Istation

Linking NWEA MAP Reading to ISIP Reading

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Executive Summary

This study provides the proficiency projection of Istation's Indicators of Progress (ISIP™) Reading on the NWEA MAP Reading assessments for kindergarten through eighth grade. Classification accuracy is also provided. The analytic sample consisted of students in kindergarten through eighth grade in four school districts located in California, New Mexico, and Texas in the 2021–2022 school year. There were 1,867 students from District A; 3,898 students from District B; 1,770 students from District C; and 20,729 students from District D, accounting for a total of 28,264 students. Students took ISIP Reading at the beginning-of-the-year (BOY), middle-of-the-year (MOY), and end-of-the-year (EOY) assessment months and took NWEA MAP in the fall, winter, and spring assessment months.

The Pearson product-moment correlations of ISIP MOY and NWEA MAP Reading at winter benchmarking range from 0.59 to 0.83, and for ISIP EOY and NWEA MAP Reading at spring benchmarking, from 0.66 to 0.83. They indicate strong relationships between the ISIP Reading and the NWEA MAP Reading assessments.

The linking study between NWEA MAP and ISIP Reading was conducted using multinomial logistic regression. At MOY, students had to be between the 25th and 50th percentile ranks to achieve the NWEA MAP Average level. In order to attain the NWEA MAP High category, students had to be between the 85th and 99th percentile ranks on ISIP. At EOY, students had to be between the 20th and 40th percentile ranks to reach the NWEA MAP Average category, whereas percentile ranks between the 85th and 99th were needed to reach the NWEA MAP High category. In general, these findings suggest that high performance on ISIP is required to attain high scores on NWEA MAP.

Classification accuracy analyses were conducted. At MOY, the percentage of students correctly classified on ISIP Reading with respect to the NWEA MAP was approximately 79% across grades: 70% of students who performed below the cut point on ISIP Reading did not meet Average or above on the NWEA MAP, and 85% of students who performed above the cut point on ISIP Reading met Average or above on the NWEA MAP. ISIP Reading accurately predicted meeting ELA proficiency on the NWEA MAP about 80% of the time at MOY.

At EOY, the percentage of students correctly classified on the ISIP Reading with respect to the NWEA MAP was approximately 76% across grades: 74% of students who performed below the cut point on ISIP Reading did not meet Average or above on the

NWEA MAP, and 80% of students who performed above the cut point on ISIP Reading met Average or above on the NWEA MAP. ISIP Reading accurately predicted meeting ELA proficiency on the NWEA MAP about 80% of the time at EOY.

Introduction

This study provides the proficiency projection of Istation's Indicators of Progress (ISIP) Reading observed scores on the NWEA MAP Reading scores for kindergarten through eighth grade. Students took these two assessments during the same school year, and a correlational study and classification accuracy were also conducted.

Because students take ISIP Reading assessments monthly or three times per year under benchmarking assessment months and take NWEA MAP Reading three times per year under benchmarking assessment months, it is helpful to conduct a linking study between ISIP Reading and NWEA MAP Reading. Teachers and school administrators can use this information to prepare students for NWEA MAP Reading in the spring.

There are several linking studies we have conducted, such as linking ISIP assessments with STAAR (Patarapichayatham et al., 2013), Virginia SOL (Campbell, Sutter & Lambie, 2019), Ohio AIR (LePlante, 2019), Renaissance STAR (Campbell, Sutter, Lambie & Tinstman Jones, 2019), CMAS ELA (Patarapichayatham, 2019), Georgia Milestones (Patarapichayatham, 2016), Idaho SAT (Wolfe & Ross, 2020), and PARCC (Cook & Ross, 2020). All information can be found on our website (www.istation.com).

Methodology

ISIP Reading Assessments

ISIP Reading assessments feature a computer-adaptive testing (CAT) algorithm that uses two-parameter Item Response Theory. ISIP gathers and reports frequent information about student progress in critical domains throughout and across academic years. ISIP accomplishes this by delivering monthly tests that target critical areas to inform instruction. Student results are immediately available online for teachers and administrators, illustrating each student's past and present performance and skill growth. Teachers are alerted when students are not making adequate progress so that the instructional program can be modified before a pattern of failure becomes established (Mathes et al., 2015).

ISIP Reading measures students' ability and identifies deficits in critical areas to provide continuous differentiated instruction. ISIP Reading is available for prekindergarten through eighth grade students. Istation provides teachers and other school personnel with easy-to-interpret, web-based reports detailing student strengths and deficits and links to teaching resources and targeted intervention strategies (Istation, 2022). ISIP Reading uses a vertical scale that assumes student proficiency increases across different grade levels from prekindergarten through eighth grade, and it reports scaled scores ranging between 100 and 900. There are five performance levels for ISIP Reading:

- Level 1: at or below the 20th percentile rank
- Level 2: between the 21st and 40th percentile rank
- Level 3: between the 41st and 60th percentile rank
- Level 4: between the 61st and 80th percentile rank
- Level 5: above the 80th percentile rank

NWEA MAP Reading Assessments

NWEA MAP Reading tests are vertically scaled interim assessments administered in CAT mode. NWEA MAP Reading is constructed to measure student achievements in kindergarten through grade 12 and is aligned with Common Core State Standards (CCSS). NWEA MAP Reading scores are reported with the Rasch Unit (RIT) scale ranging from 100 to 350. There are three benchmarking assessment months: fall, winter, and spring. Because we focus the linking study on winter and spring benchmarking assessment months, Table 1 shows cut scores at these two assessment months. Because NWEA MAP Reading does not have performance levels like a state summative test, NWEA conducts linking studies between NWEA MAP Reading and individual state summative tests. In general, students are classified into three performance categories: "Low" if they are in the 1st to 39th percentile ranks, "Average" if their abilities fall into the 40th to 79th percentile ranks, and "High" if they obtain the 80th percentile rank or higher.

