

## Undergraduate Transitions: Enhancing Student Success

by Jodi L. Wesemann

The demographics and enrollment patterns of undergraduate students are in a state of change (1). The chemistry community is trying to address these changes by looking for ways to increase access to and success in chemistry programs at all types of institutions of higher education. Encouraging the growing number of students attending community colleges—many of whom are from groups underrepresented in the sciences (2)—to continue their education at four-year institutions and universities has become increasingly important. Approaches to solving the problems of transfer were highlighted in a series of sessions at the 18th Biennial Conference on Chemical Education (BCCE) titled Undergraduate Transitions: Enhancing Student Success.<sup>1</sup>

### Overview

The sessions devoted to the topic of undergraduate transitions were of a variety of types: poster presentations, keynote speaker, oral presentations, and two panel presentations.

### Poster Session

Specific programs, resources, and approaches to facilitate transfer across institutions were highlighted during a poster session. There were presentations on the role of chemistry faculty in facilitating articulation between two- and four-year institutions in Arizona and California as well as examples highlighting the benefits of collaboration from inter-institutional programs, such as the integrated science curriculum for elementary education majors offered by four community colleges and a research university in the Chicago area.<sup>2</sup> Resources available from ACS were described, including the College Chemistry Consultant Service, the Two-Year College Chemistry Consortium, and the Student Affiliates Program (3). Other programs, such as those of the National Academic Advising Association (NACADA) and Building Engineering and Science Talent (BEST), provide useful guidance and materials (4).

### Keynote Speaker

In his keynote address, George Boggs, the president and CEO of the American Association of Community Colleges (5), described How Policy and Practice Influence Student Learning. He considered the policies and programs developed by institutions of higher education to facilitate student transitions, some of which are in response to state legislation. Boggs noted that the 26% of community college students who transfer to four-year programs actually graduate at the same rate as the students who began their studies at the four-year institutions. Stating that 42% of all community college students intend to earn a bachelor's degree, Boggs identified the following barriers to successful transition to a baccalau-

reate program: the non-traditional profile of community college students; inadequate advising and support services; and faculty attitudes and perceptions. Faculty who have been successful in helping students overcome these barriers have done so by identifying specific learning outcomes, designing a supportive learning environment, guiding students to sources of information, and connecting students to each other and to support services.

### Oral Presentations

The symposium began with a presentation by Elizabeth Dorland, an NSF Program Officer, on two congressionally mandated programs in the Division of Undergraduate Education programs: the Advanced Technological Education program (6), which has funded the Maryland Articulation Partnership for Teachers at Prince George's Community College and the STEM Talent Expansion Program (STEP) (7), has funded Dream Catchers at Northwest-Shoals Community College.

Another presentation had as its focus advising—a topic that frequently arises during discussions regarding recruitment and retention. Jane Jacobson, Director of Student Academic Services in the Iowa State University College of Liberal Arts and Sciences and a member of the National Board of Directors for NACADA (4), shared advising strategies. There is evidence to support the importance of connections that students have with the discipline, the department, faculty, and academic resources. She stressed that this requires the involvement of both faculty and professional advising staff.

### Panel Presentations

The panel presentation, Transfer Connections: Developing Policies and Programs that Facilitate Student Mobility and Success, introduced the many types of programs and policies that address concerns about student transfer and retention, the mechanisms by which they are developed and implemented, and the roles of various players in the process. Discussions focused on the involvement of chemistry faculty and the chemistry community. The panel members were Douglas Sawyer, moderator (Scottsdale Community College, AZ), Dennis Lehman (Harold Washington College, Chicago, IL), Joan Sabourin (Delta College, MI), and Herbert Strauss (University of California—Berkeley).

A second panel presentation, In Pursuit of Excellence: Maintaining Standards Along with Student Accessibility began by noting the increasing role of assessment and learning outcomes in institutional accreditation. The panelists then shared information about ACS programs and resources; the *ACS Guidelines for Approval of Undergraduate Chemistry Programs* provided by the Committee on Professional Training (CPT), the *ACS Guidelines for Chemistry in Two-Year Colleges*,

the Chemical Technology Program Approval Process, and the DivCHED Examinations Institute (8). A brief report about a SOCED initiative to explore new paradigms for teaching chemistry titled *Exploring the Molecular Vision* (9) highlighted the Committee's continuing discussions about the content and organization of chemistry courses. Discussions revisited the role of chemistry faculty and the chemistry community, focusing on ways to improve communication among institutions. The panel was moderated by John Clevenger (Truckee Meadows Community College, Reno, NV) and had as members Tom Holme (University of Wisconsin–Milwaukee), Jeanne Pemberton (University of Arizona), and Uni Susskind (Oakland Community College, MI).

