ACS Chemistry for Life™

ACS Office of Two-Year Colleges

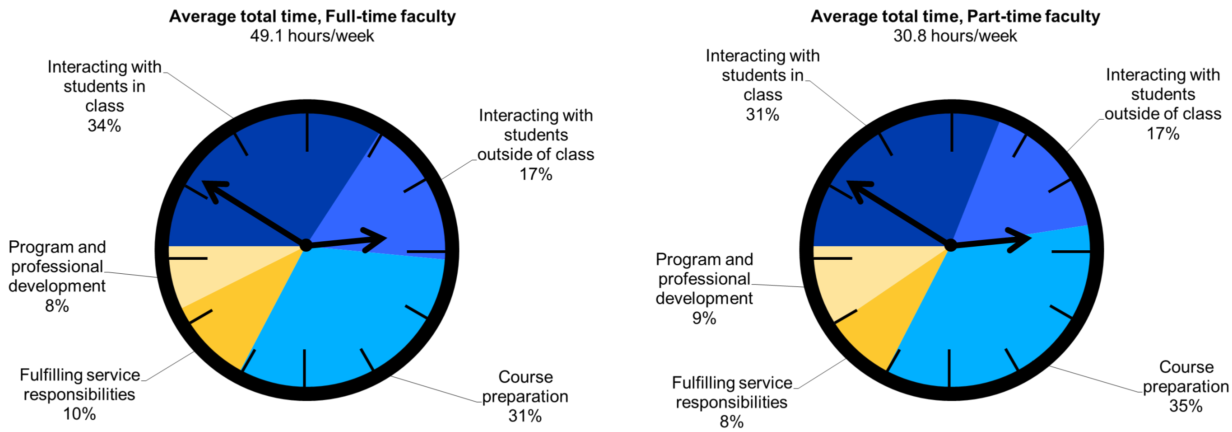
Two-Year College Chemistry Landscape 2013

Faculty Responsibilities and Practices Survey Report

Summer 2013

In Spring 2013, ACS conducted the survey, *Two-Year College Chemistry Landscape 2013: Faculty Responsibilities and Practices*. Approximately 19% of the 3,300 two-year college chemistry faculty and administrators contacted participated in the survey.

The survey provided a snapshot of two-year college workloads, responsibilities, and assessment practices. Selected findings from the survey are highlighted here. Complete data tables, as well as respondent demographics, can be found at www.acs.org/2YColleges.



Activity category	***Specific activities, as listed in the survey***
Interacting with students in class	• Scheduled class time ("lecture") • Scheduled class time ("laboratory")
Interacting with students outside of class	• Meeting with students face-to-face outside of scheduled class time • Responding to student emails • Supporting students through electronic media, such as discussion boards or virtual office hours • Conducting or supervising original research with students • Advising and/or mentoring students
Course preparation	• Preparing for classroom activities • Preparing for laboratory activities • Preparing online course materials • Grading
Fulfilling service responsibilities	• Fulfilling service and administrative responsibilities to the department and/or campus
Program and professional development	• Investigating new developments in chemistry and new educational pedagogies • Participating in professional activities including conferences • Developing new courses and/or curriculum innovations

Figure 1. Average amount of time spent on professional activities, as reported by full– and part-time faculty.*

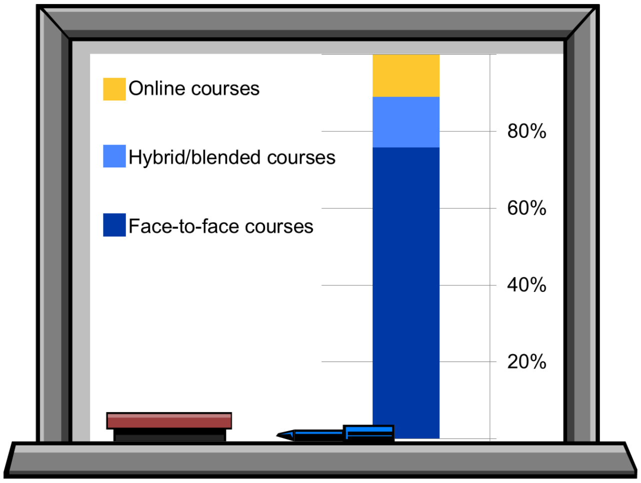


Figure 2. Percent distribution of face-to-face, hybrid, and online chemistry courses taught by 554 survey respondents.

