# Parent Choice of Learning Formats and Student Engagement
## Prepared by the Department of Research & Performance Management

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### Key Findings

- Parents who completed the July and November surveys selected the virtual option most, in-person (10%, 26%), virtual (41%, 69%) or no selection (49%, 6%).
- Parents who selected in-person learning in July changed their choice for November at a much higher rate than those who originally selected the virtual option (37% & 9%, respectively).
- English learners, students with disabilities, and those who are economically disadvantaged made similar selections to their peers on the July and November learning format surveys.
- There was a significant difference in attendance rates between all November learning choice groups with those who selected virtual having the highest attendance rate compared to those who selected in-person or made no selection.
- Teams usage also showed that students who made no selection on either survey averaged over an hour less audio time than students whose parents completed the survey regardless of their learning choice.
- Clever usage varied widely by grade band with high schoolers utilizing the platform fewer days than the younger grades. Again students of parents who did not make a selection had the lowest rates of Clever usage across all grade levels.

### Background

The Coronavirus pandemic placed schools in an exceptionally difficult position of balancing the safety of students, teachers, and staff with the need to best educate the students' they serve. Shelby County Schools created the District's S.A.F.E. (Strategic Action for Flexible Education) Planning team and the Reentry Task Force which consisted of constituents from the SCS Board, Shelby County Commissioner's Office, students, parents, teachers, administrators, community partners, City of Memphis Council, the Shelby County Health Department, and local health experts. This group supported the creation of re-entry protocols, advised on logistical issues, and how to best meet the students' academic and social emotional needs during the pandemic. As plans were made and finalized parents were given the opportunity to weigh-in on their child's preferred learning environment for when schools did ultimately reopen. Even though plans were made to re-open twice, the District ultimately did not re-open until March 2021 for in-person learning. Since everyone was virtual, this paper will investigate if their selections correlate to their students' engagement while in a virtual setting.

### Learning Options Surveys

SCS surveyed parents twice, once in July and a second time in November, to determine if they wanted their child to learn in-person or virtually. To ensure parents could make an informed choice, the District released updated Health and Safety Protocols and re-entry plans, held town hall meetings, and continued releasing the Superintendent's weekly update prior to each survey. Parents completed the survey through their PowerSchool account and answered questions about their preferred learning choice.

The July re-entry survey opened July 6th and closed the 24th. Parents could choose in-person or a virtual learning option and non-responses would be enrolled in in-person learning. Over 47,000 parents completed the survey, but some left the choice option blank, completed the form multiple times, never registered with SCS (including charters) in the fall, or only registered in a special program, all of which were removed from the analysis.[1] The final response rate was 49.1% for students enrolled in an SCS managed school on or before the 20th day of school (*n* = 45,450). Parents who completed the survey overwhelmingly chose to have their kids learn virtually in the fall. Of the parents who completed the survey, 80.3% selected virtual while 19.7% selected to return to the school buildings. Parents who originally completed the July Choice survey but never enrolled their child in an SCS managed school (*n* = 1,350) had a slightly higher percentage who requested in-person learning (23.2%). Figure 1 shows the breakdown by grade band for enrolled SCS.[2]

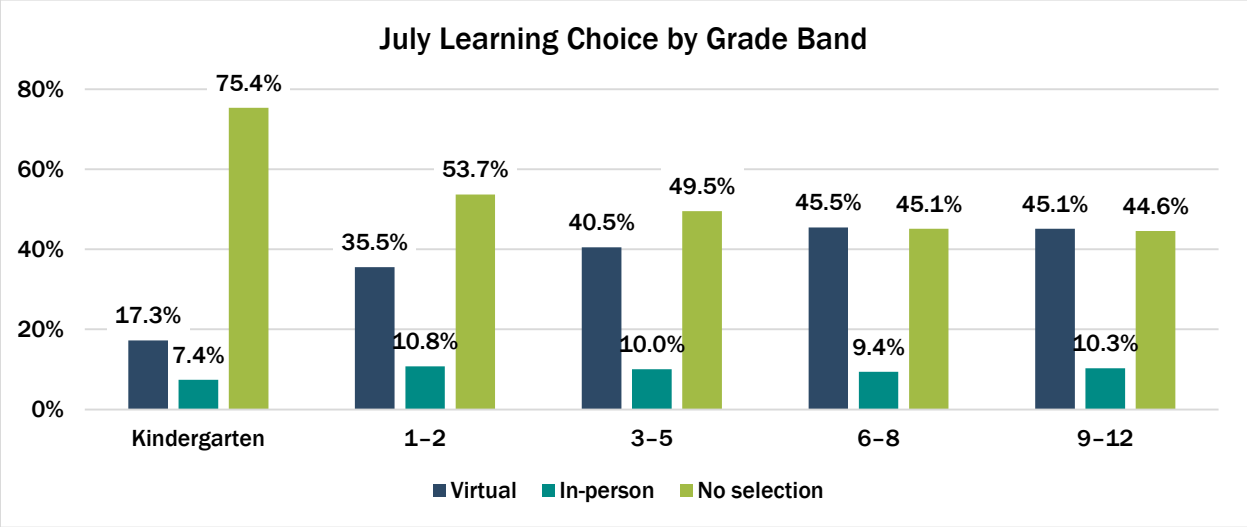


**Figure 1. Percentage of Parents Who Selected Each Learning Option in July by Grade Band**

The November re-entry survey opened October 21st and ran through November 6th. Parents completed the survey if they wished to change their previous selection. Those who wished to keep their July choice the same did not need to change anything, and those responses were rolled forward. More than 81,000 parents made a selection on the November re-entry survey and 1,500+ responses were rolled forward from the July survey (*n* = 83,405). For all SCS students in Pre-K4 through 12th grade, 24.3% of parents elected to have their child learn in-person, 64.2% selected virtual, and 11.4% did not make a selection. Figure 2 shows the breakdown by grade band for SCS students.

