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Using Computer Algebra Systems (CAS) in Teaching High School Mathematics: Two Research-Based Examples from Classroom Practice

The integration of new technologies in mathematics education has been an ongoing issue for the last two decades. Teachers and teacher educators are struggling with questions regarding the use of technological tools and their relation to required paper-and-pencil skills. The original optimism regarding the benefits of technology, which would allow a focus on conceptual understanding at the expense of calculation techniques, has become quite nuanced. This presentation will address the dialectical relation between theoretical thinking and technique, as they co-emerge in a combined computer algebra and paper-and-pencil environment. More particularly, it will focus on two Grade 10 teaching experiments involving CAS technology: the first one on equivalence, equality, and equation; the second one on generalizing and proving within factoring. Attention will be given to the nature of the tasks in which the students engaged and to students' ways of thinking within these tasks. Even though the topics are quite different, findings indicate the importance of the co-emergence of theory and technique in both cases.