education analytics

UNDERSTANDING EDUCATION ANALYTICS' LINKING STUDY BETWEEN SC READY AND NWEA MAP GROWTH ASSESSMENT, GRADES 3-8

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OVERVIEW

In the spring of 2023, the South Carolina Education Oversight Committee (SC EOC), in collaboration with the South Carolina Department of Education (SCDE), partnered with Education Analytics (EA) to complete a linking study between the South Carolina College- and Career-Ready Assessment (SC READY) in Mathematics and English Language Arts (ELA) and the NWEA MAP Growth assessment in Mathematics and Reading, respectively. Linking studies are used to statistically connect state summative test scores and interim test scores within the same grade level to facilitate comparisons of proficiency status on the two tests. Such linking studies help to answer the question, *what would my students' proficiency status on the spring state test likely be based on how they performed on the MAP assessment?*

The SC EOC enlisted EA to provide updated linked results based on the most current assessment data available (Spring 2023) and validate the results provided by interim assessment vendors, offering an independent evaluation of the alignment between interim assessments and state-level assessments. In cases where an interim vendor's studies are more recent than those presented here or utilize the same assessment year as our own results, **we recommend prioritizing the use of the vendor's results.** This approach ensures that educators and policymakers have access to the most up-to-date and aligned data and resources for making informed decisions regarding student learning and achievement.

In the following sections, we will provide a general overview of the linking study results and guidance on their interpretation, including limitations and cautions associated with linking studies. By providing an overview of EA's linking study results, methods, and considerations, this document aims to facilitate informed decision-making and promote transparency in assessment practices.

LINKING STUDIES

Data & Methods

Data from students who took both the SC READY and NWEA MAP Mathematics and ELA/Reading assessments in Spring 2023 were included in the linking study. Furthermore, only matched students who took the MAP assessments within 30 days of SC READY[1] in Spring 2023 were included. This ensures more comparability in students' exposure to the curriculum when they were tested.

[1] The SC READY data do not include the actual test administration dates, so this is an approximation based on SCDE's 2022–23 Assessment Schedule.

Linking studies establish the relationship between the two assessments by identifying corresponding percentile ranks across the test scores. Through this process we obtain scores on the spring MAP assessment that correspond to the three SC READY achievement level cut scores (i.e., cut score between Does Not Meet Expectations and Approaches Expectations, cut score between Approaches Expectations and Meets Expectations, and cut score between Meets Expectations and Exceeds Expectations) for mathematics and ELA at grades 3-8.

Results

Tables 1 and 2 present the linking results between SC READY and MAP spring tests for mathematics and ELA, respectively. The top panel shows the ranges of SC READY scale scores at each proficiency level and grade level in 2023. The bottom panel shows the corresponding MAP scores.

Table 1. SC READY and MAP Cut Score Equivalents (Spring): Mathematics

Grade	SC READY			
	Does Not Meet Expectations	Approaches Expectations	Meets Expectations	Exceeds Expectations
3	100–359	360-437	438-542	543-825
4	100-400	401-480	481-562	563-850
5	100-447	448-534	535-621	622-875
6	100-452	453-542	543-626	627-900
7	100-487	488-576	577-648	649-925
8	100-526	527-614	615-682	683-950
	NWEA MAP			
	Does Not Meet Expectations	Approaches Expectations	Meets Expectations	Exceeds Expectations
3	100-189	190-199	200-210	211-350
4	100-200	201-210	211-218	219-350
5	100-203	204-218	219-230	231-350
6	100-209	210-224	225-235	236-350
7	100-215	216-231	232-241	242-350
8	100-220	221-236	237-246	247-350

Table 2. SC READY and MAP Cut Score Equivalents (Spring): ELA

Grade	SC READY			
	Does Not Meet Expectations	Approaches Expectations	Meets Expectations	Exceeds Expectations
3	100-358	359-451	452-539	540-825
4	100-418	419-508	509-591	592-850
5	100-448	449-556	557-652	653-875
6	100-454	455-574	576-666	667-900
7	100-511	512-614	615-703	704-925
8	100-536	537-641	642-736	737-950
	NWEA MAP			
	Does Not Meet Expectations	Approaches Expectations	Meets Expectations	Exceeds Expectations
3	100-185	186-197	198-207	208-350
4	100-193	193-204	205-212	213-350
5	100-198	199-210	211-219	220-350
6	100-200	201-213	214-222	223-350
7	100-205	206-217	218-226	227-350
8	100-208	209-220	221-229	230-350

Linked MAP test scores were also extended from the spring to the fall and winter terms for the scores reaching the "Meets Expectations" performance level. These scores are summarized in Table 3. Note that these linked scores were calculated based on the mean MAP scores within each term among all South Carolina students who took the MAP test. Therefore, they reflect expected score equivalents **on average** among these students and **should not** be interpreted as accurate estimations for every individual student. The level of error around the fall and the winter scores will be larger than those around the spring scores as a result of extending these analyses to the fall and winter when SC READY is not administered.