[1] Students enrolled in the Exceptional Children's Placement School, The Avon School, and The Excel Center were excluded in the analysis due to their unique programs.
[2] Pre-K4 students were not included in the July survey numbers since most students entering Pre-K did not previously have a PowerSchool accounts. Kindergarten students are also separated out in this graph for similar reasons.

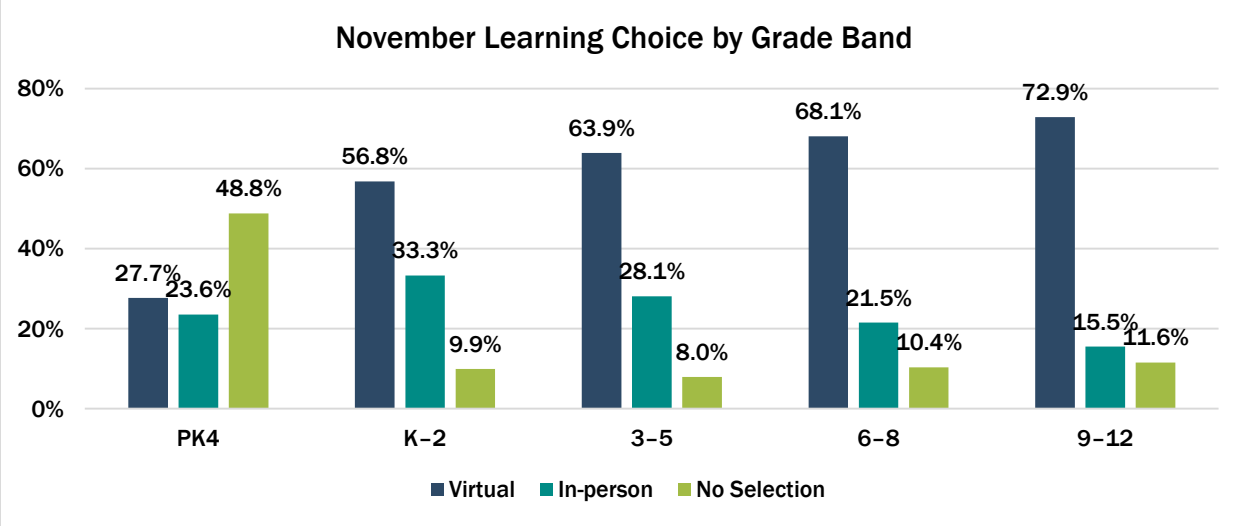


**Figure 2. Percentage of Parents Who Selected Each Learning Option in November by Grade Band**

## Learning Environment Selections

Unique groups of students often have different educational needs and thus could potentially view the ideal learning format through different lens. As such, it is important to analyze how various groups of students selected their ideal learning environment in the early months of the pandemic as well as how families revisited those choices during the later months.

### Demographics by July's Learning Format Choice

#### Virtual Option

36,462 parents selected the virtual option in July for their K–12 students who enrolled in an SCS managed school on or before the twentieth day of the school year. Students who selected the virtual option in July were split relatively evenly by sex, 51.4% female and 48.6% male. Table 1 features the racial breakdown. English Learner students represented 5.6% of the virtual choice in July, and 53.9% of students were economically disadvantaged.[3] Students with a disability made up just over ten percent of or responses (11.6%). Middle schoolers selected virtual most often (46.4%). Appendix A shows the selections by individual grade.

Of the parents who selected virtual learning in July, 96.9% of students remained actively[4] enrolled with SCS in April (*n* = 35,348). Parents could make a new selection in November, and 9.3% changed their selection from virtual to in-person learning, while 90.7% made the same selection or did not enter a new selection (31,923 & 1,137; respectively).

[3] Direct Certify status serves as a proxy for the economically disadvantaged category.
[4] Actively enrolled on April, 6th, 2021.

| July Choice by Race/Ethnicity | | | | | | |
|---|---|---|---|---|---|---|
| | Virtual Option | | In-person Option | | No Selection | |
| | *N* | % | *N* | % | *N* | % |
| Asian | 753 | 59.8% | 168 | 13.3% | 339 | 26.9% |
| Black | 26,873 | 42.3% | 5,335 | 8.4% | 31,300 | 49.3% |
| Hispanic/Latinx | 5,073 | 37.2% | 1,618 | 11.9% | 6,931 | 50.9% |
| Indigenous/Native American | * | 44.2% | * | 5.8% | * | 50.0% |
| Multiple Races | 1,288 | 46.2% | 372 | 13.3% | 1,130 | 40.5% |
| Pacific Islander/ Native Hawaiian | * | 45.7% | * | 11.4% | * | 42.9% |
| White | 2,368 | 36.6% | 1,426 | 22.0% | 2,682 | 41.4% |

** Some data omitted to protect student anonymity.*

**Table 1. July Learning Format Choice by Race and Ethnicity**

## In-Person Option

Almost 9,000 parents selected the in-person learning option on the July survey (*n* =8,951), with slightly more males than females representing the in-person choice (52.2% & 47.8%, respectively). Table 1 features the racial breakdown. English Learner students made up 8.5% of the in-person choice, and economically disadvantaged students represented 41.3%. Again, students with a disability comprised around ten percent (10.9%) of the responses. Selections by individual grade can be found in Appendix A.