Table 1. *NWEA MAP Reading Cut Scores and Performance Categories by Grade*

Grade	Low (Winter)	Average (Winter)	High (Winter)	Low (Spring)	Average (Spring)	High (Spring)
Kindergarten	<143	143-155	>155	≤149	150-162	>162
1	<163	163-176	>176	≤167	168-182	>182
2	<177	177-193	>193	≤181	182-198	>198
3	<190	190-206	>206	≤192	193-210	>210
4	<198	198-215	>215	≤200	201-218	>218
5	<205	205-221	>221	≤206	207-223	>223
6	<210	210-226	>226	≤210	211-227	>227
7	<213	213-230	>230	≤213	214-231	>231
8	<216	216-234	>234	≤216	217-234	>234

Analytic Sample

The analytic sample consisted of students who were in kindergarten through eighth grade in four school districts in California, New Mexico, and Texas in the 2021–2022 school year. There were 1,867 students from District A; 3,898 students from District B; 1,770 students from District C; and 20,729 in District D — accounting for a total of 28,264 students. The sample size by grade is available in Table 2. Students took ISIP reading in the beginning-of-the-year (BOY), middle-of-the-year (MOY), and end-of-the-year (EOY) assessment months, and they took the NWEA MAP in the fall, winter, and spring assessment months.

Table 2: *Combined Sample Size by Grade*

Grade	Combined Sample Size
K	3,643
1	3,876
2	4,409
3	3,309
4	3,536
5	3,101
6	2,188
7	2,334
8	2,228
Total	28,264

Table 3 provides a description of the demographics for gender and race/ethnicity by district. District A is in Texas, and there were 643 fourth graders, 421 fifth graders, 221 sixth graders, 301 seventh graders, and 281 eighth graders. District B is in New Mexico, and there were 1,199 kindergarteners; 1,139 first graders; 1,206 second graders; and 354 third graders. District C is in California, and there were 173 kindergarteners, 242 first graders, 301 second graders, 293 third graders, 304 fourth graders, 294 fifth graders, and 163 sixth graders. District D is also in Texas, and the sample was composed of 2,271 kindergarteners; 2,495 first graders; 2,542 second graders; 2,662 third graders; 2,589 fourth graders; 2,386 fifth graders; 1,804 sixth graders; 2,033 seventh graders; and 1,947 eighth graders.

Table 3. *Demographic Characteristics by District*

District	Demographic Characteristic	Percentage
A: *N = 1,867*	Gender: Female	49%
	Gender: Male	51%
	Race/Ethnicity: White/Non-Hispanic	30%
	Race/Ethnicity: African American or Black	15%
	Race/Ethnicity: Hispanic or Latino origin	35%
	Race/Ethnicity: Asian or Other	20%
B: *N = 3,898*	Gender: Female	46%
	Gender: Male	54%
	Race/Ethnicity: White/Non-Hispanic	29%
	Race/Ethnicity: African American or Black	2%
	Race/Ethnicity: Hispanic or Latino origin	58%
	Race/Ethnicity: Asian or Other	11%
C: *N = 1,770*	Gender: Female	53%
	Gender: Male	47%
	Race/Ethnicity: White/Non-Hispanic	2%
	Race/Ethnicity: African American or Black	5%
	Race/Ethnicity: Hispanic or Latino origin	91%
	Race/Ethnicity: Asian or Other	2%
D: *N = 20,729*	Gender: Female	49%
	Gender: Male	51%
	Race/Ethnicity: White/Non-Hispanic	15%
	Race/Ethnicity: African American or Black	4%
	Race/Ethnicity: Hispanic or Latino origin	78%
	Race/Ethnicity: Asian or Other	3%

Table 4 shows the mean scores of ISIP and the NWEA MAP by district and all four districts combined. Overall, students from combined districts had positive growth trajectories from the BOY to the MOY and EOY across all grades.

Table 4. *ISIP Reading and NWEA MAP Reading Mean Scores*

District	Grade	Sample size	ISIP BOY	ISIP MOY	ISIP EOY	MAP Fall	MAP Winter	MAP Spring
A	4	643	488.93	512.26	528.93	198.31	202.56	206.43
A	5	412	512.36	531.43	546.51	204.63	208.37	211.75
A	6	221	548.07	539.52	537.39	208.51	210.45	211.27
A	7	301	NA	567.90	556.52	213.52	214.98	216.39
A	8	281	NA	590.60	596.17	217.81	219.51	219.64
B	K	1,199	262.75	303.85	329.32	147.49	139.57	155.14
B	1	1,139	323.49	356.16	379.18	161.67	155.19	168.09
B	2	1,206	389.61	420.01	440.73	175.41	169.51	180.19
B	3	354	445.92	468.90	487.94	187.57	181.05	191.85
C	K	173	232.51	260.09	268.71	135.30	142.51	NA
C	1	242	295.33	310.72	338.34	148.21	155.48	NA
C	2	301	352.98	386.84	398.35	161.16	169.92	NA
C	3	293	414.61	432.62	446.40	177.94	182.23	NA
C	4	304	456.66	466.67	467.72	187.84	191.88	NA
C	5	294	478.01	484.60	501.15	195.31	198.65	NA
C	6	163	496.50	499.72	502.67	199.50	201.72	NA
D	K	2,271	238.68	284.52	322.67	136.48	144.83	151.21
D	1	2,495	306.48	343.99	375.35	152.06	159.14	165.06
D	2	2,542	358.54	387.82	413.20	164.69	170.85	175.55
D	3	2,662	409.64	436.32	458.35	179.72	186.68	190.87
D	4	2,589	456.44	484.66	499.35	191.53	195.63	199.49
D	5	2,386	491.13	512.18	527.41	199.43	202.62	206.57
D	6	1,804	518.64	530.42	548.30	203.51	206.42	209.49
D	7	2,033	534.38	547.93	570.31	206.88	208.32	210.85
D	8	1,947	565.98	580.15	583.20	210.12	212.74	216.16
Combined	K	3,643	247.67	290.72	323.62	140.11	143.05	152.57
Combined	1	3,876	311.84	346.40	374.55	154.85	157.79	166.01
Combined	2	4,049	367.63	397.24	421.64	167.70	170.40	177.05
Combined	3	3,309	414.23	439.70	461.11	180.44	185.68	190.99
Combined	4	3,536	462.83	489.03	503.06	192.57	196.57	200.89
Combined	5	3,092	492.49	513.31	527.93	199.73	203.02	207.36
Combined	6	2,188	517.57	529.15	544.54	203.72	206.51	209.68
Combined	7	2,335	534.38	550.65	568.51	207.73	209.19	211.58
Combined	8	2,228	565.98	581.69	584.93	211.12	213.59	216.61

