Evaluation of PAUSD “re-imagining middle school math” program

Background

The CA common core standards partition math topics to a sequence of courses: CCCS-M-6, CCCS-M-7, CCCS-M-8, Algebra 1, Geometry, Algebra 2, Precalculus, AP calculus. The “grade level” pacing leads to ``Algebra 1'' in 9th grade but it is recommended that students that are ready take Algebra 1 in 8th or 7th grade. Nearly all public schools offer a ``grade-level'' pathway and many districts offer an ``Algebra pathway'' (8th grade Algebra) and also a ``Geometry pathway'' (8th grade Geometry).

In 2019, PAUSD made a decision to de-lane middle school math (“re-imagining middle school math”). The grade-level pathway for 7th and 8th graders was eliminated and the goal was for all students to complete Algebra 1 by 8th grade and enroll in Geometry in 9th grade. The challenge was that many students were not ready, already years below grade level standards when entering middle school. The 2022-2023 8th grade cohort was the first one to experience the de-laned middle school program.

Algebra 1 is a foundational course and there is broad agreement that only students that are ready for it should be accelerated and take it earlier than 9th grade. At PAUSD that fraction was historically high, about 70% of all students (but decreased recently). But students that are placed without readiness and then passed without proficiency are effectively derailed from a pathway to STEM and are not prepared for more advanced STEM courses that build on these foundations.

The experimental program is on the agenda – up for board discussion (and decisions) at the October 24 board meeting. On October 20, 2023, PAUSD published a report ``declaring victory'' (see also the Superintendent Update in the Appendix). The report argues that only 65 students did not “perform well enough” in 8th grade Algebra from the cohort of 760 8th graders and are now repeating Algebra as 9th graders. The report uses the metric of increased course enrollment numbers in 8th grade Algebra and 9th grade Geometry to support the case for removing the grade-level option. But this is a problematic metric, since it does not correspond to math achievement – all 8th grade students are placed in 8th grade Algebra regardless of their readiness.

This begs the questions:

- How many students are actually ready for 8th grade Algebra?

- How many students finish the course proficient in Algebra and ready for Geometry?
- Are struggling students, those that are grossly unready but placed in Algebra, better off in terms of objective achievement measures? (even if not proficient in the Algebra standards, even if repeating it, is this placement the best way to support them?)
- Is PAUSD honest with the grades – are students that pass the PAUSD Algebra course with a C- or above (in 2023, all except for 65 students) actually proficient?

This last question has implications as to the contract between PAUSD, its students, and public post-secondary institutions. Algebra is a CA state graduation requirement and (when passed with a C- or above) a UC/CSU admission requirement. Notably, PAUSD stopped handing out "D/F" grades and uses standards-based grading. 90% of the 8th grade students placed in Algebra passed the course. In that, (since there is no "D"), they supposedly fulfilled the UC "Area C" Algebra 1 admission requirement! If many are not proficient, PAUSD breaks the trust of UCOP (that grants approval for PAUSD courses).

An adjacent issue at PAUSD is the systemic misplacement-down of students in math courses. PAUSD has many high achieving students that are ready for Algebra in 7th grade or before. The "re-imagining" initiative of PAUSD placed a one year limit on acceleration, regardless of readiness. Additionally, the placement process for acceleration is non-standardized and blocks the majority of students that are ready from accelerating. The requirements are far above objective readiness measures, that curiously 30%=50% of the grade-level students that organically place in the courses don't even meet. How many students are artificially held back? What are the implications to their mental health and future options? Are the PAUSD classrooms more effective or less effective by this practice?

Summary of Highlights

By SBAC data, **24%** of PAUSD 7th and 8th graders do not meet minimum grade level standards in math. That is, they would struggle even in the removed grade-level pathway. This is **65%** of our Socio-Economically Disadvantaged (SED) students and nearly **80%** of our SED Latino students! Again, these students are 2 years behind the PAUSD Algebra pathway. They were grossly not ready for the courses they were placed at.

There is no support for the practice of accelerating struggling students that are grossly not ready (not even ready for a grade-level course). Not by education experts. Not in the adopted California Math Framework (CMF). The CMF final version recommends correct placement of students and accelerating students that are ready. PAUSD must explain why they are doing this, especially that the gross misplacement practice impacts disproportionately our most vulnerable students.

