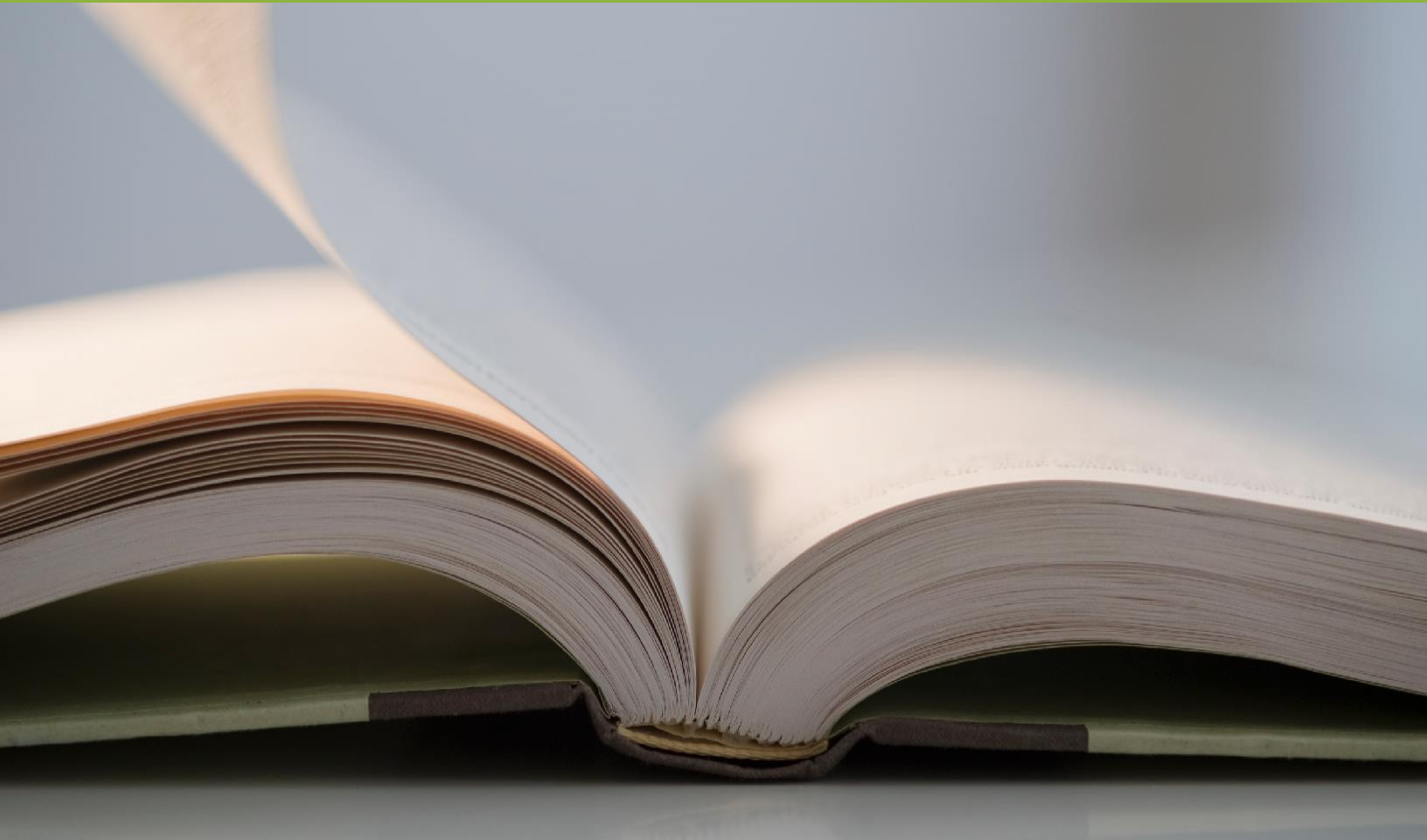


# **SAS® EVAAS**

## An Analysis of Learning Decline Resulting from the COVID-19 Pandemic

Prepared for the North Dakota Department of Public Instruction



## Executive Summary

### Background

During the 2019-20 and 2020-21 school years, the COVID-19 pandemic dramatically impacted traditional methods of student learning. Understanding the extent of the impact of students' lost instructional time and how it can vary among student groups is critical to understanding current education needs and developing recovery plans to meet those needs.

To further this understanding about the impact of students' lost instructional time, the North Dakota Department of Public Instruction (NDDPI) and SAS collaborated to leverage existing student assessment data and yield insight into one way that the pandemic disrupted student learning.

**This analysis uses student projections to the 2020-21 school year, which represent students' expected performance based on the average schooling experience across the state prior to the pandemic and then compares these projections to students' actual performance on the 2020-21 statewide assessments.**

This analysis investigates learning decline in the following ways:

- Across subjects and grades
- Across schools and districts
- Across student groups such as those with different levels of prior achievement or those with specific demographic characteristics such as socioeconomic status and English Learner status

Using these strategies offers NDDPI empirical results to realistically assess the impact of the pandemic and more effectively monitor students' recovery.

