

Exploring the Effects of the COVID-19 Pandemic on Student Achievement in Utah

Executive Report

Utah State Board of Education

The National Center for the Improvement of Educational Assessment, Inc.

October 2021

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The Utah State Board of Education (USBE) and the National Center for the Improvement of Educational Assessment (Center for Assessment) have conducted a comprehensive set of studies to help understand the effects of pandemic-related disruptions on students' academic performance during the 2020-2021 academic year. The purposes of these studies are to:

- document overall trends in participation and achievement,
- identify districts, schools, and student groups most affected by the disruptions,
- document the influence of the pandemic on already-existing achievement gaps, and
- explore how opportunity-to-learn and other related information interact with the academic outcomes indicated above.

This executive report provides an overview of the key results and findings from the studies. A full report that describes the methods and analyses used, summarizes the results, and outlines conclusions and recommendations from the studies will follow shortly.

Highlights

Briefly, fewer students participated in the 2021 compared to the 2019 assessments and this drop was substantial for historically underperforming groups of students. Further, student performance was notably lower in 2021 compared to 2019. This was true across all grades, subject areas, and student groups, with the declines slightly larger in mathematics compared to ELA. Additional details are presented below. Importantly, the pandemic effects documented here is likely an underestimate of the true pandemic effects because it is based only on students who participated in 2020-2021. This speaks to the necessity of helping all students in Utah with learning recovery going forward. It also highlights the urgency of identifying the missing students and providing targeted support to these and other traditionally lower-performing student groups to prevent them from falling into an academic spiral.

Research Questions and Methodology

The overarching research question is: *To what extent have pandemic related disruptions influenced student achievement in Utah?*

To answer this question, we formulated seven specific research questions for the studies. These research questions were shared with and informed by feedback from the Utah Technical Advisory Committee (TAC):

1. Which students participated in assessments and other measures during the 2020-2021 school year as a proportion of the underlying school population?
2. What was the performance of students who participated in assessments during the 2020-2021 school year?
3. To the extent that matched samples can be constructed, what do the results of a “fair comparison” illustrate in terms of comparative performance between the 2020-2021 and 2018-2019 school years?
4. Based on the analyses described above, what is the relationship of learning model (remote, hybrid, in person) to student achievement?
5. What were the results of the various opportunity-to-learn (OTL) measures during the 2020-2021 school year?
6. How does the performance observed from the analyses described above relate to OTL measures?
7. What common characteristics exist among the local education agencies (LEAs) and schools that show the greatest increases in academic outcomes?

Where feasible, the analysis conducted for each research question was disaggregated by the following variables:

- Grade level and content area,
- Student demographics (race/ethnicity, socioeconomic status, special education status, and English learner status),
- Primary learning model (remote/in-person/hybrid),
- School locale (rural/town/city/suburb),
- School, and
- LEAs

In our analyses and summary of findings, we adhere to the maximum: “Description before inference; inference before evaluation.” In other words, because there are so many unknowns this school year, we first must closely examine who participated in instruction and assessment this year before trying to compare performance across years, schools, and districts.

The method we adopted in our analysis follows the recommendations by Dr. Andrew Ho in this [memo](#) that he shared with the Council of Chief School Officers’ (CCSSO) Technical Issues in Large Scale Assessment (TILSA) collaborative during its convening in February 2021. In the memo, Dr. Ho describes metrics for state reporting of aggregated test scores in 2020-2021 to “advance the goal of accurate score interpretations and fair trend comparisons among schools and districts...” (Ho, 2021, p. 1) Two of the suggested metrics include:

- A “Fair Trend” adjustment that accounts for changes in the testing population due to the events of 2020-2021, allowing for a more ‘apples to apples’ comparison of 2020-2021 academic performance to the performance of similar students in 2018-2019.

- An “Equity Check” measure that attempts to estimate the best-case academic performance of students who did not test in 2020-2021, providing a gauge of the impact of missing students on the overall academic outcomes.

Data Sources

The following sources of data were used for the studies:

- *Participation*: 2020-2021 enrollment and participation data for KEEP, Acadience, WIDA ACCESS 2.0 for ELs, Utah Aspire Plus, RISE, ACT, and AAPPL,
- *Achievement*: 2016-2017, 2018-2019, and 2020-2021 assessment data for RISE and Utah Aspire Plus,
- *Learning model*: 2020-2021 COVID impact questionnaire data, and
- *Opportunity-to-Learn (OTL)*: data from the OTL survey administered to students with their spring 2021 RISE and Utah Aspire Plus assessments.

High-Level Results

To summarize the study findings, we organize the results using the following set of guiding questions:

1. How many students participated in the Utah assessments in 2020-2021?
2. Of those who participated,
 - a. How did their performance compare to 2018-2019?
 - b. What was their learning experience like during 2020-2021?
3. Of those who did *not* participate,
 - a. Who were the missing students from 2018-2019?
 - b. How would they have likely performed if they took the test?

How many participated in the Utah Assessments?

Table 1 compares the overall participation rates of Utah assessments in 2018-2019, the most recent test administration before the pandemic disruptions, and 2020-2021. We also calculated and compared the participation rates of each assessment for disaggregated student groups.

Table 1: Participation Rates for Utah Assessments

Utah Assessment	2018 2019	2020 2021
AAPPL	99%	90%
Acadience	94%	92%
ACT	94%	87%
KEEP	99%	97%
RISE (ELA/Math)	96% / 95%	91% / 91%
Utah Aspire Plus (ELA/Math)	94% / 94%	84% / 84%
WIDA ACCESS 2.0 for ELs	85%	79%

Notable trends in the participation rates include:

- The participation rates tended to be higher at the early childhood, elementary and middle school grade levels than in high school.
- The 2020-2021 participation rates for AAPPL, ACT, RISE and Utah Aspire Plus were notably lower than those in 2018-2019. This was observed overall and for the Native American, African American, Hispanic/Latino, students from low-income families, students with disabilities, and English learner groups.
- For Acadience and KEEP, the 2020-2021 participation rates were similar to those in 2018-2019.
- For WIDA ACCESS 2.0 for ELs, the participation rates in 2020-2021 were lower overall and across all disaggregated student groups.

How did participating students in 2020-2021 perform compared to 2018-2019?

To do a ‘fair comparison’ of how participating students in 2020-2021 performed compared to 2018-2019, we estimated a “fair trend” adjusted score (as recommended by [Dr. Andrew Ho](#)) for each RISE and Utah Aspire assessment, based on how similar students performed on the same test in 2018-2019. Because students who tested in 2018-2019 did not experience pandemic related disruption, the difference between the observed and fair trend adjusted scores can be interpreted as a *pandemic effect*, that is, the influence that pandemic related disruptions had on student achievement in Utah. In other words, the fair trend adjusted score is a ‘best guess’ of how participating students would have performed, had they not experienced pandemic related disruptions.

