



FACILITATION GUIDE VALUE-ADDED VIDEO SERIES

VIDEO 3: **GETTING THE BASICS:**

SAS® EVAAS® MULTIVARIATE RESPONSE MODEL (MRM),
MEAN GAIN APPROACH

For district, building, and teacher leaders supporting
professional learning on value-added analysis



BattelleforKids

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INTRODUCTION

The Value-Added Video Series is designed for teachers and administrators as an easy, digestible way to acquire a basic, conceptual understanding of Ohio's value-added measures to foster the appropriate and effective use of value-added information.

To get the most out of the video series, you are encouraged to use the videos during collaborative learning times, and leaders may use the accompanying Facilitation Guide to each video to elicit thoughtful discussions among educators in a collegial, professional learning setting.

The series includes:

- Video 1: Introduction to the Value-Added Series (6:52)
- Video 2: Establishing Awareness: Why Growth Measures Matter (24:30)
- Video 3: Getting the Basics: SAS® EVAAS® Multivariate Response Model (MRM), Mean Gain Approach (33:38)
- Video 4: Getting the Basics: SAS® EVAAS® Univariate Response Model (URM), Predicted Mean Approach (14:50)
- Video 5: Understanding Standard Error and Growth Index (17:28)
- Interpreting Value-Added & Diagnostic Reports (Facilitation Guide only, no video)
- Video 6: Analyzing and Using Value-Added Information (11:30—includes educators sharing their experiences)
- High School Value-Added Video-A Good Beginning to value-added Information (7:35)

Facilitation Guides include:

- Learning targets and length for each accompanying video
- Guided practice which includes reflection activities, questions, and scenarios
- Talking points and example responses to support the facilitator
- Additional resource suggestions for those interested in learning more

Thank you for accessing and engaging in these professional learning resources to support your understanding and use of value-added measures.

This Facilitation Guide and the accompanying Value-Added Video Series are provided through a partnership between the Ohio Department of Education and Battelle for Kids.



PLANNING FOR THE USE OF VIDEO 3: GETTING THE BASICS: SAS® EVAAS® MULTIVARIATE RESPONSE MODEL (MRM), MEAN GAIN APPROACH

STEP 1

Access and review Video 3 and this Facilitation Guide to familiarize yourself with the content prior to using the activities with an audience.

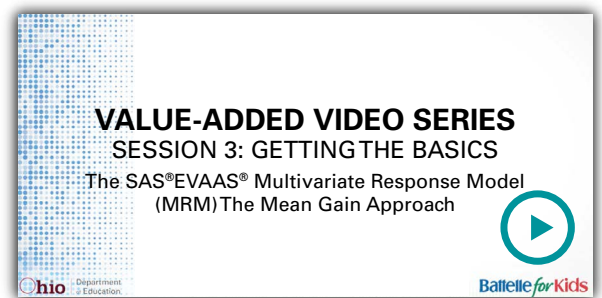
STEP 2

Decide who should participate in Video 3 professional learning and when. This video explores the value-added model used in Ohio, applicable to grades 4–8 math and ELA and in some grades/subject areas for districts that participate in approved vendor assessments to generate value-added reporting (i.e., K–2).

Video 3 Learning Targets

- Understand the history of value-added reporting in Ohio
- Learn about Ohio’s value-added analytics provider, SAS Institute, Inc.
- Acquire basic, conceptual knowledge of how the SAS® EVAAS® mean gain model is calculated

Video 3 Length: 33:38



STEP 3

- Consider the Guided Practice activities in this guide, and plan how you will integrate these activities into the professional learning.
- Determine if you will show the video in its entirety first, or pause the video throughout to facilitate activities at suggested times. Suggested times to pause the video and engage in discussion or in an activity are included in this guide. The symbol to the right is included in the videos at any point where a pause is suggested for processing time or to check for understanding.

