

WHEN DISCRETE MATHEMATICS RESEARCH TAKES PLACE IN CLASSROOM: THE "MATHS À MODELER" PROJECT IN SWITZERLAND

Mickael Da Ronch¹ and Ismaïl Mili²

¹University of Teacher Education Valais (HEP-VS), 1890 Saint-Maurice, Switzerland

²University of Teacher Education Fribourg (HEP-FR), 1700 Fribourg, Switzerland

The purpose of this communication concerns a plan based on the "Maths à Modeler" project, which has recently launched in French-speaking Switzerland. Researchers in mathematics education and mathematicians visit classes over several sessions and get pupils to work on problems arising from contemporary research in discrete mathematics. The goal gets students to practice a real research activity in mathematics by bringing the worlds of education and research closer together.

"MATHS À MODELER" PROJECT IN FRENCH-SPEAKING SWITZERLAND: PROBLEM SOLVING AND RESEARCH ACTIVITY IN MATHEMATICS FROM DISCRETE MATHEMATICS PROBLEMS

Problem solving currently occupies an important place in the new curriculum for pupils in French-speaking Switzerland. However, our initial exploratory research shows that statements suggested by the school institution do not really provide access to an exhaustive mathematical research activity within the classroom (Da Ronch et al., 2023). Indeed, most of them do not allow to the syntactic and semantic aspects and criteria that characterize the concept of problem (Da Ronch, 2022). Yet these aspects are essential for developing a research activity in mathematics close to the researcher (experimentation, formulation of conjectures, proof, *etc.*). In addition, it is also necessary to allow sufficient time for problem solving and thus give pupils the opportunity to develop a mathematical research activity. To this end, the "Maths à Modeler" project aims to use contemporary research problems in discrete mathematics to propose, over a sufficiently long period of time, problems that allow access to the mathematics research practice.

As part of the project, we are providing research workshops in mathematics classrooms, which occur over five to six sessions of one to one and a half hours each. On this occasion, mathematicians and researchers in mathematics education present a Research-Situation that emerges from a discrete mathematics problem (see e.g., Ouvrier-Bufferet and Gravier, 2022; Da Ronch et al., 2021), which students will address during these workshops. During the final session, students present their research findings at the Junior seminar of the university of teacher education to other students and researchers. On this occasion, we propose to present one of these situations proposed in a class in French-speaking Switzerland (Grade 5), how these workshops are conducted and the knowledge mobilized by the students inherent in the activity of research in mathematics.

References

- Da Ronch, M. (2022). *Pratique de l'activité mathématique en médiation : modèles didactiques et conception d'ingénieries* [PhD Thesis] Université Grenoble Alpes. <https://theses.hal.science/tel-04089443>
- Da Ronch, M., Gardes, M-L., & Mili, I. (2023). Study of the potential of problems to practice a research activity in mathematics at elementary school in French-speaking Switzerland. *The 13th Congress of the European Society for Research in Mathematics Education (CERME 13)*, 10-14 July 2023, Budapest (Hungary).
- Da Ronch, M., Gandit, M., & Gravier, S. (2021). Learning of the scientific approach at university: The case of research situations from problems of discrete mathematics [Poster presentation]. *14th International Congress on Mathematical Education*, Shanghai, China. <https://hal.science/hal-03285073>
- Gravier, S., & Ouvrier-Bufferet, C. (2022). The mathematical background of proving processes in discrete optimization—exemplification with Research Situations for the Classroom. *ZDM—Mathematics Education*, 54(4), 925–940.