Figure 1: Comparing the Observed and “Fair Trend” Adjusted Scores

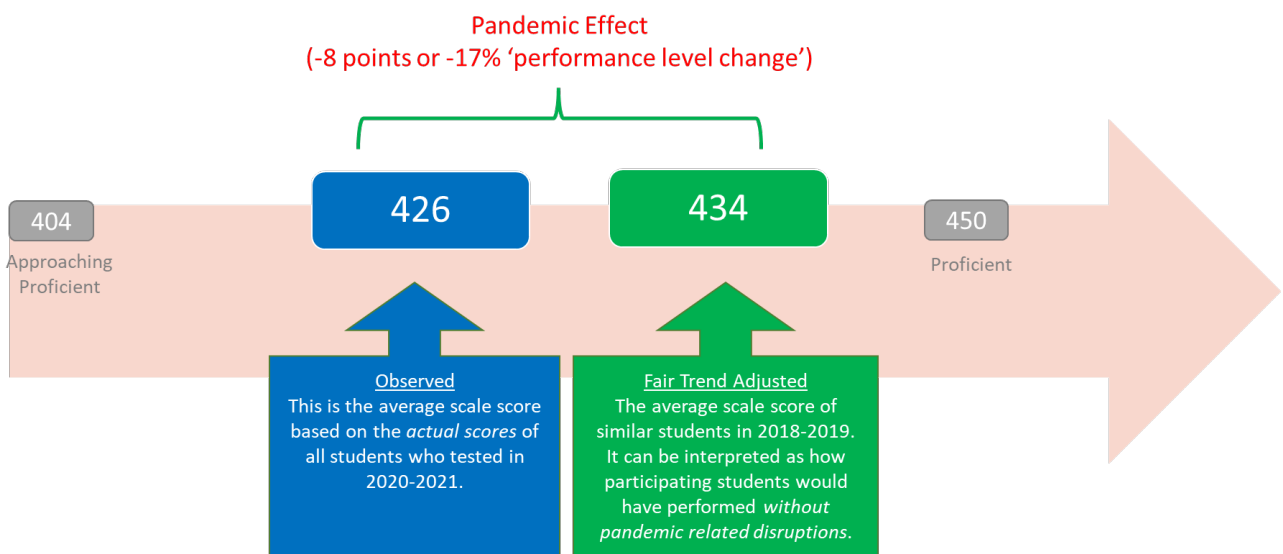


Figure 1 visually illustrates, using results from RISE Grade 7 ELA, the relationship between the *Observed* and *Fair Trend Adjusted* average scale scores. To help with interpretation, we contextualize the *pandemic effect* in terms of what is expected for a student to advance from one performance level to next level, or “performance level change”¹. For example, for RISE Grade 7 ELA, the expected performance level change is 46 scale score points². Thus, the pandemic effect of 8 scale score points represents about 17% of the performance level change.

Tables 2 and 3 summarize the *Observed* and *Fair Trend Adjusted* average scale scores for the RISE and Utah Aspire Plus assessments administered in 2020-2021 respectively. The tables also show the estimated *pandemic effects* and what they represented in terms of the expected *performance level change* for each assessment. The same analysis was conducted for all disaggregated student groups (not shown in this report but is in the full report.)

Table 2: RISE Average Scale Score Comparisons (2020-2021 vs. 2018-2019)

RISE	2020 2021 <i>Observed</i> Avg. Scale Score	2018 2019 <i>Fair Trend</i> Avg. Scale Score	Pandemic Effect	% Performance Level Change
Grade 5 ELA	387	399	-12	-25%
Grade 6 ELA	415	436	-21	-54%
Grade 7 ELA	426	434	-8	-17%
Grade 8 ELA	446	456	-10	-19%
Grade 5 Mathematics	368	378	-10	-39%
Grade 6 Mathematics	400	411	-11	-31%
Grade 7 Mathematics	429	440	-11	-33%
Grade 8 Mathematics	466	480	-14	-27%
Grade 6 Science	849	852	-3	-33%
Grade 7 Science	849	850	-1	-11%
Grade 8 Science	850	852	-2	-22%

Table 3: Utah Aspire Plus Average Scale Score Comparisons (2020-2021 vs. 2018-2019)

Utah Aspire Plus	2020 2021 <i>Observed</i> Avg. Scale Score	2018 2019 <i>Fair Trend</i> Avg. Scale Score	Pandemic Effect	% Performance Level Change
Grade 9 ELA	199	201	-2	-6%
Grade 10 ELA	201	204	-3	-9%
Grade 9 Mathematics	195	202	-7	-24%
Grade 10 Mathematics	194	201	-7	-27%

¹ As suggested by the Utah TAC, the expected “performance level change” is quantified as the difference between the *Approaching Proficient* and *Proficient* cut scores on each RISE or Utah Aspire assessment.

² For RISE Grade 7 ELA, the *Approaching Proficient* cut score is 404 and the *Proficient* cut score is 450.

The results in these tables illustrate why it is important to contextualize the average scale score difference into a metric such as expected “performance level change” when interpreting the analysis results. The RISE and Utah Aspire Plus tests are *not* on the same score scale. As such, similar scale score-point differences should not be interpreted as comparable. In Table 2, for example, both Grade 8 ELA and Grade 5 Mathematics observed a pandemic effect of -10 scale score points. However, the expected performance level changes for the tests are 55 and 24 scale score points respectively. This yields very different % performance level change for the two tests: -19% for Grade 8 ELA and -39% for Grade 5 Mathematics. This implies that the effect of the pandemic on Grade 5 Mathematics is over twice of that for Grade 8 ELA.

Notable trends in the comparisons included:

- Across RISE and Utah Aspire Plus, the *Observed* average scale scores in 2020-2021 were lower than the *Fair Trend Adjusted* average scale scores in 2018-2019 for all grades and content areas, with the decline slightly larger in mathematics than in ELA.
 - This implies that pandemic related disruptions likely led to a general decline in student achievement across grade levels and content areas.
- The decline was observed overall and for various disaggregated student groups. The larger declines in achievement were observed for traditionally lower-performing groups, including African American, American Indian, Hispanic/Latino, Pacific Islander, students from low-income families, students with disabilities and English learners.
 - This implies that achievement gaps that existed before the pandemic were likely exacerbated because of pandemic related disruptions.

What was the learning experience of participating students?

Learning Model

Table 4 summarizes the primary learning model of Utah schools during the 2020-2021 academic year. The data are based on responses provided by LEAs and schools in June 2021 to the *COVID schedule impact questionnaire*. A school’s primary learning model is the model in which it spent the most school days during 2020-2021.

Table 4: Primary Learning Models in 2020-2021

Primary Learning Model	# of Schools	% of Schools
Regular In-Person	325	31%
Remote	50	5%
Hybrid	654	62%
Online School ³	21	2%

³ An “Online School” is a school for which students attended remotely even before the pandemic. “Remote” is a school that was in-person before the pandemic but was primarily remote learning during 2020-2021.

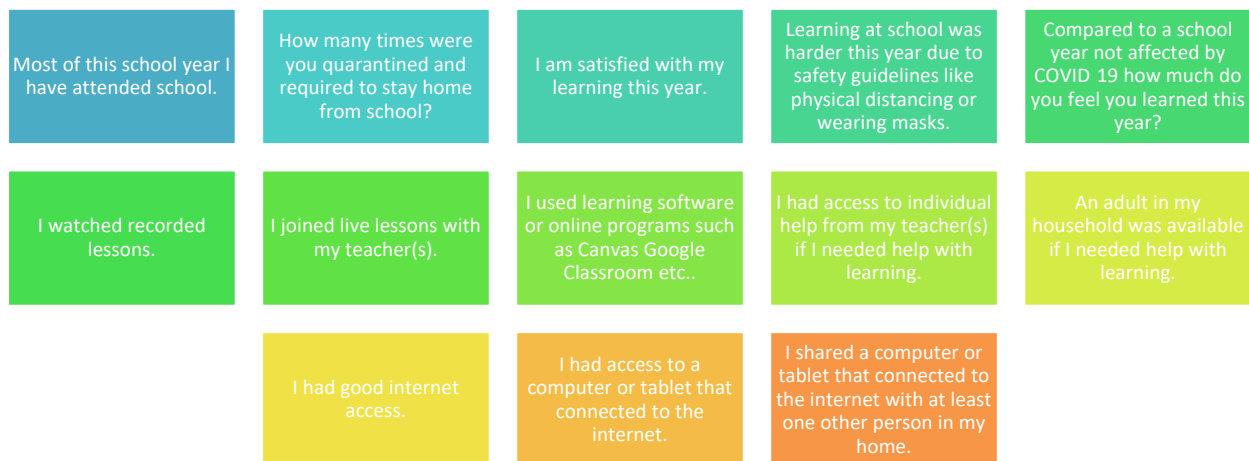
Associating the primary learning model with the 2020-2021 student achievement data in RISE and Utah Aspire Plus, we observed the following trends:

- Most schools were in-person or hybrid during 2020-2021. Note that Hybrid encompasses a wide range of schools, from those that had a few students learning remotely all year long to those that had substantial numbers of students learning remotely for parts of the year during quarantines.
- For RISE, higher achievement was associated with the in-person or in hybrid learning models.
- For Utah Aspire Plus, higher achievement was associated with the remote learning model.

Opportunity to Learn (OTL)

An OTL survey was given to students as part of their RISE and Utah Aspire Plus assessments in spring 2021. Figure 2 shows the questions in the OTL survey.

