

Functions, Dynamic Geometry and CAS: offering possibilities for learners and teachers

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In many countries of the world, the curriculum at upper secondary level privileges functions for an approach to algebra centred on developing student's experiences through encounters with real world situations involving quantitative relationships (Kieran 2007). Curricula also encourage the use of software like Computer algebra and Dynamic Geometry systems as means to support this approach, allowing students multiple representations, easier exploration and modelling of functional dependencies. This approach is however not without problems. First, a comprehensive repertoire of students' competencies relatively to functions and algebra seems not yet available. Moreover, few data exist on how these competencies develop over time. Finally, beyond innovation, it seems that more work has to be done in order that teachers have access to an effective range of classroom situations taking advantage of DG and CAS for approaches to functions.

For the research group Casyopée(1), designing a software environment, experimenting in classroom and developing materials for teachers are a way to tackle these issues. The talk will propose some upshots of this research: students' development of competencies on the long term by way of an instrumental genesis of Casyopée; situations that might help teachers to organise a well-thought approach to algebra via functions.

Kieran, C. (2007). Learning and teaching algebra at the middle school through college levels. In Lester, (Ed.), *Second handbook of research on mathematics teaching and learning* (pp. 707-762). Greenwich, CT.

(1) CAcalcul Symbolique Offrant des Possibilités aux Elèves et aux Enseignants
(<http://casyopee.eu>)