

Capability of proof constructions and conditional inferences among Finnish elementary school teacher candidates

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Traditionally the proving and conditional inferences have been scrutinised in many countries in the secondary school mathematics, on the courses of Euclidean geometry (see, e.g. Stylianides 2008). According to the textbook analyses the situation in Finland is the same. On the other hand proving has been needed also in the elementary and middle grades (Stylianides & Stylianides 2009). So the authors were interested to know, how well prospective elementary school teachers can construct logically rigor and universal proofs in rather simple proof situations. Secondly we were interested to know which kind of argumentations they will use in these proof constructions and how these argumentations are related to the students' previous mathematical experiences in secondary school mathematics. Thirdly we examined how well they can solve tasks including typical abstract conditional inferences (Inglis & Simpson 2009). We were also interested to know, how the success in these conditional inference tasks is related - if at all - to the capability to construct mathematical proofs. As for the results, the mathematical background of the teacher candidates (n=80) was tightly related to the success and argumentations in the proof constructions. None of the teacher candidates with short mathematics in sixth form were able to construct universal proofs. Most of them used inductive argumentations based on some examples. As for the teacher candidates with long mathematics part of them could use algebraic presentations and they usually ended up with logically rigor proof. The success in the abstract conditional inference tasks was not related to the used argumentations and success in the proof construction tasks. In the article the findings are interpreted in light of theory and practice.

Key words: mathematical argumentation, proving, conditional inference, teacher education, school mathematics

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