Embodied Noticing in Mathematics: Pre-Service Teachers' Observations and Noticings

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Prior research highlights the critical importance of teachers' professional noticing skills (Jacobs et al., 2010; Sherin et al., 2011). Specifically, the concept of "embodied noticing," or the ability to interpret students' physical gestures and manipulations alongside their verbalizations, is gaining attention (Bondurant et al., 2023; Goldin et al., 2011; Walkoe et al., 2023). In this study, we investigated Pre-Service Teachers' (PTs) abilities to notice and evaluate students' embodied actions in mathematics (Bondurant et al., 2020; Bondurant et al., 2023). The aim of our study was twofold: to investigate PTs' skills in noticing students' embodied actions in math, and to determine how such noticing might contribute to more equitable classroom environments. We employed a sequential exploratory design, incorporating both qualitative and quantitative methods (Creswell & Plano Clark, 2017). Initial qualitative data were gathered from 20 PTs who participated in a 15-week online pedagogical course on elementary math education. PTs were asked to watch a video of a student engaged in a math task and to respond to a set of instructional activity prompts (Musser et al., 2013).

Our findings reveal that most PTs are still at the peripheral or transitional levels of noticing embodiment in all three stages: attending, interpreting, and deciding. In particular, they often overlook the embodied nuances and focus on evaluating the correctness of students' written and verbal responses using a deficit lens. This lack of attention to embodiment may be detrimental as it fails to consider the whole child's mathematical thinking and doing, possibly leading to an inequitable evaluation (Gutiérrez, 2008; 2009).

We recommend several interventions to improve PTs' embodied noticing skills:

1. Implement a mandatory multiple-viewing approach.
2. Utilize on-screen annotation tools for enhanced evaluation.
3. Initially, mute videos to emphasize embodiment, then enable sound for subsequent viewings.

Our study contributes to the field by offering refined instructional prompts, exemplars of embodied noticing, a framework for layering embodiment and noticing, and a rubric for evaluating embodiment in educational contexts. Future research should investigate the long-term impact of these interventions on PTs' noticing, teaching practices, and student outcomes.

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# EMBODIED NOTICING IN MATHEMATICS: PRESERVICE TEACHERS OBSERVATIONS & NOTICINGS

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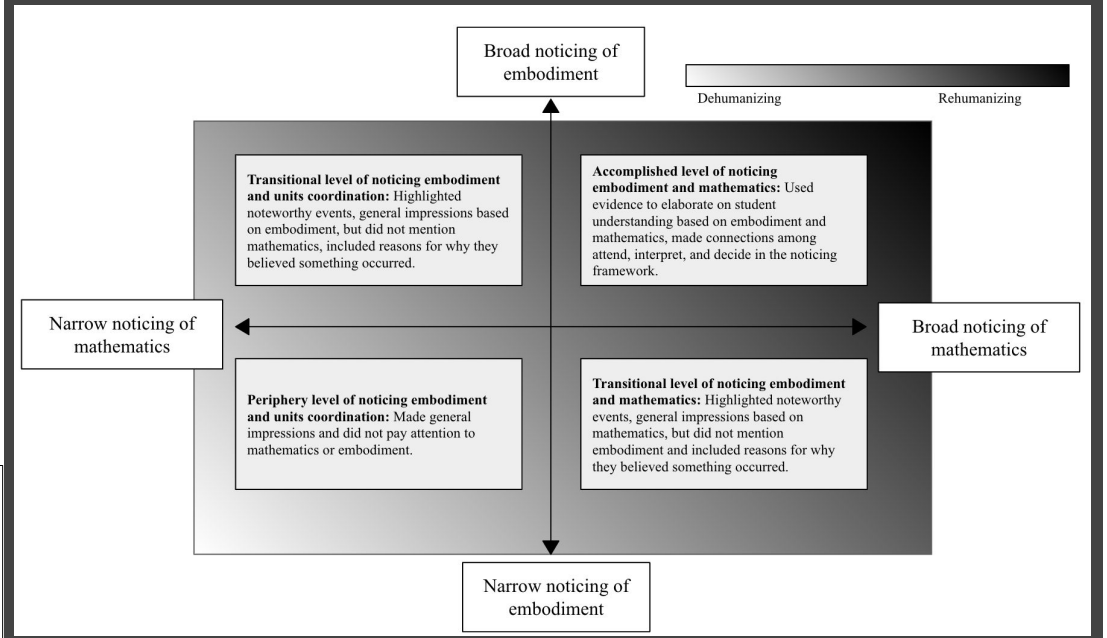
## *Do preservice teachers notice embodiment and how can noticing embodiment rehumanize maths?*

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## Embodied Utterances:

- Eye Motion
- Facial Expression
- Gaze
- Body Poise
- Sound Production
- Body Motion
- Hand Gesture
- Manipulative Use

## Noticing:

- Attending
- Interpreting
- Responding

## Findings:

- Written/verbal focus
- Miss embodiment
- Deficit lens

## Recommendations

- Expand scope of PT noticing
- Emphasize embodied noticing