Implementation of Math 180 for Middle School Students

District Leadership Forum

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1) Key Observations

Key Observations

Experience with affiliated products and the program's high quality motivated administrators at profiled districts to select Math 180. Administrators at **District A** and **District C** both highlight previous success with Read 180—a computer-based reading intervention program also produced by Houghton Mifflin Harcourt (HMH)—as the reason they chose Math 180. Similarly, the success of other HMH products throughout **District B** encouraged leaders to select the program. Administrators at **District D** emphasize the quality of Math 180 curricula, evident from conversations with developers and program demonstrations.

Administrators at *District C* and *District D* use grants and specialized department budgets to fund Math 180. At **District D**, a grant allowed administrators to pilot Math 180 with a select group of sixth graders in the district. At **District C**, administrators use funds from the special education department to fund Math 180 in the district. Administrators at **District A** and **District B** allocate general funds to finance Math 180.

All profiled districts use reports produced by Math 180 software to assess the program's effectiveness. Math 180 software provides administrators and teachers with diagnostic reports that cover a range of student-related metrics (e.g., progress, time spent on modules). Profiled districts use the metrics most often to assess the value of Math 180. The metrics can also be used to inform process improvement and student placement in the program. However, the Math 180 reports do not reflect a student's ability to apply knowledge learned in Math 180 outside of the programming. To understand this, profiled districts utilize standard state assessments.

Through training sessions, administrators at profiled districts prepare Math 180 teachers to use the new platform and teach the new curriculum. Profiled districts rely on currently employed teachers with backgrounds in math instruction and general intervention to teach Math 180. Due to the complex nature of the platform, teachers participate in initial training for Math 180 specifically. Administrators at **District B** offer continued professional development (PD) for Math 180 teachers to provide a deeper knowledge of the program. Contacts from other profiled districts also emphasize initial Math 180 training but do not offer continued PD as rigorously. Administrators at **District C** and **District D** offer PD for new teachers with little Math 180 experience and do not require tenured instructors to attend. Math 180 instructors at **District A** express confidence with programming from initial training, so administrators have offered little to no further training.

2) Math 180 Implementation

Motivations

The Quality of Math 180's Curriculum Motivated Adoption at All Profiled Districts

While profiled districts' motivations for selecting Math 180 vary, the high-quality curriculum was an important factor at all profiled districts. At **District C**, **District A**, and **District B**, previous success with Houghton Mifflin Harcourt (HMH) products influenced their selection of Math 180. Administrators at District A and District C cite successful experiences with Read 180—a computer-based reading intervention program also produced by HMH. This prior experience with Read 180 meant administrators understood the style of curriculum and had confidence in the new program. Administrators at **District D** learned about Math 180 during an academic conference. The presentation on the program highlighted the style of intervention and concept-based curriculum, which persuaded administrators to pilot the program.

Profiled Districts Motivations for Selecting Math 180

Administrative Concerns

Issues related to scheduling and standardizing interventions fostered administrative complications at **District B** and **District C.** These issues motivated administrators to implement Math 180 to streamline and improve processes.

Quality Curriculum

Administrators at **District D** chose to implement Math 180 for the program's curriculum quality and structure (e.g., conceptual instruction style).

Kid-Friendly Programming

Administrators at **District A** and District D implemented Math 180 for the gamification built into the curriculum.

Past Experience with HMH

Experience with other HMH programming influenced administrators at District A, District B, and District C to choose Math 180.

Two of Four Profiled Districts Employ Math 180 to Ease Issues with Scheduling and Standardize Intervention

Administrators from **District B** and **District C** explain that concerns with scheduling and a need to standardize intervention strategies motivated adoption of Math 180. At District B, previous math intervention platforms had been successful in some schools, but were not consistently successful for all schools. Math 180's data-driven approach facilitated streamlined intervention across the district. Schools across District C offered intervention on an as-needed basis in small (e.g., three to five students) courses. These small courses and the inconsistencies in student schedules were

unsustainable, which led administrators to implement Math 180 as a standard intervention program across the district.