Parents who selected in-person learning changed their selection more often compared to parents who initially chose virtual and then switched to in-person learning. On the November survey 37.1% of parents changed their choice to virtual (*n* = 3,323), while 59% kept the in-person selection, and 3.9% did not make a new selection and had their choice rolled (*n* = 5,628 collectively).

## No Selection

The largest group consisted of parents who did not select a learning option on the July survey (*n* = 42,969). Students who did not select an option were split similarly by sex, 47.5% female and 52.5% male. The racial breakdown is also featured in Table 1. Students who were economically disadvantaged represented 66.5% of those who did not make a selection. Again students with a disability represented 11.6% of responses, and 10.7% of the students who did not select an option were English Learners. The grade-level with the largest percentage of students with no selection was Kindergarten (74.2%). This trend is likely because many Kindergarteners were enrolling with the District for the first time in July, and their parents or guardians may not have known how to log in and make selections in SCS' student information system (PowerSchool).

SCS students whose parents did not make a selection in July were actively enrolled in April at a lower rate, 91.6%, compared to the other two groups. For the November selection 52.4% of these parents selected the virtual option, 29.6% chose in-person, and 18.0% did not make a selection either time (*n* = 22,515, 12,708, & 7,756; respectively).

## Differences in Learning Choices within Subgroups

Though the above descriptive statistics provide information about the demographics for each learning choice, it would be remiss not to investigate how different student groups made their July selections and if there are important distinctions between these groups. The following information is for students who were in K–12 and enrolled on or before the twentieth day of school.

### English Learners

Non-English learners selected virtual learning at a rate of 42.5% while only 27.5% of English Learners (EL) made the same selection. This difference primarily comes from the proportion of students in these groups who made no selection in July (62.2% EL; 47.4% non-EL). Of the students who made no selection in July, 52.6% of non-EL selected virtual for November compared to 50.2% of EL students, and 36.9% of EL chose in-person compared to 28.7% of non-EL. Active enrollment across the virtual, and in-person, or no selection groups remained consistent between the EL and non-EL students, varying by less than 1.5% in any category.

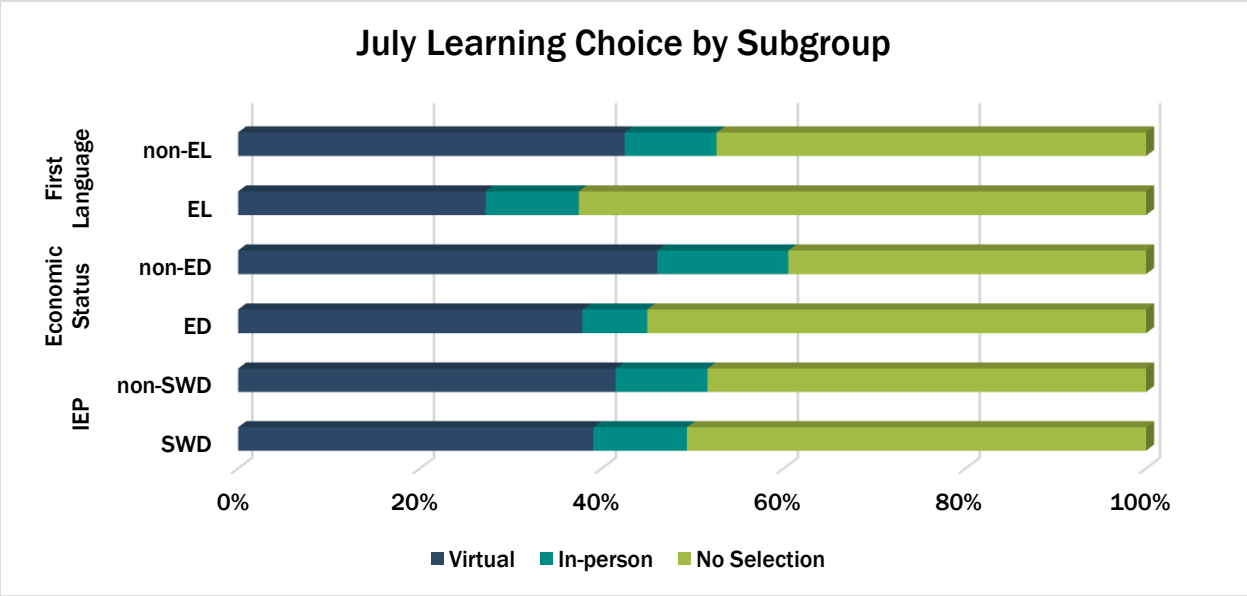


**Figure 3. Split of Parents Who Selected Each Learning Option in July by Sub-group**

### Students with Disabilities

Students with disabilities (SWD) (*n* = 9,420) who completed the July survey continued to select virtual over the in-person format at about the same rate as their peers (79.2% & 80.4%, respectively). Of those who did not make a selection in July, SWD and non-SWD made very similar choices with 52% of both groups selecting virtual and roughly 30% selecting in-person on the November survey. Active enrollment remained comparable for SWD and their peers for both groups who made a selection. However, for the group that did not make a selection on the July survey, SWD maintained active enrolled at a higher rate (97.3%) compared to their peers (90.9%).

## Economically Disadvantaged Students

Economically disadvantaged (ED) students (*n* = 51,925) completed the July survey at a much lower rate (45.0%) compared to their peers (60.5%). Of those who did complete the survey, ED students selected the virtual option (84.2%) more compared to 76.2% of other students. For those who did not complete the July survey, ED students and non-ED students made their November selections similarly, 52% selecting virtual and 29% selecting in-person. Additionally, economically disadvantaged students across all three learning format options remained active in SCS at similar rates to their peers (varying by a maximum of 1.2%).

