Teaching Expertise: Behavioral and Neural Advantages of Expert Teachers in Classroom Instruction

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Abstract：
Teaching expertise refers to teachers' excellence in performing teaching tasks, positively influencing effective teaching and student achievement. Yet, the precise attributes that distinguish expert teachers during authentic classroom teaching remain underexplored. This lecture bridges behavioral science and neuroscience to uncover the unique advantages of expert teachers in teacher-student interactions and their underlying neural mechanisms. A systematic review and meta-analysis revealed expert teachers surpass novice teachers in teaching skills, judgment, and classroom interaction strategies, forming a robust basis for high-quality teacher-student interactions. Two eye-tracking studies found that expert teachers exhibit heightened sensitivity to student needs by allocating more visual attention to students rather than teaching materials or irrelevant objects. Their gaze paths are streamlined and efficient, reflecting their adeptness in managing classroom dynamics. A hyperscanning study reveals that during classroom dialogues, expert teachers excel in posing open-ended questions, avoiding verbal dominance, and providing comprehensive feedback. These behaviors enhance inter-brain neural synchrony in the frontal-temporal regions between teachers and students, correlating strongly with improved student test performance. The findings emphasize that expert teachers' strengths lie in their refined interaction strategies and associated neural mechanisms. Their focused visual attention, strategic questioning, and synchrony-driven feedback create a learning environment conducive to student success. These insights lay a theoretical foundation for advancing novice teacher training by prioritizing teacher-student interaction quality.

Keywords：Teaching expertise; Teacher noticing; Inter-brain neural synchrony; Classroom dialogue; Expert teachers

~ All are welcome ~
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