The Curricular Approach Motivated Two of Four Districts to Choose Math 180

While the program quality influenced all profiled districts, administrators at **District A** and **District D** were particularly motivated by the program's curriculum style (e.g., gamification). At District A, administrators found Math 180's gamified instruction style attractive as it often increased student interest and success in math. Administrators at District D found that contrary to most math intervention programs, Math 180 teaches students the concepts behind math problems (e.g., mathematical language). This is an especially useful tactic in intervention programming, as it moves beyond standard teaching styles that encourage memorization. Math 180's program modules introduce strategies that students continuously practice and build upon as they progress.[1] This provides students with in-depth understanding of individual concepts taught in the program and additional practice deploying the knowledge. This also builds connections between strategies and allows students to easily transfer the concepts between different topics (e.g., between comparing numbers and understanding place value).[2]

Implementation

Gradually Implement Math 180

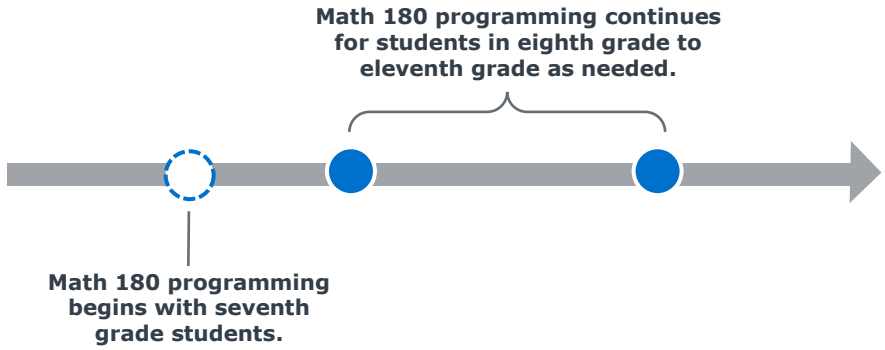
Due to Math 180's complex curriculum and platform, contacts at profiled districts recommend intentional and strategic implementation. All profiled districts prepare teachers to use the new instructional styles and the platform (e.g., troubleshoot errors on reports) through initial training. Administrators at **District C** introduced the Math 180 curriculum in segments, starting with students in seventh grade. Administrators intentionally chose seventh graders to begin Math 180 implementation because seventh grade students have just transitioned from elementary school to high school (i.e., seventh to twelfth grade). Administrators identified this school transition as an ideal time for students to be introduced to a new style of curriculum, without disrupting prior learning or other intervention strategies. Moving forward, administrators at District C plan to adapt this approach to better reflect the curriculum of Math 180, which begins with students in fourth grade. To do this, schools will introduce Math 180 to fourth grade students with low levels of content knowledge. Administrators hope this model will prepare students to reach appropriate grade-level knowledge prior to moving to a secondary-school setting (i.e., prior to seventh grade).

Ensure Schools and Classrooms Meet the Technology and Space Requirements of Math 180

Contacts at **District A** performed a physical assessment of district schools to understand the capacity to support Math 180 prior to implementation. Because the program is computer-based, but still requires teacher-led instruction, schools need resources for supporting the technology-based program.

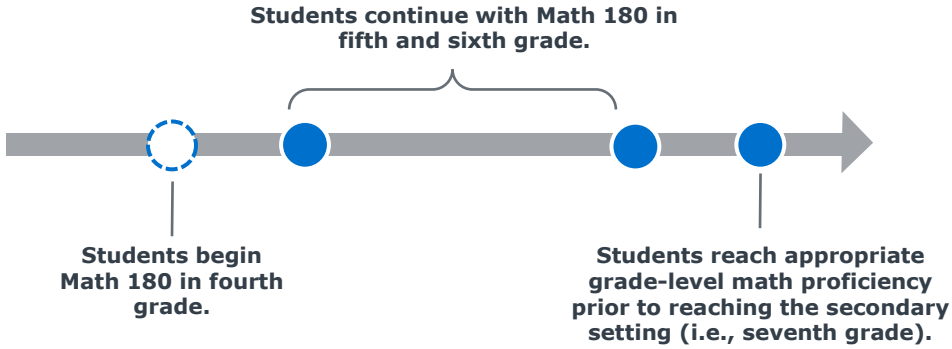
1) "Program Components," Math 180, accessed 9/19/18, https://www.hmhco.com/products/math-180/program-overview/math-curriculum.htm
2) Progress to Algebra in Grades K–8, Math 180, accessed 9/24/18, https://www.hmhco.com/products/math-180/assets/CommonCoreProgressAlgebra.pdf

Initial Implementation Timeline for Math 180 in *District C*



In the ideal timeline, students begin the Math 180 curriculum earlier and decrease the length of time spent moving toward appropriate grade-level content.

