Executive Summary

CS4All: Examining Equity in Computer Science Access and Participation in NYC Schools

By Cheri Fancsali

With Janice Lee, Alexandra Adair, Kathryn Hill, Edgar Rivera-Cash, and Symantha Clough
Acknowledgements

This report represents the work and dedication of many individuals. The entire CS4All evaluation team at the Research Alliance—Janice Lee, Kathryn Hill, Alexandra Adair, Edgar Rivera-Cash, Symantha Clough, Xia Li—worked tirelessly on the research for and development of this report. Other colleagues at the Research Alliance, including Dariana Almeyda-Vega, Kristin Black, Chelsea Farley, Clare Flack, Jim Kemple, and John Sludden, as well as our evaluation partner June Mark from EDC, provided thoughtful and helpful feedback on earlier drafts. Chelsea Farley, our communications director, edited the report, and Dariana Almeyda-Vega, our communications coordinator, managed the final layout, production, and outreach about the report. As always, we are very appreciative of our partners at the NYC Department of Education for their engagement with this research, especially Heather Wilson and Ron Summers. Finally, we would like to thank the Fund for Public Schools and the CS4All Founders Committee for their support of this work.

----------------------------------------------------

Research Alliance publications are supported by a small group of funders who underwrite our core operations, including research capacity, communications, and public engagement efforts. These funders include Carnegie Corporation of New York, the Catherine and Joseph Aresty Foundation, the New York Community Trust, the Wallace Foundation, and the William T. Grant Foundation.

Our publications reflect the findings, interpretations, and conclusions of the Research Alliance and not necessarily those of our funders or individual Steering Committee members.

Steering Committee

Augusta Souza Kappner, Chair
President Emeritus, Bank Street College of Education
Jennifer Jones Austin
Chief Executive Officer & Executive Director, Federation of Protestant Welfare Agencies
David Banks
Chancellor, New York City Department of Education
Mark Cannizzaro
President, Council of School Supervisors and Administrators
Mark Dunetz
President, New Visions for Public Schools
Katherine Fleming
Provost, New York University
Frances Lucerna
Co-Founder and Executive Director, El Puente
Christine Mangino
President, Queensborough Community College
Félix Matos Rodriguez
Chancellor, The City University of New York
James Merriman
Chief Executive Officer, New York City Charter School Center
Michael Mulgrew
President, United Federation of Teachers
Michelle Yanche
Executive Director, Good Shepherd Services

Leadership Team

James Kemple
Executive Director
Cheri Fancsali
Deputy Director
Chelsea Farley
Communications Director

About the Research Alliance

Housed at NYU Steinhardt, the Research Alliance for New York City Schools is an independent, nonpartisan research center that conducts rigorous studies on topics that matter to the City’s public schools. We strive to advance excellence and equity in education by providing evidence about the policies and practices that promote students’ development and academic success.
CS4All: Examining Equity in Computer Science Access and Participation in NYC Schools

Executive Summary

New York City is one of several large school districts around the country that are actively working to promote “computer science for all” students. Launched in 2015, NYC’s CS4All initiative aims to ensure that all public school students learn computer science—especially female, Black, and Latinx students, who are starkly underrepresented in CS education and careers. The initiative is attempting to provide meaningful CS experiences that develop computational thinking, problem-solving, creativity, and critical thinking skills to every student, at least once in each grade band (K-2, 3-5, 6-8, 9-12). As part of the Research Alliance’s ongoing evaluation of CS4All, we have been examining progress toward the initiative’s goals, including the extent to which schools are reaching all of their students with CS (i.e., saturation), as well as the extent to which participation is equitable for girls and Black and Latinx students. Our current analysis looks at the experiences of three cohorts of NYC students.

Key Findings

- Overall, from 2018-2019 to 2020-2021, the district made important progress toward the initiative’s goals. By 2020-2021, most schools in NYC (91%) were offering CS (up from 76% in 2019); 17 percent of schools were achieving the initiative’s participation and equity goals (an increase of 5 percentage points). In total, 44 percent of schools were either achieving these goals or had at least improved on measures of participation and equity during this time period.

- Most of the improvement occurred between 2018-2019 and 2019-2020. Less improvement was seen between 2019-2020 and 2020-2021, which is likely related to the onset of the COVID-19 pandemic and the move to remote instruction.

- Despite positive trends, even in 2020-2021, fully half of schools were reaching only a small portion of their student enrollment with CS (i.e., less than 10 percent), indicating that the district still has a considerable way to go toward meeting the initiative’s goals.