As said, Algebra is a CA graduation requirement and a UC/CSU admission requirement. Is PAUSD handing out meaningless grades? Students that in the Spring of 8th grade did not meet

minimum grade level standards (24%) are very very far from being proficient in Algebra. But somehow only 65 students (9%) repeated the class. This does not add up.

Moreover, according to the Fall 2022 MDTP assessments, **43%** of 22/23 8th graders placed in Algebra were not ready for the class (scored <70%). The PAUSD report states that 65 repeat Algebra as 9th graders. But many more were promoted to Geometry without readiness: Spring 2023 MDTP Geometry readiness assessments show that **50%** of the 8th graders in Algebra that were promoted to Geometry were not ready for Geometry (scored < 70% in the MDTP).

PAUSD 8th grade Algebra passing grades are given to students that are very far from proficiency. By that, PAUSD dishonors two contracts. One with its students, that are deadened by pretend education and empty diplomas. One with the post secondary education system in CA, from community colleges to UC/CSU. UCOP is the entity that approved PAUSD courses. That approval should be revoked.

In 2023/2024 PAUSD revised its 9th grade Geometry options to a "basic" and "honors" versions of the course. In prior years, the "honors" version was for students that needed additional challenges. But for 2023/2024, the "honors" version is simply for students ready for basic geometry. The basic ``Geometry'' course is remedial with the majority of students not ready by the objective MDTP assessment and half of the students are 2 or more years behind.

Historically and ironically, now that the grade-level option is eliminated at PAUSD, a **larger fraction** of PAUSD 8th graders than **at any time in the past decade** are not ready for 8th grade Algebra. This is also a larger fraction than at socio-economically comparable neighboring districts that do offer a grade level pathway as an option and practice informed placement. Our gaps in student knowledge increased as a result of removing appropriate options for students.

Recommendation:

The data clearly shows that the experiment failed. PAUSD math achievement is down across groups. PAUSD's limited and inflexible math pathway is not working. Not for the struggling students receiving pretend education. Not for the students held back. This despite large funding levels and small classrooms.

PAUSD must practice correct placement for all students. Accelerate those that are ready and support those that are not ready. The grade level pathway at our middle schools should be restored until its removal is actually justified – when nearly all of our students are actually ready for Algebra in 8th grade. Additionally, students that are ready for additional acceleration should not be held back.