Figure 2: Questions on the 2020-2021 OTL Survey



Summaries of the response to the OTL survey are available at USBE’s [Opportunity to Learn Dashboard](#). We observed the following trends when connecting the OTL and achievement results:

Attendance and Quarantine

- Most students attended school in-person for most of the school year,
- About half the students who responded to the survey experience quarantine protocols at least once during the school year,
- More frequent in-person learning was associated with higher student achievement on RISE and Utah Aspire Plus,
- Fewer quarantine frequency was also associated with higher student achievement on RISE and Utah Aspire Plus.

Quality of Learning

- More students were:
 - Satisfied with their learning this year,
 - Agreed that learning was harder due to safety guidelines like physical distancing and wearing masks,
 - Felt they learned about the same or more compared to a non-COVID impacted year, especially in grades 3-8.
- High achievement was associated with students who:
 - Were more satisfied with their learning (especially in grades 3-8),
 - Did *not* find learning harder due to safety guidelines,
 - Felt that learning this year was about the same or slightly less than a non-COVID impacted year.

Remote Learning

- Of those who participated in remote learning, more students
 - Watched recorded lessons at least occasionally,
 - Frequently used learning software or online programs (such as Canvas Google Classroom, etc.),
 - Had access to teachers to support their learning,
 - Had learning support from an adult in their household.
- Higher achievement was associated with student who:
 - Watched fewer recorded lessons in grades 3 to 8,
 - Used learning software or online programs more frequently,
 - Had ready access to teacher to support their learning,
 - Had ready access to learning support from an adult in their household.

Internet Connectivity

- Of those who participated in remote learning,
 - The majority of students had good internet access,
 - The majority of students had access to an internet-connected device,
 - Most students did not share an internet-connected device at home.
- Higher achievement was associated with students who:
 - Had ready access to good internet,
 - Had ready access to an internet-connected device,
 - Did not share an internet-connected device at home.

Who were the missing students from 2018-2019?

To better understand the students who previously tested in 2018-2019 but did not participate in 2020-2021, we compared the count and achievement of these ‘missing’ students with those who participated in both 2018-2019 and 2020-2021 (i.e., ‘participating’ students).

Figures 3 and 4 compare the number of missing students with the number of participating students for RISE and Utah Aspire Plus respectively. Consistent with the general findings about 2020-2021 participation rates (see Table 1), there were comparatively more missing students in high school (Utah Aspire Plus) than in grades 3-8 (RISE).

Figure 3: Comparison of Missing vs. Participating Students on RISE in 2020-2021

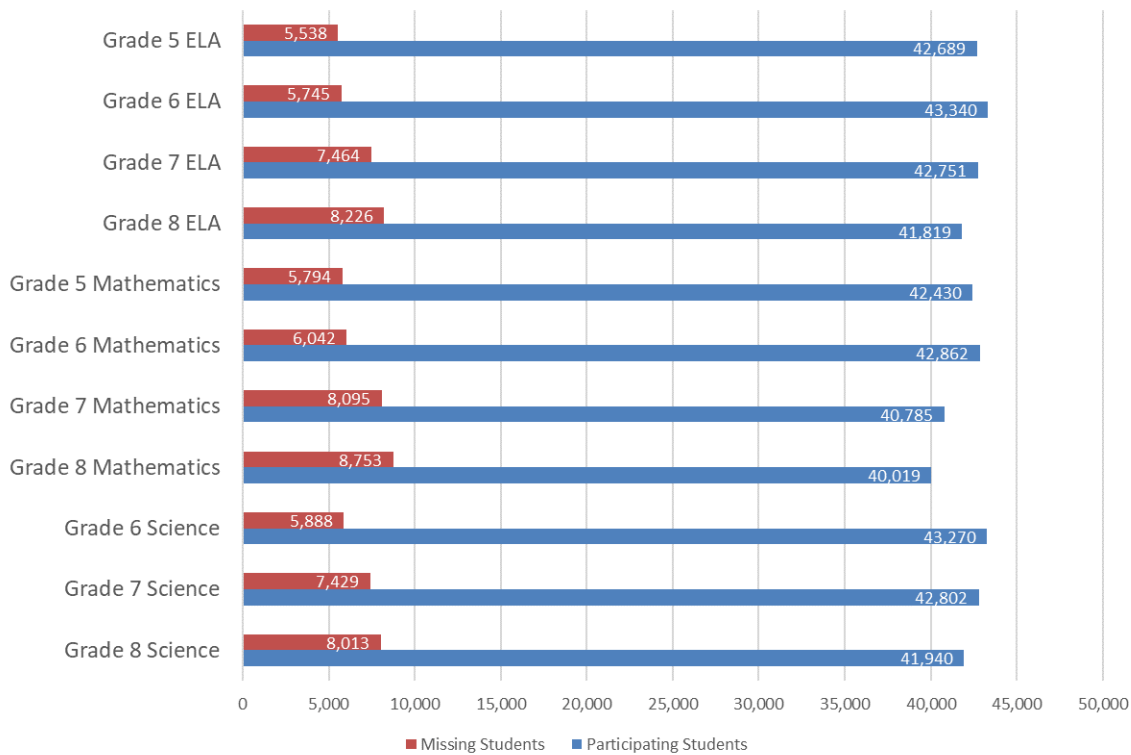
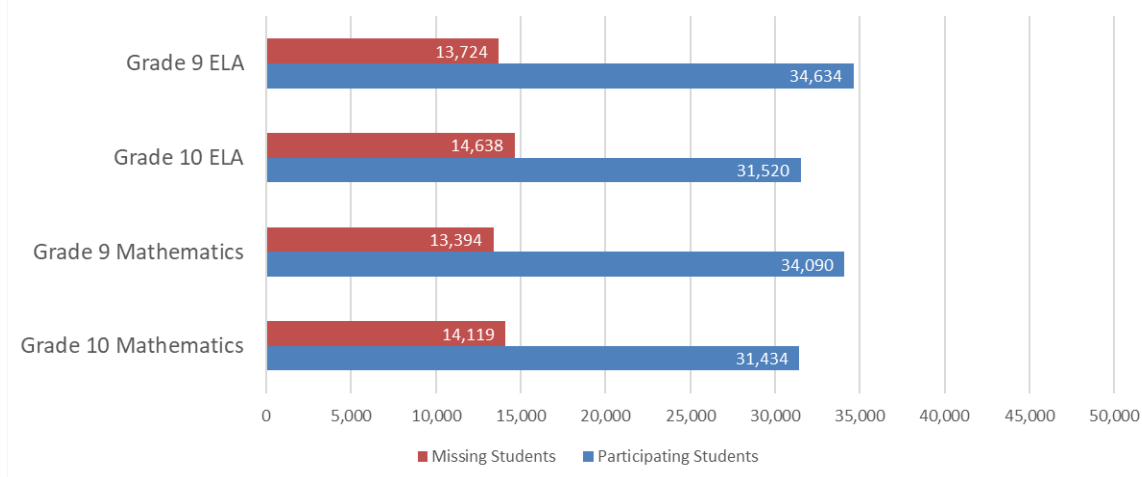


Figure 4: Comparison of Missing vs. Participating Students on Utah Aspire Plus in 2020-2021

