

How did Chicago Connected broadband access eligibility and participation affect remote learning engagement and achievement during the COVID-19 pandemic?

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This study examined the **educational engagement and achievement effects** of Chicago Connected, a COVID-19 pandemic-era broadband internet expansion initiative led by Kids First Chicago, the City of Chicago, Chicago Public Schools (CPS), philanthropic donors, and other stakeholders. It aimed to connect 100,000 students in 60,000 households to free broadband internet service for up to four years, starting in the summer of 2020.

These analyses focused on students in grades 5-8, asking:

1. What proportion of students eligible for Chicago Connected **opted to participate in the program**?
2. Did students' eligibility for, and participation in, Chicago Connected affect:
 - a. **Engagement in remote learning** during the fall 2020 semester?
 - i. Engagement was measured with a three-component index, drawn from Google Classroom data: 1) mean number of minutes logged in per school day with a staff member; 2) mean number of log-ins per day; and 3) percent of school days in which the student logged in at least once.
 - b. **Fall 2020 and spring 2021 GPAs**?
3. Did the effects of program eligibility and participation on these **outcomes differ for students with high vs. low pre-pandemic GPAs**?

Findings

Eligibility & Participation

About 70% of 5th-8th grade students continuously enrolled in non-charter CPS schools since fall 2017 were deemed eligible in summer or fall 2020 for Chicago Connected, based on their level of socioeconomic disadvantage. Approximately 30% of eligible students opted to participate, receiving either a Chicago Connected-sponsored wired connection and/or hotspot device.¹

Engagement & GPA

Differences in engagement and achievement between students with high and low GPAs grew more sharply during the pandemic period among Chicago Connected participants, compared to otherwise similar, eligible non-participants.

¹ Our main analyses excluded 5th-8th grade students in our sample whose households were deemed severely disadvantaged, based on the program's eligibility criteria. We exclude them because robustness checks suggested that they endured uniquely difficult challenges during the pandemic that we could not adequately adjust for when isolating the effects of program eligibility and participation. For similar reasons, we excluded students from households that only received a hotspot device from all analyses examining the effects of program participation on remote learning engagement and achievement.

- **Engagement**
 - Among eligible students, *participation* was associated with an increase in remote *learning engagement* for students with high pre-pandemic GPAs (by 0.06 SD) and a decrease in remote learning engagement for students with low pre-pandemic GPAs (by 0.11 SD).
 - For students with high pre-pandemic GPAs, *eligibility* was associated with an increase in remote *learning engagement*, measured in fall 2020 (by 0.04 SD), but a decrease in remote learning engagement for students with low pre-pandemic GPAs (by 0.10 SD).

- **GPA**
 - Among eligible students, *participation* was associated with a 0.06 point higher fall 2020 GPA for students with high pre-pandemic GPAs. For students with low pre-pandemic GPAs, participation was associated with a fall 2020 GPA that was 0.05 points lower.
 - Spring 2021 GPAs showed a similar pattern, with a 0.05 point higher GPA for students with high-pre-pandemic GPAs, and a 0.05 point lower GPA for students with low pre-pandemic GPAs.
 - Program *eligibility* was associated with a slightly lower fall 2020 GPA among the full analytic sample, but the magnitude (-0.05 GPA points) did not vary by students' pre-pandemic academic performance.

Policy & practice takeaways

- The growing disparities in engagement and achievement between students with high and low pre-pandemic GPAs among Chicago Connected program participants suggests increased access to technology may have contributed to the widening of educational inequities observed during the pandemic – and its aftermath.
- These findings reinforce growing concerns that technology access may be a double-edged sword for student engagement and achievement. Generating additional high-quality evidence on how technology influences outcomes and how the effects of access may vary for different student groups is imperative.
- As access to technology continues to expand, families, educators, and policymakers need to know which students are most likely to need additional supports. Researchers can help clarify what types of supports would be most effective through additional mixed-methods studies that examine how high-achieving students may be leveraging digital technologies to experience educational gains and why low-achieving students may experience academic setbacks when digital technologies are more readily available.

