FAST™ Custom Benchmarks with State Accountability Tests

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Fastbridge researchers developed custom benchmarks for FAST™ aReading and FAST™ aMath to support decisions about who is and is not on track meet state accountability assessments targets. This document describes the method used to identify the benchmarks and provides the benchmark scores associated with each of three probabilities, 75%, 50%, and 25% of meeting or exceeding the proficiency achievement level on state reading and math assessments in Grades 3 – 8. Currently, these benchmarks are available only from this report and in select states including Illinois, Minnesota, Michigan, New York, and Wisconsin. This information can supplement, but it not intended to replace the research-based national benchmarks provided in the FAST™ system. Those benchmarks were developed to support MTSS implementation and resource allocation; whereas the custom state benchmarks should be limited to evaluating the status and progress of an entire grade of students relative to state expectations.

Method

A statistical model called logistic regression was used to identify the cut scores. The model generates the probability of meeting a specific score (e.g., the score associated with proficiency) on the state test for each score on the aReading (or aMath) test. This is accomplished by predicting each student's spring state test scores using their fall, winter, and spring FAST scores. From the full set of probabilities, the score associated with the each of three probabilities 0.25, 0.50, and 0.75 was identified. Separate analyses were conducted for each grade and season.

The probabilities can also be interpreted as odds. For instance, the cut score associated with a 75% probability indicates that a student with that score has 3 to 1 odds of scoring at or above proficient on the state test. FAST™ scores above that cut score are associated with higher odds, and scores below that cut score are associated with lower odds.

The three FAST™ cut-scores provided in the tables below result in four subgroups.

- Students with scores below the 25% cut score have less than 1 in 3 odds and are at high risk of not meeting expectations on the state test
- Students with scores between the 25% and 50% cut score have from 1 in 3 odds to even odds and are at high to moderate risk of not meeting expectations on the state test
- Students with scores between the 50% and 75% cut score have from even odds to 3 to 1 odds and are at moderate to low risk of not meeting expectations on the state test

- Students with scores above the 75% cut score have greater than 3 to 1 odds and are at low risk of not meeting expectations on the state test

As an illustration of the logistic model, Figure 1 shows the logistic regression plot of the probability of meeting expectations on the PARCC math test relative to fall FAST™ aMath scores for Grade 5 students. The probability of meeting expectations on PARCC increases as the FAST™ aMath score increases. The red horizonal line is plotted at the 0.75 (75%) probability. The red vertical line shows the corresponding FAST™ aMath score (223). Note in Table 2 a fall FAST™ aMath score of 223 corresponds to a 75% probability of meeting expectations on the PARCC test.

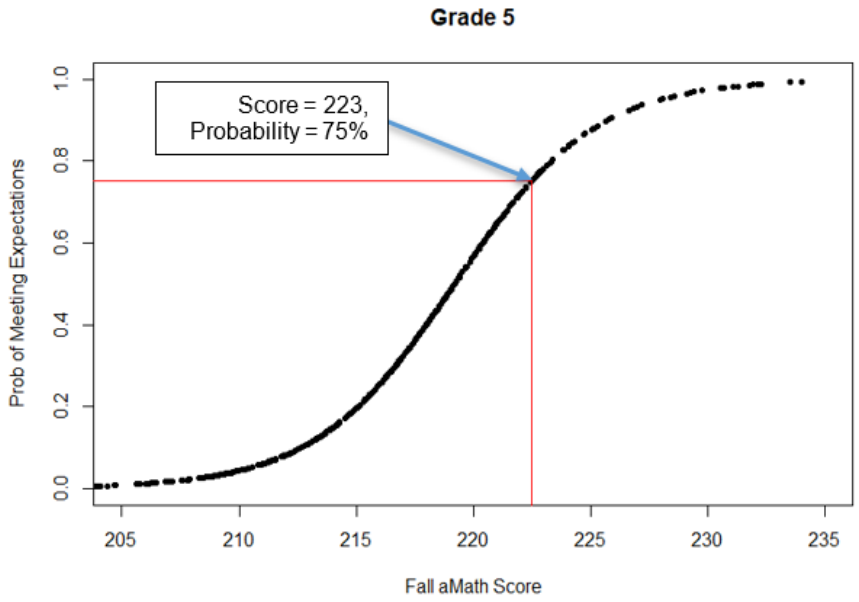

Figure 1. Probability of meeting expectations on PARCC math in Grade 5.

