

# The PDF-Concept – Triangulation and Analysis of Mathematical Tasks

S. Stank and U. Zaepernick-Rothe, *Ostfalia – University of Applied Sciences*

**ABSTRACT:** The PDF-concept was developed by Stank and Zaepernick-Rothe (2015; 2016) for the tutorial training with a mathematical focus. Presented by a triangle, it takes into account pedagogical/psychological (P), didactic (D) and expertise (F=Fachwissen in German) aspects.

An important part of the training is the acting on trial in a role-playing, in which real situations are simulated from the tutorials. The participants have to "triangulate" and analyze a mathematical task according to the PDF-concept. Subsequently, the task prepared in this way serves as a requisite for the acting on trail. The players will then receive constructive feedback from the peers as well as the trainers.

By triangulation of a task we understand the following procedure: the task to be analyzed is placed at the center of the PDF-triangle. In the pedagogical/psychological aspect, the affects, behavior and cognition of the students of the tutorial are analyzed. In the same way, one proceeds with the other aspects. The triangulation of the didactic is done with the help of the Constructive Alignment (see Biggs 2011), i.e. the conditional structure between teaching and learning activities, the assessment tasks and the intended learning outcomes. The expertise is triangulated with the help of the first three steps of the Decoding of the Disciplines (see Middendorf/Pace 2004), i.e. identifying bottlenecks in which student learning is blocked, the invisible thoughts of the experts and modeling these mental operations for the student.

With this tool tutors have the opportunity to optimize their own operational competence. If they put focus not only on the content of the task in the preparation of their tutorials, they integrate further aspects that promote the learning process.

## REFERENCES

- Zaepernick-Rothe, Ute and Stank, Sabine (2016): Probehandeln in der MatheTutorenSchulung: Zur Auswahl der Aufgaben. Beitrag in einem DisQspace der DGHD-Tagung in Bochum (21.09.2016).
- Stank, Sabine and Zaepernick-Rothe, Ute (2015): MatheTutorenSchulungen - Modell und Labor. Beitrag in einem DisQspace der DGHD-Tagung in Paderborn (05.03.2015).
- Biggs, John Burville and Tang, Catherine (2011): Teaching for Quality Learning at University, Buckingham: Open University Press/McGraw Hill.
- Middendorf, Joan and Pace, David (2004): Decoding the Disciplines: A Model for Helping Students Learn Disciplinary Ways of Thinking. New Directions for teaching and learning, Vol. 98, pp. 1-12.