



Personalized learning, universal achievement: Analyzing the impact of DreamBox Math in Pinellas County Schools, Florida

Executive Summary

DreamBox Learning, a company rated ESSA-strong for DreamBox Math and Reading Plus programs, personalizes student learning and provides educators with unique student progress insights. This study highlights the effectiveness of DreamBox's K – 8 math program. During the 2019 – 2020 and 2020 – 2021 school years, over 22,000 1st – 5th grade students in Pinellas County Schools, Florida, completed an average of 4.7 DreamBox math lessons per week within a range of 0 – 15 lessons per week. Students took NWEA MAP growth tests at the beginning of fall semester in September and the end of fall semester in December. The district's DreamBox usage and student achievement data in fall 2019 and 2020 – before and during COVID-19 – revealed the impact of completing five or more DreamBox lessons per week on math achievement in terms of NWEA MAP Growth nationally normed percentiles. Results from hierarchical linear models support the following conclusions:

In just one semester, students scored more than 5 percentile points higher when completing at least five DreamBox Math lessons (~30 – 60 minutes) per week compared with students who completed fewer than two lessons per week. The analysis controlled for students' beginning-of-semester MAP achievement percentile, school and classroom.

Regardless of starting percentiles, students experienced greater achievement when using DreamBox Math. The analysis showed students from **all percentiles in every grade level** experienced similar increases in achievement when they completed at least five lessons per week. This wide-ranging impact suggests DreamBox's ability to intelligently adapt creates a learner-driven, differentiated experience that ensures students progress at similar rates, regardless of prior achievement levels.

During COVID-19, when many districts were reporting evidence of “learning loss” and decreases in achievement, DreamBox Math provided reliable increases in student achievement. This analysis compared students' achievement from September to December in fall 2019 and 2020. Improvements in math achievement during fall 2020, in the midst of the pandemic, were consistent with DreamBox's impact during the same timespan before COVID.

These findings were strengthened through additional results that analyzed state test scores and used alternative statistical models ([click here to see Appendix](#)). These additional analyses included examining different standardized tests (i.e., Florida's FSA), compared with students without access to DreamBox and continuous/linear versions of DreamBox usage. Overall, this study provides more evidence of what prior third-party analyses have shown – elementary students who use DreamBox Math for just 30 – 60 minutes a week increase proficiency, regardless of prior achievement or grade level.

Background and significance

DreamBox Learning Math is an ESSA-strong Pre-K – 8 solution that personalizes learning for students. It engages them in lessons that intelligently adapt to their thinking, using real-time strategy and error analysis. DreamBox also provides teachers with in-the-moment data and insights about students' progress toward proficiency aligned with their state or regional standards. As students develop confidence and competence, DreamBox provides a range of insights that empower teachers to differentiate lessons more effectively to efficiently use their class time. DreamBox recommends that students complete at least five lessons per week, roughly 30 – 60 total minutes, to best support their achievement.

To help administrators make informed decisions about investing in educational technology solutions such as DreamBox, research must evaluate the impact of these solutions, controlling for key variables whenever possible. This analysis used nonexperimental research to compare achievement for students using DreamBox the recommended weekly amount with students who are not. This analysis isolated the impact of DreamBox on students' achievement by using statistical models that controlled for students' prior achievement, classroom and school.

Analyses of DreamBox's impact for different groups of learners can help teachers and administrators decide the best way to use DreamBox for each student's needs. Investigating DreamBox's impact across grade levels and among students starting at different achievement levels can help teachers make informed decisions about how to help every student excel.

One final note of importance for this analysis is that the COVID-19 pandemic dramatically and quickly changed school structures. It forced educators to shift focus in emergencies. This analysis helps educators understand the role that the broader school context plays in the effectiveness of DreamBox. Thus, research must also investigate if and how DreamBox's impact on student achievement was different in the face of major shifts in the broader school context surrounding it.

Research questions

1. Does using DreamBox math curriculum increase students' standardized test achievement?
2. Do students from all grades and achievement levels experience a positive impact?
3. Does DreamBox's impact differ pre-COVID (fall 2019) and during COVID (fall 2020)?

Method

Setting

This study took place within Pinellas County School District, located on the west coast of Florida, near Tampa. Pinellas County Schools are fully accredited, and this analysis includes test scores on the NWEA Measures of Academic Progress (MAP) from 76 elementary schools ([see Appendix A for additional details](#)). Pinellas County Schools administer the MAP twice each year (in fall and winter, but not spring).

