

**In-Person vs. Virtual: Learning Modality Choices and Movement During COVID-19
Varies Depending on Students' Ethnicity and Prior Academic Performance**

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Abstract

The COVID-19 pandemic has had a massive impact on education systems in the U.S, prompting a variety of changes to school learning environments. This study investigates student/family choices of learning modality in one large school district in the U.S and examines how these choices differ by students' race/ethnicity and performance level. Results revealed that the majority of White, Hispanic, and multiracial students initially selected in-person learning, whereas the majority of Asian and Black students selected virtual learning. Although 60% of Black students initially selected virtual learning, half of Black students transitioned to in-person learning by the end of the Fall semester. Further, only 23% of low-performing students started with virtual learning, and more than half of these students moved to in-person learning during the Fall. Findings suggest that student choice of learning modality varies depending on their race/ethnicity and academic performance, and these choices may have implications on their learning experiences and achievement during COVID-19.

Keywords: Learning Modality; In-Person; Virtual or Remote Learning, COVID-19; Race/Ethnicity; Performance Level

BACKGROUND

As COVID-19 has spread around the world, *how and where students learn* has dramatically changed. Approximately 90% of the U.S schools shifted into virtual learning in April 2020. For the 2020-2021 school year, school districts in the U.S were given the autonomy to decide how they would educate their students. While many school districts offered virtual or hybrid learning as the default, others asked students and families to choose their preferred learning modality—in person learning at school or asynchronous virtual learning at home. Some studies have reported

that students' choices vary widely by race/ethnicity and socio-economic status (Dorn et al., 2020; Parolin & Lee, 2021). However, given the spikes of COVID-19 cases throughout November and December, little is known about changes in students' learning modalities during this time.

We examined families' initial choice of learning modality for Fall 2020 as well as the changes and movement between learning modalities between the fall and spring semester.

Further, we investigated how modality choice and movement varied by prior academic performance in addition to variation by race/ethnicity. Our research questions are as follows:

1. What percentage of students in a district chose in-person or virtual learning for the school year during the COVID-19 pandemic?

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2. If students changed learning modality during the semester, which type of movement occurred more frequently?

3. What are the characteristics (race/ethnicity, prior performance level) of students who chose in-person, virtual, or changed their modality selection during the semester?

METHODS

The initial sample consisted of 4,092 seventh-graders from 10 middle schools in one suburban school district in the southeastern U.S. The school district offered students and their families a choice of learning modality (in-person or asynchronous virtual) for the school year, and they families could change modality during the semester. The school district provided data reporting students' learning modalities at two-time points (i.e., August/September 2020 and December 2020/January 2021). We excluded the students with missing data on learning modality, race/ethnicity, and academic performance level as categorized by the district, and the final sample included 3,488 students. Table 1 shows the demographics of the sample by gender, race/ethnicity, and performance level.

For RQ1 and RQ2, we conducted descriptive statistics analyses and created a Sankey diagram that depicts student choice and movement between modalities. For RQ3, we performed Chi-square tests with Bonferroni post hoc tests.

RESULTS

1. Students' Initial Choice of Learning Modality

61.5% of students initially selected in-person learning, and the remaining 38.5% chose asynchronous virtual learning (Table 2). Over 73% of White, Hispanic, and multiracial students initially selected in-person learning, while less than 41% of Black, American Indian, and Asian students did. Over half (53.4%) of the distinguished learners initially selected virtual learning, while more than 70% of the students in other levels chose in-person learning.

2. Movement in Learning Modality

87.3% of students did not change selection of modality (60.2% stayed in-person, 27.1% stayed virtual; Table 3). However, 12.7% of students did change selection over the semester. Of those students who changed, 11.4% moved from virtual to in-person learning, while only 1.3% moved from in-person to virtual learning. Figure 1 depicts the number of students who moved between virtual and the ten in-person schools over the semester.

3-1. Choices and Movement by Race/Ethnicity

A chi-square test revealed that modality choices and movement significantly differed by student race/ethnicity, $\chi^2(18, N = 3,488) = 1476.67, p < .001$, Cramer's $V = 0.38$. Bonferroni post hoc LEARNING MODALITY DURING COVID-19

tests identified a significant difference between Asian students and three other race/ethnicity categories (Black, White, Pacific islander) for moving from virtual to in-person. 84% of Asian students who started with virtual learning remained virtual, while 50% of Black, 53% of Hispanic, and 43% of White students who started with virtual learning moved to in-person classes (Figure 2).

3-2. Choices and Movement by Performance Level

A chi-square test showed a significant association between academic performance level and student choices and movement, $\chi^2(9) = 300.42, p < .001$, Cramer's $V = 0.17$. Whereas the majority of the beginning, developing, and proficient learners initially selected and stayed in in person learning, less than half of distinguished learners stayed in in-person learning (Figure 3). Among students who initially selected virtual learning, more than half of the beginning learners moved to in-person learning, whereas less than a quarter of distinguished learners moved to in person learning.