Table 3. MAP Cut Score Equivalents

Grade	Mathematics			ELA		
	Fall	Winter	Spring	Fall	Winter	Spring
3	187	194	200	187	194	198
4	200	206	211	197	202	205
5	210	215	219	204	209	211
6	218	222	225	210	212	214
7	226	229	232	214	216	218
8	231	234	237	217	219	221

Interpretation & Limitations

Classification accuracy statistics are used to evaluate the degree to which the linked scores from the spring MAP assessment to the SC READY achievement level cut scores can be used to accurately classify students' proficiency status. An evaluation of these diagnostics provides strong evidence of good classification accuracy for using the linked MAP scores to estimate students' proficiency status on the SC READY assessments at grades 3-8.

While we do see this high level of classification accuracy, it is still important to consider the appropriate uses and limitations of these results. Figure 1 displays a scatterplot of scores for all grade 3 students who took the SC READY ELA and MAP Reading tests in Spring 2023. The black dashed line represents the best-fitting curve, which signifies how MAP Reading scores correspond to the SC READY ELA scores for students **on average**. For example, a score of 452 on the SC READY ELA test is the cut score for "Meets Expectations" at grade 3; this corresponds to a MAP Reading score of 198. Yet as with any statistical methods, there is a level of error associated with the results. The narrow black bands plotted around the dashed curve show the 95% confidence intervals around the average, which represent the range of values within which the linked scores could fall.

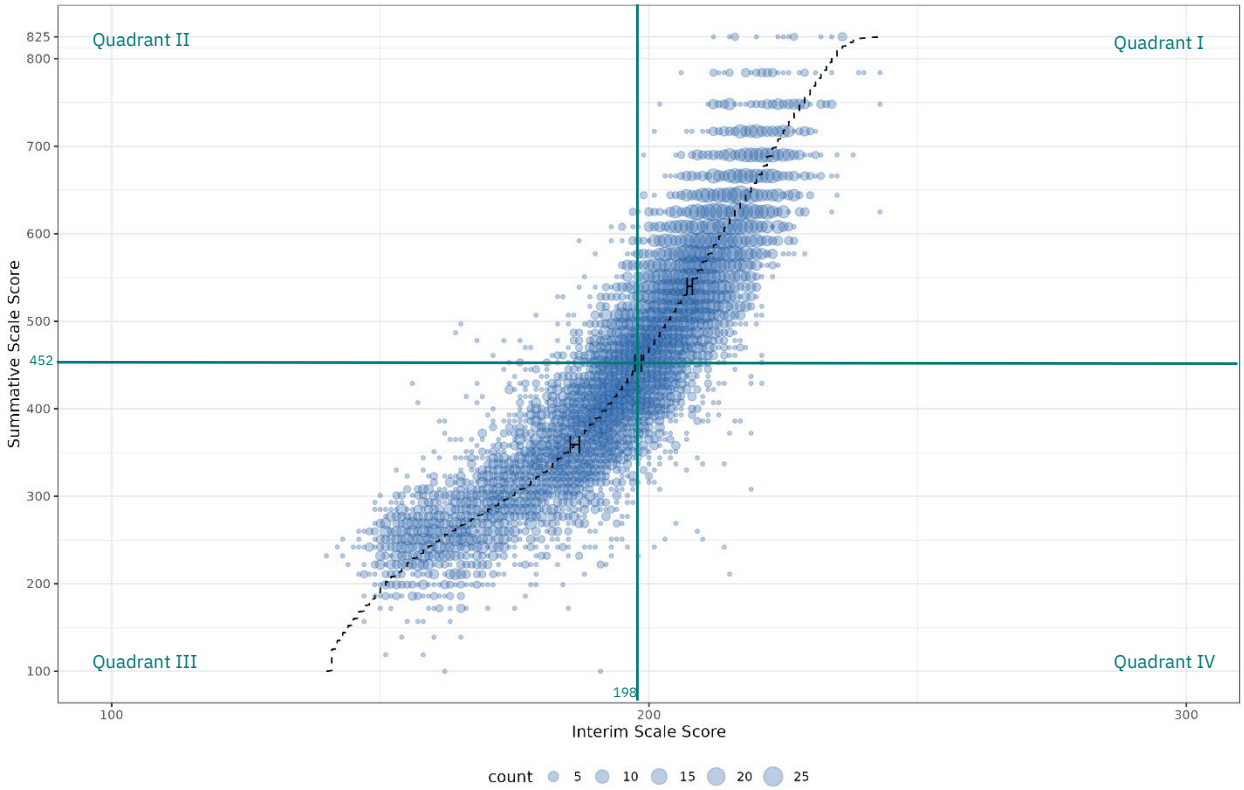
We see from this narrow band and the strong classification accuracy diagnostics that our statistical model is strong. However, it is important to keep in mind that the linked scores are based on a 50% likelihood estimation. This means that not all students who reach a