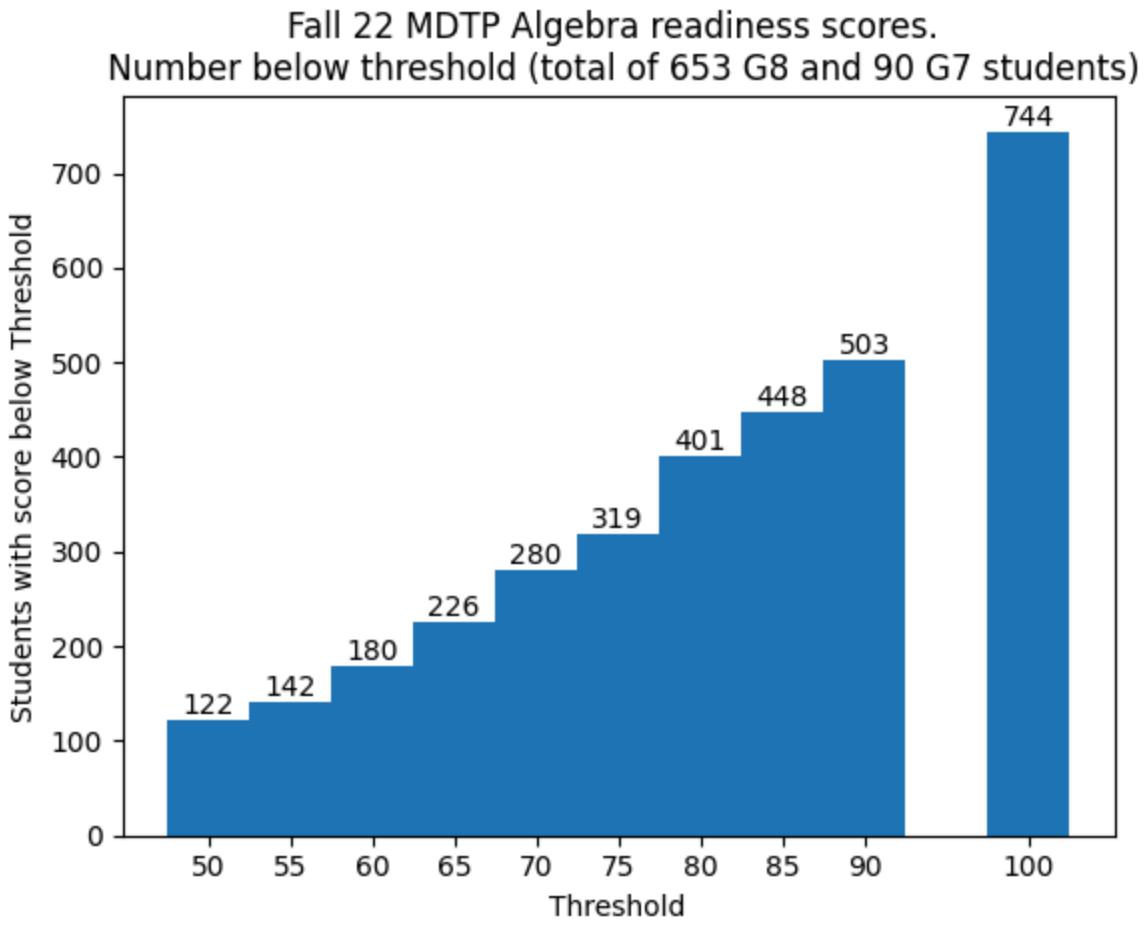
Objective Achievement Data

We have two sources of objective data on student achievement

- SBAC tests administered each Spring. These tests measure proficiency relative to the grade-level standards. The Algebra pathway is a year above. There are four levels. Level 1 is “Not meeting standards” (-2 or more years below), Level 2 is “Nearly meeting” (a year below), Level 3 is “Meeting Standards”. Level 4 “Exceeding standards” (a year above). Roughly, Level 4 students are those ready for the PAUSD pathway (Algebra in 8th grade). Level 1-2 students are grossly unready for it (more than two years behind). Level 3 students are not ready for it and need a lot of support to succeed.
- MDTP readiness assessments. This assessment suite measures readiness for a particular CA Common Core Standards aligned course: 85% is solid readiness, 75% is readiness, 70% and below are not ready. PAUSD administered the readiness tests for the next course in the Spring and for the current course in the fall. These results were obtained via PRA requests.
- Data on enrollment in math courses, available through PRAs and also in a recent report to the board.

MDTP Results for the 2022-2023 8th grade cohort

The MDTP readiness assessments were administered to all students enrolled in the Algebra course. The Algebra readiness assessment was performed in Fall 2022 and the Geometry readiness assessment in Spring 2023. The results file does not list the grade level of students enrolled in Algebra.
According to data 86% of the 760 8th graders were placed in Algebra. About 653 students (remaining 8th graders were in Geometry H). The remaining students out of the 744 tested in the Algebra sections were accelerated 7th graders. Note that the 7th graders tend to be at the very top of the achievement (due to a harsh placement process for students wishing to accelerate). Therefore, the lower achievement corresponds nearly entirely of 8th graders.



