

INVESTIGATING STUDENT CONCEPTIONS OF SCIENTIFIC MODELLING, ATOMIC STRUCTURE, AND BONDING MODELS

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BACKGROUND

Particles studied in chemistry are not directly observable, and thus can only be expressed using models. Models have been recommended as powerful teaching tools; however, when a student fails to understand the intentions and limitations of pedagogical models, they may create alternative conceptions or fail to learn anything. Hence, student learning with models has been a topic of significant interest, and modelling has become a core concept of chemistry education. This study investigated students' modelling conceptions in the university context, with focus on atomic structure and bonding as vital concepts taught in foundational chemistry using multiple models.

AIMS

This study aimed to investigate students' conceptions of the nature and use of models in science and of Valence Bond and Molecular Orbital theory, to explore links between modelling conceptions and learning of scientific models. Additionally, the extent of links between status of students' conceptions of atomic structure and bonding models have been investigated.

METHODS

This study utilised quantitative (QuPRI concept diagnostic; Roche Allred & Bretz, 2019) and qualitative (open-ended questions and problem-solving interview) to probe students' modelling, atom, and bonding conceptions. Evaluation of conceptions and extent of relationships will be presented, with recommendations for teaching of the atom and bonding with models.

REFERENCE

Roche Allred, Z. D. & Bretz, S. L. (2019). Development of the Quantization and Probability Representations Inventory as a Measure of Students' Understandings of Particulate and Symbolic Representations of Electron Structure. *Journal of Chemical Education*, 96(8), 1558-1570.

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