- Schools that made greater improvements were more likely to have multiple teachers participate in CS4All professional development (PD) and to have an administrator or teacher participate in the CS4All leadership PD, suggesting these experiences may have helped facilitate implementation.

- Schools that made greater improvement also enrolled lower percentages of Black and Latinx students on average, pointing to persistent inequities in CS access and participation not only within schools, but also across schools.

- In general, elementary schools were more successful in reaching the initiative’s goals than middle or high schools. High schools lagged behind elementary and
middle schools in terms of achieving CS4All’s goals, with only 4 percent doing so, but middle schools were the most likely to have not offered CS at all, with 21 percent still not having done so by 2021. The relative success of elementary schools is probably related to the fact that, at this level, CS is often integrated into classes that all students take. The CS content at the elementary level may also be easier to grasp for teachers who are new to CS, compared with the more advanced content typically offered in middle and high school courses.

**Recommendations**

These findings point to several recommendations, which are informing the NYC DOE’s strategies for the current and upcoming school years.

- **Target recruitment efforts and support to schools making the least progress toward the initiative’s goals.** Despite promising improvement and progress toward reaching the initiative’s goals over the last three years, there remains a substantial portion of schools that have yet to offer CS, or are only offering it to a small percentage of their enrollment. Further, progress toward CS4All’s goals intersects with preexisting inequalities along lines of race/ethnicity, with schools that are more successful serving lower proportions of Black and Latinx students. Addressing these inequities will require shifting the allocation of limited resources to target those schools and districts that are the furthest behind.

- **Support strategies must be differentiated for schools at different stages of progress and in different contexts.** Our findings point to substantial differences in progress by grade band. Because the way CS is implemented (e.g., integrated vs. stand alone), as well as the content covered, is very different for elementary, middle, and high schools, the challenges and factors related to school success are also different—suggesting a need for more targeted support strategies. The lagging progress of high schools, in particular, suggests the need to consider a new set of strategies and approaches to help those schools reach all their students. Similarly, schools at different stages of progress need different types of support. Schools not offering CS, not making progress, or regressing in their progress likely face different contextual factors and implementation challenges—requiring different solutions—than schools that have been more successful in implementing CS to date.

- **Continue to support and build on CS4All leadership PD.** Our findings suggest schools benefit from leadership PD that facilitates the development of a schoolwide CS vision as well as schoolwide activities and events that increase awareness and engagement around CS. The NYCDOE should continue to invest in and build on these strategies, and encourage both administrators and teachers to participate in leadership PD.

- **Continue to encourage multiple teachers from each school to participate in the CS4All PD.** Our findings, and ample prior research, suggest that school reform initiatives are more successful when multiple teachers participate, allowing the development of communities of practice that foster collaboration and support and mitigate challenges due to teacher turnover. The NYCDOE should continue to encourage groups of at least two or three teachers from each school to participate
in PD, and facilitate collaboration and the development of communities of practice within and across schools.

The NYCDOE has acted on these recommendations in their programming and support efforts, as well as strategic planning for the current school year (2022-2023). This includes using school-level findings to identify schools and districts to target for recruitment and additional support; reserving space in PD sessions for schools making the least progress and with at least 65 percent Black/Latinx student enrollment and/or a high proportion of students in economic need; providing additional support through coaching visits; and developing progressive PD experiences (e.g., introductory, intermediate, advanced) for teachers and school leaders to address different needs.

Next Steps

Future work conducted as part of our evaluation will include in-depth interviews and observations to deepen our understanding of the factors that promote or prevent schools’ progress toward CS4All’s goals, as well as possible solutions. Further, understanding the importance of moving beyond a numerical assessment of equity—which focuses only on whether students achieve parity in terms of access and participation in CS instruction—we are also beginning to collect data on the extent to which students are meaningfully engaged in CS instruction through culturally responsive-sustaining educational practices. In addition, our evaluation is looking at short and longer-term outcomes for students taking CS. This includes CS-related attitudes, perceptions, and achievement; continued interest and engagement in CS course-taking; and post-secondary enrollment and attainment. Future analyses in these areas are crucial to evaluating equity in CS education, and will be used to guide program improvement and ultimately gauge the success of the CS4All initiative.
The Research Alliance conducts rigorous studies on topics that matter to the City’s public schools. We strive to advance equity and excellence in education by providing nonpartisan evidence about policies and practices that promote students’ development and academic success.