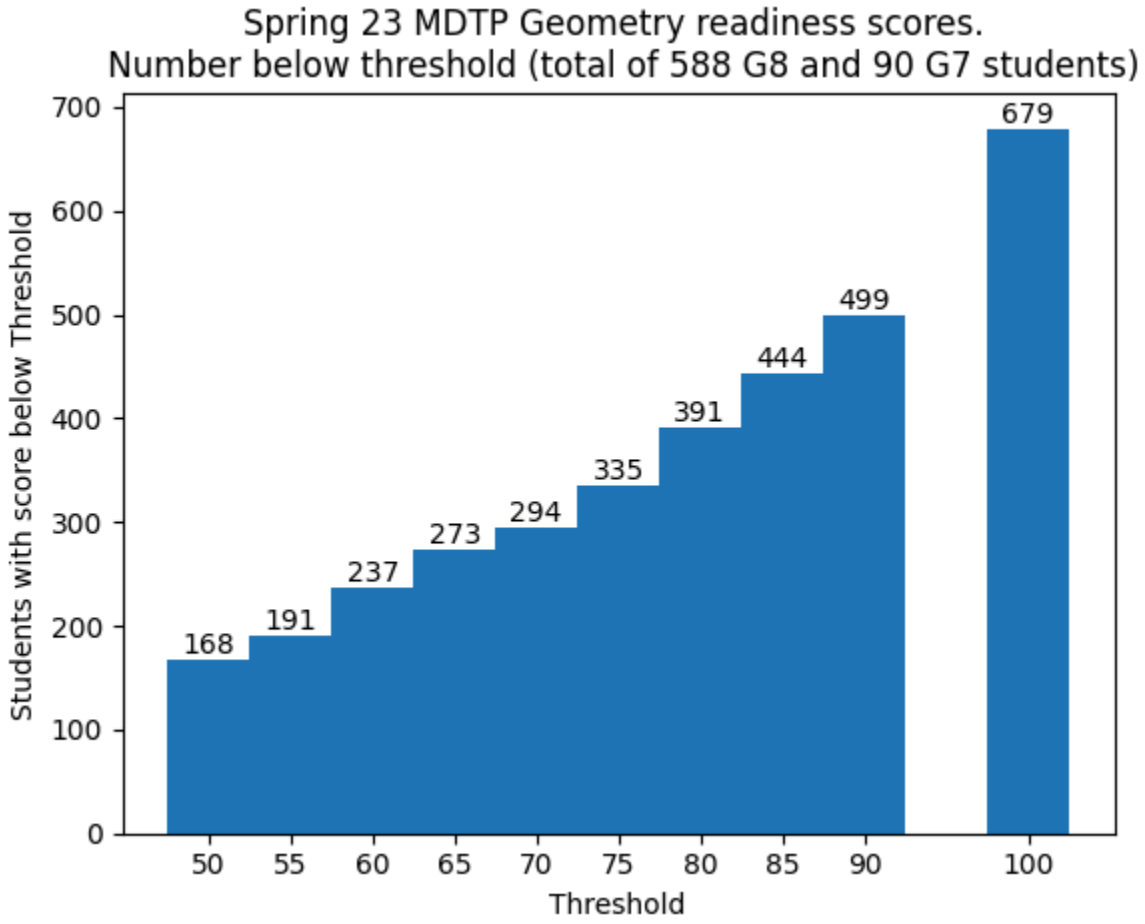
See above for a bar plot of the results of the Algebra readiness tests administered in the fall (data obtained via PRA 41366 7/2023). The plot shows the number of students with MDTP scores that meet varying thresholds of readiness (50%-100%). We can see that 280 students (280/760=**37%** of the 8th grade cohort) and 280/653= **43%** of those 8th graders placed in Algebra, scored 70% or below, which generally means they are not ready for Algebra. Worryingly, 180 students (180/653= **28%**) scored below 60% which means they are grossly unready. This is corroborated by SBAC data from Spring 2023 that shows that 183 students are not meeting minimum grade level standards.

Surprisingly, all these students (except the mentioned 65) apparently passed the Algebra class and were placed in Geometry as 9th graders. Did a miracle happen during that year? Were they ready for Geometry in 9th grade?

Below are the results of the MDTP Geometry readiness tests administered to these students in Spring 2023. Note that the assessment was not administered to the 65 students that PAUSD deemed unready.
(data obtained via PRA 41366 7/2023)

We can see that 294 (294/588 - **50%**) of those rising 9th graders that were placed in Geometry are **not ready** for the course (70% or below on the MDTP). A whopping 237 (237/488 = 40%) of those students are grossly not ready (60% or below on the MDTP). A miracle did not happen.

Overall, 280 8th grade students started 2022-2023 placed in Algebra without readiness and a larger number, 359 , finished the year not ready for Geometry. Regardless, 294 were anyhow placed in 9th grade geometry. We can ask if there was any advantage to these students. Did they advance with respect to grade level standards? For that we can look at SBAC data and PAUSD reports.