Faculty work week

Respondents were asked to estimate the amount of time per week spent on professional activities (see Figure 1). On average, participants reported spending about one-third of their time preparing for classes and another third teaching in class or laboratory. Just over half of the respondents' work weeks were spent with students inside or outside of class.*

Respondents reported spending the same amount of time preparing for, conducting, and assessing lecture activities as laboratory activities. Less than 10% of faculty time was spent on either professional or curricular development.

About 15% of responding full-time faculty reported spending time on research. According to their survey responses, they spent approximately the same number of hours on their teaching and other responsibilities as the respondents who did not report any research activities. Consequently, their average work week was 54.2 hours, vs. the 48.2 hour work week of non-research faculty.

On average, work weeks appeared to increase with total number of chemistry students. Full-time faculty at institutions with fewer than 100 chemistry students averaged 45.6 hour work weeks, while those at institutions with more than 501 chemistry students averaged 50.5 hour work weeks. The majority of the difference was in the amount of time spent grading, meeting with students outside of class, and responding to student emails.

Over 150 survey respondents reported additional professional activities that were not included in Figure 1. Service to the institution was most commonly reported, including, faculty mentorship, committee or faculty senate work, grant administration, student club advising, and administrative duties. Some respondents engaged in community outreach, such as science olympiads and demonstrations with local K-12 schools. Volunteering for ACS, teaching non-chemistry courses, and working at other institutions were also reported. Time spent on the additional activities was not consistently reported but ranged from 0.5 to over 30 hours per week.

Types of courses taught

Of the 554 respondents who shared what types of courses they taught, 98% taught at least one face-to-face class (see Figure 2 for the overall distribution of courses). About 17% taught hybrid or blended courses;14% taught online courses.

Just over 98% of respondents reported teaching at least one course with some type of hands-on laboratory component. About 12% of respondents taught at least one lecture-only course, and only 3% of respondents reported teaching a course that used computer simulations in place of hands-on experiences.

Institutional support for faculty responsibilities

About 40% of survey respondents reported support was available developing or updating chemistry curricula, 24% for conducting original research with students, 41% for mentoring or advising students, 50% for fulfilling service responsibilities to the department or institution, and 60% for performing administrative duties. Figure 3 shows the distribution of respondents who reported participating in these activities over the past three years.

As shown in Figure 4, participation in research varied with the type of program offered by the institution. Of the respondents from institutions offering chemistry-based technology programs, 37% reported that their institution supported research. In contrast, 18% of respondents from

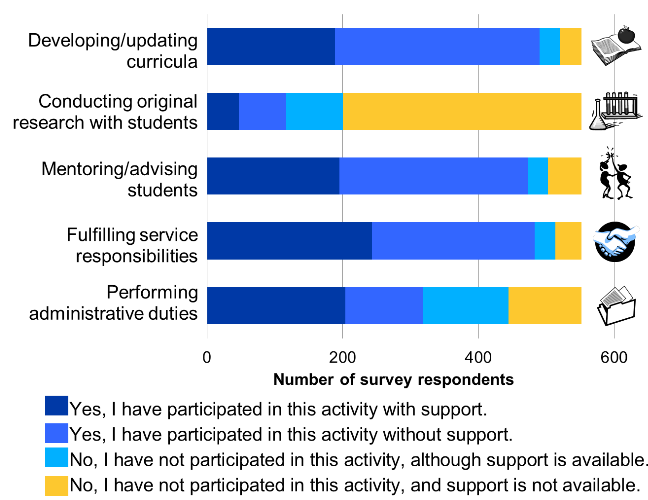


Figure 3. Number of full- and part-time chemistry faculty who reported participating in specified activities over the past three years.