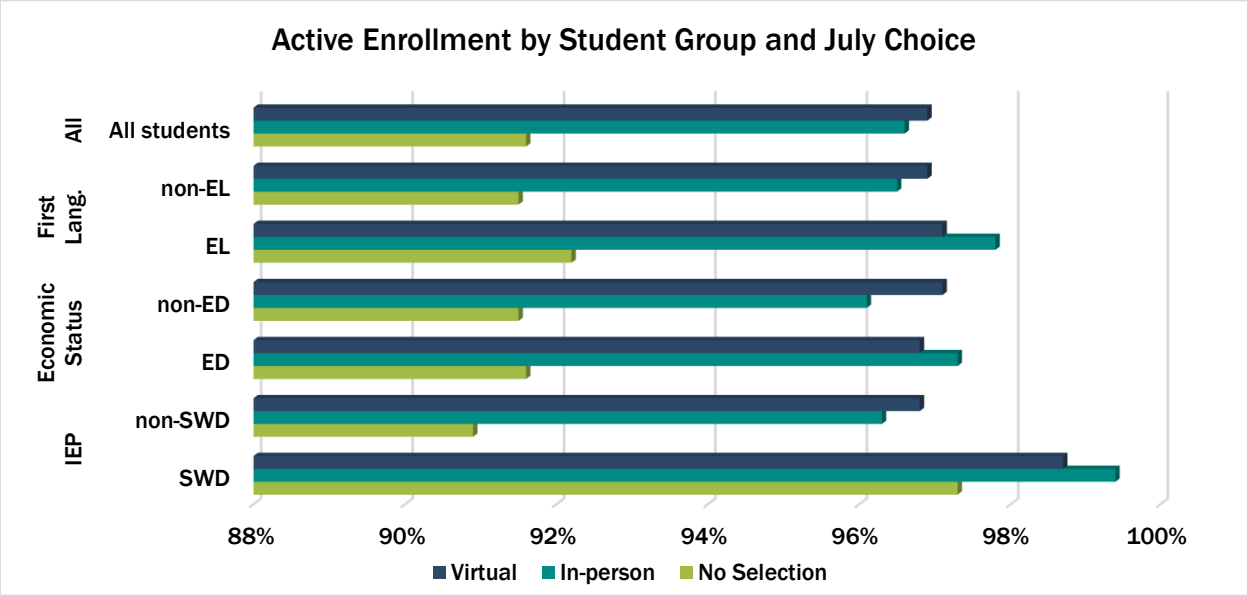


**Figure 4. Active Enrollment by Sub-group and Learning Choice**

## Student Engagement and the November Learning Option Selections

The District tracked virtual student participation through a number of different measures. Attendance rates, Teams usage, and Clever log-ins were all used to track engagement throughout the virtually learning time. The following analyses investigate if differences in student engagement existed based on the November learning format choice 1) virtual, 2) in-person, or 3) no selection. While parents were not able to utilize in-person learning, it is important to determine if learning format choice related to student engagement and how the different groups of students connected with material during the pandemic.

### Attendance

Teachers recorded student attendance from the first day of school until March 9th, 2021 when it was pulled. Students in grade K–12 with two or more enrolled days were kept in the dataset. Of those, there were 85,428 active students enrolled on April 6th, 2021. Overall, students averaged 109.75 enrolled days (*Max* = 126, *Min* = 2) with an average days-present of 104.11. This produced an average attendance rate of 94.7% (*SD* = 0.09).

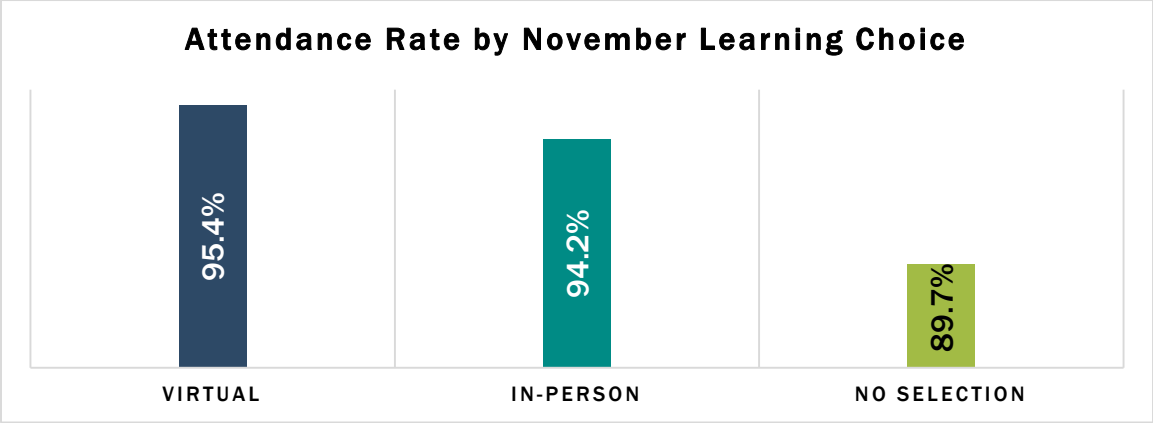


Figure 5. Attendance Rate by November Learning Choice

A one-way ANOVA was conducted to determine if there were significant differences in attendance rate for students who selected the three learning options on the November survey, 1) virtual learning, 2) in-person learning, or 3) no selection. A significant medium effect was found, suggesting that a parent's choice or lack thereof of their students learning environment did relate to the student's attendance level during virtual learning. There was a small difference in attendance rates between the in-person and virtual option (1.2%), but a stark difference was found between the no selection group and both of the other groups, in-person (4.5%) and virtual (5.7%). Full statistical results including post hoc tests can be found in Appendix B.

