PRESERVICE TEACHERS ANALYZE CHILDREN'S ANSWERS TO GEOMETRIC PATTERN PROBLEMS

Angel Gutiérrez, María José Beltrán-Meneu, Adela Jaime

Dpto. de Didáctica de la Matemática. Universidad de Valencia. Valencia (Spain)

Mathematics preservice teachers' (ps-teachers hereafter) training has to include the evaluation of students' outcomes, grounded on specialized mathematical content knowledge and noticing of students' thinking.

Geometric pattern problems (gp-problems hereafter) offer students contexts where they may start handling literal symbols in meaningful ways. Gp-problems have proved to be a successful teaching methodology, implemented in ordinary schools, even from early primary grades (Rivera, 2013).

We present a teaching experiment where primary and secondary ps-teachers were asked to evaluate children's answers to gp-problems. Our research objective was to classify the justifications provided by the ps-teachers, based on certain given criteria, to support their evaluations of children's outcomes. We obtained an emergent categorization which differs form other categorizations found in the literature.

This study was based on the answers of 33 primary ps-teachers and 23 secondary ps-teachers, who had not received any previous training related to gp-problems.

The experiment had three parts: i) We informed the ps-teachers about the gp-problems, their learning aims, and the aspects of students' solutions that they were to analyze. ii) The ps-teachers solved some gp-problems, that were posed to children in grades 6 (primary) and 8 (secondary). iii) We selected some primary/secondary children's answers and asked the primary/secondary ps-teachers to analyze them. The gp-problems asked for immediate and near terms, verbal and algebraic generalizations, and a reversing process.

To analyze the ps-teachers' answers, we followed a cyclic process of identification of types of justifications, clustering of similar justifications, and refinement of the categorization. The main result was a list of types of ps-teachers' justifications.

A surprising result was the big number of wrong analysis by both primary and secondary ps-teachers, which is in the line of results by other researchers. It suggests that ps-teachers are not used to analyze children's answers to problems.

Reference

Rivera, F. D. (2013). *Teaching and learning patterns in school mathematics*. New York: Springer.

2016. In. Csíkos, C., Rausch, A., & Szitányi, J. (Eds.). *Proceedings of the 40th Conference of the International Group for the Psychology of Mathematics Education,* Vol. 1, pp. 168. Szeged, Hungary: PME.