education
analytics

INTRODUCTION TO THE SOUTH CAROLINA ADDED-VALUE GROWTH MODEL

Overview

For the purpose of school report cards, the state of South Carolina is transitioning from a value-added (VA) school growth model to an added-value (AV) school growth model. While either model can be implemented in a norm-referenced or a criterion-referenced framework, the new AV model will be criterion-referenced. In the criterion-referenced AV model, students are classified based on the extent to which their growth crosses a threshold set using growth in the past rather than in comparison to each others' growth in the present. More about the reasoning behind the approach and methodology can be found in the South Carolina Education Oversight Committee's (EOC) description of the model (tables from the EOC report will be shared in this document as well).

In a given school year, school districts will receive targets for every student in their district at the beginning of the school year. Each student will have two targets – one for average growth and one for "added" growth. The targets for added growth are based on what is needed to get all students to meet grade-level expectations in ELA and math by the end of 8th grade. Therefore, the growth targets are larger for students with lower prior achievement.

At the end of the school year, districts will be scored based on the extent to which students achieve their growth targets. More points are awarded for attaining added growth rather than average growth and for students with lower prior achievement (though the exact scoring approach has not been finalized by the EOC).

Model Specifications

The 2023 student growth targets for each subject are set for students based on their performance on the 2022 SC READY assessment in the same subject. As stated above, the added-value model sets two targets for students based on their prior SC READY performance:

- Average, or median, annual target (MAT) – set at the 50th percentile of historical growth for each grade and subject
- Added-value target (AVT) – set between the 55th and 80th percentile of historical growth based on the prior year's score and performance category, as seen in Table 1.

MAT and AVT scores for all ELA and math pre-test scores are shown at the end of the document in Table 2. Note that the targets will look different than what was published by the EOC earlier this year. There are a couple explanations for this, including additional data and

updated methodology. The updated targets are based on an additional year of data, specifically the growth from 2021 SC READY to 2022 SC READY. And these targets were created from a more complex statistical model called quantile regression (described further in the next section).

Table 1. Percentile Ranks Used to Set Added-Value Targets (AVTs) for Growth at Various Prior Achievement Levels *(note that this is Table 4 from the EOC report)*

Current Grade Level:	4th Grade	5th Grade	6th Grade	7th Grade	8th Grade
Exceeds					
Prior ELA score range:	540 – 825	593 – 850	653 – 875	668 – 900	705 – 925
Prior Math score range:	544 – 825	563 – 850	622 – 875	628 – 900	650 – 925
AV growth target based on historical percentile:	**55**				
Meets					
Prior ELA score range:	452 – 539	509 – 592	558 – 652	576 – 667	615 – 704
Prior Math score range:	438 – 543	482 – 562	536 – 621	543 – 627	578 – 649
AV growth target based on historical percentile:	**60**				
Approaches 2					
Prior ELA score range:	408 – 451	464 – 508	504 – 557	516 – 575	562 – 614
Prior Math score range:	402 – 437	441 – 481	490 – 535	498 – 542	531 – 577
AV growth target based on historical percentile:	**65**				
Approaches 1					
Prior ELA score range:	359 – 407	419 – 463	450 – 503	455 – 515	512 – 561
Prior Math score range:	360 – 401	402 – 440	448 – 489	454 – 497	488 – 530
AV growth target based on historical percentile:	**70**				
Does Not Meet 2					
Prior ELA score range:	314 – 358	356 – 418	405 – 449	412 – 454	462 – 511
Prior Math score range:	313 – 359	366 – 401	411 – 447	414 – 453	451 – 487
AV growth target based on historical percentile:	**75**				
Does Not Meet 1					
Prior ELA score range:	100 – 313	100 – 355	100 – 404	100 – 411	100 – 461
Prior Math score range:	100 – 312	100 – 365	100 – 410	100 – 413	100 – 450
AV growth target based on historical percentile:	**80**				

QUANTILE REGRESSION

The data set used to measure the historical percentiles of growth is one that pools three years of past growth on the SC READY assessment:

- growth from the 2016-17 SC READY to the 2017-18 SC READY;
- growth from the 2017-18 SC READY to the 2018-19 SC READY; and
- growth from the 2020-21 SC READY to the 2021-22 SC READY.