## Teams Usage

Shelby County Schools selected Microsoft Teams as the platform for virtual instruction and communication between teachers and students. Students work throughout the day in Teams meetings. They are able to send messages to their teachers and participate in group calls as well as breakout sessions created by the teacher. Students are encouraged to have their camera on during the days, but it is not required in all classrooms. The District tracks students' Teams usage on a number of key metrics. Students' chat messages, posts, replies, audio time, video time, screen shares, meetings joined, and more are tracked each day.

Student Teams usage data is received from the IT department daily and is stored in the Decision Analytics and Information Management (DAIM) data warehouse. Each day of data contains the aggregation of that day and the previous week of data. In order to parse out the daily usage, the DAIM team compares the aggregate data to the student's previous week's enrollment at a given school. Daily totals were added and then divided by the student's total enrollment to get the mean daily usage for each student.

The following information is reported for the average daily amount of usage for each category. Full descriptions for additional categories are reported in Appendix C. Across every category and grade band, students who did not make a selection were less actively engaged through Teams than students who selected virtual or in-person. In fact, these students averaged an hour less daily audio calls in Teams than either of the groups who made a selection. The sharpest difference was between middle school students who selected virtual

and those who made no selection (1 hour and 15 minutes less per day). Table 2 shows the sent message count and the audio and video time in hours for students by grade band and learning format choice.

| Average Daily Messages and Hours on Teams Calls by Category, Grade Band, and Learning Format | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | K–2 | | | 3–5 | | | 6–8 | | | 9–12 | | |
| | Audio | Video | Messages | Audio | Video | Messages | Audio | Video | Messages | Audio | Video | Messages |
| Virtual | 3.54 | 3.50 | 1.08 | 3.96 | 3.91 | 4.78 | 3.71 | 3.46 | 4.96 | 3.26 | 2.73 | 3.16 |
| In-person | 3.22 | 3.18 | .90 | 3.71 | 3.66 | 4.35 | 3.46 | 3.21 | 4.65 | 3.05 | 2.50 | 2.90 |
| No Selection | 2.11 | 2.08 | .63 | 2.52 | 2.47 | 3.06 | 2.46 | 2.72 | 3.23 | 2.14 | 1.76 | 2.00 |

**Table 2. Teams Engagement by November Learning Choice and Grade Band**

A multivariate ANOVA was conducted to determine if the combination of average daily messages and audio time (in minutes) differed significantly by learning choice. Active K–12 students who had data on all three variables were included in the analysis ($n$ = 85,122). The MANOVA showed a significant association between the learning format choice and the combination of TEAMS engagement measures. Additional univariate analysis showed that 7.8% of variance in learning choice was attributable to Teams audio engagement, and only 0.7% of variance was explained by messaging rates. Post hoc comparisons were all significant after conducting Bonferroni adjustments. Similar to the attendance data the starkest differences were between the no selection group and both the virtual and in-person groups.

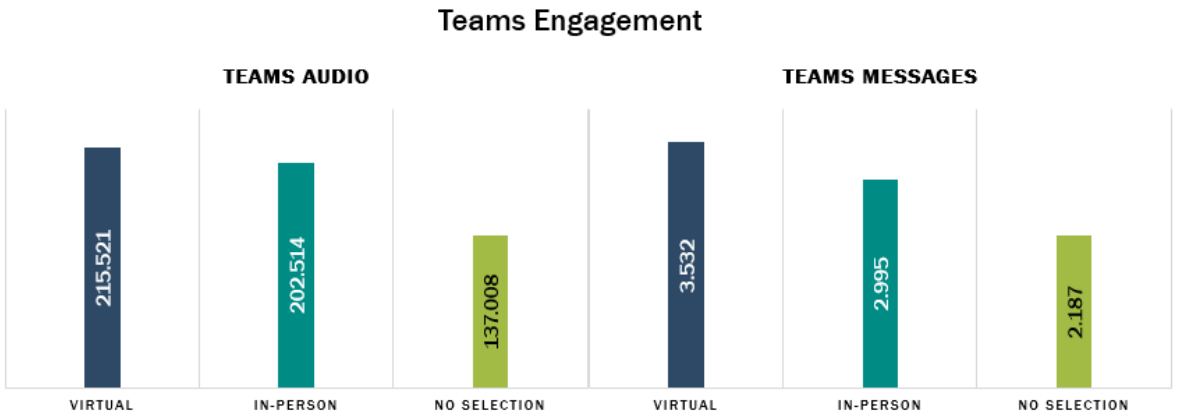


**Figure 6. Teams Engagement by November Learning Choice**

## Clever Usage

SCS students use the Clever platform to access many of the educational programs, applications, and subscriptions. Using Clever, students were able to have one single sign-on for all of their school work. While the platform was available to all grades, high school students used it about 28% of days compared for over 55% or all other grade bands. Table

3 shows the usage rates for the grade bands by their November learning choice. The Research Office previously found that lower usage rates in high school were due to the high school curriculum better aligning with resources outside the Clever portal.[5]

| Average Percent of Days of Clever Usage by Grade Band | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Total | Virtual | | In-person | | No Selection | |
| | | *N* | Mean | *N* | Mean | *N* | Mean |
| K–2 | 64.9% | 7,031 | 67.5% | 12,084 | 63.9% | 1,537 | 49.0% |
| 3–5 | 69.9% | 6,114 | 71.8% | 13,970 | 69.2% | 1,331 | 53.3% |
| 6–8 | 58.9% | 4,152 | 61.2% | 13,346 | 57.4% | 1,582 | 43.4% |
| 9–12 | 28.5% | 3,814 | 29.6% | 18,075 | 26.6% | 2,094 | 22.3% |
| Total All Grades | 54.6% | 21,111 | 55.2% | 57,475 | 57.4% | 6,544 | 40.0% |