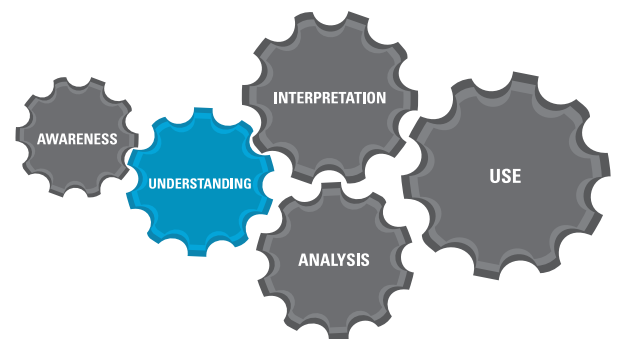


STEP 4

Print the pages in the guide you plan to use as attendee handouts. Suggestions:

- Print pages 6 and 7 (back-to-back), page 10, and pages 15 and 16 (back-to-back) for all attendees

Consider printing the pages in this guide marked “Facilitator Copy” to support your efforts. These pages include activity instructions and talking points.



TERMINOLOGY RESOURCE

PURPOSE

The purpose of this resource is for attendees to have a handout of the key terms and definitions that are referenced and explained in Video 3.

SUGGESTED USE

1. Prior to showing the video:

- Share Video 3 learning targets with the audience.
- Print the Terminology Resource, pages 6 and 7, (back-to-back) ahead of time for attendees.
- Hand out this resource prior to the video so attendees may use it as a reference.

2. After the video, if attendees would like more explanation than what was provided:

- Consider directing them to the end of the Terminology Resource to the explanation of how EVAAS[®] accommodates test transitions in the MRM model applicable to grades 4–8 math and ELA/reading. This concept was not covered in the video, but may be of interest to attendees.
- Suggest the additional resources provided at the end of this Facilitation Guide. The Technical Documentation of EVAAS[®] Analysis, located on the Ohio EVAAS[®] login site <http://ohiova.sas.com>, contains more in-depth information.



TERMINOLOGY RESOURCE

EVAAS® (Educational Value-Added Assessment System): SAS Institute, Inc.'s trademarked name for value-added analysis.

Baseline Score: A group of students' prior year mean NCE.

Note: In the MRM analysis, the students' prior year mean NCE is not simply an average of scores from just one test the prior year. All available test scores are used to inform the precision of the students' prior year mean NCE placement. For the MRM analysis, this includes students' prior scores from Ohio's math and ELA/reading state assessments.

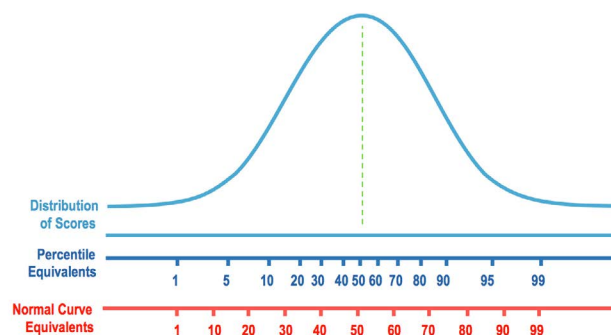
Multivariate Response Model (MRM): One of the two value-added models provided in Ohio. The MRM analysis, often called the Mean Gain model, is used when tests are administered in consecutive grades; for example, 3–8 math and ELA.

The MRM is a gain-based model, which means that it measures growth between two points in time for a group of students. The growth expectation is met when a cohort of students maintains the same relative position from one grade level to the next, with respect to statewide student achievement.

Normal Curve Equivalent (NCE): Is similar to a percentile rank in that scores are derived from scaled scores and ranked based upon performance. A significant difference between percentile rank and NCE is that an NCE scale is an equal interval scale.

Below, you will see a normal curve. This curve describes a fundamental relationship that is evident in most naturally occurring phenomena like a person's height or shoe size. Using height of adult males as an example, the distance between the curve and the straight line beneath it represents the number of adult males who are any given height. The big bulge in the middle of the curve represents the large number of adult males who are about average height, and a small number of adult males who are very short or very tall as evidenced by the short distance between these two lines at the extreme ends of the curve.

The percentile scale is tightly clustered toward the middle. This simply means that there are a larger number of adult males represented in the middle of the curve and a smaller number of adult males at the extremes. It is this uneven interval property that makes percentiles inappropriate for comparing aggregate achievement across multiple years. Percentile distributions change from one year to the next.