CONCLUSIONS

We investigated students' and their families' choice of learning modality during the COVID-19 pandemic, movement between modalities during the semester, and their relations with race/ethnicity and academic performance level in a single district. Results showed that over 60% of the students initially selected in-person learning, while 40% of students selected virtual learning. Student choice of learning modality varied significantly depending on their race/ethnicity and academic performance. In particular, non-white students tended to initially select virtual learning, which was congruent with previous findings (Parolin & Lee, 2021). In addition, the majority of the movement was students moving from virtual to in-person learning rather than from in-person to virtual learning, and the movement significantly differed by race/ethnicity. About half of Black and Hispanic students who initially selected virtual learning moved back to in-person classes, while most Asian students remained in virtual learning. Plausible explanations for these results might be due to a higher proportion of multigenerational

households and anxiety related to political and racial tensions among Asian families (Balingit et al., 2021).

Further, most of the students who moved from virtual to in-person learning were lower performing students. A likely explanation for these results is that lower performers were not succeeding in a fully asynchronous learning environment and needed more support from teachers than higher performers.

Together, these results suggest that choice of learning modality may be related to cultural or socio-economic factors as well as students' previous academic performance. As the world continues to navigate the COVID-19 pandemic, districts and education policymakers should be aware that such social and academic discrepancies in preference for remote and in-school options

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exist. Further understanding such concerns for families can, and should, inform learning recovery supports as we move forward.

Acknowledgements

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Table 1

Demographics of the Study Sample by Gender, Race/Ethnicity, and Performance Level

(N = 3,488) Number of students (%)

Gender Female 1,842 (52.8%) Male 1,646 (47.2%)

Race (25.0%) Hispanic 535 (15.3%)
/Ethnicity Black 148 (4.2%) Multiple race 109
(3.1%) American Indian 24 (0.7%)
Pacific Islander 2 (0.1%) Beginning
Learner 189 (5.4%) Developing
Learner 647 (18.5%) Proficient Learner
1,461 (41.9%) Distinguished Learner

Academic Performance level 1,191 (34.1%)
(district
categories)
White 1,797 (51.5%) Asian 873

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Table 2

Number and Proportion of Students by Their Modality Choice

(N = 3,488) In-Person Learning Virtual Learning

Total (number of students % of the full sample) 2,146 (61.5%) 1,342 (38.5%)

Race/Ethnicity

White 1,481 (82.4%) 316 (17.6%) Asian 125 (14.3%) 748 (85.7%) Hispanic 392
(73.3%) 143 (26.7%) Black 60 (40.5%) 88 (59.5%)

Multiple race 80 (73.4%) 29 (26.6%) American Indian 8 (33.3%) 16 (66.7%)

Pacific Islander 0 (0.0%) 2 (100.0%) Performance level

Beginning Learner 145 (76.7%) 44 (23.3%) Developing Learner 480 (74.2%) 167

(25.8%) Proficient Learner 681 (70.5%) 351 (29.5%) Distinguished Learner 840

(46.6%) 780 (53.4%)

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Table 3

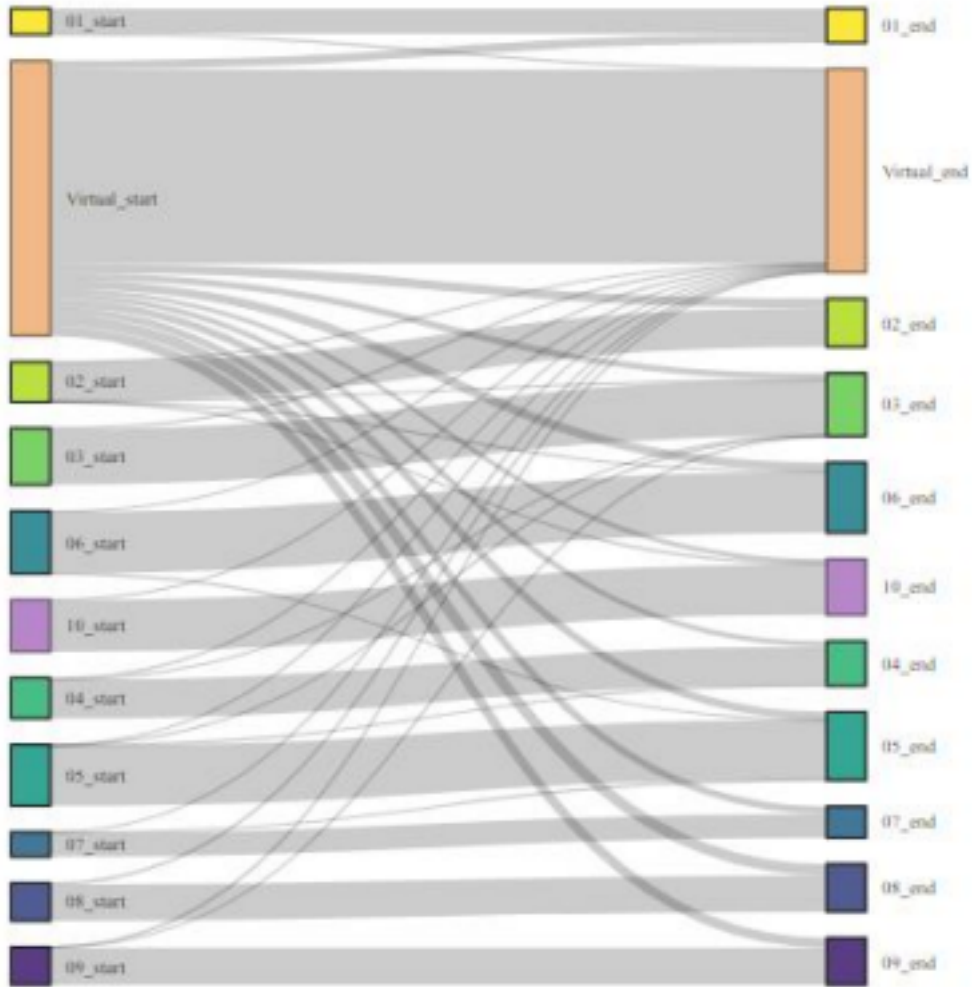
Number and Percentage of Students by Their Movement Type

