

ÉpiDEMES – Volume 2 – Editorial note

Special issue (En): Research Work from INDRUM Network – contributions to thinking differently about teaching mathematics

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The present Volume 2 of EpiDEMES “Epijournal de Didactique et d'épistémologie des mathématiques du supérieur” bring to you works by the International Network of Research in Didactics of University Mathematics (INDRUM¹). This special issue builds upon the topics presented in Volume 1, offering complementary perspectives and insights into the possible contributions of research to improve the teaching and learning of mathematics at the university level. Supported by the European Association for Research in Mathematics Education (ERME), INDRUM unites researchers from diverse countries or even continents, to explore and advance Mathematics Education at all the levels of tertiary education. The research work presented in this issue perfectly illustrates this widening of the network. We would like to mention that one of the objectives of the INDRUM network is to reinforce the visibility of research in University Mathematics Education and with respect to the Mathematics community, which is concomitant with the editorial line of EpiDEMES. The authors of the articles presented in this special issue have all positioned their research in terms of its specific relevance to higher education, while highlighting the possible contributions of this research for practitioners in higher education.

In the first paper by Inen Akrouti and Slim Mrabet, students’ conceptions of the definite integral in the first year of preparatory class are investigated. The study reveals that many students tend to rely on algebraic procedures when evaluating integrals, highlighting the need to explore alternative approaches. By analyzing students’ productions, this research provides valuable insights into students’ perspectives on this crucial topic in teaching calculus. It lays the groundwork for refining instructional strategies and enhancing students’ understanding of the definite integral.

Julie Stalder’s paper delves into the choices made by teachers teaching abstract algebra. With a focus on the concept of “Ideal”, the study employs an epistemological analysis to highlight its central role in abstract algebra. By examining the role of examples and exercises in students’ practices, the research sheds light on effective teaching approaches in this field.

Caterina Cumino, Martino Pavignano, and Ursula Zich present in the third paper an example of integrating graphic language and standards into the education of architecture students. The study focuses on the 2D representation of architectural objects, such as roofing systems generated by cylinders and their intersections. By emphasizing the use of physical or virtual models to support students’ mathematical thinking, irrespective of their varying levels of geometric understanding, this research enriches the learning experiences of architecture

¹ For a presentation of the INDRUM Network see <https://hal.science/INDRUM/>

students. The connection between mathematical modeling and architectural contexts adds depth to their education.

In the fourth paper, Chantal Buteau, Laura Broley, Kirstin Dreise, and Eric Muller explore undergraduate mathematics students' experiences in using programming for mathematics investigation projects. The study reveals the organization and complexity of students' activities, which intertwine mathematics and programming competencies. Through a analysis of student and instructor data, this research provides practical recommendations for instructors engaged in similar projects.

The final paper by Mitsuru Kawazoé focuses on the use of embodied notions in teaching linear algebra, particularly examining linear (in)dependence and basis concepts. The research investigates the relationship between students' understandings in both the embodied and symbolic worlds. It also evaluates the impact of instruction that emphasizes geometric images. The findings shed light on the association between conceptions in different worlds and the challenges of improving students' understanding through geometric instruction.

The INDRUM special issue of the "Epijournal de Didactique et d'épistémologie des mathématiques du supérieur" offers valuable insights and recommendations for teachers and researchers alike. We extend our appreciation to the authors for their contributions. May this special issue inspire further research, foster collaborative discussions, and lead to the continual improvement of mathematics teaching and learning in higher education.