Results

The custom benchmarks reported in the tables below are based on data from various school districts for 2016-17, 2017-18, and/or 2018-19 school years. Each table shows the FAST™ aReading (or FAST™ aMath) score, labeled "Cut Score" corresponding to a given probability of meeting expectations on the state test. Cut scores for fall, winter, and spring screening are provided.

The strength of the association between FAST™ aReading (or FAST™ aMath) and state scaled scores is indicated by the Pearson correlation coefficient, labeled "Corr." in the tables. Correlation coefficients range from -1 to +1. The National Center on Intensive Intervention (NCII) accepts coefficients in the .70s as indicative of a strong association and coefficients in the .80s a very strong association.

All predictions contain some error; thus, it is helpful to use other indices such as a metric known at the area under the curve (AUC) to interpret the results. The AUC ranges from 0.5 (chance classification) to 1.0 (excellent classification). AUC's greater than .80 are considered very good by NCII. The AUC tends to increase as the correlation increases, but it is also affected by the percent of students meeting the cut-score.

Custom state benchmarks in grades K-2 are estimated values derived from a downward projection of aReading and aMath scores that followed a stepwise procedure.

- The Spring cut score in a prior grade (e.g., Grade 2) was set equal to the fall cut score in the subsequent grade (e.g., Grade 3) because growth tends to be flat across the summer.
- The winter cut scores was determined by subtracting the average winter to spring growth rate (i.e, the 50^{th} national aggregate growth percentile) from the spring benchmark score.
- The fall cut scores was determined by subtracting the average fall to winter growth rate from the spring benchmark score.
- This procedure was repeated in each grade, K, 1, and 2.

Note: the seasonal growth was based on the national daily growth rates multiplie by 121 days.

Illinois (PARCC)

Table 1. Custom Benchmarks between FAST™ aReading and PARCC Reading

Grade	Season	FAST™ aReading Cut Score			Number of Students	Corr.	AUC
		25%	50%	75%			
K	Fall	*419*	*429*	*439*	---	---	---
	Winter	*426*	*436*	*446*	---	---	---
	Spring	*434*	*444*	*454*	---	---	---
1	Fall	*442*	*452*	*462*	---	---	---
	Winter	*449*	*459*	*469*	---	---	---
	Spring	*457*	*467*	*477*	---	---	---
2	Fall	*464*	*474*	*484*	---	---	---
	Winter	*472*	*482*	*492*	---	---	---
	Spring	*479*	*489*	*499*	---	---	---
3	Fall	487	497	507	1,412	.75	.87
	Winter	494	504	515	1,438	.73	.86
	Spring	504	512	519	1,443	.78	.90
4	Fall	494	504	514	2,146	.76	.88
	Winter	501	511	521	2,171	.75	.89
	Spring	509	518	526	2,174	.78	.90
5	Fall	507	518	529	2,211	.73	.86
	Winter	514	524	534	2,244	.76	.87
	Spring	520	528	536	2,254	.76	.90
6	Fall	515	527	539	2,200	.68	.84
	Winter	521	531	541	2,198	.71	.85
	Spring	527	537	547	2,187	.73	.86
7	Fall	515	526	538	3,018	.73	.85
	Winter	520	531	542	3,014	.73	.85
	Spring	526	536	546	3,032	.76	.87
8	Fall	523	534	546	2,624	.72	.85
	Winter	528	538	548	2,629	.73	.86
	Spring	533	542	552	2,628	.74	.87

Illinois (PARCC)