The historical percentiles of growth are estimated over this data set using quantile regression. Quantile regression creates a prediction for any percentile of growth among students with a given assessment score. The prediction is based not only on students with exactly that score, but also students with scores near that score. This increases the number of students used to measure the historical percentile, which makes the percentile more precise and more useful for setting targets for gain in the present and future.

The quantile regression is estimated separately for each grade and subject. It is also estimated separately for each percentile of gain. Historical percentiles of gain are estimated for the 50th, 55th, 60th, 65th, 70th, 75th, and 80th percentiles.

DECISION RULES AND INCLUSION IN THE DATA FILE

PowerSchool student enrollment files determine which students are included in districts' student target files. The rosters for all districts were pulled on October 19, 2022, which is the latest 45 day count day for any South Carolina school district. Since student inclusion in the file is based on 2022-23 enrollment, students who may have tested in a different district in 2021 or 2022 will be included in the file.

Note that all 4th-8th grade students enrolled in the district are included in the file, regardless of whether they have a prior SC READY score. Fourth-grade students without a prior score appear first in the file, therefore the names at the beginning of the file may have many empty columns. Please scroll down to get to the 4th grade students who do have prior SC READY scores and 2023 SC READY targets.

A 2022 SC READY score is necessary to receive target scores for 2023 SC READY, and only students in grades 3-8 will take the 2023 SC READY. Therefore, only current 4th-8th grade students will receive targets. Note that students who have repeated a grade will receive a target associated with the grade they are enrolled in in the current school year.

If students are linked to multiple schools in PowerSchool or took SC READY multiple times in 2022, there will be duplicates in the file. The highest test score was chosen as the primary score and any duplicates will be placed in a secondary tab in the student target file.

Using the MAT and AVT Lookup Table (Table 2)

To identify an individual student's target score for the next SC READY administration, first round their vertical scale score from the prior year (whether ELA or math) *down* to the nearest multiple of 10 and find that score in the gray, center column of Table 2. For ELA, look to the left on that row to the student's current grade level to find growth targets for this year's test. The target is to be added on top of last year's score (an example is given in the next paragraph). Follow the same procedure for math but look to the right to the current grade level to find growth targets for this year's test. The minimum vertical scale score point gains that are needed to meet the MAT goal are shown in the unshaded column and gains needed to meet the AVT goal are shown in the shaded column.

It is by design that MATs and AVTs are assigned based on rounded down scores and that all students whose prior year scores round down to the same score are assigned the same target gains. The result of this design feature is that the performance level of a student's original (unrounded) scale score may not be the same as the performance level associated with their rounded down score.

Take this example (which is the same example that is in the EOC report). Imagine that Anna is in 5th grade and scored 419 on the ELA SC READY last year. Anna's score falls within the Appr1 range (for which growth targets are typically set to 70th percentile gains). However, since the rounded score of 410 falls within the DNM2 range, Anna's growth target is based on 75th percentile gains. Table 2 indicates that MAT = 50 and AVT = 89 for Anna. Thus, if Anna scores 469 or higher (i.e., her prior year score of 419 plus her MAT of 50) on the ELA SC READY in 5th grade, she will earn at least one point for her school in the accountability system. If Anna scores 508 or higher (i.e., 419 + 89) on the 5th grade ELA test, she will earn additional points for meeting her AVT.

Table 2. Median annual target (MAT) and Added-Value target (AVT) Lookup Table *(note that this is an updated version of Table 5 from the [EOC report](#))*

Growth Targets for ELA SC READY										Prior Year Score	Growth Targets for Math SC READY									
Grade 4		Grade 5		Grade 6		Grade 7		Grade 8			Grade 4		Grade 5		Grade 6		Grade 7		Grade 8	
MAT	AVT	MAT	AVT	MAT	AVT	MAT	AVT	MAT	AVT		MAT	AVT	MAT	AVT	MAT	AVT	MAT	AVT	MAT	AVT
226	307	338	438	285	327	264	387	334	339	100	256	302	265	301	285	363	318	342	327	334
212	278	309	393	269	307	264	387	327	332	110	240	282	258	292	278	348	308	335	326	334
202	260	291	365	258	294	264	387	322	327	120	229	268	252	285	273	338	301	329	324	332
192	244	273	340	247	281	264	387	315	320	130	218	255	245	278	267	327	294	323	321	329
181	228	257	316	235	269	264	387	308	314	140	207	242	238	270	260	315	285	315	317	326
171	214	241	293	224	256	264	387	300	308	150	196	229	230	261	252	304	277	307	312	321
160	201	225	273	213	243	264	387	292	300	160	185	217	222	252	243	291	268	299	306	315
150	188	211	254	201	231	264	387	283	292	170	173	204	213	243	234	279	259	290	299	309
140	177	197	237	190	219	264	387	273	284	180	162	192	204	234	225	267	249	280	292	302

