

## RESEARCH BRIEF

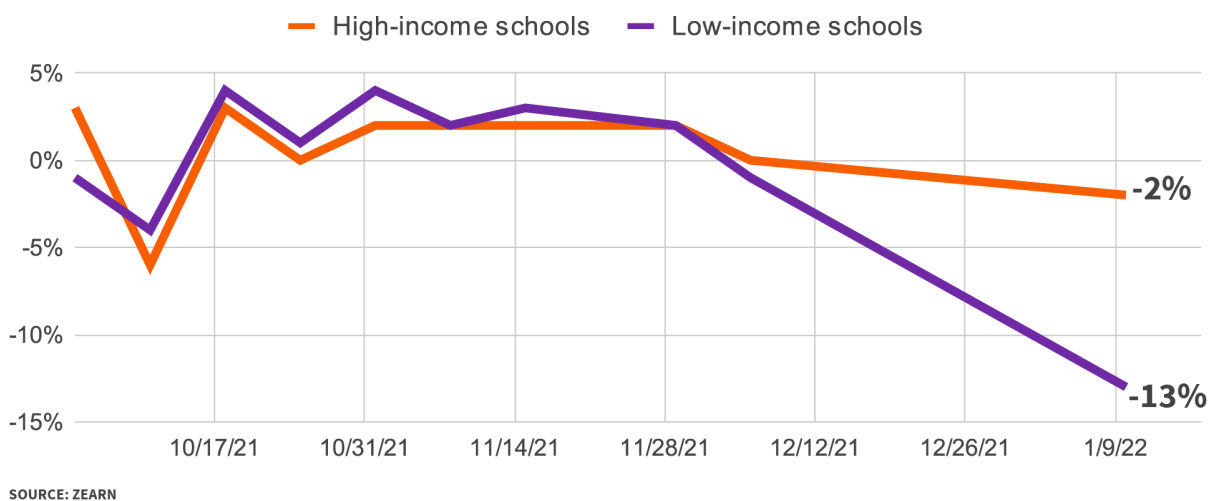
## With Omicron, another inequitable shock in math learning

The rise of the highly transmissible Omicron variant has disrupted learning across the country, with [some schools and districts opting to return to virtual learning](#) and some others [needing to close because of staffing shortages](#). Even where schools have remained open, [high absence rates of students and teachers](#) have been reported.

One of the evident consequences: **a troubling re-emergence of a gap in participation in math learning between students in low- and high-income schools.**<sup>1</sup> This most recent [K-shaped missed learning](#) shows that students in low-income communities are experiencing a new and significant impact to their learning during this period of disruption — while students in more affluent communities are largely unaffected. This new finding comes on the heels of the [reported five months of learning loss](#) low-income students have already experienced as a result of the pandemic.

Since March 2020, data from Zearn’s nonprofit online math platform have been used by Harvard and Brown University researchers at Opportunity Insights to provide real-time visibility into how the pandemic is impacting math learning by socio-economic status and geography. In short, participation data from Zearn—students logging in to the math platform—revealed [the unequal gaps in participation in online math learning from earlier in the pandemic](#). New research from Zearn shows that while it appeared as though K-shaped missed learning had started to recover in Fall 2021, a new K-shaped shock has emerged in math learning amidst the Omicron surge, comparable to inequitable trends last seen at the outset of the pandemic.

**Figure 1: Nationwide change in weekly student participation in online math learning on Zearn, relative to Fall 2021 baseline**

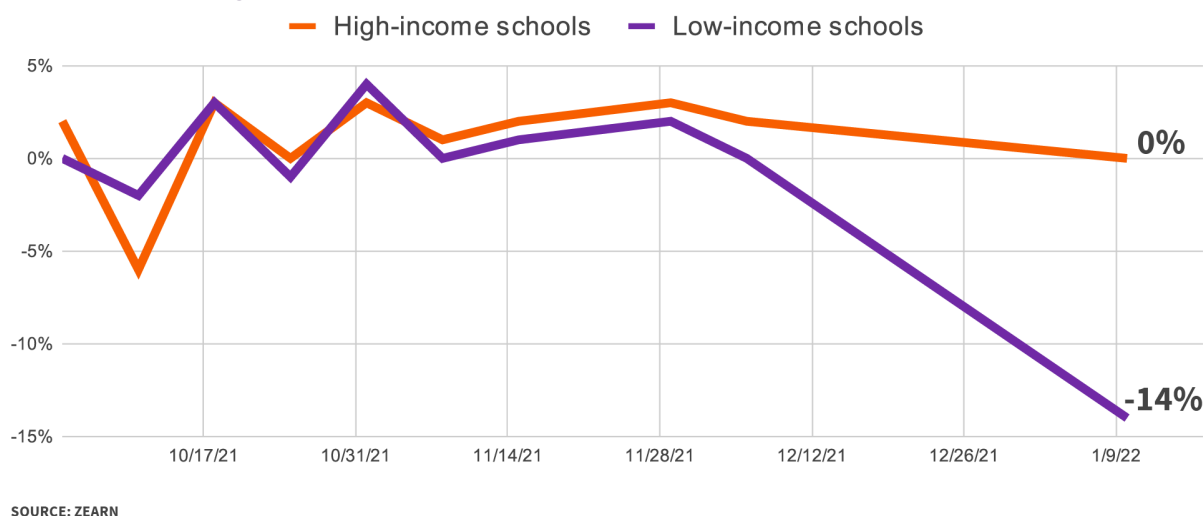


<sup>1</sup> Based on school-level percentages of students eligible for free or reduced-price lunches (FRL). Low-income defined as those with 75%+ of students FRL-eligible. High-income defined as <40% of students FRL-eligible.