Starting in fall 2019, 63 classrooms from grades 1 – 5 in 63 Pinellas County schools received full access to the DreamBox adaptive math learning platform. Pinellas introduced DreamBox to its schools along with the expectation that all students complete five or more lessons per week. DreamBox lessons vary in length based on topic and grade level, but meeting this recommendation requires roughly 30 – 60 minutes per week for each student.

Sample

The primary analysis included students from 63 of the 76 schools that had access to DreamBox. Their schools had access to DreamBox between the fall 2020 MAP test (September 2020) and winter 2020 MAP test (December 2020). This period spanned eight weeks, from September 25, to December 1. It should be noted that this study only analyzed the impact of DreamBox during fall semesters because Pinellas County Schools only administered the fall and winter MAP tests in school years 2019-20 and 2020-21.

Table 1. Sample size and key dates

Students	Classrooms	Schools	Beginning-of-semester test	End-of-semester test	DreamBox usage window	Weeks of DreamBox usage
22,380	2,168	63	Sept. 2020	Dec. 2020	9/25/20 - 12/1/20	8

Measures

National NWEA MAP Growth Math end-of-semester achievement percentile. The end-of-semester NWEA national Math MAP Growth percentile was used as this study’s outcome measure. This score was the national achievement percentile associated with each student’s RIT scale score on the math section of the NWEA MAP test in December 2020 (see Appendix C for additional details). Students’ scores were analyzed in national percentile units to support the interpretability of findings across grade levels.

National NWEA MAP Growth Math beginning-of-semester achievement percentile. The beginning-of-semester NWEA national Math MAP Growth percentile was used as this study’s key control variable. This score was the national achievement percentile students scored on the same test in September 2020. Adjusting students’ predicted end-of-semester MAP Growth score based on their score on the same test three months earlier allowed us to separate DreamBox’s impact on students’ math achievement from its correlation with prior achievement, controlling for the possibility that students using DreamBox more often were more likely to have a higher starting achievement level.

DreamBox lessons per week. The study compiled the total number of lessons students completed in DreamBox between MAP tests, divided by the number of weeks of instruction (8). This averaging method enabled us to frame the results practically, in terms of differences in students’ regular weekly usage. Completing five lessons a week takes 30 – 60 minutes, depending on the content. As depicted in Figure 1, DreamBox usage was categorized as low (fewer than two lessons per week), some (two to five lessons per week – five noninclusive) or recommended (five or more lessons per week).

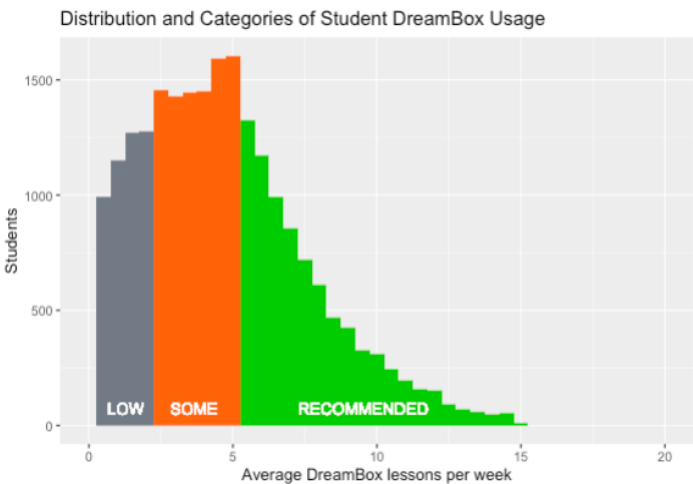


Figure 1

Analysis plan

Analyses quantified the impact of using DreamBox the recommended five or more lessons per week on end-of-semester national MAP Growth Math achievement percentile, controlling for students’ national MAP achievement percentile at the beginning of the semester. The study compared the achievement of low-use students with those completing five or more lessons a week. All analyses were conducted using hierarchical linear modeling (HLM), which controlled for the fact that students were nested in classrooms within schools (see Appendix D).