Growth Targets for ELA SC READY										Prior Year Score	Growth Targets for Math SC READY									
Grade 4		Grade 5		Grade 6		Grade 7		Grade 8			Grade 4		Grade 5		Grade 6		Grade 7		Grade 8	
MAT	AVT	MAT	AVT	MAT	AVT	MAT	AVT	MAT	AVT		MAT	AVT	MAT	AVT	MAT	AVT	MAT	AVT	MAT	AVT
130	167	184	221	178	207	250	353	263	275	190	152	181	194	224	215	254	239	271	283	294
120	158	171	206	167	195	237	327	253	266	200	141	170	185	214	205	242	229	260	274	286
111	149	160	193	156	184	225	303	242	256	210	131	160	175	204	194	229	219	250	265	277
102	142	148	181	145	173	213	280	231	246	220	121	150	165	195	183	216	208	239	255	267
94	136	138	170	134	162	201	259	220	236	230	111	141	155	185	172	204	198	228	244	258
86	130	128	161	123	152	189	240	208	225	240	102	132	145	175	161	191	187	218	233	247
79	125	119	152	113	142	177	222	197	215	250	94	124	135	166	149	179	176	207	222	237
73	121	111	144	103	133	165	206	185	204	260	86	117	125	157	138	167	166	196	210	226
68	118	103	138	94	124	154	191	174	193	270	78	111	116	148	127	155	155	185	199	216
63	116	96	132	85	115	143	177	162	183	280	72	106	107	140	116	144	145	174	187	205
60	114	89	126	76	108	133	165	151	172	290	66	102	98	132	105	133	135	164	175	194
58	113	83	122	68	100	123	153	139	162	300	61	99	90	125	94	123	125	153	163	183
57	113	78	118	60	94	113	143	128	152	310	56	96	83	119	84	113	115	143	152	173
57	101	73	115	53	88	104	135	118	142	320	53	85	76	113	74	103	106	134	140	163
58	102	68	112	46	82	95	127	107	133	330	50	84	69	108	64	95	97	125	129	153
59	103	65	110	41	78	88	120	97	124	340	48	83	64	104	55	87	88	116	118	143
61	104	62	108	35	74	80	114	87	116	350	46	82	59	101	47	79	80	108	107	134
62	96	59	96	31	71	74	110	78	108	360	45	73	55	99	39	73	72	100	97	125
63	98	57	94	27	68	68	106	70	100	370	43	71	52	88	32	67	64	93	88	117
63	99	55	93	24	67	63	102	62	94	380	41	69	50	87	26	63	58	87	79	110
64	100	53	92	22	66	59	100	55	88	390	39	68	49	88	21	59	51	82	71	103
65	102	51	91	21	66	56	98	48	83	400	38	67	48	88	16	56	46	77	63	97
67	92	50	89	20	58	54	97	42	79	410	36	57	48	79	12	54	41	73	57	92
68	94	48	78	21	59	52	87	38	75	420	34	56	48	80	10	45	37	63	51	88
70	96	47	77	21	60	52	87	34	73	430	32	55	48	81	8	45	33	61	46	84
72	97	45	76	22	62	51	87	31	72	440	31	46	48	81	7	45	30	59	42	82
73	98	44	76	23	54	51	87	29	71	450	30	45	48	70	7	37	27	57	40	81
74	90	43	75	24	55	50	79	28	72	460	29	44	47	69	7	37	25	48	38	72
74	89	42	63	24	56	50	78	28	64	470	28	44	47	68	7	37	23	47	37	72
74	89	42	63	25	57	49	77	29	66	480	27	43	46	68	7	37	21	45	37	73
74	89	42	62	25	57	48	76	30	69	490	26	42	45	60	7	30	19	44	37	65
74	89	42	62	26	57	48	74	31	71	500	25	41	45	60	6	30	18	35	37	66
74	89	42	56	27	49	47	73	32	72	510	24	40	45	60	5	30	16	34	38	66
73	88	42	56	27	50	47	66	33	65	520	23	39	45	61	4	29	15	33	38	67
73	88	42	56	28	50	47	66	34	65	530	22	38	45	62	3	29	14	32	38	67
72	80	41	56	29	50	46	66	34	65	540	21	37	45	62	2	19	13	31	38	58
70	78	40	55	29	50	46	66	35	65	550	20	28	45	62	1	18	11	23	37	58
69	76	39	53	29	43	46	65	35	65	560	19	28	45	62	1	17	10	22	36	57
67	73	37	51	29	42	45	65	36	59	570	18	28	44	54	1	16	8	21	36	57

