

DEVELOPING ALGEBRAIC THINKING WITH ICT

José Duarte (*)

Joana Brocardo

Escola Superior de Educação do Instituto Politécnico de Setúbal

In Portugal, official curriculum guidelines on algebra are going through significant changes, emphasizing that algebraic thinking must be developed since the elementary grades and that teachers must use adequate technology. The development of algebraic thinking requires a careful combination of tasks that enhance generalization and progressive formalization, supported by multiple representations (Blanton & Kaput, 2005). It also may involve the use of dynamic and interactive ICT features that allow, for example, manipulating objects and observing the results, stressing the construction of meaning (Ferrara, Pratt & Robutti, 2006).

Several authors outline the importance of collaborative contexts in order to develop teacher professional knowledge, promoting reflection and willingness to take risks. These contexts are adequate to achieve new curriculum demands, integrating new pedagogical tools and content knowledge (Ruthven & Goodchild, 2008).

This presentation reports a case study developed in a collaborative setting. This context involved a researcher and two middle school teachers, with grade 7 students. This paper analyses how teachers plan and conduct lessons using ICT aiming to develop algebraic thinking. The sources of data are observations of teachers' lessons and of collaborative working sessions, interviews, interactions in a Moodle platform, and other written documents.

This presentation draws on the results of the two case studies. I discuss the role of the collaborative setting to identify different uses of technology and to highlight those that promote interactions and learning. Through the use of tables and graphs and their translation from one representation to another and in natural language, students showed creative ways of thinking that go behind the teacher's expectations.

References

- Blanton, M., & Kaput, J. (2005). Helping elementary teachers build mathematical generality into curriculum and instruction. *ZDM*, 37(1), 1-9.
- Ferrara, F., Pratt, D., & Robutti O. (2006). The role and uses of Technologies for the teaching of algebra and calculus. In A. Gutiérrez & P. Boero (Orgs), *Handbook of research on the psychology of mathematics education: Past, present and future* (pp. 237-273). Rotterdam: Sense.
- Ruthven, K. & Goodchild, S. (2008). Linking researching with teaching. In Lyn English (Ed.), *Handbook of international research in mathematics education* (pp. 561-588). Mahwah, NJ: Laurence Erlbaum.

(*) The author has a grant supported by FCT with reference SFRH/BD/38864/2007