Results

In just eight weeks, students scored at least 5 percentile points higher when completing five or more lessons (~30 – 60 minutes) per week

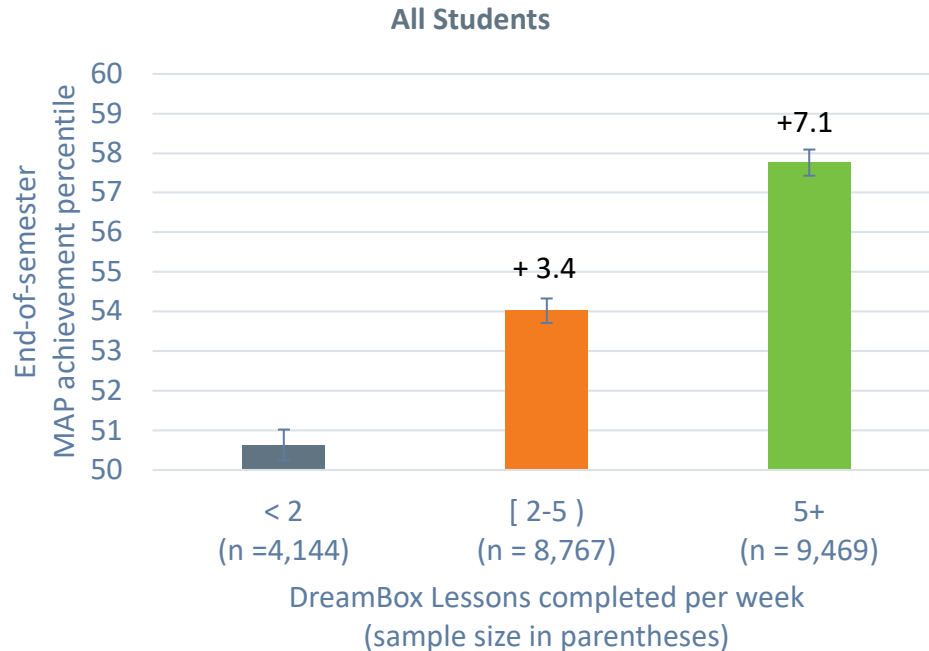


Figure 2

Results in Figure 2 show that students who completed the recommended five or more lessons per week scored an average of 7.1 national percentile points higher on the end-of-semester MAP test compared with students who completed fewer than two DreamBox lessons per week on average. Analyses used HLM to identify DreamBox’s positive impact after statistically controlling for students’ beginning-of-semester achievement, classroom and school. Results also show that students who completed between two and five lessons per week scored an average of 3.4 national percentile points higher on the end-of-semester MAP test compared with students who completed fewer than two DreamBox lessons per week on average. This result is important for schools that may wonder whether DreamBox usage below the weekly recommendation will still have an impact.

Several additional analyses ([see Appendix F](#)) demonstrate the robustness of these results. DreamBox’s positive impact held even when:

- Changing the outcome measure from NWEA MAP Math Growth percentile to the Florida Standards Assessment (FSA) scale score
- Changing the control group to include students in Pinellas County School District whose schools did not have access to DreamBox
- Treating DreamBox lessons completed per week as a continuous/linear variable, rather than categorical variable

Regardless of grade level, students achieved more when completing five or more DreamBox lessons per week.

