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Community Colleges Untapped Source of Diversity in Computer Science Field, According to New Research From CCRC and ETR

New Reports Identify Barriers to Community College Paths to BAs in Computer Fields

New York, November 15, 2016 — Seeking to diversify the nation’s pool of computer scientists and fill shortfalls in the number of graduates, [Community College Research Center](#) (CCRC) and [Education, Training, Research](#) (ETR) are releasing two complementary research reports today that explore ways to encourage community college students to pursue degrees in computer science and related fields. Both studies were commissioned by [Google](#), and the former was authored in collaboration with the [National Student Clearinghouse Research Center \(NSC\)](#).

Of the bachelor’s degrees in computer and information science in 2013–14, only 11 percent were awarded to Black students, 9 percent to Hispanic students, and 18 percent to women, a share that has been declining for three decades. Because community colleges educate a disproportionate number of Black and Hispanic undergraduates, they are a promising source of more diverse degree holders.

“We know that there’s a lack of diversity in technical roles at Google and across the tech industry. We also know that many students, especially female, Black, and Latino students and students from lower income families, aren’t participating in the computer science pathway equally,” said Sepi Hejazi Moghadam, Head of Research & Development, K-12/Pre-Uni Education, Google. “In light of this, we wanted to gain a deeper understanding of the community college pathway to a bachelor’s degree in computer science in order to inform efforts to increase students’ exposure and awareness about CS while also strengthening existing pathways.”

Students who attend community colleges on the way to computer science bachelor’s degrees encounter many challenges and obstacles along the way, according to the new research.

Students who could be successful are sometimes thwarted by limited capacity at both two- and four-year colleges, strict requirements for computer science majors that cannot be fulfilled at all community colleges, and competitive cultures that push them to drop out. Many of the students also face problems common to many community college students, especially the need to contribute to their family's income and to balance work and school.

The research found that students who are successful tend to be from higher socioeconomic backgrounds, are more likely to grow up near a technology hub, and transfer more quickly. Because many community colleges offer applied computer science degrees that are not geared toward transfer, students typically plot out their own individual paths to the four-year college. Transferring early is one strategy for students to avoid taking classes that do not apply to their major.

To address these problems, community colleges and four-year schools need to work together to remove obstacles and support students seeking to transfer into computer science majors. With targeted programs, students who left college to work in tech fields before earning a bachelor's or switched their major away from computer science could be better supported to complete a computer science bachelor's. The papers include a series of recommendations:

- Two-and four-year colleges should work together to create computer science–specific program maps with guidance on the courses that will transfer and guaranteed acceptance if requirements are met.
- Both community colleges and four-year colleges should proactively recruit students into computer science by informing students of the salaries that can be earned, the number of job openings, and the variety of jobs that use computer science skills.
- Community colleges should encourage students to choose a major and a transfer destination, and for those who choose computer science, provide supports to help them stay on track with advising and other supports.
- Colleges can also redesign their computer science programs to ensure that math prerequisites are truly necessary for the subfield, to avoid discouraging students with weaker math backgrounds.
- Four-year colleges must support students after they transfer. Many transfer students who now earn computer science pre-baccalaureate awards switch majors or never earn a bachelor's degree.
- Four-year schools can be more welcoming to female and minority transfer students by setting aside scholarships, housing, and access to programs.

To tap into the diverse pool of students that community colleges already reach, universities and industry must work with community colleges to ensure the needs of community college students are met.

The reports released today are [*A Longitudinal Analysis of Community College Pathways to Computer Science Bachelor's Degrees*](#) by Shanna Jaggars, John Fink, and Jeffrey Fletcher of CCRC and Afet Dunder of the NSC Research Center; and [*Student Perspectives of Community College Pathways to Computer Science Bachelor's Degrees*](#) by Louise Ann Lyon and Jill Denner of ETR.

Google's core mission is to organize the world's information and make it universally accessible and useful. Google creates products to increase access to opportunity, break down barriers and empower people through technology. To help reach these goals, Google works to inspire young people around the world not just to use technology but to create it. There is a need for more students to pursue an education in computer science, particularly girls and minorities, who have historically been underrepresented in the field. More information on Google's computer science education efforts is available at g.co/csedu.

The **Community College Research Center (CCRC)**, Teachers College, Columbia University, conducts research on the major issues affecting community colleges in the United States and contributes to the development of practice and policy that expands access to higher education and promotes success for all students.

The **National Student Clearinghouse® Research Center™** is the research arm of the National Student Clearinghouse. The Research Center works with higher education institutions, states, districts, high schools, and educational organizations to better inform practitioners and policymakers about student educational pathways. Through accurate longitudinal data outcomes reporting, the Research Center enables better educational policy decisions leading to improved student outcomes.

Education, Training, Research (ETR) is a nonprofit organization that aims to enhance the lives of children, youth, and their families. Since 2002, that work has included a focus on increasing diversity in Science, Technology, Engineering, and Math fields. Our multidisciplinary staff does applied research and evaluation, professional development, and program development. We work with federal agencies, universities, community colleges, schools, foundations, and businesses to design and disseminate science-based services, solutions, and programs. For more information, visit www.etr.org/areas-of-focus/it-diversity/.