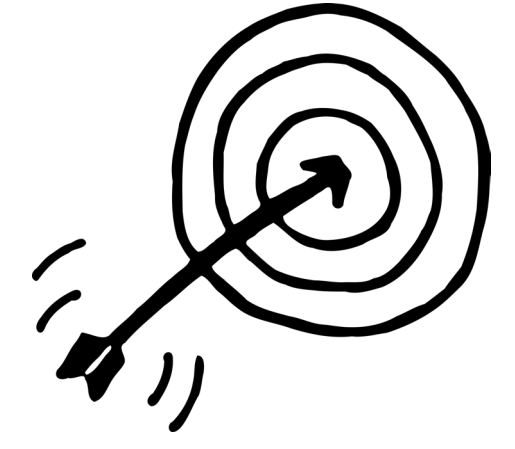


# Bridging the Gap: Research-based Professional Development for Teachers in the Field of Artificial Intelligence

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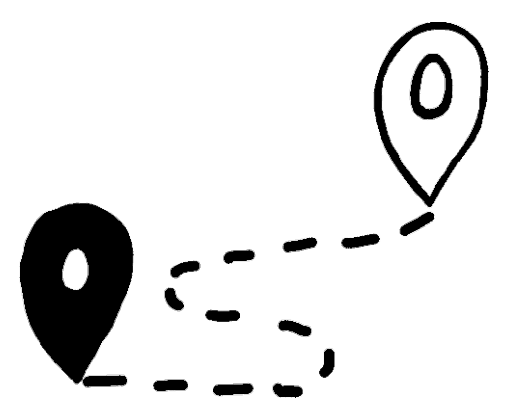
## Goal:

The professional development (PD) of teachers in the field of AI plays a central role for the successful integration of the topic in education. In order to effectively address the needs of teachers in this educationally new subject area and to develop central PD design principles for AI, a research-led PD program for computer science teachers on artificial intelligence was developed.



## Method:

A design-based research approach (Prediger 2016) is used to identify teachers' needs, challenges and problems and to address them appropriately in the professional development program.

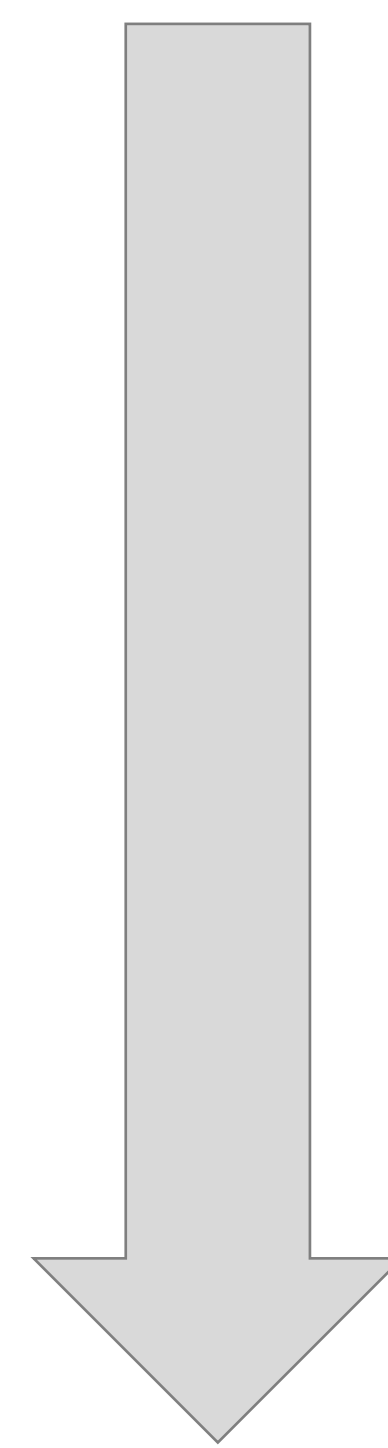


## Conceptualization of a Prototype PD Course

- Determination of PD goals
- Specification and structuring of PD contents based on an educational reconstruction process (Diethelm 2012)
- Composition of the course: three synchronous full-day face-to-face sessions to teach theory and three corresponding asynchronous online modules with in-depth practical tasks scheduled over a six-month period
- Evaluation: general design feedback; interviews of expectations; surveys on self-concept, self-efficacy, motives for participation, motivation, fulfillment of expectations and usefulness; feedback interviews; scenario-based gathering of educational knowledge and gathering of subject-related content knowledge with concept maps

## Problems & Challenges:

- Online sessions instead of face-to-face meetings due to pandemic
- Teachers face huge problems with programming tasks
- Teachers are overwhelmed by the amount and complexity of AI content
- Dealing with the complex topic is time-consuming and imposes a heavy workload on teachers
- Determining the acquired content knowledge via concept maps is difficult



## Needs:

- Teachers demand extensive references to the curriculum
- Teachers ask for ready-to-use teaching materials and want to spend much time on (collaboratively) exploring tools, activities and materials
- Teachers need materials that give them a topic-related overview, serve as a reference and structure the content
- Teachers ask for a strong focus on educational aspects

## Flipped Classroom PD Course

- Redesign of the content presentation and course composition: three asynchronous online modules for theory acquisition with video lectures and supporting practical tasks, 3.5 synchronous full-day face-to-face sessions to work with tools, explore activities and do programming tasks with individual scheduling
- Goal: more flexibility for teachers, teacher scaffolding in the area of programming, step-by-step learning approach, more time for exploration and working with teaching materials
- Evaluation continued as described in the prototype

## Review of Needs, Challenges and Problems after Redesigning the Course:

- Programming still poses a challenge, but can be facilitated with material that functions both as scaffolding material for teachers in the PD course and can be used with students in class
- Teachers gain more flexibility in the Flipped Classroom PD course which reduces the workload and allows more individual focus
- Teachers respond very positively to the teaching materials explored and presented
- Face-to-face exchange of ideas, collaborative exploration of materials and taking in the students' perspective while testing tools and materials is highly appreciated and fosters educational insights and gaining pedagogical content knowledge

## Quellen & Kontakt:



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