Research Results

Math 180 Implementation Insights: Achieving Growth through Program Usage

Study Profile

National Cohort

Grades:

3 - 12

Study Design:

Descriptive

Evaluation Period:

2024–2025 school year

Study Conducted by:

HMH

Outcome Measures:

NWEA MAP

Implementation:

Dedicated and Flex

Overview

HMH has identified an initial set of key metrics that provide insights into the fidelity of an intervention implementation and its impact on student math achievement. These metrics include the following.

- Rostering: percentage of purchased licenses
- Days: number of days students log in to the program during an academic year
- Average Minutes/Session: average time spent in those sessions
- Topics Completed: number of topics students complete
- HMH Embedded Placement and Growth Tool: number of administrations of the embedded NWEA MAP Growth interim assessment used to determine intervention eligibility, place students into the program, and measure achievement growth
- Professional Services: percentage of teacher and administrator coaching support as compared to investment in *Math 180* curriculum

Each of these metrics have some influence on the impact of *Math 180* on achievement growth and have been broken down into five usage level categories L1 (Minimum), L2 (OK), L3 (Good), L4 (Very Good), and L5 (Exceptional). See Table 1.

The metric with the most direct impact on achievement growth has been found in previous research to be number of topics completed. Therefore, we recommend this measure of program progress as the focus of any direct association with student growth. However, the other metrics serve as valuable supports or precursors for topics completed. These metrics are important to document because the topics completed for adequate growth are fostered by high levels of these other metrics. Therefore, monitoring progress on all these metrics throughout the year allows HMH stakeholders to identify areas of need to address them in a timely manner.

Although there are a variety of student outcomes that may be of interest, our focus for implementation fidelity centers on achievement growth. Achievement growth can be measured in a variety of ways. For the purposes of this analysis growth was measured by the change in RIT score from a fall testing window to the spring on the NWEA MAP Growth assessment. To put these changes into the proper context we compared growth exhibited by *Math 180* students to the annual median expected growth from a national sample of NWEA MAP Growth test takers. Since median expected growth can vary by starting RIT score, grade level, and time in between administrations, the study compared the expected growth based on all of these factors.

Table 1. Key metrics for successful *Math 180* implementation

Key Metrics	L1 (Minimum)	L2 (OK)	L3 (Good)	L4 (Very Good)	L5 (Exceptional)
Rostering	1–34%	35–59%	60–74%	75–89%	90% +
Days	1–39	40–69	70–89	90–109	110 +
Avg Min/Session	0–4	5–10	11–14	15–17	18–20
Topics Completed	0–3	4–6	7–10	11–14	15 +
HMH Embedded Placement and Growth Tool (NWEA MAP)	1	2	2	3	3
Professional Services	<10%	11–14%	15–19%	20–24%	25% +

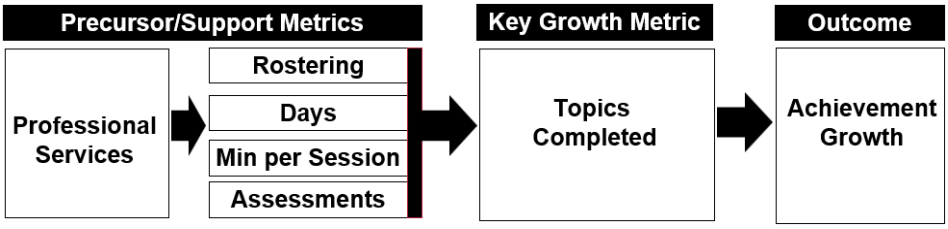
Key Takeaways

An analysis of a national sample of 15,892 *Math 180* students who scored at or below the recommended cut (35th percentile) for intervention indicated there were very few students who fit exclusively into each of the category combinations at each level in table 1. Therefore, finding an average growth expectation using these five levels where students need to meet each of the metrics' criteria is NOT recommended.

Previous efficacy research examining the effects of program usage have pointed to the number of topics completed as the greatest predictor of achievement growth for *Math 180* students. As a result, the estimates of students achieving annual growth based on program usage focused on this key metric. The metrics that capture days and average minutes per session are highly correlated to topics completed and although they are indirectly

related, they do serve as important affordances for the number of topics completed and therefore should be monitored. Additional metrics such as Professional Services and Assessments which provide guidance on best implementation practices and a means of measuring progress also serve an important supporting function. For example, in order to complete the necessary number of topics for adequate growth teachers and students must be adequately prepared and encouraged to put in the time necessary to complete the topics as illustrated in Figure 1 below.

Figure 1. Interdependence of implementation metrics on predicting achievement growth



As these supporting implementation activities increase from Level 1 up through Level 5 the likelihood of topics completed also increases. Table 2 summarizes the association of an increase in topics completed with average annual expected achievement growth. Students can demonstrate reasonable growth with minimal amounts of program completion as measured by topics completed. However, as their progress in the program increases their achievement growth also increases. This continues up to students who complete 15 or more topics. On average these *Math 180* students grow an estimated 1.8 times expected annual growth. These increases are necessary for students to eventually close the achievement gap needed to reach grade-level standards.

Table 2. Average annual growth by number of topics completed

Key Metrics	L1 (Minimum)	L2 (OK)	L3 (Good)	L4 (Very Good)	L5 (Exceptional)
Topics Completed	0–3	4–6	7–10	11–14	15 +
Annual Growth	1.1	1.2	1.4	1.5	1.8

Evidence for the relationship between *Math 180* progress and subsequent achievement growth across multiple assessments can be found in a series of efficacy studies located here.

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