Learning by doing: Supporting experimentation in inquiry-based modeling

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Abstract

Inquiry-based modeling plays an important role in science; Science makes progress through formulating and evaluating questions, hypothesis, and arguments. The inquiry-based modeling approach also enhances learning about science. However, engaging in modeling requires domain knowledge as well as quantitative skills. The Virtual Ecological Research Assistant (VERA) is an interactive learning environment that supports inquiry-based modeling for citizen and student scientists. VERA provides a visual language for conceptual modeling in the domain of ecology and an AI compiler for automatic generation of agent-based simulations in the process of constructing, evaluating, and revising the models. We conducted a pilot study with college-level biology students (N=15) using VERA for modeling ecological phenomena. The 2-hour pre- and post-test study demonstrates gains in the learning of ecological content knowledge. We also found that the use of the Encyclopedia of Life as a source of domain knowledge helped students create more complex models.