Limitations & considerations

- Although our estimates of Chicago Connected's effects carefully accounted for selection bias, key features of the program's design—including the lack of randomization in determining eligibility and the continuous expansion of eligibility throughout the time period of interest—raise the possibility that the engagement and achievement differences ascribed to program eligibility and participation reflected unobserved differences across student groups, rather than the impact of the program itself.
- The technology access of ineligible CPS students and Chicago Connected-eligible non-participants was not observed, precluding us from clarifying whether and how students' technology access changed as a result of the program.²

² Many eligible, non-participating students likely had access to some form of internet connection during the remote learning period (including, potentially, through access to a smartphone data plan only). We thus interpret our results as capturing the effect of students and families accessing a more reliable, higher-speed connection through the Chicago Connected program, compared to an alternative scenario in which they experienced minimal change in broadband access over time.

- Digital technology use in the educational setting, and its educational effects, may have looked very different in pandemic-era Chicago than in other environments.
 - Future studies could examine differential engagement and achievement impacts of digital technology, particularly broadband internet, by students' academic aptitude, in non-pandemic contexts and in other geographic locations beyond Chicago.
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Data & methods

- Our analysis focused on 77,056 students who were in 5th-8th grade in fall 2020 and who were continuously enrolled in non-charter CPS schools from fall 2017-fall 2020.
 - About 70% of these students were eventually deemed eligible in summer or fall 2020 for Chicago Connected, and approximately 30% of these eligible students within our analytic sample participated in the program.³
- Our comparisons are generated from ordinary least squares multivariate models predicting students' pandemic-era remote learning engagement index and academic achievement outcomes as a function of the main variables of interest (i.e., program eligibility or participation). We adjust for several student control variables, measured in fall 2020, including: grade level, gender, race/ethnicity, housing instability, household socioeconomic status, disability status, English proficiency, household size, and degree of structural disadvantage within the students' home neighborhood. Our models also include measures of students' pre-pandemic academic achievement and standardized test scores, as well as pandemic-era controls, including the proportion of spring 2020 courses passed, and the number of courses taken in spring and fall 2020.

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Full study:

Schachner, J.N., Marwell, N.P., de la Torre, M., Gwynne, J.A., & Allensworth, E.M. (2025). *Heterogeneous effects of closing the digital divide during COVID-19 on student engagement and achievement* (Working Paper). Providence, RI: Annenberg EdExchange. Retrieved from: <https://edworkingpapers.com/ai25-1153>.

Note: This summary is based on the working paper above. Working papers are shared to make technical details publicly available. They have not been peer reviewed or subject to the full review by Consortium research and communications staff that accompanies official Consortium publications. Working papers do not go through the Consortium editorial process, and all opinions are the responsibility of the author(s).

About the authors

Jared N. Schachner is a Research Scientist at the USC Sol Price School of Public Policy in Los Angeles. Prior to USC, Dr. Schachner participated in a postdoctoral fellowship at the University of Chicago's Mansueto Institute of Urban Innovation

³ For more details, see de la Torre, M. (2023). *Exploring Chicago Connected: Participation patterns*. Chicago, IL: University of Chicago Consortium on School Research.

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Julia A. Gwynne is a Senior Research Scientist at the UChicago Consortium. Her research spans a range of areas including, high school graduation rates, early warning indicators, school closings, charter high schools, and preschool attendance. Across these areas, she is principally interested in identifying the academic skills and behaviors students need to be successful in their current grade level and beyond. She is also interested in how district policies support the ongoing development of high-quality instructional practice. Her research has received outstanding publication awards from Division H of the American Educational Research Association.

Elaine M. Allensworth is the Lewis-Sebring Director of the UChicago Consortium, where she has conducted research on educational policy and practice for over 25 years. Her research examines factors influencing students' educational attainment, school leadership, and school improvement. She works with policymakers and practitioners to bridge research and practice, serving on panels, policy commissions, and working groups at the local, state and national levels.