SBAC results

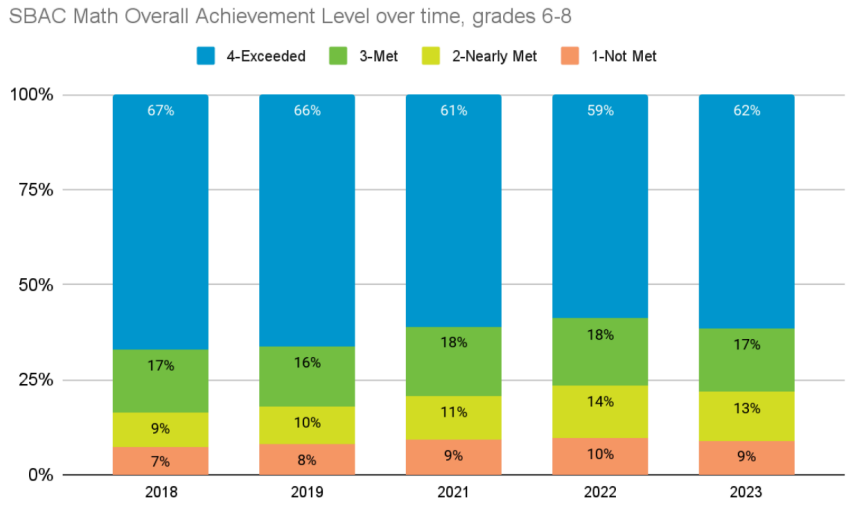
SBAC results are publicly available. SBAC results from Spring 2023 are available from the board report, which includes additional analysis such as matched cohorts.

The objective results are worrisome. We can see that the achievement level of 6th graders (fraction meeting grade level standards) remained flat since 2019, but results for 7th and 8th graders declined across groups.

The board report includes a longitudinal analysis of matched cohorts (pages 32,33 with respect to “average distance from standards”. We see deterioration or no gain for the groups of interest despite a program that forces x1.5 acceleration in 7th and 8th grade.

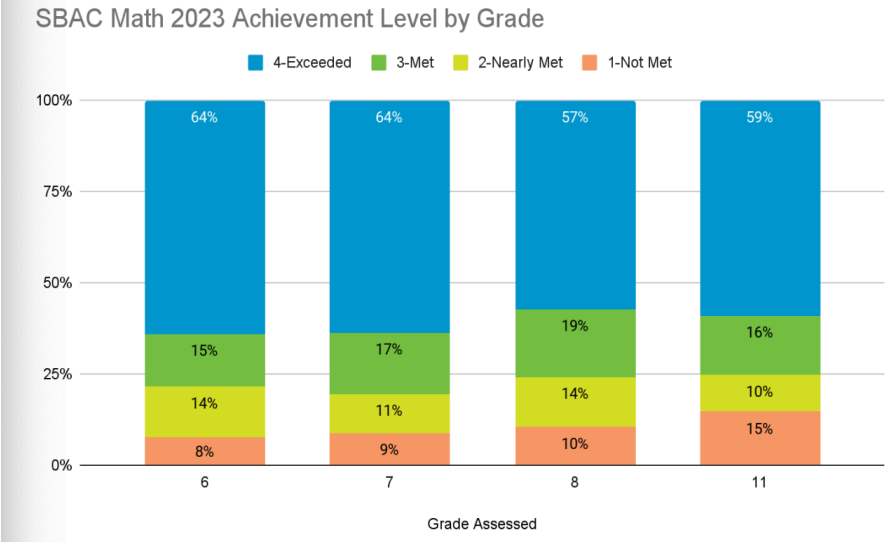
Moreover, the PAUSD reports focus on the fraction of students that meet grade-level standards. But the PAUSD single pathway to Algebra is accelerated 1 year above that. Readiness for the pathway corresponds to ``level 4'' in SBAC. This is illustrated in Chart 19 p. 27 of the report.

