

Creating the Conditions to Transform Access and Equity in Computer Science Education

Barriers	EQUITY	Teaching & Learning	Challenges
Four of the top 5 issues educators rated as significant barriers [Scale: Significant, Moderate, Low, Not a barrier] to equitable CS education in their schools are systems issues. Only one barrier is within the teacher’s control. (% of respondents who rated as a “Significant barrier”): 1. Funding CS teacher positions (46%) 2. Adding CS courses to master schedule (37%) 3. Recruiting CS teachers (33%) 4. Educator CS content knowledge (28%) 5. Identifying potential CS teachers among current staff (26%) (% of respondents who rated Seasons of CS professional learning as helpful in addressing barrier): 1. Funding CS teacher positions (28%) 2. Adding CS courses to master schedule (51%) 3. Recruiting CS teachers (40%) 4. Educator CS content knowledge (76%) 5. Identifying potential CS teachers among current staff (45%)	Seasons of CS had an explicit equity focus in its mission statement. Inclusive Curriculum, Classrooms, Teaching: • 91% agreed that programming offered a culturally responsive curriculum that was rigorous and relevant. • 89% agreed that they got the tools needed to create inclusive classroom cultures. • 65% agree that programming helped them deliver more culturally competent and relevant CS lessons. • 51% advocated to prioritize equitable access to CS in their school; 26% reported that their school took action. Classroom Practices: (% reporting frequency at “most of the time” or “always” before and after professional learning) • Co-created learning space authentic to students’ experiences, interests, cultures: +22% (21% → 43%) • Connected lessons to students’ lives: +23% (31% → 54%) • Incorporated students’ families and communities: +9% (12% → 21%)	While teachers’ confidence grew in key areas related to teaching and creating inclusive learning environments for all students, their beliefs in students’ CS abilities and potential lagged behind. (% “fairly confident” or “completely confident before and after professional learning) • Supporting students from diverse backgrounds: +28% (49% → 77%) • Engaging learners in a culturally responsive curriculum: +25% (47% → 72%) • Creating inclusive environments for all students: +21% (59% → 80%) • Getting students to believe they can do well in CS: +32% (37% → 69%) Teacher Expectations: • 86% agreed that one of their goals was to show students they are good at CS. • But only 54% agreed that all students can master CS skills. • 62% agreed that all students can understand CS concepts. • 66% agreed that all students can do well on computing tasks with the right teaching and learning supports.	Like barriers prioritized in surveys, focus group participants identified 4 primary challenges to implementing the changes they wanted to make, 3 of which were systems issues they had little power to change. 1. Time. Limited time to: teach intended CS content due to other job responsibilities; create or adapt curriculum and lesson plans during the academic school year; and attend PD during the academic school year. 2. Targeted Ongoing PD. Need: immediate access to answers on CS content questions; opportunities to co-plan with other teachers, share lessons, and receive feedback on instruction – organized by grade level, curriculum used, and teaching approach (i.e., CS lessons/units integration vs. CS courses). 3. Resources. Compensation for additional work hours on lesson planning or running CS-related clubs and activities. Funding to buy materials for high-quality CS learning experiences (e.g., need robots to teach robotics). 4. Admin Support. Enthusiasm, but no commitment of resources or staffing support/help.

Advocacy & Action	However, educators seemed to interpret “equity” as a value and culturally responsive teaching as aspirational – not a <i>requirement</i> for: 1) high-quality CS education, 2) competent CS teaching, or 3) sound implementation of professional learning. • Focus group participants indicated that they wanted to get implementation down first, and they would address cultural relevance later. • 39% advocated that their schools identify barriers to equitable CS in schools; 12% reported their school taking action. • 40% advocated to improve outreach to underrepresented students; 21% reported that their school took action. • Only 17% reported that their advocacy focused “to a great extent” on inclusion of underrepresented student groups.	ACCESS TO CS EDUCATION = ADMIN CONTROL (3% of participants) ACCESS TO HIGH-QUALITY CS LEARNING EXPERIENCES = TEACHER POWER* (81% of participants) Teachers do not have the decision-making power or resources necessary to reduce the most significant barriers to access to CS education. They have <i>some</i> influence on student recruitment and participation. They have the most power in the quality of students’ learning experiences, but this is also limited by the availability of resources and access under admin control (e.g., resources to buy materials necessary for lessons; permissions to access apps/tools). PROGRAMS INTENDING TO MAKE SYSTEMS CHANGE, PROFESSIONAL LEARNING RESOURCES AND PARTICIPANT RECRUITMENT MUST BE STRATEGICALLY TARGETED TO THESE OUTCOMES AND DESIGNED FOR THE LIMITATIONS IN THESE REALITIES.
Teachers advocated for action on system barriers. However, the action uptake by schools was lower on those than teacher-related barriers, like professional development. (% of respondents who advocated for issue vs. % of respondents who reported that their school took action): • CS-related PD for educators in other subjects and for educators teaching CS: 39% vs. 30% • Adjusting the master schedule to expand access to CS: 40% vs. 15% • Introduce CS content/skill into existing courses: 69% vs. 31% • More students take CS courses: 63% vs. 26% • Introduce CS courses for the first time: 60% vs. 44%		