Results are sometimes summarized using effect sizes; positive effect sizes indicate the magnitude by which a group of students exceeded their pre-pandemic trajectory, whereas negative effect sizes indicate the magnitude by which a group of students fell short of their pre-pandemic trajectory or experienced unfinished teaching and learning. Each student is compared to their own expected score based on their assessment data from prior to the pandemic. Any effect size comparisons between student groups do not represent the size of any achievement gaps between the groups; as a result, even if the reported effect sizes representing the impact of the pandemic are similar for two groups, any pre-existing achievement gaps between the groups would largely persist. More information about interpreting effect sizes is included at the end of the document.

### Findings

#### Across Subjects and Grades

Table 1 summarizes the effect sizes observed for NDSA ELA and Math assessments (grades 5–8 and 10) and ACT ELA and Math based on 2020-21 assessment results. For added context, a comparison of expected and actual performance is provided for NDSA assessments for the 2018-19 school year using expectations based on assessment data through the 2017-18 school year to illustrate the amount of variation between expected and actual performance observed in a more typical year.

**Table 1: Statewide Effect Sizes Across Subjects and Grades**

Assessment	Grade	2018-19 (17-18 Expectation)	2020-21 (18-19 Expectation)
NDSA ELA	5	-0.04	-0.01
NDSA ELA	6	0.12	-0.12
NDSA ELA	7	0.00	-0.13
NDSA ELA	8	0.12	-0.05
NDSA ELA	10	0.04	-0.16
NDSA Math	5	0.07	-0.14
NDSA Math	6	0.00	-0.13
NDSA Math	7	-0.10	-0.10
NDSA Math	8	0.03	-0.18
NDSA Math	10	-0.14	-0.10
ACT ELA	N/A	N/A <sup>1</sup>	-0.05
ACT Math	N/A	N/A	-0.16

The effect sizes for 2018-19 range from -0.14 to 0.12. This provides a frame of reference for how much these effect sizes might vary from zero (performing at expectations) in a typical pre-pandemic year. Although the 2020-21 results are all negative, which indicates evidence of a decline in learning resulting from the pandemic, the magnitude to which the effect sizes differ from zero is relatively similar to the magnitude to which some of the 2018-19 effect sizes differ from zero. Stated differently, there is evidence of a decline in learning, but the observed impacts are not especially large relative to the variation observed in pre-pandemic results.

In NDSA English Language Arts (ELA) for grades 5–8 and 10, students tended to score close to the pre-pandemic expectation, with effect sizes ranging from -0.16 to -0.01. The negative effect sizes provide evidence of learning decline, but the magnitude of this impact tended to be less than what has been reported in research from other states and national studies. For example, similar analysis in another state found effect sizes ranging from -0.20 to -0.16 for Reading assessments in grades 5–8.<sup>2,3</sup> The largest impacts observed across ELA subjects were in grade 10 ELA (-0.16).

<sup>1</sup> ACT results are only available for 2020-21 using 2018-19 expectations due to the data available to support the models. All ACT results are restricted to districts that administered ACT in both 2018-19 and 2020-21 in order to focus the results on the group of districts used to establish the pre-pandemic expectation.

<sup>2</sup> North Carolina State Board of Education and North Carolina Department of Public Instruction (2022). Report to the North Carolina General Assembly: An Impact Analysis of Student Learning During the COVID-19 Pandemic. [https://content.govdelivery.com/attachments/NCSBE/2022/03/02/file\\_attachments/2091616/JLEOC%20Report%20HB196.%20Impact%20on%20Lost%20Instructional%20Time%20for%20SBE%20March.pdf](https://content.govdelivery.com/attachments/NCSBE/2022/03/02/file_attachments/2091616/JLEOC%20Report%20HB196.%20Impact%20on%20Lost%20Instructional%20Time%20for%20SBE%20March.pdf)

<sup>3</sup> For examples of other research reporting effect sizes across grades and subjects, see: Storey, N., & Zhang, Q. (2021 Sept 10). A Meta-analysis of COVID Learning Loss. <https://doi.org/10.35542/osf.io/qekw2>

In grades 5–8 and 10 NDSA Math, there was an observable amount of learning decline represented by effect sizes of -0.18 to -0.10. The magnitude of this impact was less than what has been reported in research in other states and national studies. For example, analyses in two other states found effect sizes ranging from -0.31 to -0.27 and -0.52 to -0.38 for Math assessments in grades 5–8<sup>4</sup>.

Results for ACT also provided evidence of learning decline. An effect size of -0.05 in ELA indicates that students tended to narrowly fall short of pre-pandemic expectations, and an effect size of -0.16 in Math indicates that students tended to fall further short of pre-pandemic expectations. Because ACT is administered in grade 11 and students tested in 2020-21 were last assessed in grade 8 during the 2017-18 school year, the impact is measured across a longer period of time than for NDSA assessments where the impact is measured from 2018-19 assessments to 2020-21 assessments. As a result, the observed impacts for ACT cannot be as confidently attributed to the pandemic as those observed for NDSA assessments.