Chart 19: SBAC Math Overall Achievement Level over time, Grades 6 - 8



We can see that performance steadily declined. We can also see that only 60% of students (level 4 in blue) are ready for the PAUSD pathway to 8th grade Algebra. Further analysis below shows that the majority of those students, up to 80%, are actually ready for more – for a pathway to 8th grade Geometry. The green band (level 3) students are proficient on grade level standards. This is a year below the Algebra pathway. But that pathway had been removed. The students in the yellow and orange band are respectively 2 and 3+ years behind the inflexible pathway. They simply need a lot of support to even meet grade level standards. The yellow and orange band students are 25% of the current 9th grade class. Nearly all of them are taking Geometry. But they are at 7th grade level or below. See Chart 20 in p. 27 of the report.

Chart 20: SBAC Math 2023 Achievement Level by Grade



A board member blamed the pandemic in explaining the decline evident in Chart 19 and matched cohort analysis (chart 27). But was it the PAUSD program or was it the pandemic?

To answer this question, we look at the public data. We can see that in 2019, 75% of PAUSD 6th and 7th graders were at “level 4” and thus ready for an Algebra pathway or additional acceleration. In 2022, this number sharply decreased to 63%. This is a much sharper decline than comparable districts (that were also impacted by the pandemic). The PAUSD report includes a comparison to the county and state, but PAUSD is a privileged and highly funded district that should compare itself to similar districts. Below we include results for comparable districts.

SBAC results over time of PAUSD vs. comparable districts

Here is a comparison of the math achievement of 2021-2022 6th and 7th graders at PAUSD (the first two cohorts to experience the de-laned program) and at neighboring Los Altos and Cupertino. PAUSD program is inflexible and de-laned. Los Altos and Cupertino offer flexible fully-supported pathways that stretch from “grade-level” (with support if needed) to 8th grade Geometry). Both Los Altos and Cupertino these districts place students in math courses based on readiness and knowledge.
The following table reports the percentage of students that are **below grade level standards** (SBAC levels 1 or 2) by socio-economic status.

	Disadvantaged % below grade level	Not-disadvantaged % below grade level
PAUSD	**70**	**16**
Los Altos (LASD)	61	13
Cupertino (CUSD)	40	11

This is the same comparison using 2022-2023 SBAC, averaged over 6th, 7th, and 8th grades (the first three cohorts of the de-laned PAUSD program)

	Disadvantaged % below grade level	Not-disadvantaged % below grade level
PAUSD 2022-2023	**64**	**16**
Los Altos 2022-2023	54	14
Cupertino 2022-2023	38	11

We can see that both disadvantaged and non-disadvantaged students at PAUSD are more likely to be struggling, using an objective measure of math achievement, compared with peers in Los Altos and Cupertino.

We next consider how changes in the math program objectively affected higher achievers and the "middle-band." These are students that aim for Algebra or above at 8th grade. We use the SBAC Level 4 (above grade level) as a proxy for that (a year of standards above CCSS-M). The following table reports the percentage of non-disadvantaged students that are in SBAC Level 4, in 2018-2019, 2021-2022, and 2022-2023. The pandemic impacted all three districts, but PAUSD de-laned up to 7th grade math in 2021-2022 and 8th grade math in 2022-2023. The worst results in each grade-level, year, and largest declines relative to 2018-2019 baseline are emphasized in red.

	6th grade	7th grade	8th grade
PAUSD 2018-2019	**70**	**70**	75
PAUSD 2021-2022	**70**	**63**	**63**
PAUSD diff 19-22	0	**-7**	**-12**

PAUSD 2022-2023	**70**	70	**62**
PAUSD diff 22-23	**0**	0	**-13**
Los Altos 2018-2019	74	73	**70**
Los Altos 2021-2022	74	70	64
Los Altos diff 19-22	0	-3	-6
Los Altos 2022-2023	75	**68**	68
Los Altos diff 19-23	+1	**-5**	-2
Cupertino 2018-2019	73	76	76
Cupertino 2021-2022	75	76	77
Cupertino diff 19-22	+2	0	+1
Cupertino 2022-2023	75	77	78
Cupertino diff 19-23	+2	+1	+2

Lower percentage of PAUSD non-disadvantaged students are prepared in 2021-2022 for an 8th grade Algebra pathway compared with 2018-2019. Lower percentage (62%) of non-SED 2022-2023 8th graders are prepared for Geometry or above compared to peers at Los Altos (68%) and Cupertino (78%). The declines at PAUSD and lower achievements are likely explained by changes in the program since all three districts were impacted by the pandemic. PAUSD has higher funding and smaller classrooms.