proficiency cut score on MAP will necessarily reach the associated score on SC READY. The results are more accurate for students on average than as associated with individual students.

Take the example of the SC READY 452 cut score for "Meets Expectations" in grade 3 and the corresponding MAP Reading score of 198. This represents how students performed on average. In reality, there is a wide range of MAP scores among students who reached a 452 on SC READY. Not all students who scored 198 and above on the MAP Reading test also scored 452 or higher on the SC READY ELA test in Spring 2023. Specifically, students in the bottom right box in Figure 1 (i.e., Quadrant IV) scored lower than 452. Similarly, students who met or exceeded expectations (i.e., scored 452 or above) on the SC READY ELA test had a wide range of scores on the MAP Reading test. Students in the top level box on the graph (i.e., students in Quadrant II) scored below a 198 on MAP Reading.

The interpretation of this estimated average is: 3rd grade students who scored 198 on MAP Reading have a 50% chance of scoring 452 or higher (i.e., reaching "Meets Expectations") on the SC READY ELA test. We recommend thinking about this scatterplot of the real student test scores when using and interpreting the linking results. Knowing the associated limitations of the results will allow educators to take the appropriate caution when using the results to answer the question, *what would my students' proficiency status on the spring state test likely be based on how they performed on the MAP assessment?*

Figure 1. Scatterplot of the SC READY ELA and MAP Reading Scores, Grade 3, Spring 2023



CONCLUSIONS

EA conducted linking studies between the spring 2023 SC READY Mathematics and ELA assessments and the NWEA MAP Growth Mathematics and Reading assessments for the purpose of providing updated results based on the most current assessment data available in order to facilitate interpretation of scores between the two assessments. Once again, we recommend that in cases where interim vendors' studies are more recent or utilize the same assessment year as our own results, that educators prioritize the use of the vendors' results and resources.

Despite good classification accuracy results from this study, there are still important notes of caution to call out when interpreting and using the linked scores. As with any statistical procedure, there is associated error and limitations of the results. Additionally, the two tests are constructed differently with regard to test content, design, and purpose. For example, the MAP Growth Reading assessment is one of two MAP assessments used to assess students' ELA skills (Language Usage is the other assessment), and focuses on "reading comprehension, understanding of genres and text, and vocabulary" (NWEA, 2019, p.11). The SC READY ELA assessment is composed of two subtests—writing and reading—and measures student performance on Reading – Literary Text, Reading – Informational Text, Inquiry, and Writing (SCDE, 2022). The statistical adjustments in linking do not adjust for differences in test content.

Therefore, scores on the SC READY and NWEA MAP assessments should not be used interchangeably. The linked scores facilitate comparisons of proficiency status between two assessments, but do not imply equivalence.

ABOUT EDUCATION ANALYTICS

Professor Robert Meyer formed EA in late 2012 with the objective of conducting research and developing policy and management analytics to support reform and continuous improvement in American education. This institutional mission—to identify ways that analytics can make education systems better—has been central to our work with the federal government, school districts, states, non-profits, and policymakers. EA serves as a partner, and not just a vendor, by engaging in hands-on analytics support and thought partnership around how to address potential shifts in the policy landscape. EA began working with Pasco County Schools in 2023 to support their system of Student Performance Measures.

EA is a 501(c)(3) non-profit organization headquartered in Madison, Wisconsin, and employs approximately one hundred research scientists, programmers, data engineers, data strategists, and support staff. EA's areas of expertise include student growth metrics, human capital analytics, predictive analytics, technical assistance, data preparation and reporting services, and more. Our deeply knowledgeable and experienced team not only offers a full

range of education analytics knowledge to our partners to support new systems, but also strives to co-build each system with stakeholders to match the available data and meet the desired policy requirements.