As four-year schools become more expensive, academically talented students are increasingly starting their higher education at community colleges. Students can complete their general education and introductory courses in a major discipline there, potentially paving the way for transfer to four-year schools.

Initially designed to provide accessible public higher education for those who couldn’t afford or wouldn’t be admitted to four-year schools, US community colleges are now growing faster than their four-year counterparts, enrolling nearly half of all undergraduates, or a total of 6.6 million students. When part-time students are factored in, the number of undergraduates enrolled at community colleges in the US approaches 12 million.

The demographics are also changing. As of 2005, 42 percent of community-college students were age 22 or younger, a 10 percent increase in this age group over a ten-year period, according to the Community College Survey of Student Engineering. Community colleges now educate an increasing number of immigrants, first-generation citizens, and minority students (http://edlabor.house.gov/documentation/20071220GAOREport.pdf).

Associate degree programs in computer science, information science, and computer technology provide opportunities for potential four-year computer-science graduates. However, transitioning to a four-year school can be challenging. The sequential nature of the computer science curriculum and the programming and problem-solving expectations of junior- and senior-level courses make freshman- and sophomore-year courses crucial.

Several measures could boost community-college transfer students’ chances of success in technical fields. A recent study identified room for improvement in the following areas:

- articulation and transfer agreements between community colleges and four-year schools;
- student recruitment and retention at various points in the community-college process for four-year programs;
- matching two-year curriculum content, quality, and standards with four-year programs; and
- increasing diversity in four-year schools and the professional field.

The Union, New Jersey-based Kean University, where 48 percent of the student population is nonwhite, offers well-defined articulation and transfer agreements, including a statewide website (www.njtransfer.org). However, computer science faculty were concerned that in 2007, only four of Kean’s 1,000 transfer students from seven community colleges selected that subject as a major, as Table 1 shows.

As with many urban universities, the communities near Kean offer several opportunities for beginning higher education, as Figure 1 shows. The computer science department targeted seven nearby community colleges for increased transfers. The colleges had an average minority enrollment of 45 percent, well below the 70-percent minority enrollment in Kean’s computer science department.

The university enrollment numbers clearly didn’t reflect community colleges’ recruitment and retention potential. And transfer students didn’t perform as well at Kean as they had in community college, indicating a disconnect between the two environments’ curriculum content, quality, and standards.

To increase the number of transfer students succeeding in com-
puter science, Kean launched a focused effort to understand curriculum content and standards in the two environments and improve recruitment and retention.

While targeted recruiting might have been considered previously, Kean and other educational institutions hadn’t before taken an organized and methodical approach to recruit and host students on an academic-department level, coupled with faculty peer dialogue.

COMMUNITY COLLEGE TO UNIVERSITY

A review of student-recruitment approaches showed that nontraditional and transfer students were addressed in the same way as students who hadn’t previously attended college. The approach didn’t include department visits or university faculty recruiting at community colleges. Occasional phone calls between university and community-college faculty rarely focused on teaching concerns or curriculum; most discussion addressed regional research conferences or state initiatives.

Curriculum content and standards

The significant objective in a technical field such as computer science is to define what a student must know after two years of study and how this knowledge can translate into success at a four-year school. Particularly in computer science, where initial teaching languages can vary greatly, four-year universities should share expectations with regional community-college faculty to improve the success of students completing an associate degree and transferring to a university-level program.

Disjointed curriculum offerings between community colleges and universities highlight the need for regional faculty communication. To address this, the Kean computer science faculty worked with its community-college peers and identified that half of the regional community-college students were taught in C++ and the other half in Java. When the students transferred to Kean, they would be expected to have Java expertise.

Once Kean faculty members understood the situation, they made accommodations for both C++ and Java programming in initial assignments and provided opportunities for newer students to learn or refresh Java skills outside class. The faculty expected all students to be on common ground by the course midpoint, rather than expecting all to be on equal footing from the beginning of the term.

Smoothing the “jagged edge” of the transition from community college to university is just one improvement that stemmed from the faculty dialogue. There was significant benefit from the intrafaculty discussion of course content, student expectations, and shared challenges in reaching students.

Additional discussion identified courses in the articulation agree-
ment that were no longer equivalent between institutions, posing another challenge for the transfer students.

Recruitment and retention
Proximity is an important factor in recruiting and successfully retaining a community-college student in a university environment. While many potential college students regard attending college away from home as part of the process, first-generation and immigrant students might prefer the structure and cultural similarity of beginning college close to home.

Understanding this, Kean’s computer-science faculty hosted a programming contest for Kean undergraduates and regional community-college students. Recent work has identified the merits of programming contest experience. Hosting the contest at Kean showcased the university’s accessibility and personalized prospective students’ experience by providing access to Kean faculty and students, including some who have transferred.

Extending the invitation to community-college students via their professors conveyed support and encouragement for students’ aspirations to continue their education in computer science. Guidance and encouragement of this nature is often cited as a factor in determining whether students seek further education in their field after receiving an associate’s degree. A group outing underscored the team effort, which has also been shown to increase the probability that students will pursue computer science studies at the university level.

Once at Kean, the visiting students and faculty were offered a continental breakfast and had a chance to meet Kean students and tour the department. The campus accessibility, coupled with a reception, encouraged conversation between faculty and students.

Senior Kean students shared rules of the programming contest (eve. kean.edu/~leew/contest), acting as ambassadors and managing the event. This promoted collegial teamwork, with Kean contestants interspersed with community-college students. To make sure they were programming peers, the Kean contestants were in their initial years of computer science study. During the lunch break, Kean faculty provided semester schedules and information on postgraduate employment and scholarships, and students gathered in informal groups, discussing how each had attacked a given problem.

In support of the students’ dissimilar C++ and Java experience, the faculty judges accepted problem solutions in either language. The discussion focused on the approach to the problem solution, not the mechanics of implementation, which encouraged student dialogue.

The programming problems selected ranged from easy to difficult, with difficult problems being at the data-structures curriculum level. At the end of the day, results were summarized and awards were presented for visitors and Kean students, as well as best overall.

Kean and community-college computer science faculty have discussed curriculum initiatives to understand student preparation levels and potential transfer student interest. Before this effort, peer-to-peer faculty dialogue between respective departments was minimal. Currently, the Kean and targeted community-college faculty talk at least once a week, and community-college faculty visit Kean once or twice a semester.

Kean identified a two-step process for annual follow-up. First, faculty dialogue will continue, with peer visits taking place each fall semester. Second, community-college students will visit Kean each spring semester for a programming contest or other event.

Logging on to department servers and solving programming problems developed students’ confidence. If the students do choose to attend Kean, knowing where to park and how to find the department, recognizing faculty, and being familiar with the campus computer system are all solved problems.

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