Analysis of Algebraic Reasoning and Its Different Levels in Primary and Secondary Education

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Description of the Workshop: Aims and Underlying Ideas

An important objective in various curricular guidelines (e.g., NCTM, 2000) has been the enhancement of algebraic reasoning beginning in the first educational levels. This objective implies that we assume a new view of school algebra as not being limited to handling algebraic expressions. The effective implementation of this new conception of school algebra poses a challenge for the training of mathematics teachers, because few current training programs include the development of such a new vision. The objective of the workshop was to implement some practical activities aimed at recognizing the main features of school algebraic reasoning that can be used to train teachers to promote algebraic thinking in primary (Aké, Godino, Gonzato, & Wilhelmi, 2013) and secondary education (Godino et al., 2015). The wider view of school algebra that was presented and discussed takes into account the processes of generalization and symbolization as well as structural and functional modelling and analytical calculation. It also created a meaningful link between algebraic thinking in primary and secondary education.

Planned Structure

Number and length of modules: 2; 45 min each.

Practical Activities: (i) Solving a selected set of tasks on school algebraic reasoning for primary (secondary) education, (ii) assigning levels of algebraic thinking to different solutions, (iii) enunciating related tasks whose solution involves

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changes in the levels of algebraization, and (iv) presentation and discussion of results.

References

- Aké, L., Godino, J. D., Gonzato, M., & Wilhelmi, M. R. (2013). Proto-algebraic levels of mathematical thinking. In A. M. Lindmeier & A. Heinze (Eds.), *Proceedings of the 37th Conference of the International Group for the Psychology of Mathematics Education* (Vol. 2, pp. 1–8). Kiel, Germany: PME.
- Godino, J. D., Neto, T., Wilhelmi, M. R., Aké, L., Etchegaray, S. & Lasa, A. (2015). Levels of algebraic reasoning in primary and secondary education. In K. Krainer & N. Vondrová (Eds.), *Proceedings of the Ninth Conference of the European Society for Research in Mathematics Education* (CERME9, February 4–8, 2015) (pp. 426–432). Prague, Czech Republic: Charles University in Prague, Faculty of Education and ERME TWG 03: Algebraic Thinking.
- National Council of Teachers of Mathematics (NCTM). (2000). *Principles and standards for school mathematics*. Reston, VA: Raupach.

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