Ideal Timeline for Math 180 in *District C*



Administrators at **District B** and **District D** introduced Math 180 through pilot programs in individual schools or for limited groups of students. The pilot programs allowed the districts to evaluate the implementation process and Math 180's impact on student learning and teacher instruction styles. Additionally, pilot programs allowed Math 180 administrators to troubleshoot issues that arose on a smaller scale, rather than across the entire district. At District B, 3 of 20 middle and high schools piloted Math 180 with students recommended for math intervention. Administrators at District D chose to pilot Math 180 with a group of sixth graders because sixth grade is immediately before the transition to middle school. Upon successful implementation, administrators approached the superintendent about expanding the program. The successful pilot program gave contacts at District D the administrative leverage necessary to implement Math 180 on a larger scale.

Visit Other Districts to Observe Math 180 in Practice

Administrators at two profiled districts observed neighboring districts that use Math 180 as an intervention strategy to reveal useful insights into the product. At **District C**, all new initiatives begin with observation, but the practice was especially useful during the initial implementation of Math 180. Observing other districts' use of Math 180 gave administrators an opportunity to gather opinions on Math 180 from individuals who have significant experience with the curriculum but are not affiliated with Math 180. At **District B**, a group of future Math 180 teachers traveled to a local district to observe a teacher that had just received an award for effectively using Math 180. This visit gave teachers a model of effective use of Math 180 and also an example of how students use the program's platform.

Use Math 180 Training Sessions to Ensure Teachers and Administrators Understand the Program

Math 180's curriculum incorporates teaching support and coaching resources into instructional materials.[3] In addition to integrated support (i.e., module instruction throughout the program), Math 180 offers on-site and face-to-face support, at an additional cost. Schools and districts also have the option to pay for continued on-site resources and visits.

Professional Learning and Coaching Services Available Through Math 180[4]

Embedded Professional Learning

Math 180 embeds professional learning resources into teacher materials. The Math 180 resources include videos to assist teachers in understanding the program, as well as 10 lessons for the first two weeks of the course that help to foster a growth mindset and a strong classroom community.

Implementation Training

Implementation training includes a two day, in-person training delivered by Math 180 staff. The training introduces teachers to the program materials and software. An additional, half-day leadership training is available to help educators support teachers with Math 180 implementations.

Coaching & Follow-Up Courses

Math 180 also offers continued support after initial implementation training. The additional courses and support provide individualized, in-classroom coaching. Topics in additional courses include assessment methods and Math 180 software strategies.

3) "Program Overview," Math 180, accessed 9/19/18, https://www.hmhco.com/products/math-180/program-overview/theory-of-action.htm
4) Professional Learning, Math 180, accessed 9/26/18, https://www.hmhco.com/products/math-180/professional-learning.htm

While all profiled districts employed current instructors with some background in intervention or math instruction, these teachers still participated in the Math 180 initial training. Sustained participation in training and PD, however, varied among profiled districts.

Math 180 Instruction Training at Profiled Districts

Administrators at **District B** provide Math 180 PD throughout the school year to educate new teachers and to provide tenured teachers with a deeper knowledge of the platform.

Administrators at **District D** continue to use Math 180 PD with the ultimate goal of increasing capacity across teaching staff. This will avoid future issues when trained Math 180 teachers leave a school or the district.

Administrators at **District C** continue to use Math 180 PD but maintain the expectation that the district will eventually use fewer of the PD services.

Administrators at **District A** were confident in initial onboarding and embedded professional learning resources and do not plan to use further PD sessions through Math 180.