The NCE scale is just below the percentile scale. Notice that both of these scales are equivalent at the 1st, 50th, and 99th percentiles. The difference in the two scales is that NCEs are equally spaced across the entire continuum. It is this equal interval property of the NCE scale that makes it a more favorable metric for measuring group achievement level changes across years.

TERMINOLOGY RESOURCE

Observed Score: Actual scores that students earn on a test. In the MRM analysis, the observed score represents the group of students' new/most recent mean NCE.

Percentile Rank: Score that tells how the student performed in relation to a comparison group.

Scaled Score: Score that takes into account different forms of tests and the amount of difficulty of various test items. Students' raw scores from an assessment are converted into scaled scores by the assessment vendor. It is the scaled score that is provided to the value-added provider. In the MRM analysis, the value-added provider then converts scaled scores to NCEs.

Univariate Response Model (URM): One of the two value-added models provided in Ohio. The URM analysis, often called the Predicted Mean model, is used when tests are not administered in consecutive years—for example, grades 5 and 8 science, grade 6 social studies, and end-of-course (EOC) exam subject areas. Although some EOC tests are taken in succession, students don't always take high school courses/tests in a consecutive, sequential pattern, so the URM is necessary for all EOC exam subject areas.

The URM is a regression-based model, which measures the difference between students' expected scores for a particular subject/year with their observed scores. Learn more about the URM in Video 5.

THE MRM ANALYSIS AND TEST TRANSITION

Following is the explanation of how EVAAS® accommodates test transitions in the MRM model, applicable to grades 4–8 math and ELA/reading.

Intra-Year Approach (also called Within-Year Approach): One of the options to setting the growth expectation in the MRM analysis. The Intra-Year Approach is when students maintain the same relative position with respect to the statewide student achievement that year. The relative position of scale scores within each year's distribution of scale scores is the basis of NCEs, so scores do not have to be on the same scale.

This approach is required in the MRM analysis when Ohio transitions to new assessments.

Moving forward, a group of students will have met the growth standard/growth expectation if they maintain the same relative position (on the NCE scale) with respect to statewide student achievement that year for a specific subject and grade.

Previously, the calculation used a Base-Year Approach to benchmark student growth. For example, a group of students met expected growth if they maintained the same relative position with respect to statewide student achievement in the established base year. This approach cannot be used when Ohio transitions to new assessments since it would require tests given in consecutive grades to be on the same scale.



GUIDED PRACTICE 1: BASIC UNDERSTANDING OF THE MRM ANALYSIS

PURPOSE

The purpose of this activity is for attendees to process key understandings of the MRM analysis necessary to reach a basic, conceptual understanding of the model.

SUGGESTED USE

1. Prior to showing the video:

- Print Guided Practice Handout 1 (page 10) ahead of time for attendees.
- Hand out this resource prior to the video so attendees can complete while watching.

2. Pause the video at 12:11 and call attention to Guided Practice Handout 1.

- Give attendees 2–3 minutes to share their response to question 1 with a partner or their table:

How much growth is enough growth for students in the MRM analysis?

How is the growth expectation defined?

- Let attendees know that the next 15 minutes of the video will provide some explanations to assist in completing question 2:

Why is it necessary to use NCEs in the MRM analysis? Highlight important characteristics of the NCE scale.



3. Push play to continue the video.

4. After the video, give attendees 5–10 minutes to share their responses to question 2 with a partner or their table.

Suggest they use their Terminology Resource as needed. You might share a few of the Example Responses from your Facilitator Copy with the attendees to complete the activity.

GUIDED PRACTICE 1: BASIC UNDERSTANDING OF THE MRM ANALYSIS

EXAMPLE RESPONSES

1. How much growth is enough growth for students in the MRM analysis? How is the growth expectation defined?

- The growth expectation is defined as maintaining placement in the distribution of NCE scores from one year to the next.
- For example, a group of students with an entering mean NCE of 40 must at least stay at the 40th NCE relevant to the statewide distribution of scores for the current year.
- Attendees may give examples at the individual student level. For example, a student with an entering mean NCE of 20 must at least stay at the 20th NCE. You will want to remind attendees that the analysis is calculated for the group of students and is not done at the individual student level.
- Numerically on reports, the growth expectation is 0.

