Patterns in the Pythagorean configuration and some extensions: the power of interactive geometry software.

Summary: In this paper I describe classroom experiences with pre-service secondary mathematics teachers (PSMTs) investigating and extending patterns embedded in the Pythagorean configuration. This geometric figure is a fruitful source of mathematical tasks to help students, including PSMTs, further develop habits of mind such as visualization, experimenting, looking for and noticing patterns, conjecturing, inventing, constructing mathematical arguments, and posing problems. By carrying out these tasks, the PSMTs were also engaged in a plethora of mathematical practices recommended by the Common Core State Standards Initiative (CCSSI). The use of the Geometer’s Sketchpad facilitated the accomplishment of most of these activities. As students of mathematics, these PSMTs were engaged in activities to reinforce some of their mathematical habits of mind and experienced learning new mathematical ideas and processes through practices that exemplify typical mathematical thinking. As future teachers, they were engaged in tasks so they can, in turn, design or adapt instructional tasks to develop further their own students’ habits of minds and engage them in learning mathematics through the mathematical practices advocated by the CCSSI.

Classification: G49 U79 D39

Keywords: preservice teacher education; exploratory learning; Pythagorean theorem; triangles; area; generalization; conjecturing; polygons; circumcircles; common core standards; goals of mathematics education; geometry software; problem posing; patterns; visualization

http://journals.tc-library.org/index.php/matheducation/article/view/1089/691