Students Demonstrate Post-Pandemic ISIP Math Growth: A Cohort Study

—*Jean Hampel, EdD*

Key Findings

- The number of students in level 1 dropped by 14%, and the number of students in level 5 increased by 7% from September 2020 to March 2023.
- The cohort started second grade with 41% of students above the 40th percentile. That number increased to 56% by the end of fourth grade.
- The results suggest that the students in this cohort are making positive gains toward recovery in the years following the COVID-19 pandemic.

Overview

Educators use formative assessments like Istation's Indicators of Progress (ISIP™) Math to monitor student progress in real time and to identify areas where students need additional support. Providing educators and researchers with this type of data helped uncover the unfinished learning created by the COVID-19 school disruptions. However, many research studies have taken a deficit approach to analyzing the data and focused on learning gaps. This brief takes the opposite approach and evaluates longitudinal growth by investigating the math instructional levels of a selected cohort of students over three years.

Core Question: To what extent did instructional levels change on the ISIP Math assessment for a cohort of students over three years?

Analytic Sample

For the research sample, ISIP Math results were collected from 17 states from the 2020–2021, 2021–2022, and 2022–2023 school years (see Table 1). The 2020–2021 school year was chosen as the starting data collection point because it is the first full school year of learning disruption. Furthermore, that year the ISIP Math assessment moved to a vertical scale, allowing for comparisons across grades. This study followed one cohort of students from second grade (2020–2021) through fourth grade (2022–2023).

Inclusion in the convenience sample required students to have beginning-of-the-year (BOY), middle-of-the-year (MOY), and end-of-the-year (EOY) assessment results for all three years. We considered the September assessment month as BOY, January as MOY, and March as EOY because these months provided the largest sample of students with all nine scores.

We recognized that some students were at home at the beginning of the 2020–2021 school year, so we looked at the frequency of assessments taken at home in September 2020. In all, there were 2,771 instances. Removing those students, however, did not substantially change the analyzed data (approximately +/−1%). Thus, the students were left in the sample, and the final sample consisted of 9,237 students and 83,133 ISIP Math observations.

Table 1. *Cohort of Sample Participants*

State	Number of Students
Alabama	38
Arkansas	1300
California	45
Colorado	118
Florida	299
Georgia	56
Hawaii	22
Idaho	1630
Kansas	28
Missouri	65
Mississippi	2
Montana	59
North Carolina	169
North Dakota	4
New Mexico	1010
Oklahoma	860
Texas	3532
Overall	9237

Results

After students complete the 28-question ISIP Math assessment, overall and domain scores are calculated using a nationwide normative sample. We only used overall student performance data from assessments for this brief. The scores are reported to educators as a percentile and instructional level based on the percentile rank. The five instructional levels range from Level 5 (above the 80th percentile) to Level 1 (at or below the 20th percentile) (see Table 2).

The ISIP Math assessment results can also show the percentile ranks as three instructional tiers. However, using the five instructional levels allowed a better understanding of the nuances of growth by using smaller reporting bands.

Table 2. *ISIP Math Instructional Levels*

Instructional Level	Level Description
Level 5	Above the 80th percentile rank
Level 4	At or below the 80th percentile rank
Level 3	At or below the 60th percentile rank
Level 2	At or below the 40th percentile rank
Level 1	At or below the 20th percentile rank