Table 3. Clever Usage by November Learning Choice

A two-way ANOVA was conducted to determine if there were significant differences between grade band and learning choice on Clever usage. The independent variables are grade band and November learning format selection. The dependent variable is the percentage of days a student used Clever. The test of main effects for learning choice showed that 3.6% of the variance in Clever usage is attributable to differences between the three learning choice groups. Post hoc tests revealed that all groups were significantly different from each other, but that the no selection group showed the most pronounced difference.

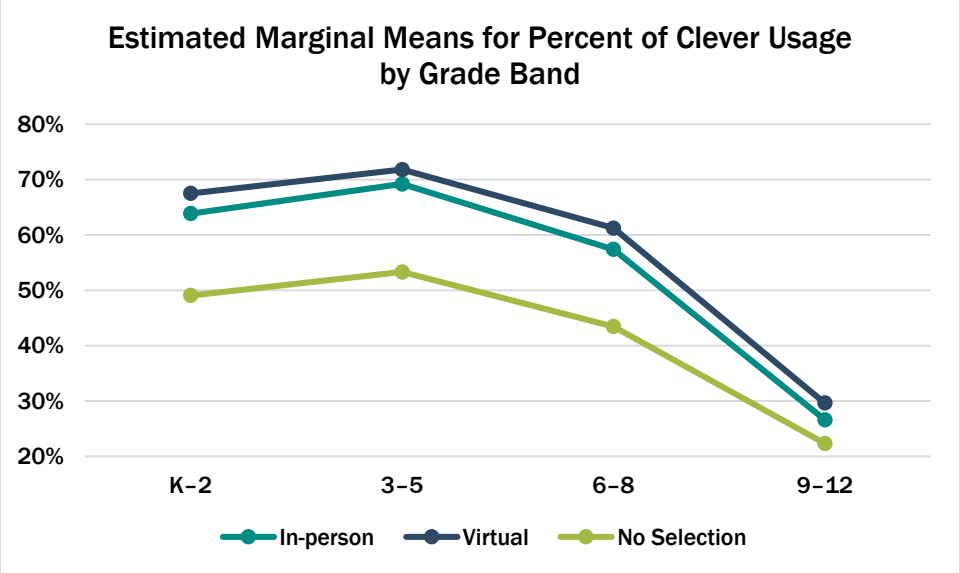


Figure 7. CLEVER Usage by November Learning Choice and Grade Band

[5] Toone, A. & Pallotta, H. (2021) Clever Usage Among High School Students.

The test of main effect of grade band also revealed statistically significant differences in the average days of Clever used, indicating the mean usage differed depending on the grade band examined, and approximately 18.8% of the variance in the Clever usage is attributable to differences between the grade bands. Post hoc results showed that the largest difference in Clever usage was between high school and upper elementary (41.5% difference).

The two-way ANOVA also revealed a statistically significant interaction effect between grade band and learning format choice. Though significant, the effect size was extremely small showing that only 0.5% of the variance in Clever usage was attributable to the interaction between a student's grade band and their learning format choice. Full results for the analysis, post hoc tests, and test of simple effects are reported in Appendix D.

## Conclusion

Shelby County School's parents overwhelmingly selected the virtual learning format for their children. In fact, parents who originally selected the in-person format more frequently changed their selection in November than those who selected to learn virtually at the beginning of the school year. Parents selection did not differ much by student group either. Compare to their peers English learners, students with disabilities, and those who were economically disadvantaged made similar selections on the July survey and changed their selection on the November survey at similar rates.

The three analyses show that parents who did not make a selection on either the July or November surveys had the lowest level of student engagement across all categories and grade levels. Attendance and Teams usage both showed the highest engagement for students who selected to learn virtually in November. It is understandable that families who selected to learn virtually would be better prepared for that learning format than those who had hoped to utilize in-person school this year.

## APPENDIX A: Survey Information

Table 4. July Parent Survey Learning Format Choice by Grade Level

| July Choice by Grade | | | | | | |
|---|---|---|---|---|---|---|
| | Virtual Option | | In-person Option | | No Selection | |
| | *N* | % | *N* | % | *N* | % |
| Kindergarten | 1,216 | 18.1% | 517 | 7.7% | 4,995 | 74.2% |
| 1st Grade | 2,518 | 34.6% | 772 | 10.6% | 3,980 | 54.7% |
| 2nd Grade | 2,857 | 38.3% | 858 | 11.5% | 3,736 | 50.1% |
| 3rd Grade | 2,906 | 39.6% | 806 | 11.0% | 3,627 | 49.4% |
| 4th Grade | 3,088 | 41.5% | 790 | 10.6% | 3,562 | 47.9% |
| 5th Grade | 3,146 | 43.0% | 678 | 9.3% | 3,490 | 47.7% |
| 6th Grade | 2,826 | 43.1% | 621 | 9.5% | 3,104 | 47.4% |
| 7th Grade | 3,165 | 47.3% | 625 | 9.3% | 2,903 | 43.4% |
| 8th Grade | 3,216 | 48.9% | 661 | 10.0% | 2,705 | 41.1% |
| 9th Grade | 2,949 | 42.2% | 635 | 9.1% | 3,412 | 48.8% |
| 10th Grade | 3,169 | 48.5% | 602 | 9.2% | 2,766 | 42.3% |
| 11th Grade | 2,818 | 47.7% | 631 | 10.7% | 2,460 | 41.6% |
| 12th Grade | 2,588 | 46.4% | 755 | 13.5% | 2,239 | 40.1% |

