

From Proof to Investigation and Back to Proof

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Abstract: There is strong consensus among mathematicians and mathematics educators that teachers' mathematical competences are a critical component of their proficiency. However, attention is less often given to mathematical creativity as a fundamental component of teachers' expertise. Creative processes presume expanding existing knowledge to the new territory, on the basis of one's existing knowledge. At the same time, the importance of creativity in learning process (both for teachers and students) follows Vygotsky's (1982/1930) claim that creativity is the central mechanism in the knowledge development. In our geometry courses for prospective mathematics teachers, we systematically integrate creativity-based mathematical activities that employ Investigation Tasks. These tasks require the participants to (a) solve proof problems in several ways; (b) find at least 3 new properties of the figure given in the problem and (c) prove the discovered properties. Systematic employment of investigation tasks develops both teachers' problem-solving skills and their creativity as expressed in mathematical discoveries. During the presentation, I will discuss the following questions: Which discoveries are more original than others? and What factors influence the originality of teachers' discoveries?