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Representational competence under the magnifying glass: Instructional landscape, student competence, and a refined model of representational competence skills

Abstract: Currently, there is little consensus on how science education researchers conceptualize representational competence. Even though understanding what it means to be representationally competent is fundamental for supporting learners in developing this critical set of skills, there is little agreement about capturing and characterizing these skills. This lack of agreement might be partly due to the lack of specificity and explanatory power of the current models that conceptualize representational competence. Within this talk, I will describe our refined model of representational competence – the Interconnected Model of Representational Competence Skills. This model has been elucidated as part of our efforts to characterize chemistry students' representational competence in the context of representations of molecular structure. Specifically, we conducted semi-structured interviews to investigate how students engage with these representations across tasks associated with multiple representational competence skills. Our results indicate that student competence varies across different skills, which supports the notion that to make comprehensive inferences about representational competence, one needs to characterize and synthesize findings across multiple skills associated with this construct. Furthermore, we found that the skills are interconnected, as some serve as prerequisites for others. These findings informed the Interconnected Model of Representational Competence Skills. Importantly, the model provides new ways of thinking about instruction and research.

Bio: Dr. Maia Popova is an Assistant Professor at the University of North Carolina at Greensboro. Research in the Popova Group focuses on three main areas: (1) chemistry students' representational competence (RC), (2) chemistry faculty pedagogical reasoning and instructional practices, and (3) diversity, equity, inclusion, and access in chemistry education. For more details, feel free to visit our website: chem.uncg.edu/popova/