Table 5. November Parent Survey Learning Format Choice by Grade Level

| November Choice by Grade | | | | | | |
|---|---|---|---|---|---|---|
| | Virtual Option | | In-person Option | | No Selection | |
| | *N* | % | *N* | % | *N* | % |
| Pre-K4 | 947 | 32.6% | 805 | 27.7% | 1,155 | 39.7% |
| Kindergarten | 3,635 | 55.6% | 2,492 | 38.1% | 410 | 6.3% |
| 1st Grade | 4,311 | 61.2% | 2,384 | 33.9% | 347 | 4.9% |
| 2nd Grade | 4,486 | 62.2% | 2,423 | 33.6% | 307 | 4.3% |
| 3rd Grade | 4,540 | 63.6% | 2,262 | 31.7% | 335 | 4.7% |
| 4th Grade | 4,837 | 66.6% | 2,112 | 29.1% | 309 | 4.3% |
| 5th Grade | 4,900 | 68.9% | 1,927 | 27.1% | 282 | 4.0% |
| 6th Grade | 4,371 | 69.4% | 1,492 | 23.7% | 437 | 6.9% |
| 7th Grade | 4,547 | 70.6% | 1,473 | 22.9% | 424 | 6.6% |
| 8th Grade | 4,691 | 72.7% | 1,352 | 21.0% | 410 | 6.4% |
| 9th Grade | 5,053 | 76.2% | 1,098 | 16.5% | 484 | 7.3% |
| 10th Grade | 4,721 | 77.1% | 993 | 16.2% | 407 | 6.6% |
| 11th Grade | 4,261 | 77.8% | 883 | 16.1% | 331 | 6.0% |
| 12th Grade | 4,028 | 77.9% | 866 | 16.7% | 277 | 5.4% |

## APPENDIX B: Attendance Information

A one-way ANOVA was conducted to determine if there were significant differences in attendance rate for students who selected the three learning options on the November survey, 1) virtual learning, 2) in-person learning, or 3) no selection. Since the data violated the assumption of homogeneity of variance ($F_{(2, 85427)} = 2{,}031.99$, $p < .001$), Welch's $F$ test was used instead of the classical ANOVA $F$ statistic. Welch's $F$ also is robust against unequal group sizes which were present in this analysis. A significant medium effect of learning option selection on attendance rates was found, $Welch's\ F_{(2, 15{,}455.88)} = 651.26$, $p < .001$, $\omega^2 = .03$. Games-Howell post hoc comparisons were subsequently conducted to determine where the significant differences were along with a measure of effect size, Hedge's $g$. There was a mean difference between the virtual and in-person selection of −1.21% which represents a significant albeit small difference ($p < .001$, $g = .15$). Additionally, there was a significant mean difference between the virtual and no selection groups (−5.7%, $p < .001$, $g = .53$) with a medium effect size. The in-person and no selection group difference was also significant and had a smaller though still moderate effect size (−4.5%, $p < .001$, $g = .40$).

Table 6. Average Attendance Rates by November Learning Format Choice

| Average Attendance by Learning Format Choice | | | |
|---|---|---|---|
| | *N* | Mean | Standard Deviation |
| Virtual | 57,604 | 95.4% | 0.08 |
| In-person | 21,185 | 94.2% | 0.09 |
| No Selection | 6,641 | 89.7% | 0.14 |

## APPENDIX C: Teams Information

A multivariate ANOVA was conducted to determine if the combination of average daily messages and audio time (in minutes) differed significantly by learning choice. Active K–12 students who had data on all three variables were included in the analysis ($n$ = 85,122). The MANOVA showed a significant association between the learning format choice and the combination of TEAMS engagement measures, Pillai's Trace[6] = 0.08, $F$ = 1761.18, $p$ < .001, $\eta^2$ = .040.

A univariate analysis for the learning format choices and audio time was also significant ($F_{(2, 18486776)}$ = 3624.19, $p$ < .001, $r^2$ = .078), indicating that 7.8% of the variance in learning format choice was attributable to Teams audio engagement. Though Teams messaging was also significantly related to learning format choice ($F_{(2, 6622.5)}$ = 321.74, $p$ < .001, $r^2$ = .007)[7], it only uniquely explained 0.7% of the variance.

Games-Howell post hoc comparisons were conducted to determine where the significant differences were between groups. Full post hoc comparison results are found in Table 7. All comparisons were significant after conducting Bonferroni adjustments. Similar to the attendance data the starkest differences were between the no selection group and both the virtual and in-person groups.

Table 7. Post Hoc Results for Teams Engagement

| Games-Howell Post Hoc Mean Differences | | | |
|---|---|---|---|
| | Virtual | In-person | No Selection |
| Virtual | | 13.01* | 78.51* |
| In-person | 0.54* | | 65.51* |
| No Selection | 1.34* | 0.81* | |

Notes: The portion above the diagonal blue cells represents audio minutes while below the diagonal is the number of messages sent.

** significant at p < .001*

[6] Pillai's trace was selected since it is least sensitive to violations of the assumptions underlying a MANOVA.
[7] Adjusted *r* squared is reported.