**Work weeks were calculated by adding the number of hours spent on the listed activities, as pertained to chemistry education only. Thus the results do not address the work hours for faculty who teach non-chemistry courses.*

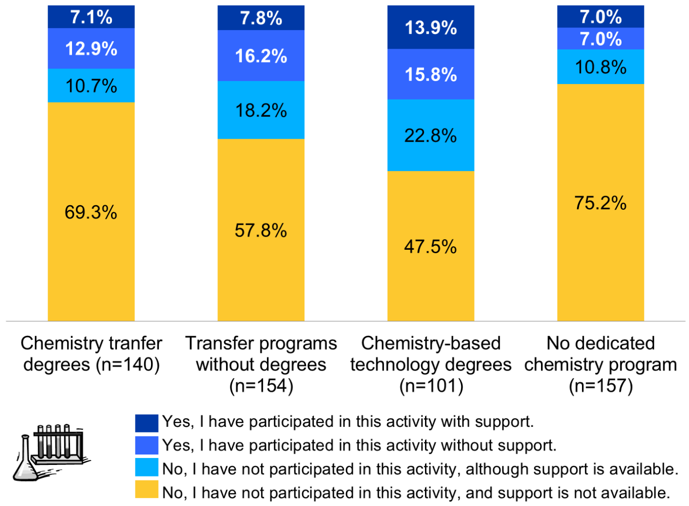


Figure 4. Percent distribution of responses regarding faculty participation in original research with students, by type of program offered.

institutions without dedicated chemistry programs reported that their institutions supported research.

Assessing student skills

As shown in Figure 5, almost all respondents reported incorporating problem-solving and laboratory safety into their teaching. Communication was less common but still frequently reported, followed by teamwork, ethics, and use of chemical literature.

Skills reported in "Other" category included critical thinking, study skills, use of software, professionalism (including time management, organization, and work ethics), career guidance, networking, resume-writing, community and global perspectives, following protocols, and integrity.

Some variations were noted. Among respondents conducting research, 67% reported incorporating ethics into their teaching, and 56% incorporated use of chemical literature. Respondents from chemistry-based technology programs were also more likely to report incorporating these skills.

Figure 6 shows the most common methods respondents reported using to assess student skills. Methods added in the "Other" category included homework, peer evaluations, class interactions, remote response systems ("clickers"), student presentations, end-of-term projects, discussions, laboratory notebooks, journals, experiment design, and student portfolios.

Full-time faculty who were conducting research were more likely to report using topic-specific exams/quizzes (75% of responses) and papers/presentations (49% of responses). Likewise, about 72% of respondents from institutions with transfer chemistry programs reported using topic-specific papers and presentations. In contrast, only 28% of part-time faculty respondents and 47% of respondents from institutions without a dedicated chemistry program reported using topic-specific papers or presentations.

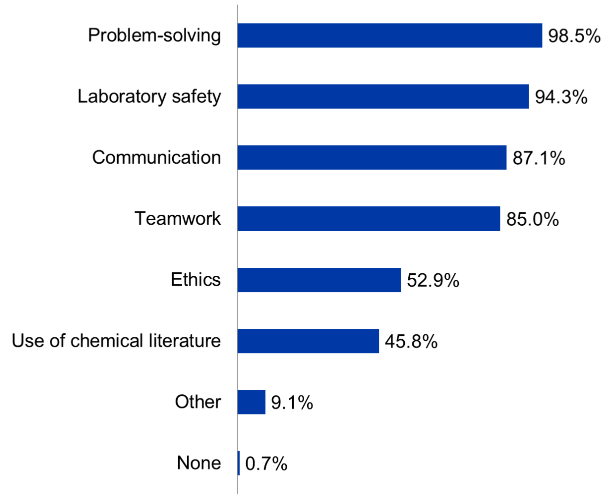


Figure 5. Percent of survey respondents who reported incorporating the identified student skills into their teaching, out of 541 respondents.

Instructor observation was most common among faculty from institutions with fewer than 100 chemistry students. Instructors from institutions offering chemistry-based technology degree programs were most likely to report using evaluation rubrics and lab practical exams (40% and 51% of respondents, respectively).

Useful assessment and teaching tools

In a free-response question, survey participants shared practices they found to be effective for the teaching and assessment of student skills. Some responses are summarized below; a complete list is included with the report data tables at www.acs.org/2YColleges.

