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Learning to enact photosynthesis: Towards a characterization of the way academic language mediates concept formation

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Abstract

Forming new science concepts, such as photosynthesis, is one of the ways students transition from everyday thinking to a more scientific worldview. Academic language (AL) is a central mediator of this transition. However, it is unclear how the features of AL (such as nominalisation and encapsulation), and classroom dynamics based on AL, promote new concept formation. We present an analytical framework to explore the way AL mediates the transition to scientific thinking, extending the simulation model of language understanding. We use this framework to develop a distributed cognition model of classroom dynamics, where the teacher first develops a standard mental simulation from textbook descriptions. She then uses this standard simulation to nudge students' individual mental simulations towards a 'gist simulation', which roughly captures the textbook model. We are currently examining how this model, along with an interactive media system to teach AL, could advance our understanding of science classroom dynamics.