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Future teachers' professional knowledge on argumentation and proof: a case study from universities in three countries.

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Summary: In this paper, qualitative results of a case study about the professional knowledge in the area of argumentation and proof of future teachers from universities in three countries are described. Based on results of open questionnaires, data about the competencies these future teachers have in the areas of mathematical knowledge and knowledge of mathematics pedagogy are presented. The study shows that the majority of the future teachers at the participating universities situated in Germany, Hong Kong and Australia, were not able to execute formal proofs, requiring only lower secondary mathematical content, in an adequate and mathematically correct way. In contrast, in all samples there was evidence of at least average competencies of pedagogical content reflection about formal and pre-formal proving in mathematics teaching. However, it appears that possessing a mathematical background as mandated for teaching and having a high affinity with proving in mathematics teaching at the lower secondary level are not a sufficient preparation for teaching proof.

Classification: B50 E50 C30 D20

Keywords: proof; proving; teacher education; mathematical content knowledge; pedagogical content knowledge; comparative studies; empirical research; competencies

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