3) Math 180 Utilization

Structure

Provide Math 180 to Students in Need of Targeted Math Intervention

Profiled districts use Math 180 as an intervention strategy and not as the basis for the general math curriculum. Administrators at profiled districts target students who underperform in math courses, who have demonstrated the need for individualized education program (IEP) goals, or who have learning disabilities. Math 180 recommends that students receive the curriculum in 45-50 minute sessions, five days a week. The courses should also incorporate group instruction and time for individual practice.[5] At **District C**, **District B**, and **District A**, Math 180 is available to students during elective periods that occur daily throughout the year. Among these three districts, courses range in length from 50 to 90 minutes. At **District D**, students in Math 180 meet all year, but only every other day for 45 minutes in an A/B block schedule model. This model differs from the ideal daily method suggested by Math 180, but administrators have not seen a negative impact on student success.

Standard Scheduling Model Template with Math 180

Monday	Tuesday	Tuesday	Tuesday	Friday
Course 1	Course 1	Course 1	Course 1	Course 1
Course 2	Course 2	Course 2	Course 2	Course 2
Course 3	Course 3	Course 3	Course 3	Course 3
Course 4	Course 4	Course 4	Course 4	Course 4
Math 180	**Math 180**	**Math 180**	**Math 180**	**Math 180**
Course 6	Course 6	Course 6	Course 6	Course 6
Course 7	Course 7	Course 7	Course 7	Course 7

A/B Style Math 180 Schedule Model Template with Math 180

Monday	Tuesday	Wednesday	Thursday	Friday
Course 1	Course 5	Course 1	Course 5	Course 1
Course 2	Course 6	Course 2	Course 6	Course 2
Math 180	Course 7	**Math 180**	Course 7	**Math 180**
Course 4	Course 8	Course 4	Course 8	Course 4

5) Instructional Design, Math 180, accessed 9/26/18, https://www.hmhco.com/products/math-180/program-overview/math-best-practices.htm

Curriculum Combination Block Schedule Model Template with Math 180

Term 1	Term 2	Term 3	Term 4
Course 1	Course 1	Course 5	Course 5
Course 2	Course 2	Course 6	Course 6
Math 180 **_____** **State Math Curriculum**	**Math 180** **_____** **State Math Curriculum**	**Math 180** **_____** **State Math Curriculum**	**Math 180** **_____** **State Math Curriculum**
Course 4	Course 4	Course 8	Course 8

While general curriculum and intervention courses such as Math 180 remain separate at **District D**, teachers who instruct both courses sometimes use the concept-based curriculum to inform standard state curriculum.

Consider Including State Curriculum Standards in Math 180 Courses to Foster Student Success

Teachers at **District C** include state curriculum standards in Math 180 courses. Courses throughout the year last 90 minutes, which provides teachers with time beyond what Math 180 requires. With this additional time, teachers instruct students on the state curriculum standards. Administrators at **District B** considered a similar model, but administrators have not moved to extend the model across the district. Rather, individual schools can choose to include state curriculum in Math 180 courses. Contacts report that a lack of state curriculum in the majority of Math 180 courses has not negatively impacted student success at District B. In fact, at several district schools, students in Math 180 programming have performed above the district median on state assessments.

Placement

Use a Combination of Metrics to Determine Student Placement in Math 180 Courses

Districts must use diverse metrics, including grades, teacher recommendations, and past test performances, to determine if a student should be placed into Math 180 programming. At **District C**, special education students tend to be placed into Math 180. At other profiled districts, teachers and administrators recommend students for Math 180 programming based on teacher referrals and academic performance, among other metrics. Because Math 180 programming is developed for students from fourth grade to eleventh grade, profiled districts typically place students in these grades into the program. Administrators tend to place emphasis on students from sixth to eighth grade, as a strategy to prevent students from falling behind in content knowledge before high school.

Metrics Used in Student Placement into Math 180

Teacher Recommendation

Teacher recommendations provide districts with a more holistic view into students' abilities. The recommendations can reveal character traits and information around behavioral issues. This proves useful during placement and informs whether a student can succeed in a non-traditional learning (i.e., computer-based) setting.

English Proficiency

At **District B**, district administrators consider a student's English proficiency to determine if the student might perform better in math if they possessed the language tools necessary to read and comprehend math problems. If this is the case, the student is placed in an English intervention course rather than Math 180.

Standardized Test Scores and Grades

Tests and grades from a student's general education courses can reveal insights into student knowledge of math content. Administrators use multiple student grades and test scores from throughout the year to add context to other metrics. Using many scores can control for outlier scores that occurred because of issues not related to content knowledge (e.g., students having a bad day).