### **Across Schools and Districts**

Students in many schools and districts across North Dakota met or exceeded the pre-pandemic expectations, suggesting there are many exemplars that could offer valuable lessons learned. About 40% of schools and districts met or exceeded the pre-pandemic expectation in NDSA ELA across grades 5–8, and about 30% of schools and districts met or exceeded in NDSA Math across grades 5-8.

### **Differences According to Student-Level Characteristics**

Overall, students with all levels of entering achievement, as represented by the quintiles of their expected scores, tended to experience similar levels of learning decline.

For some student groups, there were differences in the observed patterns in learning decline compared to their peers, but these differences mirrored those observed prior to the pandemic. In these cases, while gaps between groups of students likely widened, the observed differences might instead be indicative of ongoing factors independent of the pandemic. These student groups include:

- Students with disabilities
- English Learners
- Students identified as low income
- Students identified as homeless
- Male students

Some student groups exhibited more learning decline than other students, and the magnitude and/or direction of the differences varied from the patterns observed prior to the pandemic:

- Native American students tended to fall further short of expectations than students of other races/ethnicities prior to the pandemic. These differences persisted during the pandemic but

---

Locke, V., & Patarapichayatham, C. Learning Loss in Reading and Math in U.S. Schools Due to the COVID-19 Pandemic. Istation. [https://www.istation.com/Content/downloads/studies/COVID-19\\_Learning\\_Loss\\_USA.pdf](https://www.istation.com/Content/downloads/studies/COVID-19_Learning_Loss_USA.pdf)

<sup>4</sup> North Carolina State Board of Education and North Carolina Department of Public Instruction (2022). Report to the North Carolina General Assembly: An Impact Analysis of Student Learning During the COVID-19 Pandemic. [https://content.govdelivery.com/attachments/NCSBE/2022/03/02/file\\_attachments/2091616/JLEOC%20Report%20HB196.%20Impact%20on%20Lost%20Instructional%20Time%20for%20SBE%20March.pdf](https://content.govdelivery.com/attachments/NCSBE/2022/03/02/file_attachments/2091616/JLEOC%20Report%20HB196.%20Impact%20on%20Lost%20Instructional%20Time%20for%20SBE%20March.pdf)

Kogan, V., & Lavertu, S. (2021). How the COVID-19 Pandemic Affected Student Learning in Ohio: Analysis of Spring 2021 Ohio State Tests. The Ohio State University. [https://glenn.osu.edu/sites/default/files/2021-10/210828\\_KL\\_OST\\_Final\\_0.pdf](https://glenn.osu.edu/sites/default/files/2021-10/210828_KL_OST_Final_0.pdf)

greatly increased in magnitude, indicating that Native American students experienced significant learning decline due to the pandemic.

- Migrant students experienced more learning decline relative to their peers though the amount of data available makes it difficult to draw definitive conclusions.

### Hybrid and Distance Learning

During the course of the pandemic, instructional approaches varied between in-person instruction, hybrid learning, and distance learning. Overall, students who participated in distance learning experienced more learning decline than those who participated in hybrid learning, and students participating in neither performed closer to pre-pandemic expectations. Students who participated in both distance learning and hybrid learning tended to perform similarly to students who participated in only distance learning.

Although these patterns held across most assessments, the observed differences were substantially larger in Math subjects than in ELA subjects.

### Interpreting Effect Sizes

#### Interpreting Effect Sizes

Effect sizes are sometimes classified as small, medium, or large to assist with interpretation and whether any differences in student performance are meaningful. Various researchers have offered thoughts on what defines a small, medium, and large effect size.

- Cohen describes +/- 0.20 as small, +/- 0.50 as medium, and +/- 0.80 as large (Cohen, Jacob. *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. Mahwah, NJ: Lawrence Erlbaum, 1988).
- Hattie describes an effect size of +/- 0.40 as the average seen across all interventions, and +/- 0.40 as the “hinge point” (Hattie, John. *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. London: Routledge, 2008).
- Kraft suggested 0.05/-0.05 as small, +/- 0.05 to 0.20 as medium, and > 0.20 or <-0.20 as large based on the distributions of effect sizes and changes in achievement (Kraft, MA. “Interpreting Effect Sizes of Education Interventions.” *Educational Researcher*. 2020; 49 (4):241-253).

All of the researchers agree that it is important to interpret results within the distribution of actual results. In other words, what constitutes a small, medium, or large effect size is determined by what is observed in the actual results. As shown in Table 1, effect sizes across assessments using a similar analysis for 2018-19 results ranged from -0.14 to 0.12. This provides important context about the typical differences between expected and actual performance observed across North Dakota in a typical year using the same methodology.