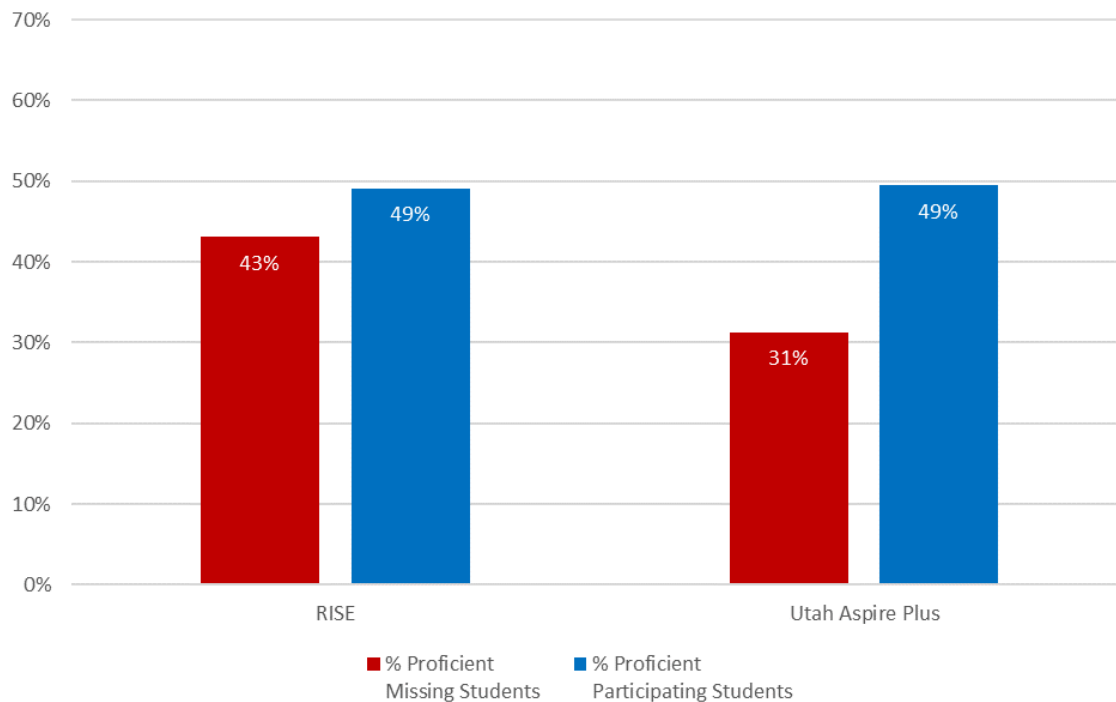


Figures A.1 to A.4 in the [Appendix](#) compare the demographic compositions of the missing students (upper pie charts) with those of the participating students (lower pie charts) on RISE in 2020-2021. These comparisons show that the missing students on RISE included a relatively higher percentage of Native American students (compare the [green boxes](#) in Figure A.1).

Figures A.5 to A.8 in the [Appendix](#) compare the demographic compositions of the missing students (upper pie charts) with those of the participating (lower pie charts) on Utah Aspire Plus in 2020-2021. For Utah Aspire Plus, the missing students included a notably lower percentage of White students and higher percentages of Hispanic/Latino, Native American, African American, and Pacific Islander students – compare the charts in Figure A.5. There were also higher percentages of student from low-income families, special education students and English learners – compare the charts in Figures A.6, A.7 and A.8, respectively.

Figure 5 compares how the missing students ([red bars](#)) and the participating students ([blue bars](#)) performance in 2018-2019 on the RISE and Utah Aspire Plus. The comparisons show that the missing students had lower proficiency rates than participating students, especially for Utah Aspire Plus.

Figure 5: 2018-2019 Proficiency Rates of Missing vs. Participating Students



In summary, the students who did not participate in 2020-2021 tended to be those from traditionally lower-performing student groups and those who were, in general, lower performing when they took the test in 2018-2019.

How would missing students have performed if they took the test?

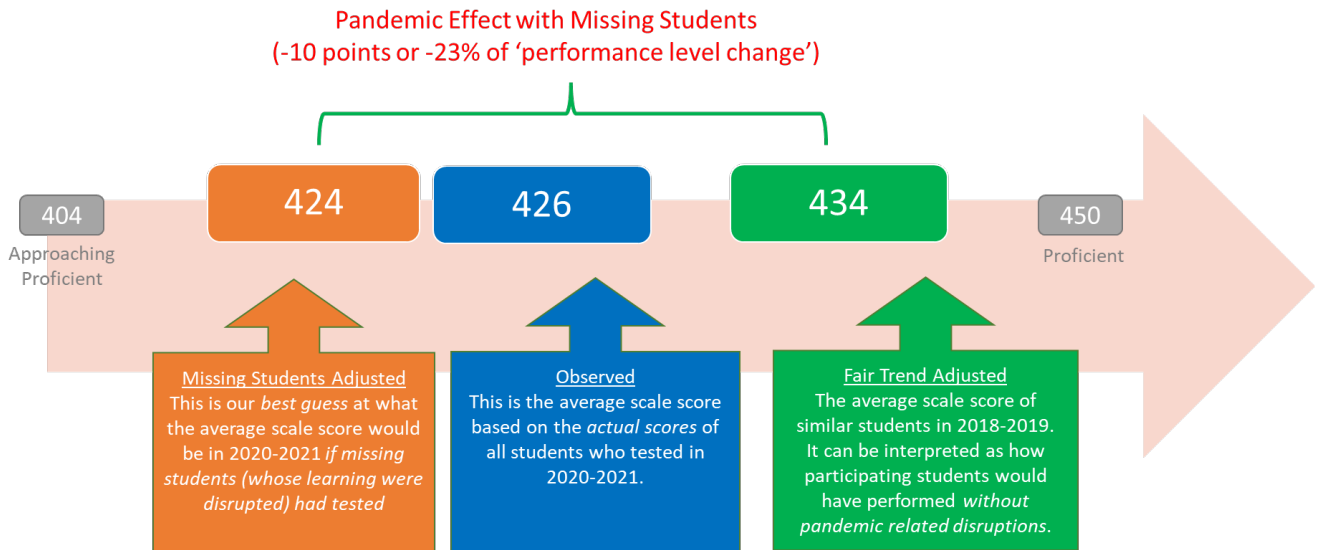
Based on the findings for the previous question, it is reasonable to assume that if the missing students had tested in 2020-2021, they would likely have performed worse than those who participated in both years. We used [Dr. Andrew Ho's](#) 'equity check' metric to estimate the best-case⁴ academic achievement of these missing students.

Figure 6 extends the visual illustration in Figure 1 by including an estimate of what the average scale score for RISE Grade 7 ELA in 2020-2021 would have been *if missing students had tested*. The difference between the *Fair Trend Adjusted* score (green box) and the *Missing Students Adjusted* score (orange box) represents an estimation of the pandemic effect *with missing*

⁴ In this 'best case' scenario, we assume that the effect of pandemic disruption on missing students is *similar* to that of the participating students for each RISE and Utah Aspire Plus assessment (i.e., the "Pandemic Effect" columns in Tables 2-3 above.) While it is impossible to estimate empirically, it is reasonable to assume that pandemic disruptions may have affected the achievement of missing students more than participating students.

students included. To help contextualize the effect, we also present the pandemic effects in terms of performance level change.

Figure 6: Comparing the “Missing Students” and “Fair Trend” Adjusted Scores



Tables 5 and 6 summarize the *Missing Students Adjusted* and *Fair Trend Adjusted* average scale scores for RISE and Utah Aspire Plus respectively along with the estimated pandemic effects and what they represented in terms of expected performance level change for each assessment.

Table 5: RISE Average Scale Score Comparisons with Missing Students

RISE	2020 2021 <i>Missing Students Adjusted</i> Avg. Scale Score	2018 2019 <i>Fair Trend Adjusted</i> Avg. Scale Score	Pandemic Effect with Missing Students	% Performance Level Change
Grade 5 ELA	386	399	-13	-27%
Grade 6 ELA	413	436	-23	-57%
Grade 7 ELA	424	434	-10	-23%
Grade 8 ELA	442	456	-14	-26%
Grade 5 Mathematics	367	378	-11	-45%
Grade 6 Mathematics	398	411	-13	-37%
Grade 7 Mathematics	426	440	-14	-41%
Grade 8 Mathematics	461	480	-19	-37%
Grade 6 Science	849	852	-3	-37%
Grade 7 Science	848	850	-1	-15%
Grade 8 Science	850	852	-2	-24%

Table 6: Utah Aspire Plus Average Scale Score Comparisons with Missing Students

Utah Aspire Plus	2020 2021 <i>Missing Students</i> <i>Adjusted</i> Avg. Scale Score	2018 2019 <i>Fair Trend</i> <i>Adjusted</i> Avg. Scale Score	Pandemic Effect with Missing Students	% Performance Level Change
Grade 9 ELA	196	201	-5	-14%
Grade 10 ELA	199	204	-5	-14%
Grade 9 Mathematics	191	202	-11	-37%
Grade 10 Mathematics	189	201	-12	-46%

As noted with Dr. Ho’s “equity check” metric, the *Missing Students Adjusted* score is a ‘best guess’ and ‘best case’ scenario. It is therefore reasonable to assume that the estimated pandemic effects are underestimations of the ‘true’ pandemic effects on all Utah students. This speaks to the necessity of helping all students in Utah with learning recovery going forward. It also highlights the urgency of identifying the missing students and providing targeted support to these and other traditionally lower-performing student groups to prevent them from falling into an academic spiral.