Movement type	Number of students (%)
Stayed In-person learning	2,099 (60.2%)
Stayed virtual learning	946 (27.1%)
Shifted from In-person to virtual learning	47 (1.3%)
Shifted from virtual to In-person learning	396 (11.4%)

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Figure 1

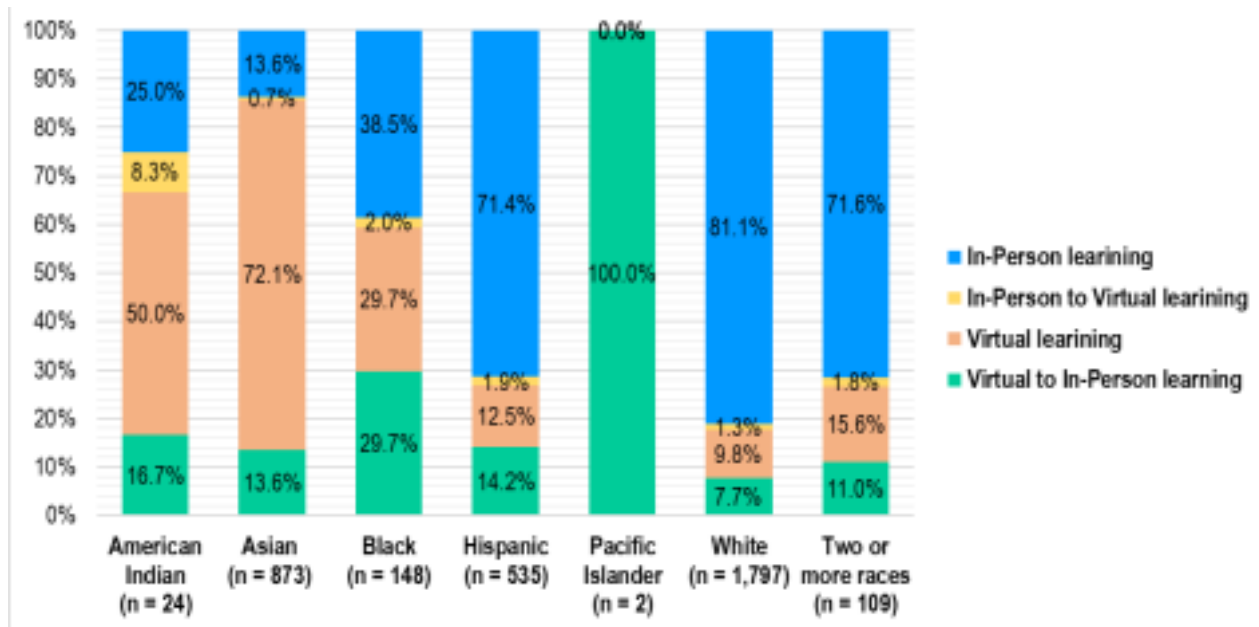
A Sankey Diagram Depicting Student Movement between Virtual Learning and In-person Learning (01-10)



*Note: 01 through 10 indicates the students who chose in-person learning at each school.
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Figure 2

Percentage of Students Choosing In-Person or Virtual Learning or Moving between Modalities by Race/Ethnicity



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Figure 3

Percentage of Students Choosing In-Person or Virtual Learning or Moving between Modalities by Performance Level