Analyses

Our analytic plan first evaluated the Pearson product-moment correlation between ISIP Reading and the NWEA MAP Reading assessments. Then we used multinomial logistic regression to determine probabilities for reaching Average (AV) or

High (HI) on the NWEA MAP Reading. Finally, we conducted a classification accuracy to determine cut points that best predict whether or not the student will meet the Average (AV) or High (HI) level on the NWEA MAP Reading.

Linking Study Analysis

We used multinomial logistic regression to determine the probabilities of reaching the Average (AV) or High (HI) level on the NWEA MAP Reading. The ISIP scores are the predictor, and the NWEA MAP Reading performance levels are the outcome variable. Students who had ISIP scores between the 1st and 99th percentile ranks were included in the analysis. The model is fitted for each grade separately. A total of 20 ISIP Reading scaled scores in the MOY and EOY of kindergarten through eighth grades are selected, corresponding to the 1st through 99th percentile ranks with an increment of five. For the outcome variable in the multinomial logistic regression, performance levels are defined by the NWEA MAP Reading proficiency cut points (see Table 1 above).

The probability of the NWEA MAP Reading Average (AV) or above is computed by adding the probabilities of the Average (AV) and High (HI) levels. The probability of the NWEA MAP Reading High (HI) level is the probability of this level itself. The analyses are computed using R software with the nnet package.

Classification Accuracy Analysis

Classification accuracy is a classification model. It measures the extent to which ISIP Reading scores accurately predicted whether students in the sample would achieve the Average (AV) level or higher on the NWEA MAP Reading.

Students were classified as “Not Proficient” or “Proficient” based on their NWEA MAP Reading scores. They were also classified as “Not Proficient” or “Proficient” based on their ISIP Reading scores. Table 5 shows a classification of students based on their observed ISIP Reading scores and status on their NWEA MAP Reading. Students classified in the true negative (TN) category were those both predicted to be Not Proficient based on the ISIP Reading cut scores and also classified as Observed Not Proficient based on the NWEA MAP Reading cut scores. Students classified in the true positive (TP) category were those both predicted to be Proficient based on the ISIP Reading cut scores and also classified as Observed Proficient based on the NWEA MAP

Reading cut scores. Students classified in the false positive (FP) category were those both predicted to be Proficient based on the ISIP Reading cut scores and classified as Observed Not Proficient based on the NWEA MAP Reading cut scores. Students classified in the false negative (FN) category were those both predicated to be Not Proficient based on the ISIP Reading cut scores and classified as Observed Proficient based on the NWEA MAP Reading cut scores. The overall classification accuracy was computed as the proportion of correct classifications among the entire sample by (TP+TN) / (TP+TN+FP+FN).

Table 5. *Performance Classification Based on ISIP Reading and NWEA MAP Reading Scores*

Performance Classification	Not Proficient (MAP)	Proficient (MAP)
Observed Not Proficient (ISIP)	True Negative	False Negative
Observed Proficient (ISIP)	False Positive	True Positive

We conducted classification accuracy of ISIP cut scores at the 30th, 35th, 40th, 45th, 50th, 55th, 60th, 65th, 70th, 75th, and 80th percentiles and NWEA MAP Reading Average (AV) level or higher. The area under the curve (AUC), sensitivity (TN), specificity (TP), FP, FN, and the overall rate were computed and compared to determine the best ISIP Reading cut point to identify students who would most likely meet the Average (AV) level or higher on the NWEA MAP Reading in the winter and spring benchmark periods.

Results

Correlational Study

The Pearson product-moment correlations of ISIP MOY scores and NWEA MAP Reading winter benchmarking RIT scores and of ISIP EOY scores and NWEA MAP Reading spring benchmarking RIT scores are conducted and shown in Table 4. In the MOY, the correlations range from 0.59 to 0.83, indicating strong relationships between ISIP Reading and the NWEA MAP Reading assessments once students take ISIP Reading at the MOY and NWEA MAP Reading in the winter benchmarking assessment month. At EOY, the correlations were slightly higher than MOY. They range from 0.66 to 0.83, indicating strong relationships between ISIP Reading and the NWEA MAP Reading assessments when students take both assessments in spring.

Table 6. *Pearson Product-Moment Correlations of ISIP Reading and NWEA MAP Reading*

Grade	ISIP MOY & NWEA MAP Winter	ISIP EOY & NWEA MAP Spring
Kindergarten	0.59	0.81
1	0.74	0.83
2	0.78	0.81
3	0.82	0.82
4	0.83	0.81
5	0.79	0.78
6	0.78	0.72
7	0.76	0.66
8	0.76	0.73

Linking Study: ISIP at MOY and NWEA MAP at Winter Benchmarking

Tables 7 to 11 are concordance tables derived from statistical linking procedures that directly link ISIP Reading scores and NWEA MAP Reading assessment levels. Concordance tables provide helpful information for educators, parents, administrators, researchers, and policymakers to evaluate students' academic performance.

Kindergarteners who attained an ISIP Reading score around 294 (35th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score around 366 (90th percentile rank), they are likely to achieve the NWEA MAP High level.

First grade students who attained an ISIP Reading score of around 365 (50th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score around 453 (95th percentile rank), they are projected to achieve the NWEA MAP High level.

Second grade students who attained an ISIP Reading score around 430 (50th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score around 566 (99th percentile rank), they are projected to achieve the NWEA MAP High level.