LEA and School Level Analyses

We also computed the *Fair Trend Adjusted* and *Missing Students Adjusted* for all Utah LEAs and schools. While the general trends across LEAs and schools are consistent with those at the state level. We did identify some entities that appear to have ‘bucked the trends’ and overcame the influence of pandemic related disruptions on student achievement. Detailed information about the LEA and school level analysis is contained in the full report.

Call to Action

The observed academic impacts of school disruptions from the COVID-19 pandemic on student learning are substantial. In fact, the results of our analyses point to unprecedented impacts on both student participation and academic achievement on the Utah assessments. For example, we are observing in some cases over two times the declines in student achievement in Utah compared to the effects attributed to Hurricane Katrina on students from New Orleans⁵. Importantly, we have been reporting state average scores, but the patterns varied considerably across LEAs, schools, and student groups. In fact, the results are noticeably lower for students from certain racial and ethnic groups as well as English learners and students with disabilities. In other words, the students that could least afford to lose ground tended to experience more severe impacts than the general student population. These detailed breakdowns are included in the full report.

⁵ [Sacerdote \(2012\)](#) reported an effect-size impact on student achievement of -0.16 while [Payne, McCaffrey, Kalra, and Zhou \(2008\)](#) reported an effect size of -0.06. Depending upon grade and content area, the effect-size estimates found for RISE and Utah Aspire Plus in our studies ranged from -0.08 to -0.26. The effect-size estimates for RISE and Utah Aspire Plus are provided in the full report.

We recognize, however, that these findings must be interpreted along with other information, both local assessment and OTL indicators, to best determine the actions necessary to address these learning disruptions. State assessment results in 2022 will be an important source of confirmatory information, but in the near-term, educators and school leaders must rely on assessment information closest to the teaching and learning process to guide acceleration efforts.

While there are several potential threats to the validity of the comparisons presented in this report, we argue that the signal is loud enough to be heard through any noise. These results must be interpreted as a call to action from the statehouse to the schoolhouse. The learning acceleration necessary cannot be left to teachers and principals alone. School leaders, educators, and local communities will need support and resources to sustain the necessary interventions well beyond the time when the federal ESSER funds run out.

References

Ho, Andrew (2021). *Three test-score metrics that all states should report in the COVID-19-affected spring of 2021*. Memorandum presented at the convening of the Council of Chief School Officers' (CCSSO) Technical Issues in Large Scale Assessment (TILSA) collaborative, February 2021. Retrieved from <https://scholar.harvard.edu/files/andrewho/files/threemetrics.pdf>

Appendix – Demographic Comparisons of Missing vs. Participating Students

Figure A.1: Comparison of Race/Ethnicity Distributions for Missing vs. Participating Students on RISE in 2020-2021

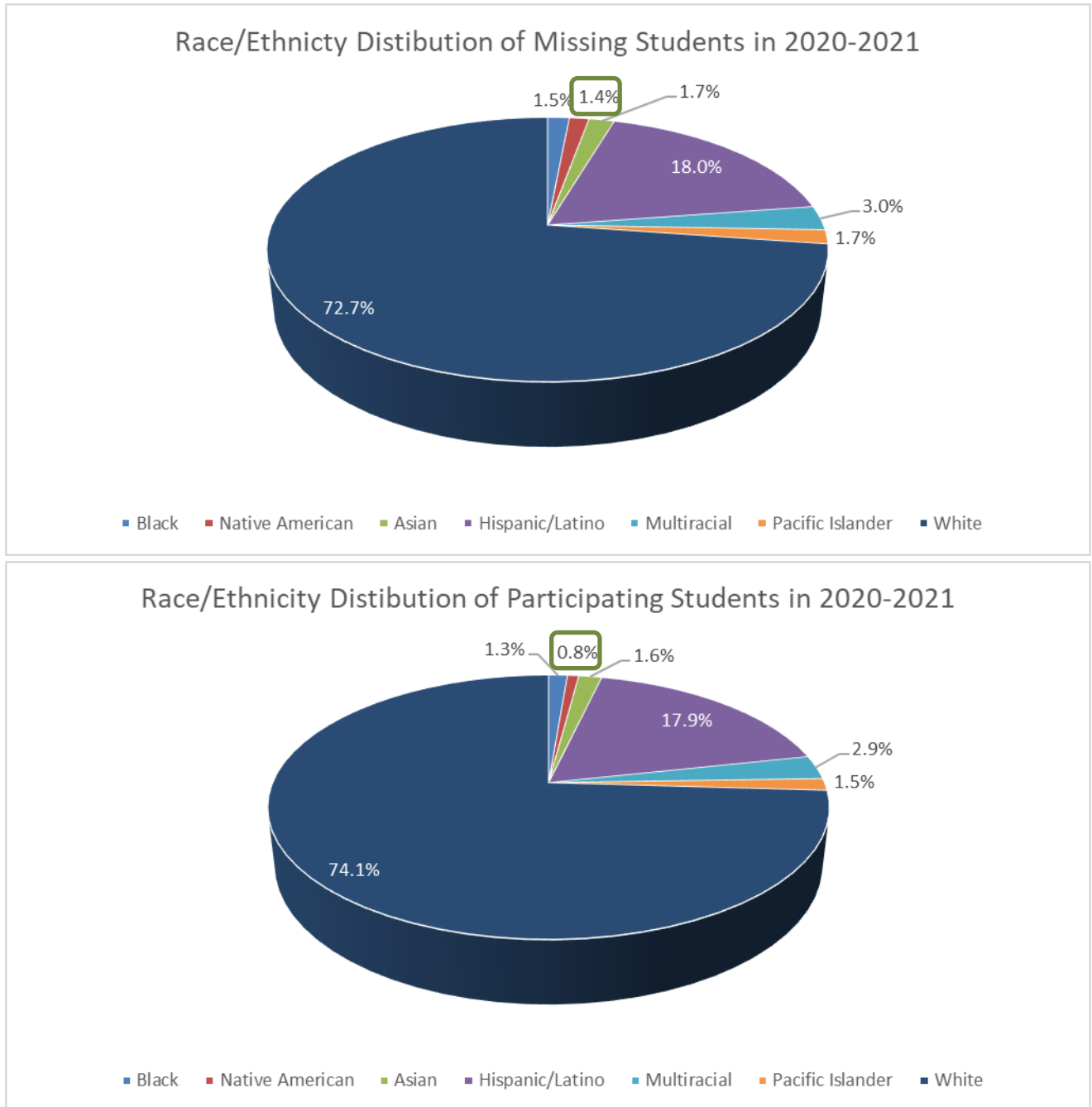


Figure A.2: Comparison of Family Income Distributions for Missing vs. Participating Students on RISE in 2020-2021

