

# Exploring Pre-Service Teachers' Video-based Collaborative Diagnostic Reasoning

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## Collaborative Diagnostic Reasoning

- teachers' diagnostic competences are crucial pre-requisites for delivering effective feedback on classroom situations (Prilop et al., 2024).
- authentic cases, such as simulated or recorded classroom scenarios, can effectively foster the acquisition of diagnostic competences (Sailer et al., 2023).
- recent studies emphasized the benefits of collaborative learning for teachers' diagnostic reasoning (Pickal et al., 2023)
- interdisciplinary teacher collaboration promises to enhance professional development (Perl-Nussbaum et al., 2023)

**Collaborative Problem-Solving:** „process whereby two or more agents attempt to solve a problem by sharing the understanding and effort required to come to a solution and pooling their knowledge, skills and efforts to reach that solution“ (OECD, 2013, p. 6)

**Diagnosing:** „the goal-oriented collection and interpretation of case-specific or problem-specific information to reduce uncertainty in order to make [...] educational decisions.“ (Heitzmann et al., 2019, p. 4)

Collaborative Diagnostic Reasoning (CDR; Radkowitz et al., 2022)

## Research Question and Procedure

**RQ:** Which patterns of diagnostic and collaborative activities exhibit teacher dyads during video-based CDR and to what extent do CDR activities differ between interdisciplinary and same-discipline teacher teams?

### Procedure:

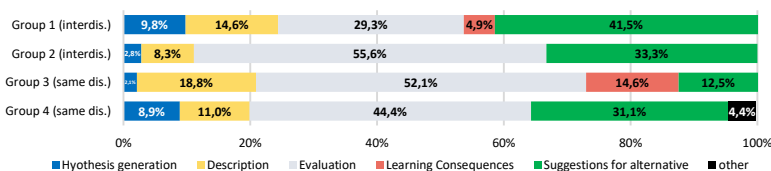
- Individual video-based diagnosis of teacher behavior on a web-based video-platform
- Collaborative exchange in dyads about diagnosis and creation of joint feedback for the observed teacher on the platform ZOOM
- Coding of the transcribed discussions according to **diagnostic** (Heitzmann et al., 2019; Kramer et al., 2021a) and **collaborative activities** (Liu et al., 2015, von Davier et al., 2017)

## Participants

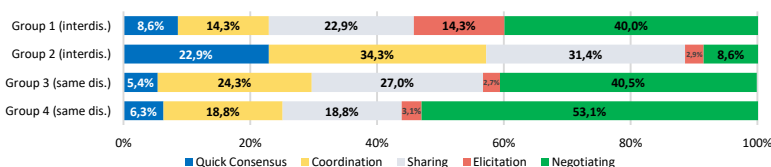
| Group               | Study Discipline    | Age | Sex | Topic of the Video              | Topic of Diagnosis   |
|---------------------|---------------------|-----|-----|---------------------------------|----------------------|
| 1 Interdisciplinary | Chemistry Edu. (MA) | 32  | m   | Science: State of Matter (3:30) | Cognitive Activation |
|                     | Chemistry (BA)      | 27  | f   |                                 |                      |
| 2 Interdisciplinary | English Edu. (BA)   | 42  | f   | Science: State of Matter (3:30) | Cognitive Activation |
|                     | Physics Edu. (BA)   | 19  | f   |                                 |                      |
| 3 Same Discipline   | Science Edu. (BA)   | 25  | m   | Science: State of Matter (3:30) | Cognitive Activation |
|                     | Science Edu. (BA)   | 20  | f   |                                 |                      |
| 4 Same Discipline   | English Edu. (MA)   | 26  | m   | English: Past Tense (5:07)      | Constructive Support |
|                     | English Edu. (BA)   | 42  | f   |                                 |                      |

## Results

### Diagnostic Activities



### Collaborative Activities



## Example for Activities

|           | Coded Segment                                                                                                                                                                                                                                                         | Collaborative Activity      | Diagnostic Activity         |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------|
| Teacher 1 | What did you write down as an alternative approach?                                                                                                                                                                                                                   | Elicitation                 | Suggestions for alternative |
| Teacher 2 | So, um, for example, one could give the students homework as preparation beforehand. Not just listening in school first, but rather: please read this paragraph and prepare it for tomorrow. This way, the students might develop a better understanding of the tasks | Sharing                     | Suggestions for alternative |
| Teacher 1 | Do you think that activates students? I mean, homework and assignments aren't exactly the most popular among students, right? I'm not sure if that really activates them.                                                                                             | Negotiating                 | Suggestions for alternative |
| Teacher 2 | Okay, yeah, that's true, they are still young. (...) Hmm. Yeah, I think I'm being too ambitious, but what is your suggestion?                                                                                                                                         | Negotiating/<br>Elicitation | Suggestions for alternative |

## Discussion

- learners particularly focused on the part of the diagnosis they had already been prompted during their individual preparation (description, evaluation & suggestions for alternatives)
- increased amount of Quick consensus and low amount of Negotiation in interdisciplinary teacher teams
- Differences in collaboration patterns during CDR may be caused by emerging power relations (Perl-Nussbaum et al., 2023)
- due to the exploratory nature of this study and the small sample size, the results are not generalizable.
- in order to balance the effects of other factors, such as gender, age, or expertise level, a replication of the study with a large sample size is being conducted.
- subsequently, conclusions can be drawn regarding which patterns of CDR activities need to be supported at which phase in the collaborative process depending on the group composition of the collaborating teachers

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