Table 2. Custom Benchmarks between FAST™ aMath and PARCC Math

Grade	Season	FAST™ aMath Cut Score			Number of Students	Corr.	AUC
		25%	50%	75%			
K	Fall	175	179	184	---	---	---
	Winter	178	182	187	---	---	---
	Spring	181	185	190	---	---	---
1	Fall	184	188	193	---	---	---
	Winter	187	191	196	---	---	---
	Spring	190	194	199	---	---	---
2	Fall	192	196	201	---	---	---
	Winter	195	199	204	---	---	---
	Spring	198	202	207	---	---	---
3	Fall	201	205	210	1,416	.72	.88
	Winter	206	210	213	1,454	.80	.87
	Spring	209	212	215	1,457	.83	.90
4	Fall	210	213	216	2,154	.77	.89
	Winter	213	216	219	2,189	.80	.90
	Spring	217	221	225	2,191	.84	.91
5	Fall	214	218	222	2,209	.79	.90
	Winter	219	223	227	2,253	.80	.90
	Spring	223	226	229	2,267	.83	.95
6	Fall	218	223	226	2,191	.78	.91
	Winter	223	227	231	2,200	.83	.93
	Spring	226	230	234	2,188	.86	.95
7	Fall	222	226	231	3,018	.83	.90
	Winter	225	229	234	3,030	.85	.91
	Spring	228	231	235	3,027	.86	.94
8	Fall	225	229	234	2,624	.78	.91
	Winter	228	231	235	2,633	.81	.94
	Spring	229	233	236	2,619	.82	.94

Michigan (M-STEP)

Table 3. Custom Benchmarks between FAST™ aReading and M-STEP Reading

Grade	Season	FAST™ aReading Cut Score			Number of Students	Corr.	AUC
		25%	50%	75%			
K	Fall	414	426	438	---	---	---
	Winter	421	433	445	---	---	---
	Spring	429	441	453	---	---	---
1	Fall	437	449	461	---	---	---
	Winter	444	456	468	---	---	---
	Spring	452	464	476	---	---	---
2	Fall	459	471	483	---	---	---
	Winter	467	479	491	---	---	---
	Spring	474	486	498	---	---	---
3	Fall	482	494	506	4,958	.66	.83
	Winter	494	503	513	5,058	.69	.84
	Spring	504	510	516	5,094	.73	.89
4	Fall	492	502	512	5,697	.73	.86
	Winter	501	510	519	5,769	.72	.86
	Spring	510	515	521	5,742	.81	.92
5	Fall	506	515	525	6,185	.72	.86
	Winter	512	520	527	6,194	.74	.88
	Spring	518	525	531	6,311	.80	.92
6	Fall	514	525	536	3,262	.72	.84
	Winter	516	526	539	3,515	.64	.84
	Spring	524	532	540	3,554	.78	.90
7	Fall	521	529	537	3,511	.77	.88
	Winter	524	532	540	3,633	.77	.89
	Spring	526	534	542	3,616	.80	.90
8	Fall	523	532	542	3,684	.74	.88
	Winter	529	538	548	3,805	.74	.87
	Spring	533	542	551	3,836	.80	.89

Michigan (M-STEP)

Table 4. Custom Benchmarks between FAST™ aMath and M-STEP Math

Grade	Season	FAST™ aMath Cut Score			Number of Students	Corr.	AUC
		25%	50%	75%			
K	Fall	174	178	182	---	---	---
	Winter	177	181	185	---	---	---
	Spring	180	184	188	---	---	---
1	Fall	183	187	191	---	---	---
	Winter	186	190	194	---	---	---
	Spring	189	193	197	---	---	---
2	Fall	191	195	199	---	---	---
	Winter	194	198	202	---	---	---
	Spring	197	201	205	---	---	---
3	Fall	200	204	208	4,940	.70	.89
	Winter	206	208	211	5,067	.79	.91
	Spring	209	211	213	5,067	.86	.94
4	Fall	208	211	214	5,704	.73	.89
	Winter	211	213	216	5,776	.77	.89
	Spring	215	217	220	5,742	.88	.95
5	Fall	214	218	221	6,184	.79	.91
	Winter	219	222	226	6,202	.85	.93
	Spring	222	225	229	6,337	.86	.94
6	Fall	219	223	228	3,366	.84	.91
	Winter	222	226	230	3,511	.84	.92
	Spring	225	228	232	3,516	.88	.94
7	Fall	221	225	229	3,508	.85	.92
	Winter	226	229	233	3,642	.86	.94
	Spring	229	232	235	3,567	.85	.95
8	Fall	227	230	234	3,711	.84	.94
	Winter	230	233	237	3,803	.82	.93
	Spring	230	234	237	3,745	.83	.93

Minnesota (MCA-III)