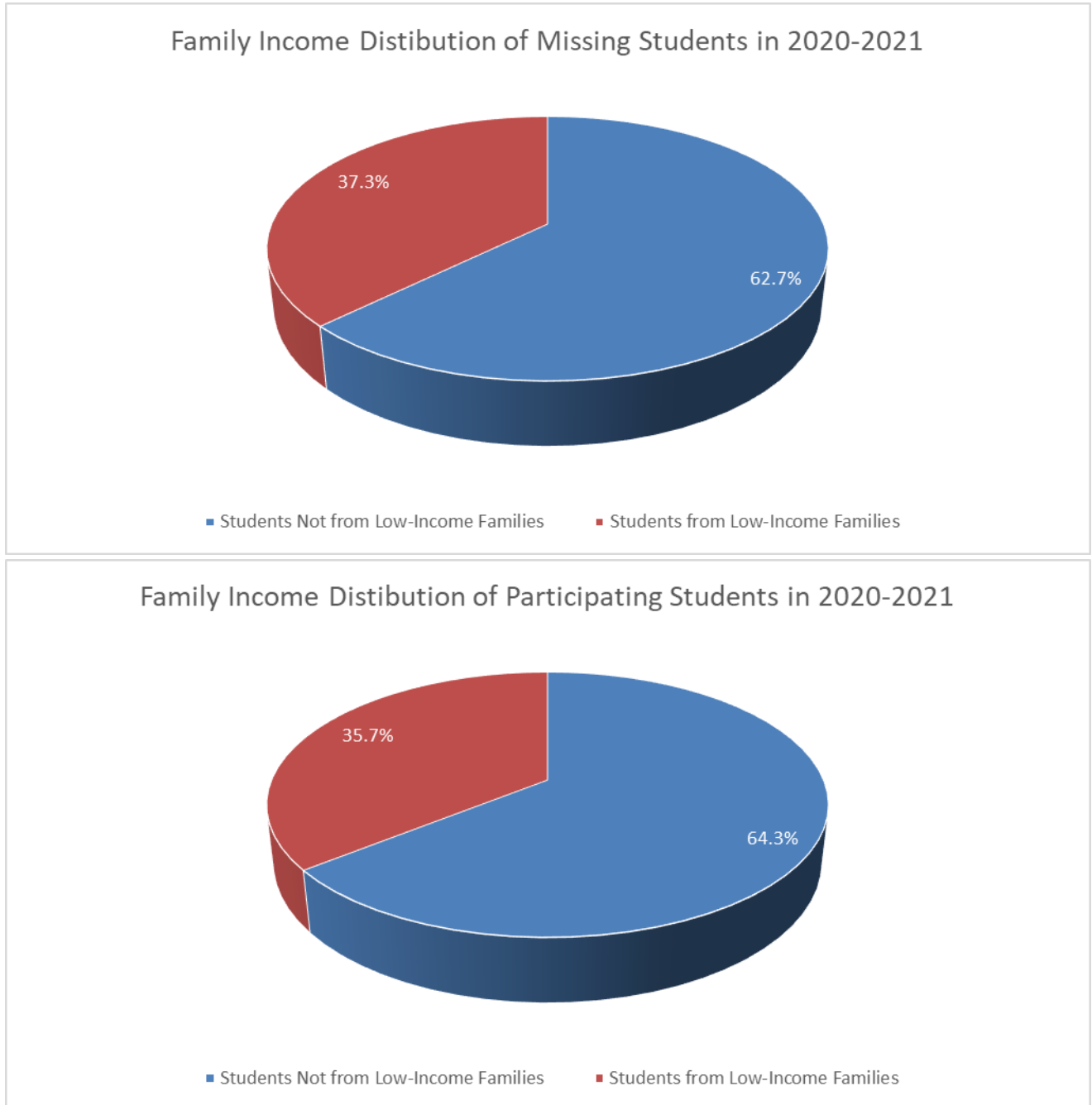


Figure A.3: Comparison of Special Education Status Distributions for Missing vs. Participating Students on RISE in 2020-2021

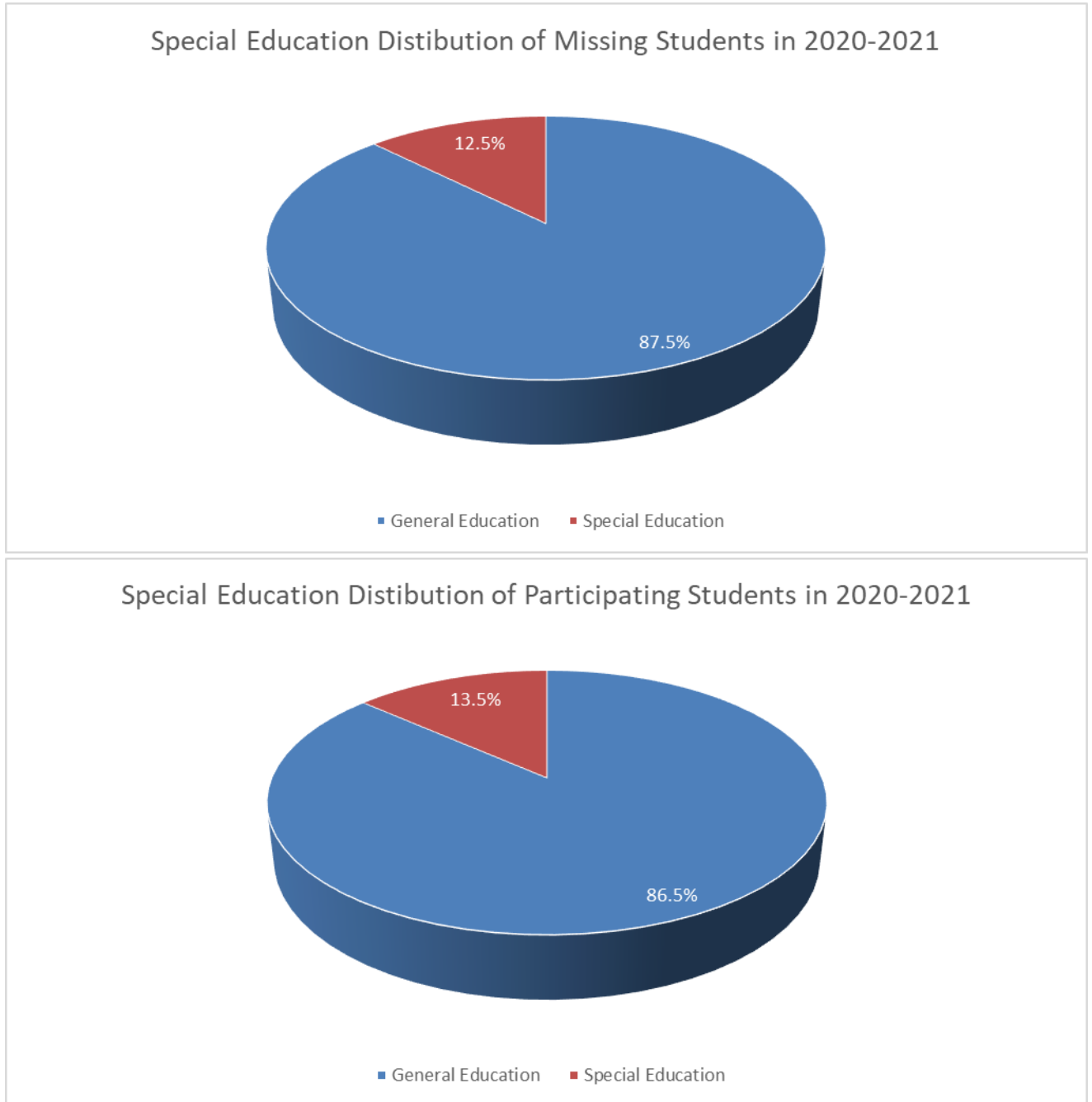


Figure A.4: Comparison of English Learner Status Distributions for Missing vs. Participating Students on RISE in 2020-2021

