

Diving into matter: Exploring student learning with the particle model enactments in pictures, text and computer simulation.

Pictures and written text are common representations used for introducing models of matter to students. Nowadays, computer simulations have become equally important representations, especially for developing a dynamic understanding of the particle level mechanism. Simulations of the particle model usually start by letting the student determine the initial variables or setup of the system, and then observe the process unfold. Participatory simulations allow students to take part in the mechanism of the process through role-play, thereby being active throughout the simulation.

In my talk, I will present two studies that examine these different representations for learning about the particle model of matter.

The first study compares learning about the particle model in classrooms that used a participatory simulation with classrooms that used an ordinary simulation with no role-play. The second study examines how equivalent pictorial and verbal representations of the particle model, prime different response patterns among students.

Each format- verbal explanation, picture, simulation or participatory simulation, is a different enactment of the model (i.e., external expression that represents and shapes thinking).

I will contrast learning with different formats through the lens of variation theory (Marton & Tsui, 2004), which uses critical features in the way the model is enacted to explain variation in learning patterns.