Correct Placement into Math 180 Prevents Academic Underperformance

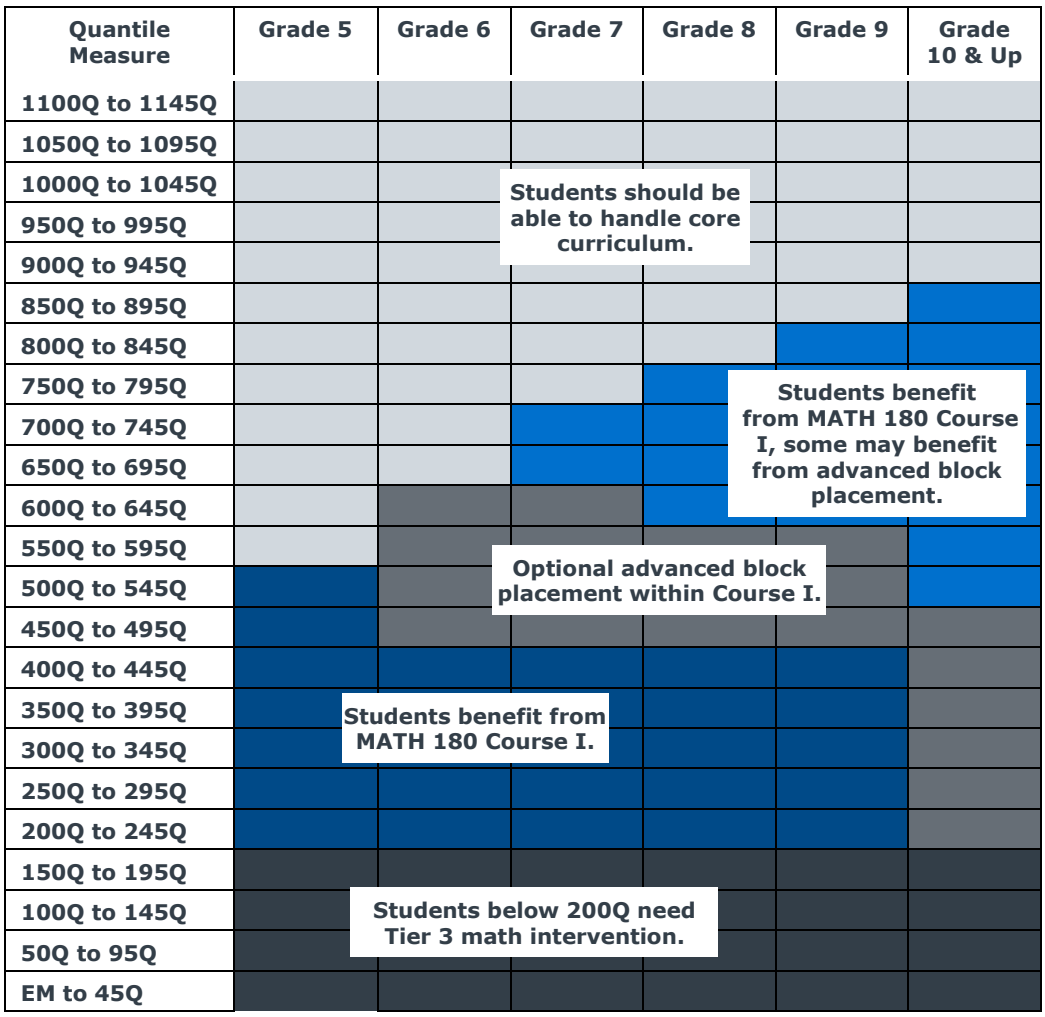
At **District D**, administrators emphasize that incorrect placement into a Math 180 course can impact a student's academic success. If a student must be removed from Math 180 because of incorrect placement, the student is more susceptible to falling behind in the general education course. Administrators at **District B** echo these sentiments and further emphasize how incorrect placement within Math 180 can cause a student to perform significantly worse.