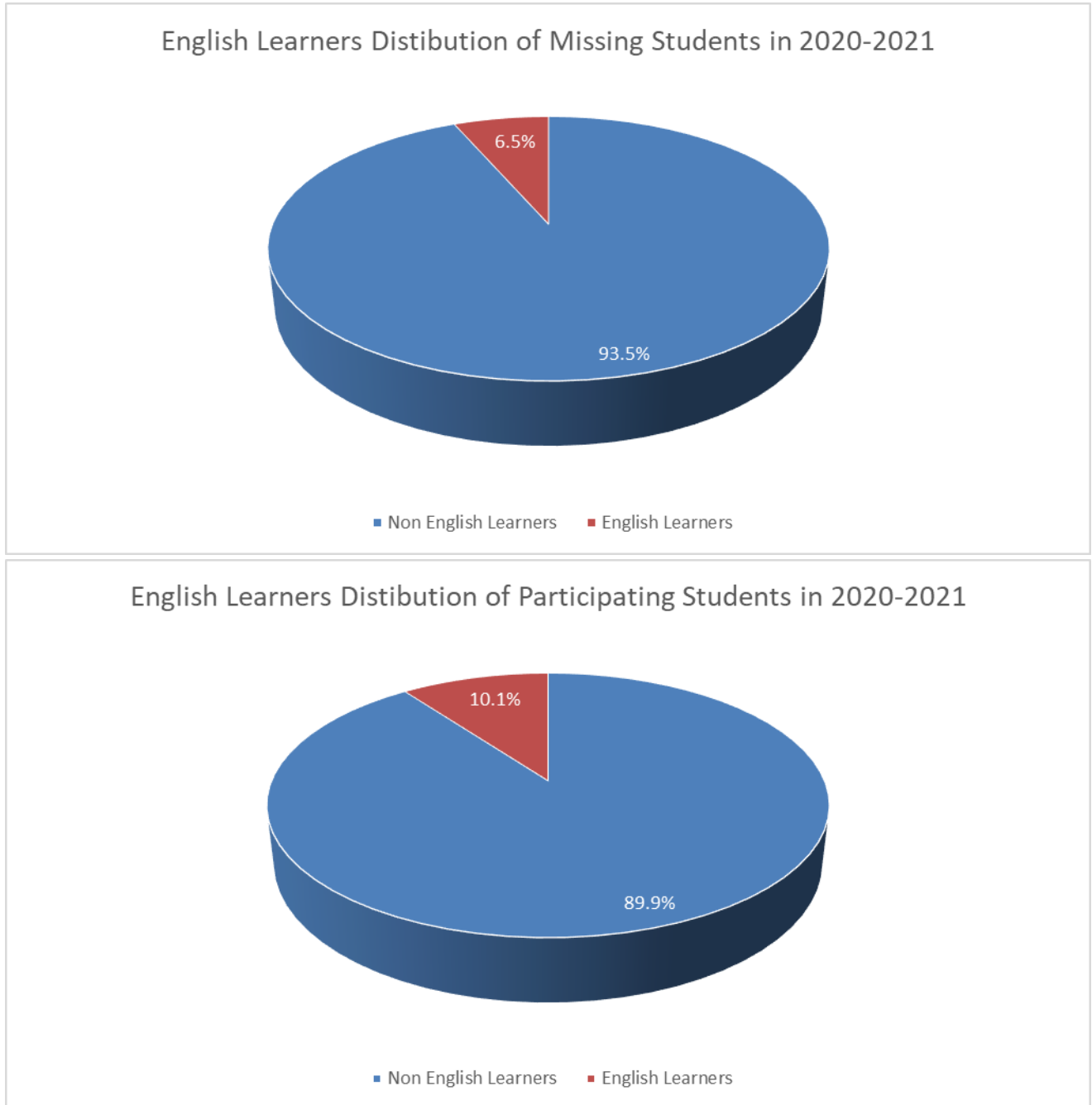


Figure A.5: Comparison of Race/Ethnicity Distributions for Missing vs. Participating Students on Utah Aspire Plus in 2020-2021

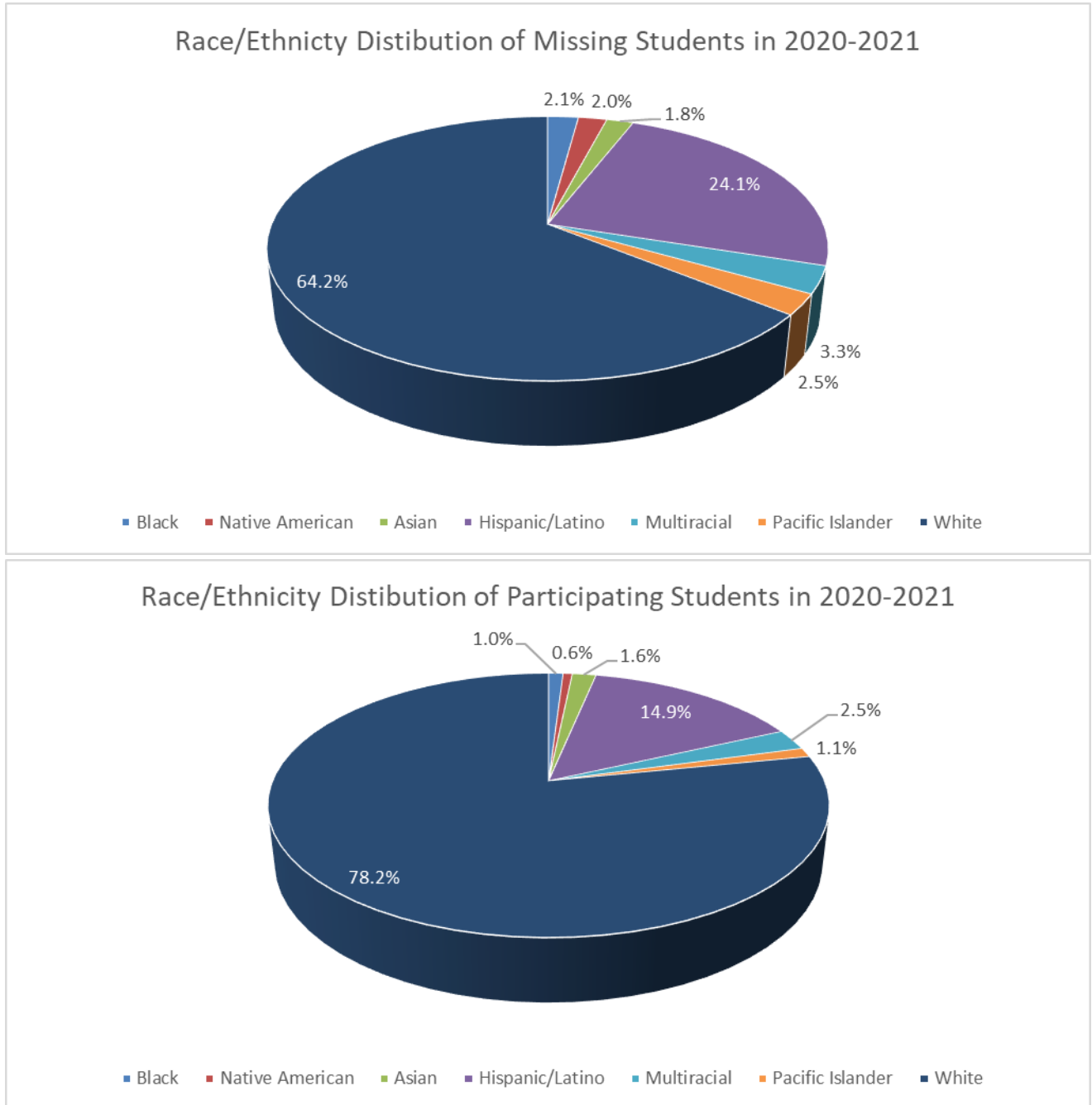


Figure A.6: Comparison of Family Income Distributions for Missing vs. Participating Students on Utah Aspire Plus in 2020-2021