Third grade students who attained an ISIP Reading score around 460 (40th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score around 548 (90th percentile rank), they are projected to achieve the NWEA MAP High level.

Fourth grade students who attained an ISIP Reading score around 485 (30th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score around 578 (85th percentile rank) or higher, they are projected to achieve the NWEA MAP High level.

Fifth grade students who attained an ISIP Reading score around 513 (30th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score of around 612 (85th percentile rank), they are projected to achieve the NWEA MAP High level.

Sixth grade students who attained an ISIP Reading score around 543 (35th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score around 651 (90th percentile rank) or higher, they are projected to achieve the NWEA MAP High level.

Seventh grade students who attained an ISIP Reading score around 554 (25th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score of around 675 (85th percentile rank), they are projected to achieve the NWEA MAP High level.

Eighth grade students who attained an ISIP Reading score of around 583 (25th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score of about 713 (85th percentile rank), they are projected to achieve the NWEA MAP High level.

In order to attain the NWEA MAP Average level, kindergarteners had to be at the 35th percentile rank, first graders at the 50th, second graders at the 55th, and third graders at the 40th percentile. Kindergarten students had to be at the 90th percentile or higher to achieve the NWEA MAP High level. Students in higher grades had different cut points for achieving the NWEA MAP Average level: 30th percentile rank for fourth and fifth grades, 35th percentile rank for sixth grade, and 25th percentile rank for seventh and eighth grades. To achieve the NWEA MAP High level, grades 4 and above had to attain the 85th percentile rank or higher. This was consistent across the older grades except for sixth grade, where a 90th percentile rank was needed to achieve the NWEA MAP High level.

Table 7. *Kindergarten and First Grade Proficiency Projection for ISIP at MOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
K	226	5	0.193	No	0.005	No
K	247	10	0.271	No	0.012	No
K	261	15	0.334	No	0.021	No
K	271	20	0.384	No	0.032	No
K	279	25	0.428	No	0.044	No
K	287	30	0.474	No	0.060	No
K	294	35	0.515	Yes	0.077	No
K	300	40	0.552	Yes	0.095	No
K	306	45	0.589	Yes	0.117	No
K	311	50	0.620	Yes	0.138	No
K	317	55	0.657	Yes	0.167	No
K	322	60	0.687	Yes	0.193	No
K	328	65	0.723	Yes	0.229	No
K	334	70	0.757	Yes	0.269	No
K	340	75	0.789	Yes	0.312	No
K	347	80	0.824	Yes	0.366	No
K	356	85	0.863	Yes	0.439	No
K	366	90	0.900	Yes	0.521	Yes
K	383	95	0.945	Yes	0.653	Yes
K	419	99	0.987	Yes	0.851	Yes
1	275	5	0.050	No	0.000	No
1	297	10	0.098	No	0.001	No
1	311	15	0.147	No	0.002	No
1	321	20	0.193	No	0.004	No
1	330	25	0.245	No	0.007	No
1	338	30	0.298	No	0.011	No
1	345	35	0.350	No	0.016	No
1	352	40	0.407	No	0.023	No
1	358	45	0.458	No	0.031	No
1	365	50	0.520	Yes	0.045	No
1	371	55	0.573	Yes	0.059	No
1	378	60	0.634	Yes	0.081	No
1	384	65	0.685	Yes	0.105	No
1	391	70	0.740	Yes	0.139	No
1	399	75	0.797	Yes	0.186	No
1	408	80	0.851	Yes	0.250	No
1	418	85	0.899	Yes	0.333	No
1	432	90	0.945	Yes	0.462	No
1	453	95	0.981	Yes	0.652	Yes
1	495	99	0.998	Yes	0.893	Yes

Table 8. *Second and Third Grades Proficiency Projection for ISIP at MOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
2	321	5	0.024	No	0.000	No
2	348	10	0.059	No	0.000	No
2	366	15	0.105	No	0.001	No
2	379	20	0.156	No	0.001	No
2	389	25	0.208	No	0.002	No
2	399	30	0.271	No	0.004	No
2	407	35	0.331	No	0.006	No
2	415	40	0.396	No	0.010	No
2	423	45	0.466	No	0.015	No
2	430	50	0.529	Yes	0.021	No
2	437	55	0.591	Yes	0.030	No
2	444	60	0.652	Yes	0.041	No
2	452	65	0.716	Yes	0.058	No
2	459	70	0.766	Yes	0.077	No
2	467	75	0.817	Yes	0.103	No
2	477	80	0.869	Yes	0.146	No
2	487	85	0.909	Yes	0.201	No
2	501	90	0.949	Yes	0.295	No
2	522	95	0.981	Yes	0.468	No
2	566	99	0.998	Yes	0.798	Yes
3	363	5	0.035	No	0.000	No
3	392	10	0.094	No	0.002	No
3	410	15	0.169	No	0.005	No
3	423	20	0.248	No	0.010	No
3	434	25	0.333	No	0.018	No
3	443	30	0.413	No	0.028	No
3	452	35	0.498	No	0.042	No
3	460	40	0.575	Yes	0.059	No
3	467	45	0.641	Yes	0.077	No
3	474	50	0.702	Yes	0.098	No
3	481	55	0.758	Yes	0.124	No
3	489	60	0.813	Yes	0.158	No
3	496	65	0.853	Yes	0.191	No
3	504	70	0.891	Yes	0.234	No
3	512	75	0.921	Yes	0.281	No
3	522	80	0.948	Yes	0.344	No
3	533	85	0.968	Yes	0.417	No
3	548	90	0.984	Yes	0.520	Yes
3	572	95	0.996	Yes	0.673	Yes
3	626	99	1.000	Yes	0.895	Yes

