Community colleges have been criticized with respect to both the low numbers of students who transfer to four-year institutions and the inadequate preparation of the students who do transfer. However, there is no uniform method for calculating transfer students and the data that do exist on their performance indicate that they do as well as native students. Clearly, articulation between two- and four-year colleges is about more than the numbers of students transferring; it involves admission, exclusion, readmission, counseling, curriculum planning, and course and credit evaluation. Differences in academic cultures and attitudes between two- and four-year institutions and their faculty do create barriers for two-year college transfer students, while establishing transfer criteria and the authority for transfer decisions are also problems. Three styles of articulation agreements currently operate: formal and legal policies, state-system policies, and voluntary agreements among institutions. As part of an effort to examine articulation practices and problems and investigate the feasibility of an approval service for two-year college chemistry transfer programs, the American Chemical Society's Committee on Education sponsored a conference on two-year college programs in November 1995. While the 15 participants decided that such a service would be too expensive, they did develop recommendations for improving articulation related to developing a literature base, promoting a consensus on articulation among all concerned parties, and establishing mechanisms to promote collegiality and trust. A chart of proposed data elements for improving the articulation of chemistry programs is appended. (TGI)
Opportunities and Challenges: Bridging the Two-Year Four-Year College Gap

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Paper presented at "Articulation from 2- to 4- Year Colleges: Is It an Allowed or Forbidden Transition?" a symposium sponsored by Oakland Community College (Auburn Hills, MI, August 4-8, 1996).
"Articulation from Two- to Four-Year Colleges: Is It an Allowed or Forbidden Transition?" (Symposium Title)

Opportunities and Challenges: Bridging the Two-Year Four-Year College Gap
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At Bucknell’s ’94 BCCE, Margot Schumm and Dudley Herron organized a symposium entitled, “Is an Associate Degree Detrimental to an Academic Future?” The symposium was stimulated by an editorial that appeared in the January ’93 issue of the Journal of Chemical Education, which contained these remarks:

“There is a real concern, which has been strongly voiced by many four-year college science faculty, that bachelor’s students who start at community colleges may experience a lesser quality of education, in terms of instruction, expectation levels and facilities, than that generally provided in four-year institutions. If there are deficits in the community college students’ experience, these must be made up in four-year institutions.”

The editor of the Journal based his comments on the results of a Ford Foundation study, which claimed that among the states reviewed (California, Florida, Illinois, Indiana, and Wisconsin) those that had the least reliance on community colleges appeared to have had better success in students earning the baccalaureate degree. The conclusion drawn was that if a baccalaureate degree is important for students, they should begin their studies at a four-year campus.
Community colleges have been suspected, if not accused, of doing an inadequate job with their transfer students. They are constantly having to defend their transfer effectiveness when there are no reliable data. There appears to be no consistent way of counting transfers. Patterns of student flow have never been linear; they swirl. Students drop in and out of community colleges and universities; they take courses concurrently at both types of institutions, and they transfer frequently from one to another. Some start as freshmen at the university, drop out to attend a community college and subsequently return; some take summer courses at community colleges; some attend a community college and do not enroll in the university until several years later; some transfer from the community college to the university in midyear; and some who have advanced degrees start a new career with courses at the community college. All these permutations affect the data sets. In some reports none of these students would be considered community college transfers; in others all of them would. Why are the data so incomplete? There are no incentives to collect them. In addition to their being difficult to collect, state funds are allocated on the basis of student enrollment independent of when they leave and where they go.

Transfer rates vary dramatically from state to state. In Florida, which has a well-articulated system, 42% of all the undergraduates in public universities have previously attended community colleges; in Kansas only 17% of the undergraduates in state universities are transfers. Significant variations among institutions in the same state exist; for example, the campuses of California State University receive ten times the number of transfers as the campuses of the Univ. of California.

