

The Assessment and Improvement of Student Problem Solving

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Dr. Cooper's research projects involve several areas of chemistry education. She is interested in the development and assessment of new curriculum materials, and investigating the effects of the changes on how students learn chemistry. She is particularly interested in methods to improve student problem solving both in the lecture and the laboratory.

Current projects include:

1. "The Use of Software to Investigate How Students Solve Problems". Students involved in this project will develop web-based problems that will be incorporated into the IMMEX (www.immex.ucla.edu) software system, which tracks students' actions as they move through a problem. When the results are analyzed we will provide feedback tailored to the students' problem solving strategy. We have found for example that many students benefit from working in groups on complex problems and that this benefit carries over to the individual problem solving activities of students at a later date. Typically undergraduate students who choose to do research in this area are able to develop a story-line for the problem and obtain the experimental data needed. In many cases the students have also authored the problems for publication on the web. In other cases student researchers have chosen to administer the problem to a class of undergraduates, followed by an analysis of the data. In this way we can accommodate a range of students whose interests lie in laboratory work, computer programming, or in educational research, and usually a combination of all three areas are at least touched on.
2. "The Development of Project Based Laboratory Experiments". Our general chemistry laboratories involve group projects that require students to develop their own experimental protocols, and produce both oral and written reports. Undergraduate student researchers are particularly good at the development of these experiments. For example undergraduate students assisted in the development of many of the project based laboratories that are used in the ACS "General Chemistry" Laboratory program. For example "Kidney Stones" "Soap" and "Soil" were all developed with a great deal of input from undergraduate research students.