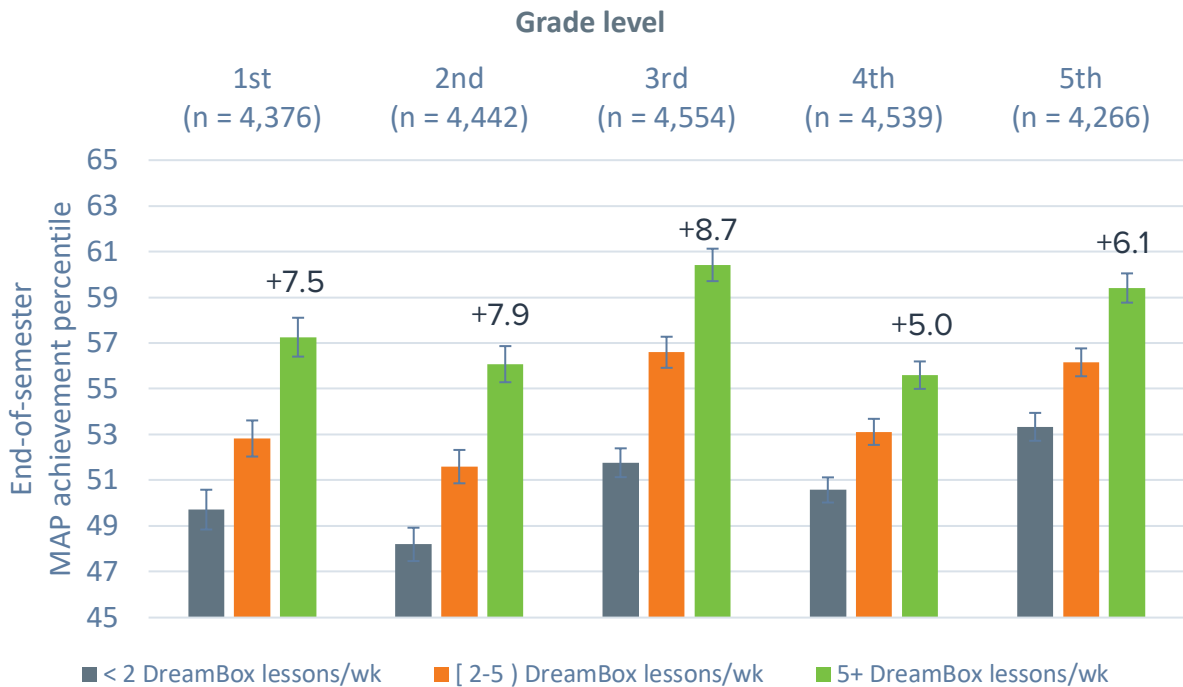


Figure 3

These analyses tested whether DreamBox’s positive impact held true for different groups of learners in fall 2020. As can be seen in Figure 3, breaking down the analysis by grade, results show students in all grade levels achieved significantly more when completing the recommended five or more DreamBox lessons per week or two to five lessons per week compared with those completing fewer than two lessons per week ([see Appendix G for details](#)).

Regardless of the starting achievement level, students achieved more when completing five or more DreamBox lessons per week