Can one estimate the number of community college transfer students nationwide? An educated guess would be that out of the approximately 350,000 two-yr. college
graduates nationwide who are awarded AA and AS degrees annually, approximately 275,000 transfer directly to a university. There are probably another 300,000 to 400,000 transfers who do not complete a two-year associate degree program. This would give us around 625,000 transfers per year out of a total community college student population of 5 million (12-13%). If these figures appear low; consider the number of community college students enrolled in current interest courses, occupational programs, remedial courses, non-credit educational activities, and the number of returning students who have advanced degrees. If we subtract these populations from the 5 million, we are left with 1.7 million students whose primary reason for attending the community college is to transfer to a baccalaureate-granting institution. The transfer rate then increases dramatically to 36%.

Although the absolute number of transferring students has increased in recent years because of expanding populations, the percentage of students who transfer to senior institutions has declined when compared with the increased percentage of students who enroll in courses that lead to immediate employment, job-enhancement skills, or who take courses for personal interest. The mission of the community college is not designed primarily for transfer to the baccalaureate granting institution. If it were, then the community college is a disaster by design. It draws many poorly prepared students and encourages part-time commuters. Its students view the institution as being readily accessible for dropping in and out without penalty. This pattern of ad hoc attendance seems to fit their needs and purposes. For many community college students, especially those who work, those who come from lower socio economic classes and those who are minorities, the choice is not between the community college and a senior institution; it is between the community college and nothing. It is reasonable to expect that on the whole, students who begin their collegiate studies in
community colleges are more likely to drop out or, if they go on to the baccalaureate, to take longer in achieving it. However, the conclusions that critics draw are simply not true with respect to the transferring students' preparation for higher learning.

The story of transfer is a happy one. Data indicate that most community college students who go on to the four-year colleges and universities do quite well. There is an initial transfer shock, with the students' grade point average generally dropping slightly in their first term after transfer. Most of them persist on to the baccalaureate, and by the time they achieve it, their records are not much different from those who began at 4-year institutions. Recent studies show that students who transfer to universities with a large number of credits or with an associate degree tend to do better than those who transfer with only a few credits; furthermore, they perform as well as native students. A Spring '95 study by a team of researchers at the University of Illinois at Chicago and at Pennsylvania State University concluded that "at least during the first year of attendance, the cognitive impacts of two-year colleges may be indistinguishable from those of four-year institutions that enroll similar students." The study investigated cognitive impacts of five 2-year (280 students) and six 4-year colleges (531 students) drawn from all sections of the United States. Controlling for individual precollege ability, there was general parity between 2-yr. and 4-yr. college students on end-of-freshman year reading comprehension, mathematics, critical thinking, and composite achievement.

Clearly, articulation is not only about the numbers who transfer or how long it takes a student to obtain the baccalaureate degree. It is about the movement of students - and their academic credits - from one institution to another: from H.S. to college; from two-year colleges to universities and vice versa. Articulation involves admission,
exclusion, readmission, counseling, curriculum planning, and course and credit evaluation. Ideally, articulation should provide the transfer student an academic fit with minimal duplication of studies and with no "loss of credits". The process presumes that the transfer student from the 2-yr. college is prepared for upper-division studies. Ideally, the transfer function also serves to establish the academic validity and credibility of the transferring institution as a legitimate partner in providing education for the transfer student. But, in reality, it hasn't worked that way. Barriers exist, which have more to do with differences (real or perceived) in academic cultures and attitudes between two-and four-year colleges and faculty than anything else, including:

- Division-based 2-yr. colleges vs. discipline-based 4-yr colleges.
- Teaching emphasis in 2-yr. colleges vs. research emphasis in 4-yr. colleges.
- Accessibility and low-cost tuition at 2-yr. colleges vs. standards and higher cost tuition at 4-yr. colleges.
- A broad a mission at 2-yr. colleges vs. a focussed mission at 4-yr. colleges.
- Non traditional, working, commuting students at 2-yr colleges vs. full-time, residential traditional student at 4-yr. colleges.
- Realistic & practical emphases at a 2-yr. college vs. learning for its own sake at 4-yr. colleges.