Table 9. *Fourth and Fifth Grades Proficiency Projection for ISIP at MOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
4	408	5	0.043	No	0.000	No
4	435	10	0.118	No	0.000	No
4	452	15	0.210	No	0.001	No
4	465	20	0.309	No	0.004	No
4	476	25	0.412	No	0.008	No
4	485	30	0.503	Yes	0.014	No
4	493	35	0.585	Yes	0.022	No
4	501	40	0.663	Yes	0.034	No
4	509	45	0.734	Yes	0.052	No
4	516	50	0.789	Yes	0.073	No
4	524	55	0.842	Yes	0.104	No
4	531	60	0.880	Yes	0.139	No
4	539	65	0.915	Yes	0.190	No
4	547	70	0.941	Yes	0.252	No
4	556	75	0.963	Yes	0.333	No
4	566	80	0.978	Yes	0.435	No
4	578	85	0.989	Yes	0.562	Yes
4	593	90	0.996	Yes	0.707	Yes
4	616	95	0.999	Yes	0.863	Yes
4	661	99	1.000	Yes	0.976	Yes
5	432	5	0.041	No	0.000	No
5	461	10	0.118	No	0.001	No
5	479	15	0.215	No	0.002	No
5	492	20	0.315	No	0.005	No
5	504	25	0.426	No	0.011	No
5	513	30	0.517	Yes	0.018	No
5	522	35	0.607	Yes	0.029	No
5	531	40	0.691	Yes	0.044	No
5	539	45	0.758	Yes	0.063	No
5	547	50	0.815	Yes	0.087	No
5	555	55	0.862	Yes	0.118	No
5	563	60	0.899	Yes	0.156	No
5	571	65	0.928	Yes	0.202	No
5	580	70	0.952	Yes	0.264	No
5	589	75	0.969	Yes	0.334	No
5	600	80	0.983	Yes	0.429	No
5	612	85	0.991	Yes	0.538	Yes
5	629	90	0.997	Yes	0.681	Yes
5	653	95	0.999	Yes	0.834	Yes
5	702	99	1.000	Yes	0.966	Yes

Table 10. *Sixth and Seventh Grades Proficiency Projection for ISIP at MOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
6	453	5	0.047	No	0.000	No
6	480	10	0.117	No	0.001	No
6	498	15	0.206	No	0.002	No
6	512	20	0.299	No	0.006	No
6	523	25	0.390	No	0.010	No
6	533	30	0.480	No	0.016	No
6	543	35	0.573	Yes	0.026	No
6	552	40	0.653	Yes	0.039	No
6	560	45	0.719	Yes	0.053	No
6	568	50	0.777	Yes	0.072	No
6	576	55	0.827	Yes	0.095	No
6	585	60	0.873	Yes	0.127	No
6	593	65	0.905	Yes	0.162	No
6	602	70	0.933	Yes	0.207	No
6	612	75	0.956	Yes	0.266	No
6	622	80	0.971	Yes	0.333	No
6	635	85	0.984	Yes	0.429	No
6	651	90	0.993	Yes	0.552	Yes
6	675	95	0.998	Yes	0.720	Yes
6	721	99	1.000	Yes	0.912	Yes
7	476	5	0.083	No	0.000	No
7	506	10	0.187	No	0.002	No
7	526	15	0.300	No	0.005	No
7	541	20	0.407	No	0.010	No
7	554	25	0.508	Yes	0.018	No
7	565	30	0.595	Yes	0.028	No
7	576	35	0.677	Yes	0.042	No
7	585	40	0.738	Yes	0.058	No
7	595	45	0.797	Yes	0.081	No
7	604	50	0.842	Yes	0.106	No
7	612	55	0.875	Yes	0.134	No
7	621	60	0.906	Yes	0.170	No
7	630	65	0.931	Yes	0.213	No
7	640	70	0.951	Yes	0.267	No
7	650	75	0.967	Yes	0.329	No
7	662	80	0.979	Yes	0.410	No
7	675	85	0.988	Yes	0.501	Yes
7	692	90	0.995	Yes	0.619	Yes
7	717	95	0.998	Yes	0.766	Yes
7	764	99	1.000	Yes	0.923	Yes

Table 11. *Eighth Grade Proficiency Projection for ISIP at MOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
8	496	5	0.127	No	0.001	No
8	530	10	0.260	No	0.004	No
8	552	15	0.385	No	0.009	No
8	569	20	0.495	No	0.017	No
8	583	25	0.588	Yes	0.027	No
8	595	30	0.664	Yes	0.041	No
8	606	35	0.728	Yes	0.057	No
8	617	40	0.784	Yes	0.078	No
8	627	45	0.829	Yes	0.102	No
8	636	50	0.863	Yes	0.127	No
8	646	55	0.894	Yes	0.161	No
8	656	60	0.920	Yes	0.201	No
8	665	65	0.938	Yes	0.241	No
8	676	70	0.956	Yes	0.297	No
8	687	75	0.969	Yes	0.358	No
8	699	80	0.980	Yes	0.429	No
8	713	85	0.988	Yes	0.515	Yes
8	730	90	0.994	Yes	0.617	Yes
8	756	95	0.998	Yes	0.751	Yes
8	805	99	1.000	Yes	0.907	Yes

Linking Study: ISIP at EOY and NWEA MAP at Spring Benchmarking

Kindergarteners who attained an ISIP Reading score of around 307 (25th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score of about 375 (80th percentile rank), they are projected to achieve the NWEA MAP High level.

First grade students who attained an ISIP Reading score around 374 (35th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score around 456 (85th percentile rank), they are projected to achieve the NWEA MAP High level.

Second grade students who attained an ISIP Reading score of around 440 (40th percentile rank) or higher are projected to achieve an NWEA MAP Average level or

higher. If they attain an ISIP Reading score around 594 (99th percentile rank), they are projected to achieve the NWEA MAP High level.

Third grade students who attained an ISIP Reading score around 458 (30th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score around 571 (90th percentile rank), they are projected to achieve the NWEA MAP High level.

Fourth grade students who attained an ISIP Reading score around 490 (25th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score around 598 (85th percentile rank) or higher, they are projected to achieve the NWEA MAP High level.

Fifth grade students who attained an ISIP Reading score around 514 (25th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score of around 627 (85th percentile rank), they are projected to achieve the NWEA MAP High level.

