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DEVELOPMENT AND VALIDATION OF AN INSTRUMENT FOR IDENTIFYING NOTICING OF PHYSICS PRE-SERVICE TEACHERS



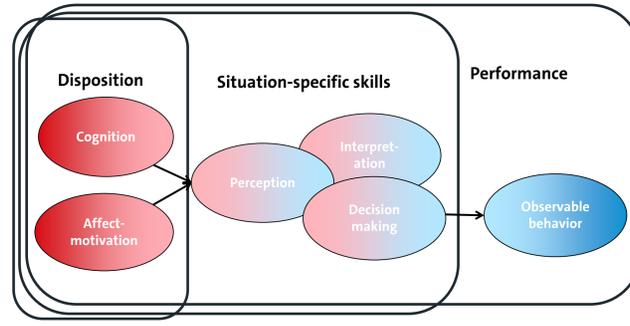
STARTING POINT

THEORY

Research in educational sciences has indicated teachers' competencies as pivotal for successful learning. Projects like COACTIV (2013) have modeled teachers' professional knowledge as content knowledge, pedagogical knowledge and pedagogical content knowledge as well as attitudes and beliefs. How professional knowledge and successful teaching practice might be interrelated, is still a subject of research. The concept of Noticing is a promising candidate for closing the gap between teachers' professional knowledge and their teaching performance. Noticing is an action-orientated and situated competence (Kaiser et al. 2015) and entails a concrete, contingent and unpredictable action demand for teachers.

MODEL

(Blömeke, Gustafsson, Shavelson 2015)



OUR RESEARCH DESIGN

- Step 1** (done!):
- Development and Validation of written vignettes
 - Shooting videos
- Step 2** (almost Done!):
- Piloting videos
 - Developing questionnaire
- Step 3** (future work):
- Validation of instrument (n=150, online: videos + questionnaire, IRT-scaling)



RESEARCH QUESTIONS

Can pre-service physics teachers' noticing be assessed in a valid manner by an online survey instrument, which encompasses video-based stimuli each followed by a questionnaire?

- Is noticing of pre-service physics teachers distinguishable from noticing of teachers in another domain like geography?
- Does noticing develop during University teacher training and to which extend?

METHOD: PILOT STUDY

1. DISTRACTORS AND ANCHOR EXAMPLES

All three vignettes in conjunction with prompts originating from the pre-pilot study were piloted. Quality of the Incidents implemented in video Vignettes were Assured based on an Analysis of all test person's responses. Based on this analysis, distractors (incorrect, but plausible answers) and anchor examples (Attractors, correct answers) are generated leading to the construction of Multiple-Choice test items in a final Online-Instrument for Noticing.

2. SAMPLE

A systematic sampling strategy was applied in order to maximize variance among test persons: Test persons vary according to semester (2., 6., 10. semester) and their Participation teacher training program in physics (primary, secondary, upper-secondary, vocational training school, n = 12). Each video is watched by n = 8 test persons.

3. ITEM CONSTRUCTION FOR MAIN STUDY

Finally, items are constructed. Each item encompasses a particular Section of a video vignettes, in which a teacher has to notice a specific situation relevant for learning, and one question followed by a series of options how to answer (distractors & anchor example). Hence, each vignette finally encompasses 9-15 items which assess physics teachers' noticing. Subsequently, vignettes will be assembled to an online survey resulting in 3 vignettes, up to 38 closed and 38 open-ended questions.

FIRST RESULTS

Incidence	Stopped (of N = 8 test persons)	Stopped + perceived correctly	Stopped + perceived correctly + answered correctly
1	5	3	3
2	4	4	3
3	6	5	2
4	3	2	1
5	7	6	4
6	2	1	0
7	2	2	0
8	1	1	0
9	8	4	1
Mean	4	3	2

INTERESTING INCIDENCES:

- Incidence 5:**
- Highest chance to solve (6 out of 8 test persons)
 - Perceived by 6 test persons (n=8) (4 Exp.)
 - Solved by 4 test persons (3 Exp.)
- Incidence 8:**
- Lowest chance to solve (1 out of 8 test persons)
 - None of the test persons could solve completely (see also 6, 7)
- Incidence 9:**
- Chance to solve 50,0%
 - Stopped by all test persons, but only solved completely once

OUTLOOK AND NEXT STEPS:

- Test of Intercoder-reliability
- Development of distractors and anchor examples (structuring qualitative content analysis, Mayring)
- Online-implementation of the instrument
- Testing the online-instrument
- Final Validation and IRT-Scaling of the Instrument (n=150)

References:

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