

**„Prospective Teachers´ Capabilities of Anticipations Regarding Students´
Argumentation During Reasoning Tasks“** by Christian Klostermann

Supervisor: Prof. Dr. Astrid Fischer, Mathematics Education,
Carl von Ossietzky University of Oldenburg

Stylianides et al. (2013) have identified different challenges for prospective elementary teachers to teach reasoning-and-proving: implementing high-level tasks and knowing common student difficulties/misconceptions are prominent. For secondary school teachers integrating reasoning-and-proving tasks across all mathematical concepts seems to be a challenge as well (Boyle, 2012). The practical phase can give prospective teachers an opportunity to encounter these challenges by teaching reasoning-and-proving supported by mentors and university.

The probands of this empirical case-study are 24 prospective teachers of secondary school. They choose to perform the first five weeks of their second practical phase for their second subject and the remaining two weeks for mathematics. All of them finished the basis modules of the Bachelor of Science (mathematics) including a basic lecture in mathematic didactics and a first practical phase over five weeks with few own teaching experiences.

They are assigned to develop and accomplish a lesson with reasoning and proving tasks during their practical phase. The lesson is to be implemented in the regular lessons of a learning group. Since the successful anticipation of typical problems in lessons is a characteristic of an expert teacher (Hattie, 2003), the probands shall be mindful of possible students´ argumentation in the context of lesson planning and write them down. The lessons are videotaped in seven cases in order to document the actions and reactions of the prospective teachers to students´ statements. Sequences of these tapes are used in stimulated recall interviews to support the probands reflecting their own behaviour during specific argumentation processes.

Answers to the following research questions shall be generated with this empirical data: To what extent are prospective teachers able to anticipate diverse solution approaches to a reasoning task? How do prospective teacher´s reactions to students´ argumentation in lesson differ depending on, whether they have anticipated them in planning? How do the probands reflect their own reactions after watching them?

References

Boyle, Justin D. (2012). *A Study of Prospective Secondary Mathematics Teachers´ Evolving Understanding of Reasoning-and-Proving*. (Doctoral Dissertation). University Pittsburgh.

Hattie, J. (2003). *Teachers Make a Difference. What is the research evidence?* (Distinguishing Expert Teachers from Novice and Experienced Teachers.) Auckland: Australian Council for Educational Research.

Stylianides, G. J., Stylianides, A. J., & Shilling-Traina, L. N. (2013). Prospective teachers´ challenges in teaching reasoning-and-proving. *International Journal of Science and Mathematics Education*, 11, 1463-1490.