Math 180 Diagnostic Tools Assist in Student Placement at Profiled Districts

The placement tools provided by Math 180 assess students by Quantile Measures, which measures the math concepts a child knows and matches the child with the concepts they are ready to learn.[6] The students who have been previously recommended for Math 180 take the Quantile Measure placement test at the beginning of the year with a Math 180 or special education instructor. Math 180 instructors and school administrators use the test to determine the placement of students into the specific levels, or blocks, of Math 180.[7] The blocks cover nine mathematical themes necessary for a student to progress towards algebra.[8]

6) What is a Quantile Measure? Quantile Framework for Mathematics', Accessed 9/17/18, https://www.quantiles.com/parents-students/understanding-quantile-measures/what-is-a-quantile-measure/
7) Program Overview, Math 180, Date accessed 9/17/18, https://www.hmhco.com/products/math-180/program-overview/math-curriculum.htm
8) Instrucitonal Focus, Math 180, accessed 9/26/18, https://www.hmhco.com/products/math-180/instructional-focus/course-2-pre-algebra.htm

Explanation of Quantile Measures Score and Math 180 Student Placement[9]



Under a Response to Intervention (RTI) framework, Tier 3 math intervention is available to students who need more intensive intervention strategies (e.g., special education instruction).[10]

Funding

Grants and General Funds Primarily Finance Math 180 at Profiled Districts

As a high-cost program, Math 180 requires district administrators to think strategically about funding options. At **District D**, existing grant funds allowed administrators to pilot Math 180. Administrators hope to expand Math 180 throughout the district (e.g., high schools, special education) by collaborating with district departments such as special education to secure additional funding. **District C** finances Math 180 using specialized access funds for special education students. **District B** and **District A** fund Math 180 using general funds.

9) Examine Quantile Data, Date Accessed 9/21/2018,
10) Russell Gersten, Sybilla Beckmann, Benjamin Clarke, Anne Foegen, Laurel Marsh, Jon R. Star, and Bradley Witzel. "Assisting Students Struggling with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools. 4." What Works Clearinghouse (2009).

Math 180's High Quality Outweighs the Costs for Administrators at All Profiled Districts

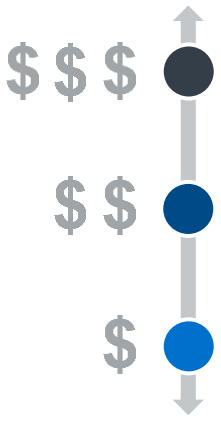
Despite large upfront costs for purchasing and implementing Math 180, profiled districts all continue to use Math 180 for its quality. The significant improvement in student learning as a result of Math 180 programming motivates districts leaders to continue funding the program. The costs associated with the Math 180 licenses must be paid only once and the license continues to exist indefinitely in the district. Administrators at profiled districts note that the upfront license cost is typically the most expensive aspect of the program, and afterwards the price becomes more manageable.

Use Cost Saving Strategies to Minimize Initial Costs

To minimize initial costs of Math 180, contacts at profiled districts relied on strategies to make the purchase of Math 180 manageable. For example, administrators at **District C** work with Math 180 sales associates and district teachers every year to prioritize the minimum resources needed to achieve high value from the program. This requires forecasting potential needs among students and teachers to avoid purchasing extra materials and licenses. Administrators at other profiled districts, including **District B**, emphasize that workbooks for Math 180 can be useful but are not necessary. In the future, district leaders may elect to no longer purchase these additional materials as a way to lower costs. While all districts recommend utilizing the training services offered by Math 180, administrators at **District A** offer only the initial training services to new teachers, instead of continued PD provided by Math 180. Teachers instead rely on the embedded professional learning materials within the Math 180 platform. Contacts note that this has not negatively impacted performance at District A. All other profiled districts have continued to use some Math 180-provided PD services for strategic reasons (e.g., building staff capacity, solidifying teacher ability).

Potential Cost Saving Options for Math 180

All cost reduction strategies should be adopted only after a thorough assessment of the impacts of the strategies



Reduce the number of PD sessions provided by Math 180.

Reduce the amount of consumables purchased through Math 180.

Strategic purchasing with Math 180 consultant to prioritize the minimum resources needed.

Use Math 180 Reports to Measure Student Progress and Improve the Program

The reports published by Math 180 provide extensive detail and effectively measure student success in the program. The reports include all the data around a student's past scores and performance in Math 180. This allows teachers to benchmark students against their own growth to accurately understand a student's progress through Math 180 and toward grade-level math content knowledge. While profiled districts do not report quantitative information, all contacts express satisfaction with the program's measurable impact on student achievement.