Sixth grade students who attained an ISIP Reading score of 536 (25th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score around 667 (90th percentile rank) or higher, they are projected to achieve the NWEA MAP High level.

Seventh grade students who attained an ISIP Reading score around 553 (20th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score of around 733 (95th percentile rank), they are projected to achieve the NWEA MAP High level.

Eighth grade students who attained an ISIP Reading score around 579 (20th percentile rank) or higher are projected to achieve an NWEA MAP Average level or higher. If they attain an ISIP Reading score around 745 (90th percentile rank) or higher, they are projected to achieve the NWEA MAP High level.

Overall, to achieve the NWEA MAP Average level, kindergarten and fourth through eighth grade students had to be at 25th percentile rank or higher, third graders at or above the 30th percentile rank, first graders at or above the 35th percentile rank, and second graders at or above the 45th percentile rank. To attain the NWEA MAP High level, the following percentile ranks were needed: 80th for kindergarten, 85th for first grade, 99th for second grade, 90th for third grade, 85th for fourth grade, 85th for fifth grade, 90th for sixth grade, 95th for seventh grade, and 90th for eighth grade.

Table 12. *Kindergarten and First Grade Proficiency Projection for ISIP at EOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
K	245	5	0.080	No	0.001	No
K	270	10	0.200	No	0.005	No
K	286	15	0.333	No	0.014	No
K	297	20	0.447	No	0.028	No
K	307	25	0.559	Yes	0.050	No
K	315	30	0.647	Yes	0.077	No
K	322	35	0.718	Yes	0.107	No
K	328	40	0.772	Yes	0.140	No
K	334	45	0.820	Yes	0.179	No
K	340	50	0.861	Yes	0.223	No
K	345	55	0.890	Yes	0.264	No
K	351	60	0.918	Yes	0.319	No
K	356	65	0.937	Yes	0.367	No
K	362	70	0.954	Yes	0.427	No
K	368	75	0.968	Yes	0.488	No
K	375	80	0.979	Yes	0.558	Yes
K	383	85	0.987	Yes	0.635	Yes
K	393	90	0.994	Yes	0.720	Yes
K	410	95	0.998	Yes	0.833	Yes
K	451	99	1.000	Yes	0.960	Yes
1	292	5	0.029	No	0.000	No
1	317	10	0.085	No	0.000	No
1	333	15	0.163	No	0.001	No
1	346	20	0.261	No	0.002	No
1	356	25	0.359	No	0.004	No
1	365	30	0.459	No	0.008	No
1	374	35	0.564	Yes	0.015	No
1	382	40	0.653	Yes	0.025	No
1	389	45	0.725	Yes	0.038	No
1	396	50	0.787	Yes	0.056	No
1	404	55	0.846	Yes	0.085	No
1	411	60	0.887	Yes	0.119	No
1	419	65	0.923	Yes	0.170	No
1	427	70	0.949	Yes	0.235	No
1	435	75	0.968	Yes	0.313	No
1	445	80	0.983	Yes	0.425	No
1	456	85	0.992	Yes	0.556	Yes
1	470	90	0.997	Yes	0.709	Yes
1	491	95	0.999	Yes	0.868	Yes
1	532	99	1.000	Yes	0.978	Yes

Table 13. *Second and Third Grades Proficiency Projection for ISIP at EOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
2	335	5	0.015	No	0.000	No
2	367	10	0.054	No	0.000	No
2	387	15	0.116	No	0.001	No
2	401	20	0.189	No	0.002	No
2	413	25	0.278	No	0.004	No
2	423	30	0.368	No	0.007	No
2	432	35	0.459	No	0.011	No
2	440	40	0.543	Yes	0.017	No
2	448	45	0.624	Yes	0.024	No
2	455	50	0.691	Yes	0.033	No
2	462	55	0.751	Yes	0.044	No
2	469	60	0.803	Yes	0.058	No
2	477	65	0.853	Yes	0.077	No
2	484	70	0.887	Yes	0.097	No
2	492	75	0.919	Yes	0.125	No
2	501	80	0.945	Yes	0.163	No
2	511	85	0.965	Yes	0.213	No
2	525	90	0.982	Yes	0.298	No
2	546	95	0.994	Yes	0.451	No
2	594	99	1.000	Yes	0.784	Yes
3	371	5	0.052	No	0.000	No
3	402	10	0.137	No	0.001	No
3	422	15	0.241	No	0.004	No
3	436	20	0.342	No	0.008	No
3	448	25	0.442	No	0.015	No
3	458	30	0.531	Yes	0.024	No
3	467	35	0.609	Yes	0.035	No
3	475	40	0.676	Yes	0.048	No
3	483	45	0.736	Yes	0.064	No
3	491	50	0.790	Yes	0.084	No
3	499	55	0.836	Yes	0.108	No
3	506	60	0.869	Yes	0.134	No
3	514	65	0.901	Yes	0.167	No
3	523	70	0.929	Yes	0.211	No
3	532	75	0.950	Yes	0.261	No
3	542	80	0.967	Yes	0.323	No
3	555	85	0.981	Yes	0.413	No
3	571	90	0.991	Yes	0.528	Yes
3	596	95	0.998	Yes	0.696	Yes
3	653	99	1.000	Yes	0.920	Yes