Researchers at Zearn analyzed aggregated and anonymized data from a nationally representative sample of one million students using the math platform during the 21-22 academic year. Researchers then compared January 2022 math participation rates to a Fall 2021 baseline<sup>2</sup>. In October and November 2021, nationwide online participation in math learning trended similarly for low- and high-income students (see Figure 1). However, starting in January 2022, student participation among low-income schools dropped 13% compared to Fall 2021 baselines, while students in high-income schools have been minimally impacted, with their participation down just 2% (see Figure 1).

While this troubling re-emergence of inequitable missed learning does not appear to be correlated to school closures as represented in the Burbio data set<sup>3</sup>, there is a correlation between learning participation gaps and COVID-19 infection rates. As cases have risen dramatically across the country, in-school learning has been disrupted even in absence of school closures. Zearn researchers analyzed math participation in states with above- and below-average infection rates from the NYT data set<sup>4</sup>, analyzing the change in participation during January 2022 compared to Fall 2021 baselines. In states with above-average infection rates, student participation among low-income schools has dropped 14%, compared to Fall 2021 baselines, while students in high-income schools have not been impacted (see Figure 2). In states with below-average infection rates, the divergence in participation between high-income and low-income is less severe (see Figure 3).

**Figure 2: For states with above average infection rates<sup>5</sup>, change in weekly student participation in online math learning on Zearn, relative to Fall 2021 baseline**



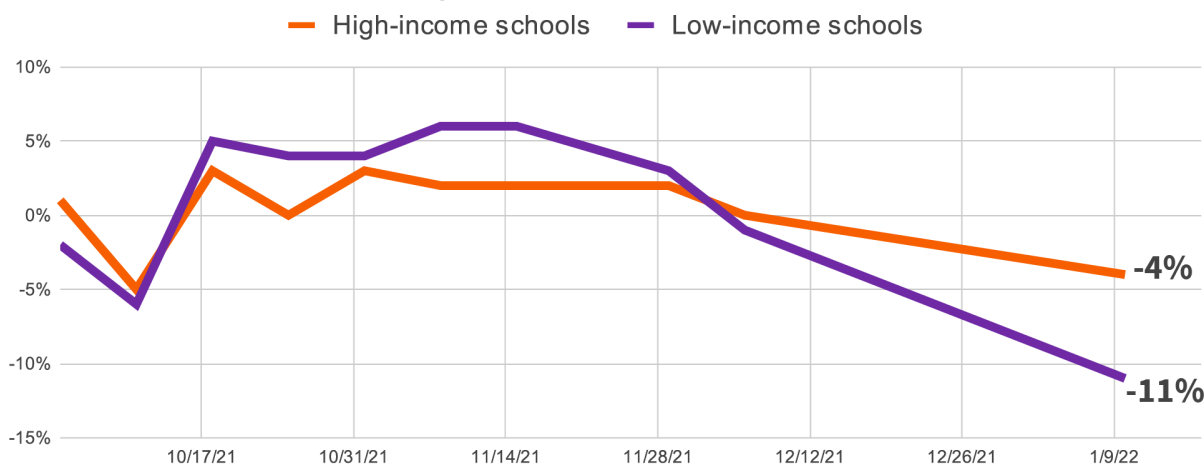
<sup>2</sup> Baselines are calculated by taking weekly average student participation for the weeks of 10/4, 10/11, 10/18, and 10/22.

<sup>3</sup> State-by-state school closure data was scraped from [Burbio's K-12 School Opening Tracker](#); no correlation was found between rate of students affected by school closures in each state versus the emerging participation gap in high-income vs. low-income schools

<sup>4</sup> State-by-state COVID case rates pulled from New York Times' [Case Count interactive](#) (using daily average cases per 100,000). States were then categorized relative to national averages as "below average" or "above average".

<sup>5</sup> Includes all states with daily average case rates higher than U.S. average of 238 per 100,000; as of 1/17/22. States in this category include AK, AR, AZ, CA, CO, CT, DC, DE, FL, HI, KS, LA, MA, NC, ND, NJ, NY, RI, SC, UT, VT, WI. Per [Coronavirus in the U.S.: Latest Map and Case Count \(New York Times\)](#).

**Figure 3: For states with below average COVID-19 infection rates<sup>6</sup>, change in weekly student participation in online math learning on Zearn, relative to Fall 2021 baseline**



SOURCE: ZEARN

While 95% of schools have remained open, Zearn data show that the situation on the ground is far more complex. Districts that have remained open have experienced [high student and teacher absence rates](#), either because they or someone in their family has contracted the virus or they have needed to quarantine after exposure. In many districts, particularly those that serve students from low-income communities, the [digital divide continues to exist](#). The result is that while schools are open amidst Omicron surges, students from low-income communities are missing critical instructional time. While Omicron is everywhere, its inequitable effects are not. Students who missed the most learning during the 2020-21 school year are now missing the most again.

**About Zearn:** Zearn is the nonprofit educational organization behind Zearn Math, the top-rated math learning platform used by 1 in 4 elementary students nationwide. Learn more at [about.zearn.org](https://about.zearn.org)

<sup>6</sup> Includes all states with daily average case rates lower than U.S. average of 238 per 100,000; as of 1/17/22. States in this category include AL, GA, IA, ID, IL, IN, KY, MD, ME, MI, MN, MO, MS, MT, NE, NH, NM, NV, OH, OK, OR, PA, SD, TN, TX, VA, WA, WV, WY. Per [Coronavirus in the U.S.: Latest Map and Case Count \(New York Times\)](#)