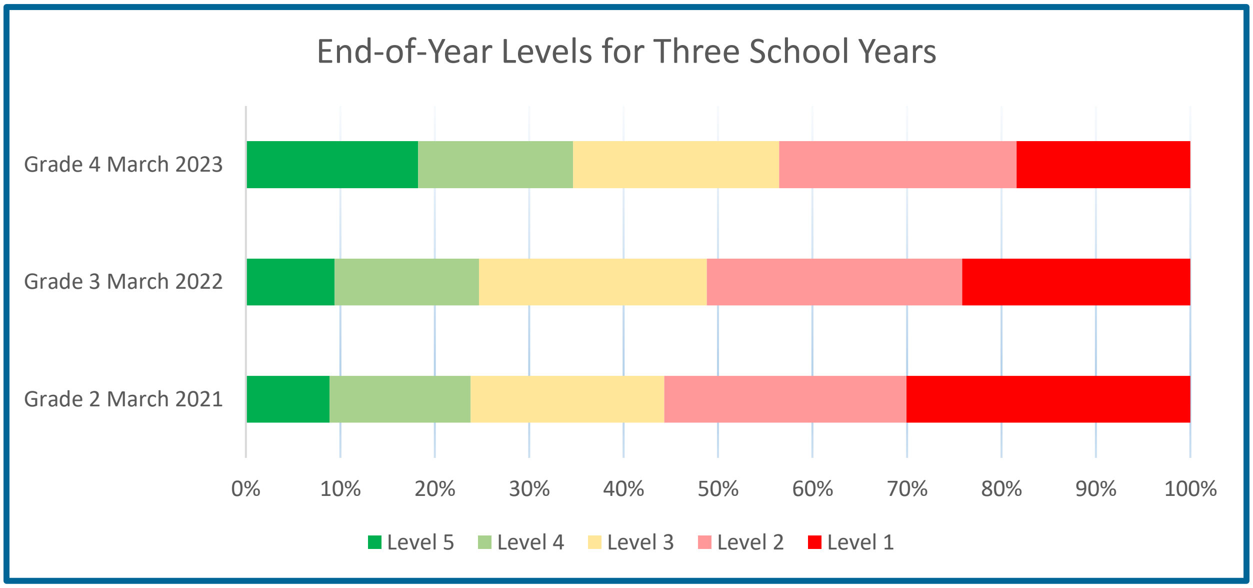
Overall, students in the cohort showed positive growth in instructional levels over three years. The number of students in level 1 (at or below the 20th percentile) dropped 14% from the September baseline for grade two (2020) through March of grade four (2023). Level 2 students (at or below the 40th percentile) decreased by 2 percent. In the two middle bands, levels 3 and 4 (at or below the 60th and 80th percentile, respectively), the number of students increased by 4% in each level. Finally, the number of students in level 5 (above the 80th percentile) grew by 7% during the same period (see Table 3).

Table 3. *Percentage of Students in Each Level During Observed Period*

Level	Grade 2 09/2020	Grade 2 01/2021	Grade 2 03/2021	Grade 3 09/2021	Grade 3 01/2022	Grade 3 03/2022	Grade 4 09/2022	Grade 4 01/2023	Grade 4 03/2023
5	11%	9%	9%	10%	7%	9%	19%	12%	18%
4	12%	13%	15%	20%	15%	15%	26%	16%	16%
3	18%	20%	21%	23%	25%	24%	22%	25%	22%
2	27%	27%	26%	26%	31%	27%	18%	29%	25%
1	32%	32%	30%	22%	23%	24%	14%	19%	18%

The general trend was a declining number of students at the lower range and an increasing number of students meeting proficiency as measured by ISIP scores at or above level 3 (see Figure 1). More specifically, 41% of the sample population started second grade above the 40th percentile (levels 3–5). However, by the end of fourth grade, that number increased to 56% of students in levels 3 through 5.

Figure 1. *End-of-Year Levels for Three School Years*



Conclusion

This brief examined longitudinal math growth using a formative assessment with a cohort of students over three years. Rather than looking for learning gaps, learning gains were discovered for consistently assessed students during the benchmark periods.

These findings suggest the students in this cohort are making positive gains toward recovery in the years following the COVID-19 pandemic. Using descriptive statistics allowed us to summarize the cohort assessment data quickly. The results will allow us to continue researching student growth in math and find correlations with other variables.

Limitations

There are several limitations to this study. One limitation is that data were only collected for students who completed all nine assessments during the three years. Therefore, the data were a convenience sample. Additionally, this data collection method ensured that only students who attended school consistently were included, which may result in a biased sample. The results may not be generalizable to the entire student population that includes more transient students.

Another limitation is the descriptive statistics were an aggregate of the ISIP Math scores. Consequently, the results do not show the individual losses and gains in achievement.

Finally, this study had a limited scope and only used descriptive statistics that did not allow us to infer the conditions that led to academic growth. Further research is needed to understand if there was a large-scale change for ISIP Math users and what variables positively influenced or correlated with that growth. For example, we did not assess the impact of progress monitoring or the use of the Istation supplemental curriculum, which may explain some of these findings.

Future research should examine the impact of Istation usage on student progress in math. Also, investigating additional cohorts will allow for a broader understanding of the consequences of the COVID-19 pandemic.