Arguing and Reasoning supported by Technology

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ABSTRACT

Standards and Curricula express expected competences at certain steps of the learning process. The task of the teachers is to accompany, to support the development of the competences of the learners. I will give some examples of how technology can promote this development of competence in the field of arguing and reasoning.

The first part of the lecture deals with **clarification of terms** by discussing pairs of contradictory concepts like

- competence versus skills
- competence oriented versus calculation oriented mathematics education

A **characteristic of competence orientation** is to look at the learning process from a different angle, not from the contents which have to be executed (as most of the teachers are doing) but from the angle of mathematical activities like modelling, calculating, interpreting, arguing and reasoning which have to be performed by using the contents.

In **the second part** I will delve into the **development of competence in the field of arguing and reasoning**. The development of arguing does not start with deductive proofs. As Freudenthal said: "Students at first should learn to suppose before learning to prove." I will show the role of technology in **the heuristic, experimental phase** as well as in the **exactifying phase** of the learning process. May be "exactifying" is a neologism, but by using this word I wanted to verbalize, that the emphasis of my thesis is the process of becoming more and more exact and not the product which could be entitled "exact phase". In many cases technology makes the heuristic phase possible in the first place. In the exactifying phase calculating can be transferred to technology, learners can center their activities on the thinking technology of proving.

Technology tools which I will use in the heuristic phase are "Technology supported learning paths" which ACDCA has produced in cooperation with the organizations "Geogebra" and "Mathe online". The project was called "Diversity of Media in Mathematics Education". Especially in the exactifying phase CAS like TI Voyage or TI nSpire are the main tools.

Keywords
Competence, arguing, supposing, reasoning, learning path, Geogebra, TI Voyage