

# **A Comparison of Students' Collaboration While Conducting Chemistry Wet Lab Experiments and While Using Molecular Design Software**

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How does student collaboration differ in the wet lab and computer lab? How do different tools and representations influence the kind of discourse that occurs and the understanding that students achieve? As part of an interdisciplinary program of research to design and develop a network-based learning environment that facilitates learning and collaboration at a distance, we conducted a study of college chemistry students, as they were engaged in collaborative activities in the real world.

During four class periods over a 12 week semester, we videotaped four pairs of students collaborating to conduct experiments in their laboratory course. For one period, students conducted an experiment in the laboratory. This was followed by a second period during which students analyzed the results of their experiments, using molecular modeling software. Even though the chemical products were the same for these two explorations, the tools and representations that students used were very different: In the wet lab, students had reagents, beakers, Bunsen burners, and vacuum pumps. They used these to synthesize a chemical product—a yellow crystal. In the computer lab, students had a workstation and modeling software. They used these to construct a molecular model of the same product, which was represented as a ball-and-stick or a space-filling figure. Students could optimize the energy of these structures and rotate them in space.

In this study, we examine the discourse and activities of students as they collaborate while using these different tools and representations. We look at the difference between the roles students take during collaboration and we do a content analysis of the chemical concepts that students mention in their discourse to examine the differences between collaboration in the wet lab and collaboration in the computer lab.