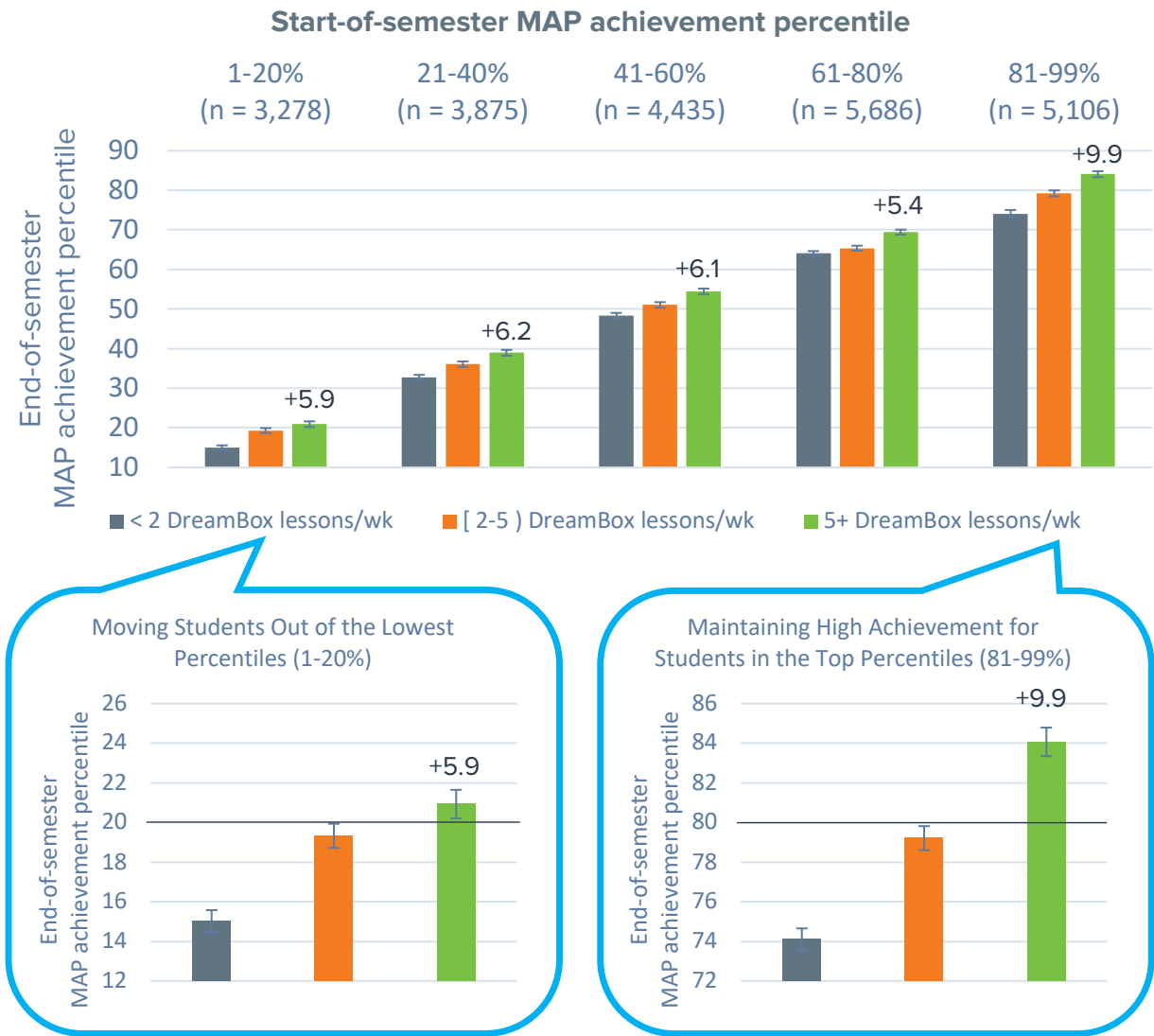


Figure 4

Results show that in fall 2020, students in both the lowest and highest percentiles saw improvement when completing five or more DreamBox lessons per week. DreamBox Math continually recommends lessons for all students automatically, though teachers can create assignments for specific topics to one or more students. Important in this analysis, for students completing five or more lessons per week within each achievement level, a mean of only 4% – 5% of the completed lessons were assigned by their teachers, with a median of 0% ([see Appendix G for details](#)). Therefore, an average of 95% of students’ completed lessons were recommended by DreamBox’s intelligent algorithms. This fact underscores the strength of DreamBox Math technology for meeting students right where they are, effectively differentiating for them quickly.

Supplemental educational platforms such as DreamBox have been used in the past as support for lower-achieving students who need help getting onto a trajectory that leads to grade-level proficiency. This finding confirms the appropriateness and effectiveness of using DreamBox Math to support elementary students of all achievement and grade levels. DreamBox Math intelligently adapts to students’ unique areas for improvement and optimal level of challenge. It also supports consistent growth for students with different

achievement levels, a trend befitting a personalized learning platform that has been previously confirmed by other studies.