These cultural differences often lead to non communication, competition, and suspicion. Establishing the criteria for transfer and who shall have the ultimate authority to make decisions on transfer are problems to begin with. Until recently articulation with 4-year institutions has been largely one-way: a series of policies and procedures, called articulation agreements, prescribed by senior institutions. These agreements provided the structural framework for the process.
Today, there are three styles of articulation agreements that operate in our fifty states: formal and legal policies; state-system policies, in which the state tends to be the controlling agency; and voluntary agreements among institutions, whose main features are cooperation and negotiation rather than unilateral declaration or legislative fiat.

Most states have some type of articulation policy, many of which are merely guidelines (e.g., Missouri, Iowa, Michigan); others act as state mandates (e.g., Nevada, Florida). Florida, for example, has a state legislated system of common course numbers and common transcripts for all public community colleges and universities. Other states including California, have central offices to reinforce articulation agreements among institutions. However their statewide agreements are so weak that the only useful transfer arrangements are those negotiated among sets of institutions. The statewide agreements negotiated in New York’s CUNY (City University of New York) provides for 64 credits toward a baccalaureate program upon transfer. However, the mandated acceptance of these credits is not intended to prevent senior colleges from establishing requirements and prerequisites for discipline majors. Even with the best-mandated agreements, there are loopholes. Students may be guaranteed admission to the university in general, but not to specific programs. Maryland’s system is quite progressive. It accepts all students who have successfully completed the AA degree or 56 hours of credit with at least an overall 2.0 average. In oversubscribed programs, they provide equal treatment for native and transfer students, with the possibility of appeal when there are differences in interpretation.

Regardless of the presence or absence of state mandates, numerous colleges develop articulation agreements with nearby universities. However, more than half the
institutions (both 2-yr. and 4-yr.) have reported no such agreements in force. More than two-thirds of the senior colleges indicate that they would not accept the associate degree as evidence that a student has had appropriate lower-division preparation. Instead, they review students’ prior course work and grades individually, awarding credit toward the baccalaureate only for courses that meet certain unspecified specifications.

On November 3-5, 1995 the American Chemical Society’s Committee on Education (SOCED) sponsored an Invitational Conference on two-year college transfer programs. It was the latest step in a progression of SOCED activities initiated a decade ago focusing on two-year colleges. This invitational was to examine articulation practices and problems and investigate the feasibility of an ACS approval service for two-year college chemistry transfer programs. The approval service could be modeled on the approval service for two-year college chemical technology programs, which began as a pilot project in 1990. It was clear to all the 15 invited participants, who represented two- and four-year colleges, research universities, predominantly minority institutions, SOCED, the Chemical Technology Program Approval Service (CTPAS), the College Chemistry Consultants (C3S), the ACS Committee on Professional Training (CPT), and experts in articulation, that implementing such a service would be too expensive, too intricate an operation, and would not be the most effective action taken at this time. With this established, the focus of the invitational conference became articulation.

The conferees discussed the many aspects of articulation from the both two- and four-year college perspectives and developed the following recommendations to heighten articulation effectiveness. Recommendations ranged from increasing the awareness
in the chemistry community and elsewhere about the articulation issues to developing shareholders in the articulation process within the college communities.

RECOMMENDATIONS:

1. That ACS catalyze thinking about articulation and develop a literature base to reach the pertinent sectors by:

   - publicizing these recommendations in the ACS Education Division web site and in various ACS publications (e.g., 2YC3 Newsletter, CHED Newsletter, Chemunity News, Journal of Chemical Education, ACSESS, Chemical & Engineering News, and local section newsletters.)

   - extending the news of ACS actions in articulation to a broader educational community through such publications as The Chronicle of Higher Education.