2. Why is it necessary to use NCEs in the MRM analysis? Highlight important characteristics of the NCE scale.

- The MRM is a gain-based model, which means that it measures growth between two points in time for a group of students. One reason why scaled scores cannot be used in this model is because many tests were not designed with a vertical scale, meaning an increase in scaled scores across grade levels does NOT imply growth.
- The NCE is similar to a percentile rank in that scores are derived from scaled scores and ranked based upon performance. A significant difference is that the NCE scale is an **equal interval scale**. The difference between the 50th and 55th NCE is the same as the difference between the 90th and 95th NCE.
- NCEs are constructed to be equivalent to percentile ranks at 1, 50, and 99. NCEs are allowed to range above 100 and below 0 to preserve their equal-interval property. So, an NCE of 1 does not imply the floor of the test, nor does the 99th NCE imply the ceiling. For display purposes, the EVAAS® website shows NCEs as 1 to 99.

Additional information for facilitators in fielding questions on the topic of high-achieving students:

- o Tests must meet certain properties every year to be used by Ohio's value-added provider, including sufficient stretch in the test scales to measure differences among very high- and very low-achieving students.
- o As mentioned in the video, NCEs can go higher than 99. In a typical year in Ohio, the average maximum NCE is approximately 125.
- o ODE provides statistical summaries of state tests that provide the scaled score ranges of each test so you can see the floor, ceiling, and range by performance category.
- o ODE provides a scaled score frequency report through the password-protected Ohio Online Assessment System (OAARS). This can provide data on how few, if any, students within a district/school scored at the ceiling of a test in a given year.



GUIDED PRACTICE 1: BASIC UNDERSTANDING OF THE MRM ANALYSIS

1. How much growth is enough growth for students in the MRM analysis? How is the growth expectation defined?

2. Why is it necessary to use NCEs in the MRM analysis? Highlight important characteristics of the NCE scale.

GUIDED PRACTICE 2: DEEPER UNDERSTANDING OF THE MRM ANALYSIS

PURPOSE

The purpose of this activity is for attendees to unpack advanced concepts highlighted in the video with examples and scenarios to deepen the understanding of the MRM analysis.

If attendees are not at a readiness level to work through these guided questions, you might use this resource primarily for your learning and support in the facilitator role.

SUGGESTED USE

1. Prior to showing the video:

- Be sure to read through the Facilitator Copy of this resource and consider if attendees are at a readiness level to work through these questions.

If appropriate for use:

- Print Guided Practice 2, pages 15 and 16, (back-to-back) ahead of time for attendees.
- Pending the size of your audience, you might provide each of the table facilitators with the Facilitator copy of the Example Responses to this Guided Practice 2 activity.
- Although it's suggested to complete this activity in its entirety after the video, you might distribute the handout prior to the video so attendees can consider the questions while watching.

2. After the video:

- Allow for at least 10 minutes for attendees to work with a partner or their table group on the questions/scenarios in Guided Practice Handout 2. Pending time, you might assign groups to work on one or two questions versus all four.
- If time permits, call on a few tables to share highlights from their conversation.
- You might share a few of the Example Responses from your Facilitator Copy to complete the activity.
- If attendees would like more explanation than what was provided, suggest the Additional Resources provided at the end of this Facilitation Guide. The Technical Documentation of EVAAS® Analysis, located on the Ohio EVAAS® login site <http://ohiova.sas.com>, contains more in-depth information.



GUIDED PRACTICE 2: DEEPER UNDERSTANDING OF THE MRM ANALYSIS

EXAMPLE RESPONSES

1. The video mentions several times that **all** available student test scores are used to inform the analysis (7:55 and again at 29:52).

For example: Within the Baseline Score, all available state test data across grades and subjects is looked at and considered to inform the precision of the Mean NCE placement of the Baseline Score (entering achievement) for a group of students.

What are the advantages of using multiple test scores of a student versus a single test score in the MRM analysis?

- To increase reliability of the growth measure.
 - A similar response is: To improve the precision of the entering achievement estimate for the group of students.
- Value-added looks beyond what students do on just one day by looking for a pattern across multiple years of growth estimates and student test scores to see whether students, on average, made expected growth.
- There are many reasons why a student may have a bad test day compared to what is typical for that student (i.e., not feeling well). Similarly, there are reasons why that student might have an extraordinary test day (i.e., guessing).