Lab reports and classwork

In addition to traditional lab reports, several respondents reported that having students keep traditional laboratory notebooks, in which students write all their procedures, observations, and calculations, provided a useful assessment tool. A number of respondents found student-

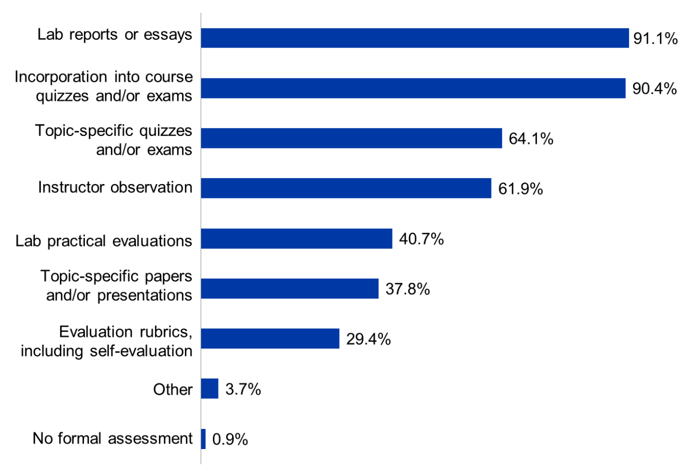


Figure 6. Percent of survey respondents who reported using the listed techniques for assessing student skills, out of 540 responses.

centered teaching methods, such as inquiry-based and peer-led team learning, useful for both teaching and assessing student skills.

Quizzes and exams

Respondents frequently reported using quizzes and exams for assessment of student skills. Exams and quizzes were written and oral, topic-specific and cumulative, planned and unannounced. Some used ACS exams, and some favored open-ended questions when teaching smaller classes. Student response systems ("clickers") were reported to be useful for immediate, in-class assessments.

Instructor observations

Respondents reported that instructor observation provided ample opportunity to assess student understanding and development of non-technical skills, such as teamwork and problem-solving. Inquiry-based learning techniques were reported to provide more time for such observations.

Lab practical evaluations

A variety of lab practical evaluations were reported by survey respondents. Some provided students with unknown samples to analyze, while others required students to develop their own experimental procedures. One respondent set up a variety of stations to test specific skills.

Papers and presentations

Respondents reported assigning reports, posters, and presentations for class and laboratory work, both in groups and individually. One respondent who assigned group poster projects based on literature searches noted that the "ease of finding partners is usually correlated with [students'] skill at working in a group and their flexibility."

Evaluation rubrics, including self-evaluation

A number of respondents used rubrics, frequently sharing them with their students to guide their work. Peer evaluations were also reported to be helpful, especially for group projects and presentations.

Self-assessments were reported to benefit both students and faculty. One respondent reported a mid-term self-evaluation in which students considered how they learned best, how the instructor could help, and what assessment formats work for them. The instructor could then change assessment tactics as needed.

Other

Respondents reported a variety of projects and homework assignments as assessment tools. Student portfolios, customized review sessions, and collaboration with other faculty were also reported.

See the sidebar or the complete survey data tables at www.acs.org/2YColleges for more examples of reported practices.

Examples of reported assessment and teaching tools

Assessment and teaching tools reported by survey respondents included the following:

- Allowing students to keep a problem-solving portfolio to use in exams
- Assigning complex problems requiring teamwork to solve
- Laboratory checkpoints at which students must demonstrate a laboratory technique for the instructor
- 120-hour internship at a pharmaceutical, biotechnology, government, quality control, or environmental laboratory
- Theoretical background research of a student-selected topic resulting in a laboratory demonstration
- Analysis of Material Safety Data Sheets (MSDS)
- Online platform for assessment and peer-review of writing assignments
- Student development of annotated bibliography on a topic of the student's choosing.

More responses can be found at www.acs.org/2YColleges.

Conclusions and more information

Based on the responses to the survey, traditional face-to-face classes dominate the chemistry education landscape. However, alternative formats, such as inquiry-based, hybrid, and online courses, have gained a foothold.

On average, respondents reported spending about half of their working time interacting with students inside or outside of class, with another 30-35% spent grading and preparing for class or lab. Additionally, respondents reported a number of professional activities that were not included in the work week totals.

Respondents reported a variety of tools for assessing student skills incorporated into the chemistry curriculum. A more complete listing of assessment tools and data tables is available at www.acs.org/2YColleges.

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