   - publishing a monograph on articulation issues and problem-solving strategies, which the AACC (American Assoc of Community Colleges) may undertake.

   - developing an appropriate statement about articulation that the ACS government relations department can use for policy makers on both state and federal levels.

2. That ACS build shareholders in articulation and develop a dialogue among all parties whose central concern is for the student by

   - organizing series of forums and panels that involve leaders in articulation to identify case studies and model articulation programs, obtain innovative ideas about productive practices, build regional support, and emphasize the significance of articulation.

   - holding forums at ACS national and regional meetings, e.g., Two-Year College
Chemistry Conferences and DivCHED’s Chemical Education biennial conferences.

- expanding the forums to other regional and national organizations (e.g., American Association of Community Colleges).

- identifying people who could be added to the local sections speakers bureau to validate the importance of articulation.

3. That ACS develop a consensus on articulation and establish mechanisms to promote collegiality, mutual respect and trust by

- encouraging allocation of institutional and government resources (e.g., time and monies) for collaborative activities between two- and four-year institutions including joint research, seminars, course development, teaching and meetings on articulation.

  At such meetings curriculum, academic standards and other requirements for transfer students could be discussed.

  At some colleges, community college faculty and deans sat at accreditation teams for four-year campuses, and vice-versa, in order to insure courses compatibility.

  Shared academic advising can be worked out with nearby state universities where most transfers go.

  There needs to be an ongoing process of consultation, monitoring, and review of agreements.

  It is known that wherever a university and the community colleges in its region work together closely, transfer flourishes. In some cases the university’s upper division may have more transfers than native freshmen. Arizona State Univ. and the Univ. of MA at Boston serve as examples to this pattern.

  - identifying model faculty exchange programs between four- and two-year institutions.

  - recognizing and rewarding those involved in faculty-faculty interactions,
collaborations and articulation.

- developing articulation expertise among the ACS College Chemistry Consultants and publicizing to administrators and chemistry faculty that ACS can provide a service that will assist them in improving articulation and developing articulation agreements.

- examining the feasibility of developing a guideline for those schools approved by the ACS Committee on Professional Training that focuses on their interactions with two-year colleges. (For example, when a four-year college's enrollment depends on 20% transfer students, accountability for the baccalaureate-granting institution to have formalized relationships with its feeder schools could be established via a guideline).

- conducting a comprehensive survey of chemical education in two-year colleges and establishing a data base of information to facilitate articulation and to develop mutual learning goals among two- and four-year colleges and universities.

This recommendation is very important in terms of establishing the facts. Community colleges have relied far too much on the anecdotal. If there is a two-year college story to be told, it needs to be told effectively with hard data.
Proposed Data Elements to Facilitate Articulation for a Baseline Study of Chemistry Education in Two-Year Colleges

A. Course Equivalency

• course objective
• topics covered (sequence)
• structure
  - hours
  - credit
  - lab
• prerequisites
• evaluation
  - grade distribution
• research component
• legal limits/restrictions

B. Resources

• department size
• technical support
• secretarial support
• facilities
  - instruments
  - multimedia
  - cyberspace - student, faculty, internet/www
• distance learning
• funding

C. Faculty

• credentials
• teaching load
• part-time/full-time
• temporary/permanent
• professional development opportunity
• professional scholarship
• expectations/rewards

D. Students

• part-time/full-time
• demographics
• time/hours to graduation
• retention
• class size
• performance - native & transfer
• status of transfer student
  - simple transfer
  - co-enroll
  - swirling
  - when transfer
• requirements for transfer
• % transfer students
• long-term effects on transfer & native
In conclusion, I see the problems dealing with effective articulation as having to do more with prejudice than with any other factor... and prejudice must be broken down. A self-selected, intrepid student who has already run the gamut of a two-year college chemistry education should be allowed to make his/her transition toward a baccalaureate degree in chemistry with fewer barriers than a woman making her way into the Citadel in South Carolina.

References:
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