SCC
ST. CHARLES COMMUNITY COLLEGE

St. Charles Community College

Cottleville, MO

- IPEDS enrollment, Fall 2010: 8,202
- Type of community: Suburban, but draws students from a rural area
- Number of campuses: 1
- Number of chemistry students, Fall 2011: 500
- Number of full-time chemistry faculty: 3
- Number of adjunct chemistry instructors: 12
- Structure: Chemistry is part of the Science Department, which is part of the Math, Science, Health, and Wellness Division
- Focus of chemistry program: Transfer
- Sections of the Guidelines used: 4.1, 4.2, 5.4, 5.9

John Bookstaver, a professor of chemistry at St. Charles Community College (SCCC), used the *American Chemical Society (ACS) Guidelines for Chemistry in Two-Year College Programs* to

- Inform plans to renovate laboratory facilities
- Select new equipment
- Update software

Although the college's chemistry lab was in a building that opened in 1994, it was the first building constructed on campus when the college was new and small. During the past 20 years, the pace of population growth in St. Charles County was among the fastest in the United States. As enrollment in SCCC grew, the college's one chemistry lab was not sufficient. Of even greater concern to Bookstaver were the lab's inadequate ventilation and its limited instrumentation for teaching organic chemistry. "I used to joke that we were teaching organic the way they did in the nineteenth century. About the most sophisticated piece of equipment we had was a melting-point apparatus," Bookstaver commented.

Influencing Renovation Plans and College Practices

Phase IV building plans that the college started in 2002 included moving a physics lab and using that space as an organic chemistry lab. Unfortunately, the money ran out before the college could undertake the lab renovation project. In the meantime, Dean Michael Banks, who went on to become vice president of Academic Affairs, kept the lab on his list of priorities. When the college received additional funds from the state's Lewis and Clark Initiative in 2007, he earmarked them for the organic chemistry lab. Banks started the planning process by pulling out a file that contained the yellowing copies of pages from the 1997 edition of the ACS Guidelines that Bookstaver had provided for the original Phase IV needs analysis.

"It was almost spooky how having those things in print from the ACS really spoke with some authority," Bookstaver said. He continued, "To an administrator who was a theater major, and who therefore knew nothing about chemistry, I think it was very helpful to have specific guidelines to use as a jumping off point, to say, 'OK if we are going to do a good job of chemical education, then these are the tools we need to give our people. Yes, it's going to be expensive, but it's just because that equipment is expensive—it's just what chemists use every day.'"

The influence of the Guidelines was most obvious when the planners worked with the architect to configure the students' workspace. After they tried several arrangements, it became clear that it would be nearly impossible to provide 4.5 linear feet of working bench space per student (as the 1997 Guidelines recommended) for the 24 students that the college had scheduled for each lab class.[1] When Bookstaver suggested the college lower the cap for the organic chemistry lab to 20 students, he was happily surprised that Banks readily agreed. No one on the planning committee objected on financial grounds, nor did they argue that less space per student would be good enough. "They really respected

that they [the authors of the Guidelines] are the professionals in their field," Bookstaver explained.

Initiating Curricular Changes

The new lab and the $285,000 worth of equipment[2] the college purchased for it (based on the equipment listed in the Guidelines [3]) have transformed the college's chemistry program. "I teach organic chemistry completely differently than I did five years ago," Bookstaver stated, going on to list some of the differences.

The new equipment allows students in organic chemistry to do fractional distillations and follow and analyze the fractions with GC. "This allows students to see why they get better separation with fractional distillation than with simple distillation," Bookstaver explained. Students also follow the progress of reactions with GC and GCMS. In addition, they work on a 60MHz NMR and learn how to use various spectrometers. "They leave here with a much more sophisticated set of skills than they [had] before," he said of the students, who typically transfer to baccalaureate biology and chemistry programs.

The curriculum changes also extend into the first-year chemistry courses. Bookstaver and another colleague have rewritten most of the General Chemistry I laboratory exercises to improve students' technical skills. They hope that as more students master basic lab techniques earlier in their academic careers, it will be possible to introduce more advanced instruments during General Chemistry II. The instructors eventually plan to have students collaborate with nearby universities on research projects.

The content of this case study was provided by John Bookstaver. Bookstaver joined St. Charles Community College's faculty as an adjunct instructor in 1994. He has been a full-time faculty member since 1998. Bookstaver holds a bachelor's degree in chemistry from the University of Missouri–St. Louis and one in philosophy from Cardinal Glennon College. He earned a master's degree in chemistry and a Ph.D. in organic chemistry from Washington University. In 2011, Bookstaver received the Governor's Award for Excellence in Teaching and an Emerson Excellence in Teaching Award.

Notes

1. *In Section 4.1, the current Guidelines recommend: "At least 50 square feet of net space per student should be provided, including lab tables and benches."*
2. *The college purchased, an HPLC and IR, AA, NMR, and UV/Vis spectrometers.*
3. *Instrumentation recommendations appear in Section 4.2 of the current Guidelines.*