Misplacement down: Holding back students that are ready

PAUSD misplaces ``up'' many students – by accelerated students that are grossly unready in a single pathway. This does not serve the students. PAUSD also misplaces students ``down'' into that pathway by blocking those that are ready from advancement. PAUSD narrowly allows acceleration of students to Geometry by 8th grade. But data shows that systemically the vast majority of students that are ready are held back. There is also an artificial limit on acceleration of 1 year. Here is an open letter created and signed by nearly 300 PAUSD students, explaining these issues and the ``anti-math-students'' culture of PAUSD.

We report here data from the placement assessments of Spring 2023. Unlike neighboring districts, PAUSD does not offer fluid math laning that supports acceleration through the school. Students that wish to accelerate must go through an obstacle course of learning outside the

school with no support or guidance and then pass a sequence of weed-out assessments that culminates in a PAUSD proprietary assessment that fails most of the qualified students (with no example exam or preparation material provided).

The least friction point for acceleration to students that are ready is during 6th grade, but data shows that most students that are ready for 7th grade math at this point are blocked. Many of these students that are misplaced down at school continue to learn outside of school while being misplaced at school. They attempt the problematic placement process each year of middle school. Eventually, when they reach high school, thanks to PAUSD losing a recent lawsuit on its illegal placement practices, and based upon completion of a UC approved Geometry course, students can correctly place when in 9th grade.

The 2023 acceleration process at PAUSD consists of two MDTP assessments and a proprietary non-standardized assessment. All students take the MDTP assessment that corresponds to the next course in the Spring. Those that pass the very high bar of meeting all topics/critical levels then take the assessment for the next course in the sequence. Those that pass all topics/critical levels (typically 85% of all questions but students with a 96% score can fail) then take a PAUSD proprietary assessment that disqualifies the majority of students that reached that point.

These requirements are internally inconsistent – much higher than what is used as guidance for "H" lane Geometry or Algebra2+Trig in HS. For high school students, meeting only 5/7 critical levels as stated in the Paly Course Catalog suffice for honors placement. For younger students, ⅔ of those that meet ALL critical levels are disqualified by a proprietary assessment.

Here are results from the Spring 2023 assessments (see data files here from PRA) of PAUSD 5th graders:

- 755 students (about everyone) took MDTP 6th grade readiness
- 475 passed the high bar (all topics) and then took the MDTP 7th grade readiness

Out of these 475:

- ~350 scored > 75% on the MDTP (are solidly ready for 7th grade math by a reasonable bar)
- 248 passed the very high and brittle bar of "all topics".

Only 94 of the 248 then passed the PAUSD-designed "part 2".

So to summarize the weed-out process:

- 350/755 (**46%**) are ready to take 7th grade math as 6th graders.
- 94/755 (**12%**) of rising 6th graders were allowed to place in 7th grade math

For 2023/2024, the fraction (see here p18) on PAUSD 9th graders placed at the Algebra2 level and above is 21%. This is about double that of 2022/2023 (which was more than ever before). About 75 of these students accelerated by taking Geometry on their own or over the summer (here p6 shows 106 students in 8th grade Geo), this after PAUSD was forced to do so in the math lawsuit. Many of these students were misplaced down through their middle school experience at PAUSD. Is this fair to our students?

Looking at the 22/23 SBAC data for the same cohort we can see that 433 students were ``Level 4'' (acceleration to 8th grade Algebra or above). But 80% (350/433) of these ``level 4'' students were ready for 7th grade math (acceleration to 7th grade Algebra). So nearly all students ready for some acceleration are ready for 2-year acceleration. The PAUSD inflexible pathway is therefore the ``right'' pathway for about 11% of the current 6th grade cohort. 46% need more acceleration and remaining students need more support or a grade level pathway.