Growth Targets for ELA SC READY										Prior Year Score	Growth Targets for Math SC READY									
Grade 4		Grade 5		Grade 6		Grade 7		Grade 8			Grade 4		Grade 5		Grade 6		Grade 7		Grade 8	
MAT	AVT	MAT	AVT	MAT	AVT	MAT	AVT	MAT	AVT		MAT	AVT	MAT	AVT	MAT	AVT	MAT	AVT	MAT	AVT
65	71	35	49	28	42	44	57	36	59	580	16	27	43	54	0	16	7	20	36	50
62	68	33	47	28	41	43	57	37	59	590	14	26	42	53	0	15	6	19	36	50
59	64	32	40	27	40	42	57	37	59	600	12	24	41	52	0	15	5	18	36	51
56	61	30	39	26	40	42	57	37	59	610	8	22	39	51	0	14	5	18	36	51
52	57	29	36	26	39	41	57	37	51	620	5	18	37	50	0	14	4	17	36	51
48	54	27	34	25	39	41	57	37	51	630	1	14	35	48	0	5	4	11	35	51
43	50	24	31	23	38	41	57	37	50	640	0	10	34	46	0	5	3	11	35	51
38	45	21	28	22	36	41	57	37	49	650	0	5	32	44	0	5	2	10	34	42
33	41	17	25	20	28	41	56	36	48	660	0	5	30	41	0	5	0	9	33	41
28	36	13	21	18	26	41	47	35	46	670	0	5	27	38	0	5	0	7	32	41
22	31	9	17	16	24	40	47	33	45	680	0	5	25	35	0	5	0	6	31	41
16	26	4	12	14	21	39	47	32	44	690	0	5	22	32	0	5	0	5	30	40
10	20	0	7	12	19	38	46	30	42	700	0	5	20	28	0	5	0	5	29	39
4	14	0	5	9	16	36	44	28	34	710	0	5	17	25	0	5	0	5	28	38
0	8	0	5	6	13	34	42	26	33	720	0	5	14	21	0	5	0	5	27	37
0	5	0	5	3	9	32	39	24	31	730	0	5	11	17	0	5	0	5	26	35
0	5	0	5	0	6	29	36	21	28	740	0	5	7	13	0	5	0	5	25	33
0	5	0	5	0	5	25	32	17	25	750	0	5	3	8	0	5	0	5	23	31
0	5	0	5	0	5	21	28	13	21	760	0	5	0	5	0	5	0	5	22	28
0	5	0	5	0	5	17	23	9	17	770	0	5	0	5	0	5	0	5	20	26
0	5	0	5	0	5	13	18	4	12	780	0	5	0	5	0	5	0	5	18	23
0	5	0	5	0	5	8	13	0	7	790	0	5	0	5	0	5	0	5	16	21
0	5	0	5	0	5	3	8	0	5	800	0	5	0	5	0	5	0	5	13	18
0	5	0	5	0	5	0	5	0	5	810	0	5	0	5	0	5	0	5	11	16
0	5	0	5	0	5	0	5	0	5	820	0	5	0	5	0	5	0	5	7	13
		0	5	0	5	0	5	0	5	830			0	5	0	5	0	5	4	11
		0	5	0	5	0	5	0	5	840			0	5	0	5	0	5	0	9
		0	5	0	5	0	5	0	5	850			0	5	0	5	0	5	0	7
				0	5	0	5	0	5	860					0	5	0	5	0	5
				0	5	0	5	0	5	870					0	5	0	5	0	5
						0	5	0	5	880							0	5	0	5
						0	5	0	5	890							0	5	0	5
						0	5	0	5	900							0	5	0	5
								0	5	910									0	5
								0	5	920									0	5