Table 14. *Fourth and Fifth Grades Proficiency Projection for ISIP at EOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
4	419	5	0.084	No	0.000	No
4	448	10	0.207	No	0.001	No
4	465	15	0.326	No	0.003	No
4	479	20	0.446	No	0.007	No
4	490	25	0.547	Yes	0.014	No
4	500	30	0.637	Yes	0.023	No
4	509	35	0.711	Yes	0.035	No
4	517	40	0.769	Yes	0.049	No
4	525	45	0.820	Yes	0.069	No
4	533	50	0.862	Yes	0.095	No
4	541	55	0.896	Yes	0.128	No
4	549	60	0.924	Yes	0.169	No
4	557	65	0.945	Yes	0.218	No
4	565	70	0.961	Yes	0.277	No
4	575	75	0.976	Yes	0.360	No
4	586	80	0.986	Yes	0.461	No
4	598	85	0.993	Yes	0.573	Yes
4	614	90	0.997	Yes	0.709	Yes
4	638	95	0.999	Yes	0.856	Yes
4	685	99	1.000	Yes	0.971	Yes
5	440	5	0.077	No	0.000	No
5	470	10	0.197	No	0.003	No
5	488	15	0.321	No	0.007	No
5	502	20	0.441	No	0.015	No
5	514	25	0.552	Yes	0.026	No
5	524	30	0.642	Yes	0.040	No
5	533	35	0.716	Yes	0.057	No
5	542	40	0.781	Yes	0.080	No
5	550	45	0.830	Yes	0.105	No
5	559	50	0.875	Yes	0.138	No
5	567	55	0.907	Yes	0.174	No
5	575	60	0.931	Yes	0.216	No
5	584	65	0.953	Yes	0.269	No
5	593	70	0.968	Yes	0.328	No
5	603	75	0.980	Yes	0.400	No
5	614	80	0.988	Yes	0.482	No
5	627	85	0.994	Yes	0.579	Yes
5	643	90	0.997	Yes	0.690	Yes
5	669	95	0.999	Yes	0.828	Yes
5	719	99	1.000	Yes	0.955	Yes

Table 15. *Sixth and Seventh Grades Proficiency Projection for ISIP at EOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
6	462	5	0.105	No	0.001	No
6	491	10	0.227	No	0.004	No
6	509	15	0.341	No	0.009	No
6	524	20	0.455	No	0.016	No
6	536	25	0.551	Yes	0.026	No
6	547	30	0.636	Yes	0.039	No
6	556	35	0.702	Yes	0.052	No
6	565	40	0.760	Yes	0.069	No
6	574	45	0.811	Yes	0.090	No
6	583	50	0.853	Yes	0.115	No
6	591	55	0.885	Yes	0.140	No
6	600	60	0.913	Yes	0.174	No
6	608	65	0.934	Yes	0.207	No
6	617	70	0.952	Yes	0.250	No
6	627	75	0.966	Yes	0.302	No
6	638	80	0.978	Yes	0.364	No
6	651	85	0.987	Yes	0.443	No
6	667	90	0.993	Yes	0.542	Yes
6	692	95	0.998	Yes	0.687	Yes
6	739	99	1.000	Yes	0.874	Yes
7	484	5	0.169	No	0.002	No
7	516	10	0.305	No	0.008	No
7	537	15	0.422	No	0.015	No
7	553	20	0.519	Yes	0.025	No
7	566	25	0.598	Yes	0.037	No
7	578	30	0.668	Yes	0.051	No
7	588	35	0.721	Yes	0.066	No
7	598	40	0.770	Yes	0.083	No
7	608	45	0.812	Yes	0.104	No
7	617	50	0.846	Yes	0.126	No
7	626	55	0.875	Yes	0.150	No
7	635	60	0.899	Yes	0.178	No
7	645	65	0.922	Yes	0.212	No
7	655	70	0.940	Yes	0.249	No
7	665	75	0.954	Yes	0.290	No
7	677	80	0.968	Yes	0.343	No
7	690	85	0.978	Yes	0.404	No
7	707	90	0.987	Yes	0.488	No
7	733	95	0.995	Yes	0.613	Yes
7	781	99	0.999	Yes	0.800	Yes

Table 16. *Eighth Grade Proficiency Projection for ISIP at EOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
8	503	5	0.153	No	0.002	No
8	539	10	0.328	No	0.009	No
8	561	15	0.474	No	0.020	No
8	579	20	0.600	Yes	0.035	No
8	593	25	0.691	Yes	0.051	No
8	606	30	0.765	Yes	0.070	No
8	618	35	0.822	Yes	0.092	No
8	628	40	0.861	Yes	0.113	No
8	639	45	0.896	Yes	0.140	No
8	649	50	0.921	Yes	0.168	No
8	659	55	0.941	Yes	0.198	No
8	669	60	0.956	Yes	0.232	No
8	679	65	0.968	Yes	0.269	No
8	689	70	0.976	Yes	0.309	No
8	700	75	0.984	Yes	0.356	No
8	713	80	0.989	Yes	0.414	No
8	727	85	0.994	Yes	0.478	No
8	745	90	0.997	Yes	0.561	Yes
8	771	95	0.999	Yes	0.674	Yes
8	820	99	1.000	Yes	0.835	Yes

Classification Accuracy

Classification accuracy was conducted to predict whether students in the sample would achieve Average level or higher on the NWEA MAP Reading. A higher classification accuracy rate indicates stronger congruence between ISIP Reading and NWEA MAP assessments. We conducted a classification accuracy for kindergarten through eighth grade ISIP Reading at MOY, ISIP Reading at EOY, and NWEA MAP of Average level and higher. Classification accuracy analyses were performed to determine ISIP cut points that could help differentiate students who would or would not attain Average or High levels on the NWEA MAP. Table 17 shows the sample breakdown of MAP levels by benchmark period and grade.

Table 17. *Percentage of Students in MAP Levels by Benchmark Period and Grade*

Benchmark Period	Grade	Low MAP Level	Average MAP Level	High MAP Level
MOY	Kindergarten	53%	33%	14%
MOY	1	77%	19%	4%
MOY	2	64%	31%	5%
MOY	3	55%	34%	11%
MOY	4	48%	39%	13%
MOY	5	49%	39%	12%
MOY	6	52%	39%	9%
MOY	7	53%	38%	9%
MOY	8	49%	41%	10%
EOY	Kindergarten	41%	36%	23%
EOY	1	67%	27%	6%
EOY	2	57%	37%	6%
EOY	3	47%	41%	12%
EOY	4	41%	46%	13%
EOY	5	40%	45%	15%
EOY	6	44%	43%	13%
EOY	7	46%	43%	11%
EOY	8	42%	44%	14%

We conducted classification accuracy of ISIP cut scores at the 30th, 35th, 40th, 45th, 50th, 55th, 60th, 65th, 70th, 75th, and 80th percentiles and NWEA MAP Average level or higher. The area under the curve (AUC), sensitivity, specificity, positive predictive power, negative predictive power, and the overall rate were computed and compared to determine the best ISIP Reading cut point to identify students who would most likely meet the Average level or higher on the NWEA MAP. Results show that the best cut scores vary by grade on ISIP at MOY and EOY.

