## STRATEGIES OF SOLUTION OF GEOMETRIC PATTERN PROBLEMS AS TRAITS OF MATHEMATICAL GIFTEDNESS <sup>1</sup>

Eva Arbona<sup>a</sup>, <u>Ángel Gutiérrez</u><sup>a</sup>, and María José Beltrán-Meneu<sup>b</sup> <sup>a</sup>Universitat de València, Valencia, Spain; <sup>b</sup>Universitat Jaume I, Castellón, Spain

*Algebraic thinking a*llows students operating with variables and unknowns without needing formal symbolic alphanumeric expressions, and it enhances the mathematical abilities of students, particularly of mathematically gifted students (gifted students hereafter). *Geometric pattern problems* (gp problems hereafter) are a context adequate to develop algebraic thinking in primary school. A description of gp problems can be found in Rivera (2013) and the references therein. García-Reche, Callejo, & Fernández (2015) have described students' resolution strategies.

Gifted students present unusual problem solving abilities, compared to ordinary students of the same age or grade, like identifying patterns, generalising, and inverting mental procedures, all them necessary to progress in algebraic thinking (Miller, 1990). However, there is little research reporting gifted students' behaviour when solving gp problems. In this direction, we wish to identify solution strategies characteristic of gifted students, since they would be helpful *traits of giftedness*. Our goal is, among students in grades 4 to 6, to identify differences between solution strategies i) among the grades, and ii) among good gp problem solvers and less successful ones.

We present results from the answers of 118 students in grades 4 to 6 to several gp problems. We consider as traits of giftedness the solution strategies by students who solved correctly all the gp problems posed. Most good gp problem solvers in grade 4 always used functional strategies, in grade 5 combined recursive and functional strategies, and in grade 6 used functional strategies. The other students combined functional and proportional (incorrect) strategies in grades 4 and 6, and used functional strategies in grade 5, many times incorrectly.

The analysis of data from our experiment let us conclude that i) the absence of proportional incorrect strategies appears as a trait of giftedness in algebraic thinking, and ii) the higher the grade, the more efficient became all students, but iii) the less successful students in all grades had difficulties identifying functional strategies.

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