

MS48 What should undergraduate students learn about crystallography?

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Developing a playful crystallography learning method for undergraduate students - experiences from Benin

M.Y. Agbahoungbata¹, **S.A. Bonou**¹, **T. D'Almeida**¹, **C. Borna**¹

¹X-TechLab / Agence de Développement de Sèmè City - Cotonou (Benin)

Abstract

The applications of crystallography and related sciences extend to many sectors of activity essential to the daily life including health, energy, agriculture, environment, etc. Most of these applications have the potential to contribute significantly to the development of Benin. However, the application of crystallography in these key sectors requires capacity building and training to allow for a real appropriation of the know-how in the field. To date, training in crystallography in national universities is very limited and is restricted to a general and exclusively theoretical courses within the classical physics and chemistry programs, which leave almost no room for practice or experimentation.

Changing this situation and “Fostering high-standard education, Technical and vocational training” becomes a national priority [1].

Within the “Agence de Développement de Sèmè City”, one of the flagship projects of Benin Government whose three pillars are Training, Research and Entrepreneurship, there is a platform named X-TechLab whose genesis, design and missions are closely related to the applications of X-ray techniques (crystallography, tomography, spectrometry, etc.). Thanks to an agreement between X-TechLab and the Chemistry Department of the University of Abomey-Calavi (UAC), the biggest public university in Benin, a training program titled “Initiation to Crystallography and crystal symmetry” has been carried out [2]. The aim was to endow the participants with the skills that will allow them to better understand the symmetry operations in crystallography. The training was fully practical and has been completed as tutorials. First, the students built their own motifs by following a guideline and then they used the motif for paving a plan using translation and inversion as symmetry operations (crystallographic group P1 and P2) to get some wallpapers. This led them to revise and to use most of the geometry rules they have studied in High school, and it allowed them to understand the key role played by symmetry operations in several fields such as architectural, aesthetics, etc.

The program has reached over a thousand learners, i.e. undergraduate students whose age range is approximately 18 to 22 years old. Almost 97% of them have succeeded the final test at the end of the training. The aim of this presentation is to highlight the impact of this learning method and its capability to raise students' awareness about the importance of Crystallography & applications.

References

[1]https://www.gouv.bj/download/309/presentation_pag-2021-2026-seance-appropriation-06-01-2021.pdf

[2] <https://www.xtechlab.co/en/general/breve-description-du-programme-de-formation-a-luac-benin/>