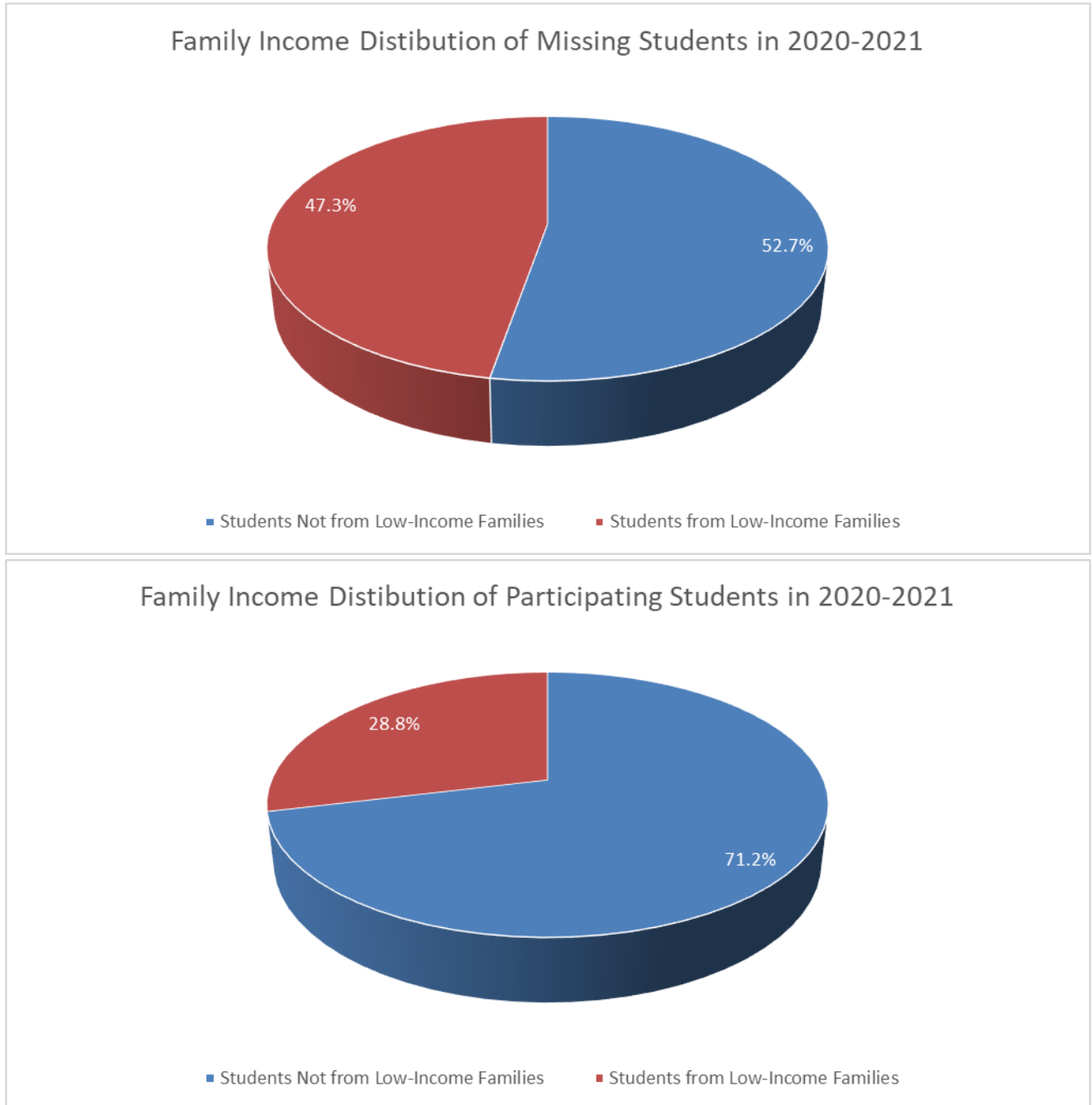


Figure A.7: Comparison of Special Education Status Distributions for Missing vs. Participating Students on Utah Aspire Plus in 2020-2021

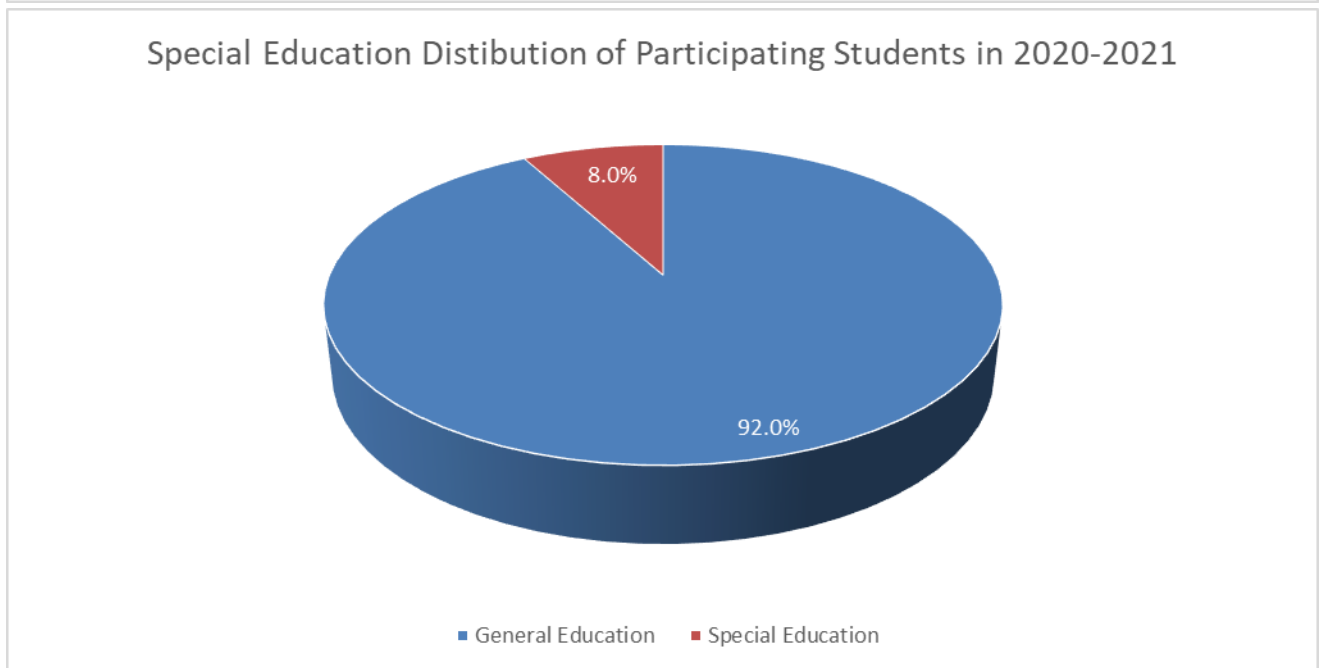
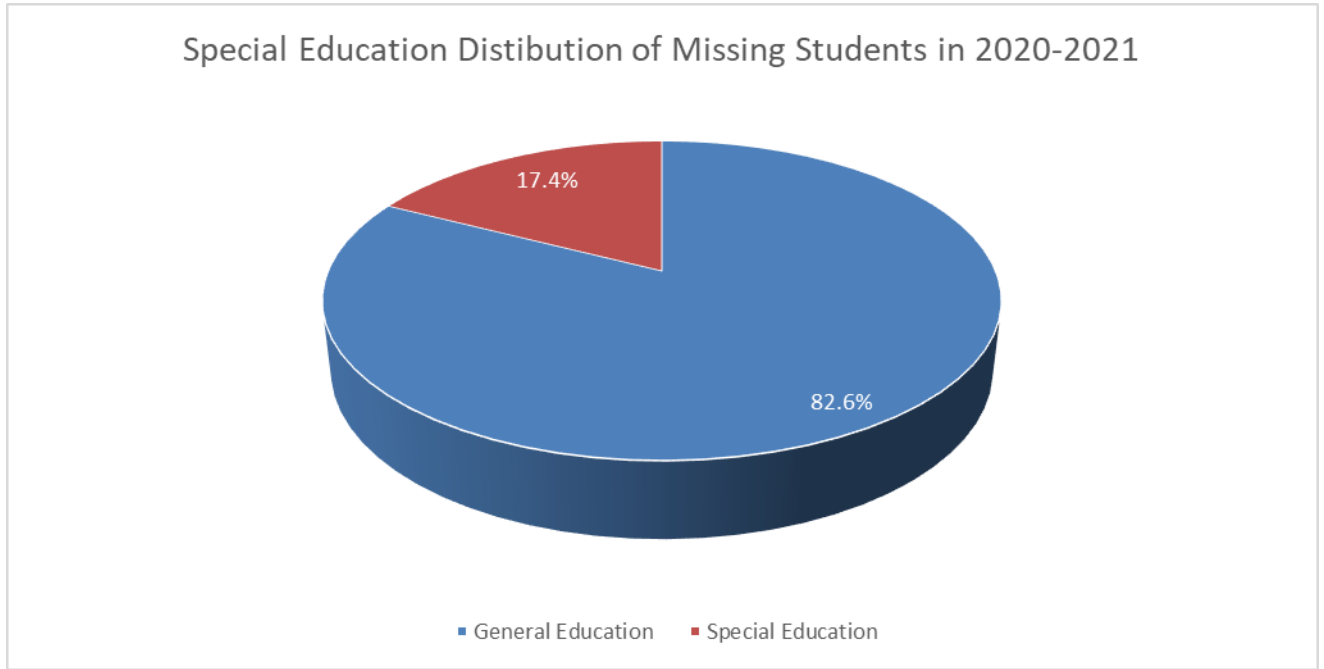


Figure A.8: Comparison of English Learner Status Distributions for Missing vs. Participating Students on Utah Aspire Plus in 2020-2021