Table 5. Custom Benchmarks between FAST™ aReading and MCA-III Reading

Grade	Season	FAST™ aReading Cut Score			Number of Students	Corr.	AUC
		25%	50%	75%			
K	Fall	415	424	432	---	---	---
	Winter	422	431	439	---	---	---
	Spring	430	439	447	---	---	---
1	Fall	438	447	455	---	---	---
	Winter	445	454	462	---	---	---
	Spring	453	462	470	---	---	---
2	Fall	460	469	477	---	---	---
	Winter	468	477	485	---	---	---
	Spring	475	484	492	---	---	---
3	Fall	483	492	500	3,592	.81	.91
	Winter	496	503	510	2,726	.82	.91
	Spring	500	506	512	2,799	.84	.92
4	Fall	497	504	512	3,572	.80	.90
	Winter	507	512	518	2,771	.82	.91
	Spring	510	516	521	2,778	.83	.92
5	Fall	499	507	515	3,414	.78	.92
	Winter	508	514	521	2,473	.83	.92
	Spring	510	516	522	2,571	.85	.93
6	Fall	511	519	527	2,492	.78	.90
	Winter	515	523	531	2,523	.79	.90
	Spring	515	523	532	2,554	.77	.91
7	Fall	521	529	538	886	.79	.90
	Winter	526	534	542	878	.82	.91
	Spring	528	533	539	398	.83	.95
8	Fall	526	534	542	873	.74	.88
	Winter	532	541	549	678	.78	.89
	Spring	532	541	549	386	.83	.95

Minnesota (MCA-III)

Table 6. Custom Benchmarks between FAST™ aMath and MCA-III Math

Grade	Season	FAST™ aMath Cut Score			Number of Students	Corr.	AUC
		25%	50%	75%			
K	Fall	173	177	180	---	---	---
	Winter	176	180	183	---	---	---
	Spring	179	183	186	---	---	---
1	Fall	182	186	189	---	---	---
	Winter	185	189	192	---	---	---
	Spring	188	192	195	---	---	---
2	Fall	190	194	197	---	---	---
	Winter	193	197	200	---	---	---
	Spring	196	200	203	---	---	---
3	Fall	199	203	206	3,385	.75	.89
	Winter	204	207	210	2,476	.77	.90
	Spring	206	209	211	2,035	.82	.93
4	Fall	203	207	211	3,531	.74	.89
	Winter	208	211	214	2,756	.77	.90
	Spring	210	213	216	2,253	.89	.95
5	Fall	211	216	220	3,393	.79	.89
	Winter	216	220	224	2,176	.84	.93
	Spring	219	222	226	2,059	.86	.95
6	Fall	216	220	225	2,271	.80	.90
	Winter	220	223	227	1,936	.87	.94
	Spring	223	226	229	1,945	.88	.95
7	Fall	220	225	229	641	.81	.90
	Winter	223	226	229	302	.89	.95
	Spring	225	228	231	296	.89	.96
8	Fall	220	222	225	298	.84	.95
	Winter	---	---	---	---	---	---
	Spring	221	225	228	300	.85	.95

New York (NYST)

Table 7. Custom Benchmarks between FAST™ aReading and NYST Reading

Grade	Season	FAST™ aReading Cut Score			Number of Students	Corr.	AUC
		25%	50%	75%			
K	Fall	416	430	445	---	---	---
	Winter	423	437	452	---	---	---
	Spring	431	445	460	---	---	---
1	Fall	439	453	468	---	---	---
	Winter	446	460	475	---	---	---
	Spring	454	468	483	---	---	---
2	Fall	461	475	490	---	---	---
	Winter	469	483	498	---	---	---
	Spring	476	490	505	---	---	---
3	Fall	484	498	513	122	.63	.82
	Winter	497	508	519	126	.76	.84
	Spring	508	515	522	126	.81	.88
4	Fall	502	511	521	138	.75	.90
	Winter	511	518	526	141	.77	.91
	Spring	519	525	532	142	.78	.93
5	Fall	519	529	539	108	.77	.87
	Winter	525	536	546	109	.77	.86
	Spring	532	540	550	109	.80	.88
6	Fall	---	---	---	---	---	---
	Winter	---	---	---	---	---	---
	Spring	---	---	---	---	---	---
7	Fall	520	529	538	124	.77	.89
	Winter	523	533	541	126	.71	.87
	Spring	528	537	545	126	.75	.87
8	Fall	542	550	556	117	.73	.91
	Winter	546	555	563	121	.68	.86
	Spring	550	559	567	121	.71	.88

New York (NYST)