Additional information for facilitators in fielding questions:

- An example of prior data points used to inform the 6th grade math Baseline Score for the 7th grade math value-added analysis: 6th grade math and reading, 5th grade math and reading, 4th grade math and reading, and 3rd grade math and reading.
- This is NOT to suggest that these prior data points are simply averaged together. The purpose in reviewing all testing history for students, across grades and subjects, is to look for patterns in the data and to identify anomalies to strengthen the precision of the estimated entering achievement or Baseline Score.

2. How would you respond to colleagues that suggest it is harder for this year's teachers to meet or exceed the growth expectation with a group of students because those same students experienced high gains the prior year?

- Prior teachers impact the starting point, or estimated entering achievement level (i.e., the Baseline Score), of the student cohort; however, value-added analysis is measuring the average gain of that group of students for the current year. The growth expectation is met when students maintain the same relative position from one year to the next.
- It is important for teachers to know where students are when they come into their classroom so they can meet their academic needs. If teachers are used to teaching the same information the same way and at the same pace every year to all students, then it could be perceived as harder to meet or exceed the growth expectation if their current students are at different academic levels than previous students. Strong formative instructional practices are essential to success.

Additional tips for facilitators in fielding questions:

- Public reports on the EVAAS® website (<https://ohiova.sas.com>) can be explored to find similar schools in the state that have had strong value-added results across years for the same student cohort. One strategy you might consider is to look for schools like yours that are getting the desired results and contact them about their programs.

GUIDED PRACTICE 2: DEEPER UNDERSTANDING OF THE MRM ANALYSIS

EXAMPLE RESPONSES

3. It's suggested that gifted students cannot meet or exceed expected gains. What are some strategies to share when responding to this concern?

- Explain the scaled score range of the assessment to staff. Remind them that having sufficient stretch is a requirement for an assessment to be used in value-added analysis. You might highlight the magnitude of the range of scaled scores at the Advanced level. (Statistical Summaries provide such information).
- Remind staff that NCEs go above a 99. NCEs range above 100 and below 0 to preserve their equal-interval property. So, an NCE of 1 does not imply the floor of the test, nor does the 99th NCE imply the ceiling. For display purposes, the EVAAS® website shows NCEs as a 1 to 99.
- Show staff how few students actually hit the ceiling of an assessment in a given year, let alone two consecutive years.
 - o To access how many students actually received a maximum scaled score in your school/district, utilize the school's scale score frequency report from the password-protected Ohio Online Assessment System (OAARS) to obtain these numbers.
 - o If there is a concern of a student(s) hitting the ceiling consecutively across years, review your district/school's acceleration options.
- Remind staff of key value-added model concepts:
 - o Value-added is measuring gains of a group of students, not an individual student.
 - o The growth expectation in the MRM analysis is asking that students maintain their placement in the distribution to meet expected growth.
- Actual data may be the most readily apparent evidence.
 - o Use the Scatterplot feature in the educator login part of the EVAAS® site to plot the Growth Index and Entering Achievement or Performance Index for all schools in Ohio. Regardless of the year, grade, or subject area chosen, you will not see a correlation of school achievement to the growth index. In other words, the dots representing each school do not trend up or down as achievement increases; the cluster of dots is fairly even across the achievement spectrum.
 - o Public reports on the EVAAS® website (<https://ohiova.sas.com>) can be explored to find similar schools in the state that have had strong value-added results for cohorts of high-achieving students or student subgroups such as gifted. Look for schools like yours that are getting the desired results and contact them about their programs.
- If applicable to the situation, address the fact that if a student is identified as gifted, it does not necessarily mean they are currently high achieving in all subject areas, i.e., they may have been identified as gifted in one subject area several years ago. Sometimes educators are surprised to find that gifted students aren't necessarily in the top quintile of the EVAAS® diagnostic reports.



GUIDED PRACTICE 2: DEEPER UNDERSTANDING OF THE MRM ANALYSIS

EXAMPLE RESPONSES

4. **An important concept was introduced toward the end of this video: A student’s background is accounted for within the analysis in the baseline score because all available student test scores are used to inform the analysis (mentioned in video at 26:06).**

This points to common misunderstandings among educators concerned that serving certain types of students puts them at a disadvantage for value-added (i.e., socioeconomic or demographic characteristics).

