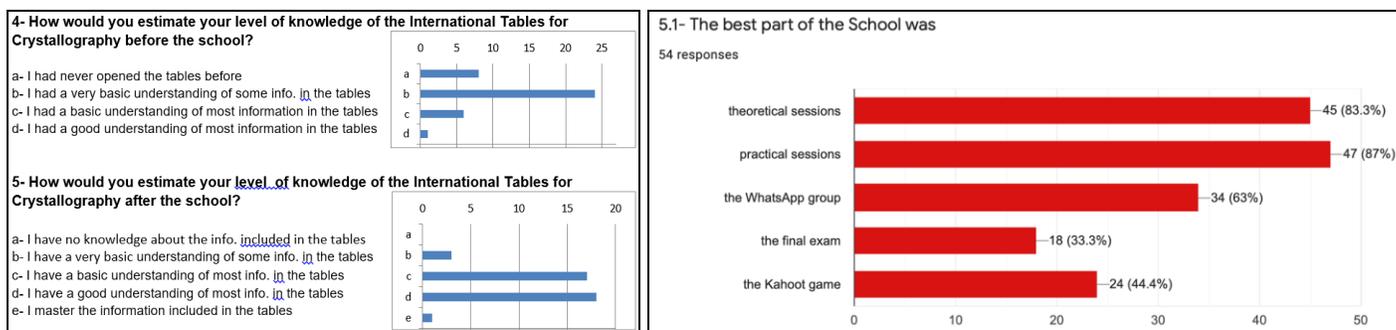
Figure 1. Extract of the evaluation by participant form of ISFC2010 [1] (left) and 3rd LACA School [2] (right).

[1] https://www.crystallography.fr/mathcryst/meetings.php (scroll down to Schools in Latin America).

[2] https://www.iquimica.unam.mx/LACA/

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