Table 18 shows results at the MOY: the AUC ranged from 0.70 to 0.83, indicating that the percentage of students correctly classified on ISIP Reading with respect to the NWEA MAP was approximately 76% across grades. Sensitivity ranged from 0.69 to 0.83, indicating that about 74% of students who performed below the cut point on ISIP Reading did not meet the Average level or above on the NWEA MAP. The specificity ranged from 0.71 to 0.89, indicating that approximately 80% of students who performed above the cut point on ISIP Reading were likely to meet the Average level or above on the NWEA MAP. ISIP Reading accurately predicted meeting proficiency on the NWEA MAP about 80% of the time at the MOY.

Table 18. *Classification Accuracy Indices at MOY*

Grade	Cut Point	AUC	Sensitivity	Specificity
Kindergarten	35th	0.70	0.69	0.71
1	45th	0.75	0.76	0.74
2	40th	0.82	0.83	0.81
3	35th	0.83	0.81	0.84
4	35th	0.83	0.80	0.85
5	30th	0.83	0.83	0.82
6	30th	0.83	0.83	0.88
7	30th	0.81	0.75	0.87
8	30th	0.78	0.68	0.89

Table 19 shows results at EOY: the AUC ranged from 0.76 to 0.84, indicating that the percentage of students correctly classified on ISIP Reading with respect to the NWEA MAP was approximately 80% across grades. Sensitivity ranged from 0.66 to 0.81, indicating that approximately 74% of students who performed below the cut point on ISIP Reading did not meet the Average level or above on the NWEA MAP. The specificity ranged from 0.74 to 0.94, indicating that approximately 84% of students who performed above the cut point on ISIP Reading were likely to meet the Average level or above on the NWEA MAP. ISIP Reading accurately predicted meeting proficiency on the NWEA MAP about 80% of the time at the EOY.

Table 19. *Classification Accuracy Indices at EOY*

Grade	Cut point	AUC	Sensitivity	Specificity
Kindergarten	30th	0.81	0.77	0.85
1	40th	0.76	0.79	0.74
2	40th	0.84	0.80	0.88
3	30th	0.82	0.81	0.84
4	30th	0.81	0.80	0.83
5	30th	0.82	0.78	0.86
6	30th	0.83	0.80	0.86
7	30th	0.80	0.70	0.89
8	30th	0.80	0.66	0.94

This study demonstrates how ISIP scores predict students' performance on the NWEA MAP in reading. Results vary by grade and by benchmarking assessment months. Students in performance level 2 or higher are projected to achieve the NWEA

MAP Average level or higher. However, they have to be in performance level 4 or 5 (at or above the 61st percentile) to achieve the NWEA MAP High level.

The results confirm a positive relationship between the ISIP Reading and NWEA MAP Reading assessments. While these results are promising, it must be understood that predicting a student's achievement on the NWEA MAP Reading assessment is not a certainty, as a student's score may be affected by other factors that may not be reflected in their reading ability as measured by ISIP Reading..

References

Campbell, L.O., Sutter, C. C., & Lambie, G. W. (2019). Predictability of Istation's Indicators of Progress scores on students' Virginia Standard of Learning scores: Grades 3 through 8. University of Central Florida. www.istation.com

Campbell, L.O., Sutter, C. C., Lambie G. W., & Tinstman Jones, J. (2019). Measuring the predictability of Istation's Indicators of Progress Early Reading (ISIP ER) scores on Renaissance STAR Reading® scores. University of Central Florida. www.istation.com

Cook, M., & Ross, S. (2020). PARCC predictability study – 3rd grade. Johns Hopkins University. www.istation.com/studies

Istation. (2022). Technical manual: Istation's Indicators of Progress (ISIP) Reading: computer adaptive testing system for continuous progress monitoring of reading for students prekindergarten through grade 8. Dallas, TX: Istation.

LePlante, J. (2019). Predictability study of Istation ISIP (Math and Reading) and Ohio AIR (Math and English Language Arts) tests for 3rd-8th grade students in the Youngstown City School District. Youngstown City Schools. www.istation.com/studies

Mathes, P. (2011). Technical manual: Istation's Indicators of Progress, Advanced Reading: Computer adaptive testing system for continuous progress monitoring of reading growth for students grade 4 through grade 8. Dallas, TX: Istation.

Mathes, P., Torgesen, J., & Herron, J. (2015). Technical manual: Istation's Indicators of Progress, Early Reading: Computer adaptive testing system for continuous progress monitoring of reading growth for students pre–K to grade 3.

Patarapichayatham, C., Fahle, W., & Roden, T. R. (2013). ISIP Reading versus STAAR Reading: The predictability study. Dallas, TX: Istation.

Patarapichayatham, C. (2019). Linking the Colorado Measures of Academic Success English Language Arts (CMAS ELA) assessments to ISIP Reading assessments grades 3 through 5. Southern Methodist University. www.istation.com/studies

Patarapichayatham, C. (2016). Predictability Study of ISIP Reading and Georgia Milestones Assessment System: 3rd – 6th Grade Students. Southern Methodist University. www.istation.com/studies

Thum, Y. M., & Kuhfeld, M. (2020). NWEA 2020 MAP Growth achievement status and growth norms tables for students and schools. NWEA Research Report. Portland, OR: NWEA.

Wolfe, E., & Ross, S. (2020). Linking Istation ISIP Early Reading with the Idaho ISAT. Johns Hopkins University. www.istation.com/studies