A strength of Ohio’s value-added system is that the SAS® EVAAS® models use all available state testing history for every student. Therefore, each student serves as his or her own control, and SES/DEM influences are already represented in the student’s data.

How would you respond to a colleague concerned about his/her value-added results due to having specific populations of students (i.e., students with disabilities, economically disadvantaged, etc.)?

- Remind them that the growth expectation maintains placement in the distribution of scores from one year to the next.
 - o If needed, discuss a growth mindset and setting expectations for all students.
- The extent to which a student’s family background, or factor such as a disability, has resulted in the achievement level of that student in the past, that is being taken into account because the value-added analysis is using all available test history of that student.
- Public reports on the EVAAS® website (<https://ohiova.sas.com>) can be explored to find similar schools in the state that have had strong value-added results regardless of student subgroups. Look for schools like yours that are getting the desired results and contact them about their programs.
 - o If logged into the educator EVAAS® site, you might use the Scatterplot feature to plot the Growth Index and a demographic subgroup.

RESOURCE 2: DEEPER UNDERSTANDING OF THE MRM ANALYSIS

1. It is mentioned several times in the video that all available student test scores are used to inform the analysis.

For example: Within the Baseline Score, all available state test data across grades and subjects is looked at and considered to inform the precision of the Mean NCE placement of the Baseline Score (entering achievement) for a group of students.

What are the advantages of using multiple test scores of a student versus a single test score of a student in the MRM analysis?

2. How would you respond to colleagues that suggest it is harder for this year's teachers to meet or exceed the growth expectation with a group of students because those same students experienced high gains the prior year?



RESOURCE 2: DEEPER UNDERSTANDING OF THE MRM ANALYSIS

3. It's suggested to you that gifted students cannot meet or exceed expected gains. What are some strategies to share when responding to this concern?

4. An important concept was introduced toward the end of this video: A student's background is accounted for within the analysis in the baseline score because all available student test scores are used to inform the analysis (mentioned in video at 26:06).

This points to common misunderstandings among educators concerned that serving certain types of students puts them at a disadvantage for value-added (i.e., socioeconomic or demographic characteristics).

A strength of Ohio's value-added system is that the SAS® EVAAS® models use all available state testing history for every student. Therefore, each student serves as his or her own control, and SES/DEM influences are already represented in the student's data.

How would you respond to a colleague concerned about his/her value-added results due to having specific populations of students (i.e., students with disabilities, economically disadvantaged, etc.)?

NEXT STEPS & ADDITIONAL RESOURCES

STEP 1

Follow up with attendees:

- Show them where to access the resources from Video 3 of the Value-Added Video Series located on the Ohio Student Progress Portal: www.BattelleforKids.org/ohio.
- Communicate the plan for additional professional learning that will lead to the effective use of value-added information.

Tips:

- Some educators will not need to understand the content in Video 4: *Getting the Basics: SAS® EVAAS® Univariate Response Model (URM), Predicted Mean Approach*. The URM value-added model is applicable to grades 5 and 8 science, grade 6 social studies, and end-of-course subject areas.
- Video 5: *Understanding Standard Error and Growth Index* is a continuation of understanding Ohio's value-added analysis, and the content is applicable to both the MRM and URM models.

STEP 2

Determine if the staff need more time with the content from Video 3.

- Share the Additional Resource information, below, for more professional learning with the entire staff, groups/teacher teams, and/or individuals before proceeding with the Value-Added Video Series.

ADDITIONAL RESOURCES

The following are free to Ohio educators and available for use to go deeper into the content discussed in this video and guide.

- The Technical Documentation of EVAAS® analyses can be found on the Ohio EVAAS® login site at <https://ohiova.sas.com>.
- Online value-added modules:
 - o Coming spring 2016: New course on Understanding the MRM Analysis

Log into the Ohio Student Progress Portal to access online courses through “My Learning” and Enroll in Learning: www.BattelleforKids.org/Ohio.

Many online courses are available for Ohio educators, including value-added and formative instructional practices.

