The Role and Expectations of Academia

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Surveys and conferences managed by ACS, the Center for the Advancement of Process Technology, and other organizations have industry-academia-community partnerships as critical to the success of technician education. Constant communication among the stakeholders ensures that the needs of everybody are met.

Chemical technology programs vs. chemistry programs
Chemical technology programs are distinctly different from chemistry programs. The goal of a typical chemistry program is to prepare students for further study of chemistry. The goal of a chemical technology program is to prepare students for a career in chemistry-based laboratory work.

Both chemistry and chemical technology programs cover the same chemistry topics, and some programs even enroll students in the same core courses. However, chemical technology programs have a strong focus on industry-relevant topics, and the day-to-day concerns of laboratory technicians. Chemical technology programs can be more intense than chemistry programs, featuring heavy emphasis on analysis and laboratory work. Semester-long projects and industry internships are frequently required.

Because students in chemical technology programs learn the same theories and content as those in traditional chemistry programs, chemical technology graduates should be able to matriculate into four-year chemistry or chemical technology programs. However, establishing a matriculation agreement can be difficult, especially if the practices of the two-year program are not well-understood.

Additionally, chemistry concepts in chemical technology programs are often taught in a different sequence than in a chemistry program. Consequently, chemical technology students can sometimes only matriculate if they complete the entire two-year program.

Successful partnerships in academic chemical technology programs
Successful chemical technology programs meet the needs of the local and/or regional community. Identifying and meeting those needs is most readily accomplished with all members of the community—the industries, the K-16 programs, the workforce organizations, etc.—share the responsibility for the chemical technology program. Representatives from the community form partnership to develop and maintain the curriculum, resources, promotion, and productivity of a chemical technology program.

Large or small, strong partnerships play a significant role in the success of a chemical technology program. Field trips to local plants show students where they can be working. Guest speakers from industry can interact with the students and reinforce classroom topics, such as the importance of laboratory notebooks.

Industry can identify the right equipment and vendors for programs to use, sometimes providing second-hand equipment to the programs. Industry also contributes the topics

students need to learn, as well as internships to provide work experience. Industry representatives can make powerful recruiters at career fairs.

By partnering with other academic programs, chemical technology programs can pool resources throughout the community. Because they are focused on preparation for a career, they are often appealing to displaced workers from other industries and marginalized secondary students who may not understand the "point" of education.

Program alignment with industry needs
Naturally, chemical technology programs need to stay aligned with industry needs. One method for achieving alignment is a gap analysis.

ChemTechStandards is the ACS tool for performing a gap analysis. Users can prepare a customized survey using one or more sets of industry-based skill standards for technicians. Industry partners take the survey, identifying skills needed in their specific business. Academic partners complete the same survey, identifying the learning outcomes of their program. The ChemTechStandards software then determines the gap between academic outcomes and industry expectations, and the curriculum can be adjusted accordingly.

The most common use of the gap analysis is for the initial development of a chemical technology program. Repeating the gap analysis every few years is a simple way of ensuring alignment of the program with changing industry needs.

The gap survey can also be used to prepare students for the future. Industry members can complete the survey twice, indicating the expectations for new and experienced technicians. While the process can be time-consuming, the results of these surveys can show students what to expect as their career progresses.

Benefits of partnerships for industry
Alliance-type partnerships benefit more than academia. By providing curriculum information and materials, industries are preparing their own future workforce. Students learn what they need in the classroom and are ready to start work with little or no extra training.

The one-on-one interaction of industry representatives with students also benefits both. Students see the friendly, human side of a company and are more likely to take their talents there. Industry representatives learn just how qualified and professional the students are; they can identify qualified employees easily and shorten the interview process.

Preparing students for chemical technology programs
Both chemical technology programs and industrial laboratories are fast-paced environments where duties and responsibilities change quickly and often.

Secondary teachers wishing to prepare their students for chemical technology programs are encouraged to focus on basic knowledge and skills. Students have to be able to read, write, and perform algebra quickly, with little to no assistance. They also need to be able to think critically and problem-solve with a great deal of independence. Using simple equipment, taking care of glassware, and calculating dilutions are also valuable skills.

Follow-up activities

- Attend meetings, such as ACS, Bio-Link, and BIOCOMM meetings to identify potential partners in your region.
- Conduct a gap analysis. Have respondents fill out their surveys twice: once for new technicians and once for experienced technicians
- Arrange for an industry representative to speak on the life and career of a chemical technician. (Note to industry members: contact your local high school, chemical technology program, or ACS local section to volunteer to be a guest speaker.)
- Host a panel discussion on the needs of industry
- Host a panel discussion on the opportunities in academia.
- Encourage graduates of chemical technology programs to speak on their experiences.