Table 8. Average Daily Teams Usage by Category, Grade Band, and Learning Format

| Average Daily Usage on Teams by Category, Grade Band, and Learning Format | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | K–2 | | | 3–5 | | | 6–8 | | | 9–12 | | |
| | Virtual | In-person | No Selection | Virtual | In-person | No Selection | Virtual | In-person | No Selection | Virtual | In-person | No Selection |
| Audio Minutes | 213.04 | 193.18 | 126.96 | 238.19 | 222.64 | 151.96 | 223.13 | 207.85 | 148.57 | 196.08 | 183.29 | 128.80 |
| Video Minutes | 210.80 | 190.92 | 125.16 | 235.34 | 219.85 | 148.91 | 208.15 | 193.10 | 136.78 | 163.85 | 149.80 | 105.72 |
| Chat Messages | .42 | .36 | .26 | 1.20 | 1.09 | .74 | 1.32 | 1.24 | .89 | .95 | .88 | .61 |
| Channel Messages | .35 | .28 | .19 | 1.99 | 1.76 | 1.45 | 2.15 | 1.96 | 1.27 | 1.21 | 1.11 | .77 |
| Reply Messages | .28 | .22 | .15 | 1.60 | 1.40 | 1.20 | 1.64 | 1.51 | .99 | .75 | .68 | .45 |
| Post Messages | .06 | .05 | .03 | .35 | .32 | .22 | .40 | .35 | .21 | .27 | .25 | .18 |
| Meetings Participated | 1.63 | 1.52 | 1.07 | 2.67 | 2.53 | 1.81 | 3.91 | 3.68 | 2.60 | 3.47 | 3.15 | 2.14 |
| Group Calls | .04 | .03 | .02 | .08 | .08 | .05 | .13 | .13 | .10 | .14 | .12 | .10 |
| Used Teams at Least Once During Day | 1.00 | 1.00 | .89 | 1.00 | 1.00 | .88 | 1.00 | 1.00 | .92 | 1.00 | 1.00 | .96 |
| *N* | 12,119 | 7,063 | 1,566 | 14,002 | 6,135 | 1,351 | 13,379 | 4,163 | 1,602 | 18,102 | 3,824 | 2,122 |

## APPENDIX D: Clever Information

A two-way ANOVA was conducted to determine if there were significant differences between grade band and learning choice on Clever usage. The independent variables are grade band and November learning format selection. The dependent variable is the percentage of days a student used Clever.

The test of main effect of November learning choice ($F_{(2, 83920)} = 1580.75$; $p < .001$) showed a statistically significant difference in the average days Clever was used across the three learning choice groups. The η2 = .036 indicated that only 3.6% of the variance is attributable to differences between the three choice groups.

Post hoc comparisons using the Tukey procedure determined which pairs of the three group means differed. It indicated that the no selection group ($M$ = 38.74%, $SD$ = .26) had significantly lower usage compared to the virtual selection group ($M$ = 55.18%, $SD$ = .22, $p < .001$) and the in-person selection group ($M$ = 57.42%, $SD$ = .26, $p < .001$). Full post hoc results are reported in Appendix D.

The test of main effect of grade band ($F_{(3, 83920)} = 6474.34$; $p < .001$) also revealed statistically significant differences in the average days of Clever used, indicating the mean usage differed depending on the grade band examined. The η2 = .188 indicated that approximately 18.8% of the variance in the Clever usage is attributable to differences between the grade bands.

Again, post hoc tests were completed using the Tukey procedure to affirm which grade band's usage differed significantly. High school across the board showed significant difference from all other grade bands with the largest difference between it and upper elementary (41.5%). After high school, the largest difference in Clever usage was found between middle grades and upper elementary (11.3%). All grade bands showed significant differences and full post hoc results are reported in Appendix D.

The two-way ANOVA also revealed a statistically significant interaction effect ($F_{(6, 83920)} = 68.78$, $p < .001$) between grade band and learning format choice. Though significant, the effect size (η2 = .005) was extremely small showing that only 0.5% of the variance in Clever usage was attributable to the interaction between a student's grade band and their learning format choice. Results for the test of simple effects are reported in Appendix D. All tests of simple effects were significant indicating that across all categories significant differences were found in average daily Clever usage.

Table 9. Post Hoc Results for the Main Effect of Learning Format Choice on Clever Usage

| Tukey Post Hoc Mean Differences | | |
|---|---|---|
| | Virtual | In-person |
| In-person | 2.2%* | |
| No Selection | 16.4%* | 18.7%* |

** significant at p < .001*

Table 10. Post Hoc Results for the Main Effect of Grade Band on Clever Usage

| Tukey Post Hoc Mean Differences | | | |
|---|---|---|---|
| | K–2 | 3–5 | 6–8 |
| 3–5 | –4.95%* | | |
| 6–8 | 6.3%* | 11.3%* | |
| 9–12 | 36.5%* | 41.5%* | 30.2%* |

** significant at p < .001*

Table 11. Results for the Test of Simple Effects for the Interactions of Learning Format Choice on Clever Usage

| Test of Simple Effects | | | | |
|---|---|---|---|---|
| | | *F* | Sig. | η2 |
| Learning Format† | Virtual | 13562.35 | < .001 | 0.327 |
| | In-person | 3596.86 | < .001 | 0.114 |
| | No Selection | 619.48 | < .001 | 0.002 |
| Grade Bands‡ | K–2 | 553.03 | < .001 | 0.013 |
| | 3–5 | 425.39 | < .001 | 0.01 |
| | 6–8 | 555.34 | < .001 | 0.013 |
| | 9–12 | 119.06 | < .001 | 0.003 |

† *df* =3; ‡ *df* = 2