Table 8. Custom Benchmarks between FAST™ aMath and NYST Math

Grade	Season	FAST™ aMath Cut Score			Number of Students	Corr.	AUC
		25%	50%	75%			
K	Fall	176	179	182	---	---	---
	Winter	179	182	185	---	---	---
	Spring	182	185	188	---	---	---
1	Fall	185	188	191	---	---	---
	Winter	188	191	194	---	---	---
	Spring	191	194	197	---	---	---
2	Fall	193	196	199	---	---	---
	Winter	196	199	202	---	---	---
	Spring	199	202	205	---	---	---
3	Fall	202	205	208	126	.77	.86
	Winter	206	209	212	129	.79	.88
	Spring	210	213	215	129	.83	.90
4	Fall	212	214	216	137	.82	.93
	Winter	215	216	218	140	.88	.95
	Spring	218	220	223	142	.90	.97
5	Fall	216	220	223	106	.78	.90
	Winter	221	223	226	109	.83	.94
	Spring	226	228	231	110	.86	.96
6	Fall	---	---	---	---	---	---
	Winter	---	---	---	---	---	---
	Spring	---	---	---	---	---	---
7	Fall	220	224	229	122	.82	.92
	Winter	226	228	231	122	.83	.94
	Spring	227	230	233	120	.85	.96
8	Fall	224	230	236	118	.82	.85
	Winter	228	233	237	118	.81	.90
	Spring	231	235	240	116	.83	.90

Wisconsin (Forward Exam)

Table 9. Custom Benchmarks between FAST™ aReading and Forward Exam Reading

Grade	Season	FAST™ aReading Cut Score			Number of Students	Corr.	AUC
		25%	50%	75%			
K	Fall	420	426	433	---	---	---
	Winter	427	433	440	---	---	---
	Spring	435	441	448	---	---	---
1	Fall	443	449	456	---	---	---
	Winter	450	456	463	---	---	---
	Spring	458	464	471	---	---	---
2	Fall	465	471	478	---	---	---
	Winter	473	479	486	---	---	---
	Spring	480	486	493	---	---	---
3	Fall	488	494	501	3,288	.77	.90
	Winter	---	---	---	---	---	---
	Spring	500	505	511	3,313	.79	.91
4	Fall	501	508	516	3,882	.73	.88
	Winter	---	---	---	---	---	---
	Spring	510	515	521	3,947	.76	.91
5	Fall	507	516	526	3,693	.75	.86
	Winter	---	---	---	---	---	---
	Spring	516	522	529	3,753	.77	.89
6	Fall	519	526	533	3,368	.76	.89
	Winter	---	---	---	---	---	---
	Spring	524	530	537	3,451	.79	.90
7	Fall	518	528	537	5,821	.71	.84
	Winter	---	---	---	---	---	---
	Spring	524	533	541	5,870	.73	.87
8	Fall	536	545	554	5,321	.66	.85
	Winter	---	---	---	---	---	---
	Spring	542	551	560	5,351	.68	.86

Wisconsin (Forward Exam)

Table 10. Custom Benchmarks between FAST™ aMath and Forward Math

Grade	Season	FAST™ aMath Cut Score			Number of Students	Corr.	AUC
		25%	50%	75%			
K	Fall	174	177	180	---	---	---
	Winter	177	180	183	---	---	---
	Spring	180	183	186	---	---	---
1	Fall	183	186	189	---	---	---
	Winter	186	189	192	---	---	---
	Spring	189	192	195	---	---	---
2	Fall	191	194	197	---	---	---
	Winter	194	197	200	---	---	---
	Spring	197	200	203	---	---	---
3	Fall	200	203	206	3,265	.71	.89
	Winter	---	---	---	---	---	---
	Spring	205	207	210	3,304	.74	.90
4	Fall	203	207	211	3,882	.60	.85
	Winter	---	---	---	---	---	---
	Spring	208	212	216	3,938	.74	.90
5	Fall	207	211	215	3,645	.76	.89
	Winter	---	---	---	---	---	---
	Spring	212	217	221	3,750	.80	.93
6	Fall	209	215	220	3,378	.77	.86
	Winter	---	---	---	---	---	---
	Spring	217	222	227	3,442	.83	.90
7	Fall	220	224	229	5,781	.71	.89
	Winter	---	---	---	---	---	---
	Spring	225	229	233	5,825	.80	.91
8	Fall	226	230	234	5,346	.77	.89
	Winter	---	---	---	---	---	---
	Spring	231	235	239	5,354	.77	.92