### Key Recommendations

Recommendations from these sessions fell into three general categories:

- Increase the awareness of the various approaches that are being pursued and the need for involvement of chemistry faculty in these efforts.
- Improve communication among all parties involved—students, advisors, administrators, faculty at the transferring institution, and faculty at the receiving institution.
- Develop partnerships for sustaining regular interactions, promoting the benefits to all partners, and maintaining a focus on the students.

### Increase Awareness

Although many chemists know that the demographics of our society are changing and that an increasing number and an increasing percentage of students are attending community colleges, few are aware of the extent of these trends. Of all undergraduate students, 57% attend more than one institution (1); some attend two-year colleges and then transfer to four-year programs. However, the number of students following alternative pathways in higher education has increased to the point that the term “swirling” has been coined to describe the extent of their mobility (10). Community colleges play a key role in educating and diversifying the scientific workforce (11). Of recent science and engineering bachelor's and master's graduates, 44% had attended a community college; the corresponding rates for Hispanic, American Indian/Alaskan Native, and African American graduates are 51%, 45%, and 44%.

To maximize the access and success of these students, dedicated and coordinated action by both transferring and receiving institutions and their faculty is required. The BEST report on broadening participation in higher education identified eight design principles for successful programs (12):

- Institutional leadership
- Targeted recruitment
- Engaged faculty

- Personal attention
- Peer support
- Enriched research opportunities
- Bridging to the next level
- Continuous evaluation

Chemistry faculty must be involved in the development and implementation of programs that facilitate transfer between institutions and support students who attend more than one institution. Faculty who have been involved in either mandated or voluntary programs can provide key lessons and suggest appropriate strategies.

### Improve Communication

Communication between all parties is crucial. The first step in addressing the many issues involved with student access and success is talking about them. Conversations with colleagues in the same department, other departments, and other institutions can help identify common concerns and possible solutions. Since effective approaches include advising, curricular, and programmatic components, faculty need to consult with advisors, administrators, and students. Remaining focused on the students is key, especially during difficult conversations.

### Develop Partnerships

The key to establishing successful partnerships is designing them so that they benefit all parties. Key contacts at each institution must be involved and a plan for sustaining the partnership mapped out. Strategies for sustaining partnerships include communicating frequently and regularly; reviewing and updating the curriculum annually; sharing data (for assessment) and materials; maintaining referral mechanisms and resources for advising/counseling; promoting outcomes that benefit all players; and holding special events, such as signing ceremonies, luncheons, and community outreach/service programs.

### The Role of the Chemistry Community

Although student transfer issues often involve individual state policies and are much broader than the particular concerns of the chemistry community, participants in the sessions identified several ways that the community could increase awareness, improve communication, and support the development of partnerships. Sharing the information presented in these sessions in meetings, presentations, and publications will help raise awareness. Increasing the involvement of two-year college faculty in ACS activities and hosting events that include faculty from both two- and four-year institutions will foster communication. Data collected on chemistry programs at two-year colleges and students who transfer to four-year programs will assist those forming partnerships. Given the importance of broadening participation in and increasing the understanding of science and chemistry, it is essential for the chemistry community to support and encourage local, regional and national efforts to facilitate undergraduate transitions across institutions.

## Association Reports: ACS Education

### Notes

1. Undergraduate Transitions: Enhancing Student Success was cosponsored by the ACS Society Committee on Education (SOCED), the ACS Committee on Minority Affairs, and the ACS Committee on Technician Affairs. Information about the symposium may be found at this Web site: <http://www.chemistry.org/education/BCCEConference.html> (accessed Nov 2004).

2. The Chicago-area inter-institutional program involves Harold Washington College, Olive-Harvey College, Harper College, Truman College, and University of Illinois–Chicago.

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