When discussing the middle school math program, the placement process must be discussed as well. The process violates the guidelines in the CA Math Placement Act, as clarified by the court. The Math Placement Act is the law for 9th graders but only recommended as best practices for the middle school grades. PAUSD chooses not to follow best practices. Students should be placed according to their readiness, not grade level. Gross misplacement also violates recommendations in the recently adopted version of the California Math Framework (hear the president of the CA SBE) .

Appendix: Fact Checking the October 20 Superintendent message:

Fact checking: The message (appended below) states that only 65 students are repeating Algebra in 9th grade. But objective data shows that 290 more were not proficient and not ready to advance. The message blames the pandemic for worse results with the experiment. But when contrasting PAUSD with similar districts (that also experienced the pandemic), we see that the decline was much sharper at PAUSD and can not be explained by the pandemic alone.The message claims success but the objective data shows the opposite. The message states “the doors to advanced math are now open to all”. But students that are accelerated without proficiency are being deadened, as math foundations build sequentially. The doors closed up to them.

Superintendent's Message

I am writing to provide an update on our "Reimagining Math" initiative, initially presented to the Board of Education on December 10, 2019. Our primary objective was to increase the number of students entering high school (9th grade) in Geometry or higher, a significant departure from the default curriculum of Algebra I in California. As we reflect on our journey, it is essential to consider the context in which it unfolded.

The implementation of the Reimagining Middle School Mathematics Plan was set to commence shortly after its presentation. However, the unforeseen arrival of the pandemic in March 2020 shifted all educational systems towards remote learning and the imperative of safely returning staff and students to in-person instruction. The class currently in 9th grade experienced a particularly disrupted transition from elementary to middle school due to these closures.

Despite the challenges, our middle school program shifts successfully aligned with the goal of offering more students advanced math pathways in high school. Notably, PAUSD's 9th grade enrollment in Geometry and higher courses has reached unprecedented numbers, encompassing every subgroup. Importantly, students who were previously screened or discouraged from taking Algebra I in 8th grade now have clear pathways to Calculus upon entering high school.

However, our progress is not without its imperfections. Roughly 65 students did not perform as well as expected in 8th grade Algebra I and began high school at the recommended pace of Algebra I for California. While this places them on track, it prompts us to reconsider how we support 8th grade students.

Our core objective of elevating expectations for all students has remained steadfast. Middle school students now have the opportunity to advance beyond our already accelerated program. Although this isn't suitable for every student, our enrollment data for 9th grade courses reveals an increase in students entering Algebra II and higher levels.

In closing, we remain optimistic about the opportunities our shifts have unlocked for students who were previously underserved. The doors to advanced math pathways are now open to all, signaling a promising future for our educational community.

Conclusion

Background: In 2019, PAUSD de-laned its middle school math program by removing the lower "grade level" pathway. This means that all students, ready or not, are placed in 8th grade Algebra. For high achievers, acceleration in middle school beyond that is intentionally much more limited than at comparable districts.

Is this inflexible program working? PAUSD claims it does. Objective data shows otherwise.

Struggling students: Data (MDTP) shows that 43% of 22/23 8th graders in Algebra are not ready for this course. Moreover (MDTP and SBAC) show that nearly 28% are not even meeting minimum grade level standards. Unsurprisingly (Spring '23 MDTP), 50% of current 9th graders in Geometry are not ready for the course. Who is served by this? Acceleration of students that are grossly unready goes against experts advice and even against the final version of the adopted CA Math Framework.

High achievers: data shows that 46% of our 6th graders are ready for 7th grade math but PAUSD allows only 12% to take 7th grade math. Is this serving students? Some of these students continue to learn outside of school and (thanks to the lawsuit) can correctly place in 9th grade. This year 21% of 9th graders, twice than ever before, are at Algebra 2 and above. But this is despite the PAUSD middle school math program.

The majority of PAUSD students are not served by the middle school math program. A third are held back through middle school. A third are grossly not ready for their math courses. PAUSD should instead adopt a flexible program with fluid laning and correct placement of students in math courses. Data shows that students at similar districts that offer flexible supportive math pathways outperform their PAUSD peers. Despite higher levels of funding and smaller class sizes at PAUSD.