Sample Math 180 Assessment Report

Total Grades: 4
Total Math Inventory Students: 29
Average Quantile® Growth: 115

District C Junior Senior High School (29 total students)

Grade	First Test Score (Avg.) In Selected Time Period	Last Test Score (Avg.) In Selected Time Period	Average Growth In Quantile®
Seventh grade	420	540	120
Eight grade	470	575	105
Ninth grade	590	685	95
Tenth grade	615	800	185

Seventh grade (6 total students)

Grade	First Test Score (Avg.) In Selected Time Period	Last Test Score (Avg.) In Selected Time Period	Average Growth In Quantile®
MATH 7 C2 M180	370	465	95

Eight grade (12 total students)

Grade	First Test Score (Avg.) In Selected Time Period	Last Test Score (Avg.) In Selected Time Period	Average Growth In Quantile®
MATH 8 C3 M180	420	757	105

The detailed information from Math 180-generated reports can also be used to determine if a student should continue in the program. While administrators at profiled districts do not often remove a student mid-year from a Math 180 course, administrators will use the reports to determine a student's future placement. At **District C**, administrators emphasize the importance of the reports during a student's

third year in the program, because the this year typically determines if a student will continue into Course II from Math 180 or be removed from the program.

Data from Progress Reports Can Inform Strategic Decisions for Math 180

The data provided in the Math 180 reports support administrators and teachers in their improvement of administrative processes (e.g., student placement). The reports reflect different aspects of the program (e.g., individual student success and utilization, comparison across schools), and administrators use the data to adjust how the district and schools approach Math 180. For example, administrators at **District B** used data gathered through the Math 180 reports to adjust placement strategies. Data revealed that students placed lower than what the Math 180 diagnostic suggested did poorly in the course, whereas students placed above what the diagnostic suggested exceeded expectations and showed significant growth. Students placed at the level suggested by the diagnostic met performance expectations. With this information, the district now plans to strategically place students above the level suggested by the diagnostic to foster success among students.

4) Research Methodology

Project Challenge

Leadership at a member institution approached the Forum with the following questions:

- Why did contact districts choose to implement Math 180?
- How long was the implementation process for Math 180 programming at contact districts?
- How was Math 180 programming introduced and communicated to teachers and parents?
- Did contact districts face issues with implementation process for Math 180 programming? How were these issues resolved?
- Which individuals were involved in the implementation of Math 180 programming?
- Which middle school students use Math 180 programming?
- What administrative resources were dedicated to implementing Math 180 programming?
- What training opportunities did contact districts provide teachers during the implementation of Math 180 programming?
- How do teachers at contact districts access support services?
- Are support services at contact districts offered on a continual basis or only during the implementation process?
- How do contact districts measure success in Math 180 programing?
- Have contact districts seen a measurable impact of Math 180 programming on middle school students?
- What duration of time must Math 180 programming exist before contact districts can assess measurable results of the program?
- What elements have proven most successful in implementing Math 180 programming? What elements have proven least successful?

Project Sources

The Forum consulted the following sources for this report:

- EAB's internal and online research libraries (eab.com)
- The Chronicle of Higher Education (http://chronicle.com)
- National Center for Education Statistics (NCES) (http://nces.ed.gov/)
- Examine Quantile Data (https://www.matsuk12.us/cms/lib/AK01000953/Centricity/Domain/5328/MATH%20180%20Placement%20Assessment%20Plan.pdf)
- Math 180 (https://www.hmhco.com/products/math-180/program-overview/math-best-practices.htm)
- Russell Gersten, Sybilla Beckmann, Benjamin Clarke, Anne Foegen, Laurel Marsh, Jon R. Star, and Bradley Witzel. "Assisting Students Struggling with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools. 4." What Works Clearinghouse (2009).
- Quantile Framework for Mathematics (https://www.quantiles.com/parents-students/understanding-quantile-measures/what-is-a-quantile-measure/)

Research Parameters

The Forum interviewed program directors and coordinators of Math 180 programming.

A Guide to Institutions Profiled in this Brief

Institution	Location	Approximate Enrollment
District A	Pacific West	9,100
District B	Pacific West	41,000
District C	Mid-Atlantic	800
District D	Mid-Atlantic	15,000