Primary School Teachers' First Experiences and Challenges in Teaching CS

UNIVERSITÄT DUISBURG ESSEN

Offen im Denken

Motivation

- Digital technology increasingly influences children's lives
- In many countries, computer science (CS) is already an essential part of primary school curricula (Nenner & Bergner, 2022)
- Also in Germany, some competencies in media literacy as well as in CS have been integrated into primary school curricula in various federal states in recent years:

  e.g. Programming a sequence
- Nevertheless, systematic support for current and future primary school teachers is still lacking

A research and development project funded by the Federal Ministry of Schools and Education in NRW aims to address this need by developing

- CS-related professional development courses as well as
- teaching material, that is ready for immediate use

In order to take the schools' and teachers' needs into account as well as to evaluate the impact of the interventions, they will be asked to participate in an **online survey** at the beginning of the project

Survey Design

Orientation on success criteria for CS education in primary schools, at individual as well as institutional level:

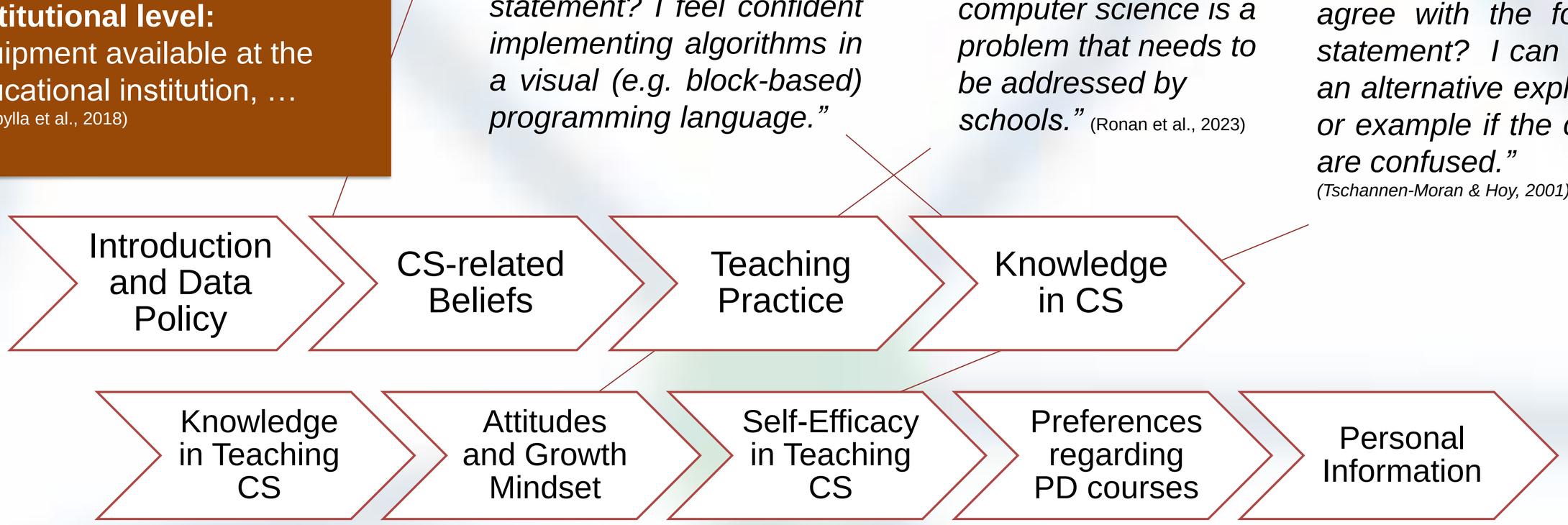
- **Individual level:** CS competencies, knowledge in teaching CS, positive attitudes towards CS, … (Bergner et al., 2023)
- **Institutional level:** **e**quipment available at the educational institution, … (Przybylla et al., 2018)

"Please give us a few keywords that you associate with the term computer science."

"To what extent do you agree with the following statement? I feel confident implementing algorithms in a visual (e.g. block-based) programming language."

"To what extent do you agree with the following statement? The underrepresentation of certain groups in computer science is a problem that needs to be addressed by schools." (Ronan et al., 2023)

"To what extent do you agree with the following statement? I can provide an alternative explanation or example if the children are confused."
(Tschannen-Moran & Hoy, 2001)



First Results *(Pilot Study)* and next Steps

- Many teachers primarily **associate CS with programming**; the **social impact of digital technology is rarely interpreted as a CS-related topic**
- Many teachers report that they **do not address all of the CS-related content specified in the curriculum** in their lessons
- Computer games, game consoles and controllers are often mentioned as contexts based on the everyday life of children used in their lessons, as well as other systems such as the navigation system in their parents' car
- Teachers expect **CS-related teaching material** to be **easy to understand and ready to use**
- They describe the **children's response to CS-related topics** as **positive**

Next steps include…

- Completion of the pilot study
- Validation of the survey design
- Roll out on a larger scale

We would like to express our gratitude to the Federal Ministry of Schools and Education in NRW for funding this project.

Literature

- Bergner, N., Köster, H., Magenheim, J., Müller, K., Romeike, R., Schroeder, U., Schulte, C., "Haus der kleinen Forscher" Foundation (eds.): Early computer science education. Goals and success criteria for pre-primary and primary education. Verlag Barbara Budrich, Opladen; Berlin; Toronto (2023)
- Nenner, C., Bergner, N.: Informatics Education in German Primary School Curricula. In: Informatics in Schools. A Step Beyond Digital Education, pp. 3–14. Springer International Publishing, Cham (2022)
- Przybylla, M., Romeike, R.: Impact of Physical Computing on Learner Motivation. In: Proceedings of the 18th Koli Calling International Conference on Computing Education Research (Koli Calling '18), pp. 1–10. Association for Computing Machinery, New York, NY, USA (2018)
- Ronan, D., Erdil, D. C., Brylow, D.: Teacher Attitudes and Beliefs in Computer Science (T-ABC): Development and Validation of a Teacher Survey Instrument. ACM Transactions on Computing Education 23(2), pp. 1–23 (2023)
- Tschannen-Moran, M., Hoy, A. W.: Teacher Efficacy: Capturing an Elusive Construct. Teaching and Teacher Education 17(7), pp. 783–805 (2001)

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