DreamBox provided reliable impact on student achievement during COVID-19

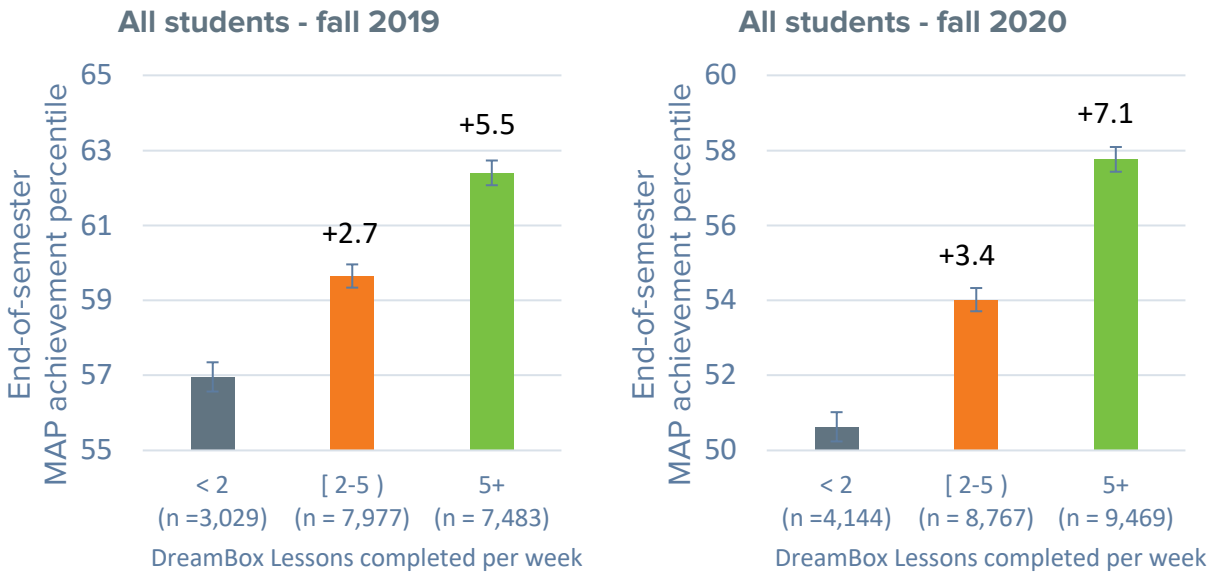


Figure 5

Finally, the study investigated the third research question, which is effectively the first research question about DreamBox’s impact, but involves analysis of parallel data from fall 2020 and 2019, before COVID-19 began affecting schools and students across the country. The results suggest a similarly positive effect of using DreamBox on improving students’ achievement as measured by NWEA MAP Math Growth national percentile. The impact of using DreamBox as recommended in fall 2019 was positive, with students growing 5.5 percentile points more in just eight weeks compared with students completing fewer than two lessons per week ([see Appendix H for details](#)).

Despite major changes to students’ learning environment, Dreambox’s impact did not decline during the pandemic. The COVID-19 pandemic demonstrated how natural disasters can dramatically change school procedures. In such times, it is likely that digital tools will be relied on even more than normal, as they ensure consistency, data and equity where schools have invested in access to broadband and device access for students. In such situations, educators might expect students to benefit less from any instructional tool, including digital ones. Nevertheless, the impact of using DreamBox on both students’ national achievement percentile and RIT scale scores ([see Appendix H for additional analyses](#)) remained just as strong when comparing fall semester 2019 to fall semester 2020.

Limitations and future directions

This study highlights the consistency of DreamBox's impact on different groups of elementary students in a large, diverse district. In the future, gathering demographic data to break down DreamBox's impact across gender, race/ethnicity, English language learner status and free- and reduced-lunch status would yield additional insights that are important for educators focused on supporting students to ensure equitable opportunities and outcomes. As noted earlier, spring MAP Growth scores were unavailable. Evaluating the impact of DreamBox over an entire academic year would be ideal for a future nonexperimental analysis.

It is worth noting that the DreamBox lessons per week measure had a large range in the recommended category (students completing as many as 15 lessons per week), illustrating the idea that students who reach the recommended goal of five lessons per week often go on to exceed it. Accordingly, this study's comparison of both low and recommended usage represented the average difference between these groups, which was 6.5 lessons per week. Additionally, students with the same average lessons per week are not differentiated by whether they consistently completed the same number of lessons each week or more lessons in some weeks. Investigating the role of consistency of lessons played could be a useful focus in future studies.

Like many nonexperimental studies, the analyses of DreamBox's impact rely on the assumption that statistical models have accounted for variables most likely to affect both students' DreamBox usage and their achievement. These include students' prior achievement, classroom conditions and school context. Additional notes on potential covariates that were not measured in this study can be found in [Appendix I](#).

Conclusion

This study provides new, confirmatory evidence of DreamBox's significant positive impact on elementary students' math achievement. The positive impact of playing five or more lessons per week is evident regardless of students' achievement or grade level and has persisted into the COVID-19 pandemic. As educators face choices about investing in digital tools for students with a wide range of learning needs and gaps in prior knowledge, it is noteworthy that using the DreamBox personalized learning platform for 30 - 60 minutes per week during an eight-week window supported achievement for all students across a district's full range of achievement and grade levels.

Technical Appendix

[Click here to access the technical appendix](#) that is referred to throughout this paper.

About The Author

Dr. Peter McPartlan is a research scientist on the Learning Research team at DreamBox Learning, focused on evaluating DreamBox's impact among diverse groups of students. He received his PhD in Education from the University of California, Irvine, with a focus on identifying developmentally and socially appropriate environments to support student motivation, especially in online settings. Dr. McPartlan's peer-reviewed research has been published in journals such as *Computers & Education*, *Educational Researcher* and *AERA Open*.

About DreamBox

DreamBox Learning®, the leading K - 12 education technology provider, is transforming the way the world learns. As the only dual-discipline solution rated “Strong” by Johns Hopkins EvidenceforESSA.org in both mathematics and reading, DreamBox provides high-quality adaptive learning proven to accelerate student growth. Built by teachers and for teachers, DreamBox empowers educators with robust data analytics and content-specific professional development solutions to complement instruction. DreamBox supports 400,000 educators and approximately 6 million students in all 50 states, the District of Columbia, Puerto Rico and throughout the United Kingdom, Australia, Canada and Mexico. For more information, visit www.dreambox.com