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Less Than Four Domains: Creating an Overall Composite Score as an Indicator of English Language Proficiency for English Learners with 504 or Individualized Education Plans

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Abstract

The authors illustrate models and procedures that can be applied to calculate overall composite scores in order to identify an indicator of English language proficiency, based on composite scores for English learners with 504 or individualized education plans who are missing one or more domain scores on the Assessing Comprehension and Communication in English State-to-State for English Language Learners assessment for state monitoring, achievement, and accountability determinations. As a technical reference, the appendix includes tables and statistical programming code used to compute the different methods. The analyses and results provide clear and concise frameworks for approaching accountability criteria and decisions.

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Students' overall composite scores on their English language proficiency assessments can be used to create an indicator that meets federal requirements under the Every Student Succeeds Act (ESSA) of 2015. However, if a student is exempted from part of an assessment because of a disability, reporting student progress can be challenging. This paper outlines methods WIDA states could use or adapt in their efforts to create overall composite scores for students who are missing one or more language assessment domains in order to identify their indicators.

ESSA defines an English learner (EL) as a student aged 3 years through 21 years enrolled or preparing to enroll in elementary or secondary school, whose difficulties in speaking, reading, writing, or understanding the English language may be sufficient to deny the individual (i) the ability to meet challenging state academic standards; (ii) the ability to achieve in classrooms where the language of instruction is English; or (iii) the opportunity to participate fully in society (ESSA Title 8, Section 8101(20)).[1]

Federal requirements under ESSA stipulate that states and districts within states must establish long-term and interim goals to demonstrate that ELs make annual gains in their progress toward English language proficiency (ESSA Title 1, Part A, Section 1111(b)(1)(F)). ESSA also requires states to identify an indicator for ELs that measures growth in the percentage of students making progress toward achieving English language proficiency (ESSA Title I, Part A, Section 1111(C)(4)(A)(ii)). Based on the current interpretations of federal law regarding long-term and interim English language growth, states must select an indicator and do the following:

1. Determine a scoring metric (EL indicator) and criterion to be used to measure growth,
2. Set the starting point for growth targets,
3. Set the ending point for growth targets,
4. Determine the amount of time needed for schools to get from the starting to ending targets, and
5. Establish an annual rate of growth.

This report focuses on Step 1. WIDA states can use overall composite scores on the WIDA Assessing Comprehension and Communication in English State-to-State for English Language Learners (ACCESS for ELLs) English language proficiency assessment to identify an EL

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[1] The definition of an EL also includes a student who was (i) not born in the United States or whose native language is other than English; (ii)(I) is a Native American or Alaska Native, or a native resident of the outlying areas; and (II) who comes from an environment where a language other than English has had a significant impact on the individual's level of English language proficiency; or (iii) is migratory, whose native language is a language other than English, and who comes from an environment where a language other than English is dominant.

indicator and measure changes in English language proficiency for students in their respective states. WIDA recommends states annually assess and score ELs in the four recognized domains of Listening, Speaking, Reading, and Writing. Almost all WIDA states use these domain scores to create some form of a weighted overall composite score to determine students' English language proficiency levels to monitor school and district accountability, attainment, and progress (Linquanti, Cook, Bailey, & MacDonald, R., 2016). The formula to calculate an overall composite score for ACCESS and Alternate ACCESS for ELLs is: 15% Listening + 15% Speaking + 35% Reading + 35% Writing. The overall composite score can then be matched to its corresponding English language proficiency level, which serves as an indicator for English lanauge proficiency.

Yet, some ELs with disabilities do not take all four domain tests. These students have individualized education plans (IEPs) or 504 plans. IEPs ensure specialized instruction for students with disabilities attending elementary or secondary school. 504 plans (29 U.S.C. § 701) stem from the U.S. Rehabilitation Act of 1973, which prevents exclusion from programs and activities that receive federal funding for individuals with disabilities. IEPs and 504 plans specify that students may have disabilities that exempt them from taking specific domain tests. In such instances, an overall composite score cannot be easily calculated (and thus a proficiency level cannot be derived). The lack of such an indicator may affect whether an EL is reclassified as a former or non-EL and influence other decisions schools and districts make about such students.

In general, the share of ELs with disabilities who do not take all four assessments is small. For example, of the 50,000 ELs in State A who took ACCESS in the 2017–18 academic year, about 15% (7,500) of those ELs had IEPs or 504 plans. Of that 15%, 142, or less than 2% of the 50,000, lacked one or more domain scores. About 40 of those ELs, or 0.5% of the 7,500, had IEPs or 504 plans that exempted the students from specific domain tests—a small number.

The following analyses illustrate models and procedures that districts can use to derive a missing domain score and then calculate an alternate overall composite score. These methods apply only to ELs with IEPs or 504 plans requiring that they not be assessed in one or more domains. Analyses herein use the ACCESS for ELLs assessment for the 2017-18 school year. The appendices include tables and statistical programming code used to compute the different models. Appendix A features a sample of the most commonly applied domain-specific English language proficiency exit criteria scale scores throughout the WIDA Consortium. Appendix B illustrates the mean scale score values for each grade and domain. Appendix C provides the programming code to generate domain-specific z-score values to calculate overall composite scores for ELs who are missing one or more domain scores.

Cook (2013) created a logistic regression model to conduct an extensive and complex imputation analysis to account for missing domain scores. His computation method requires sophisticated statistical modeling and assumptions about relationships among performance on state content assessments and English language proficiency, composite score weighting, and assessment performance of ELs with disabilities relative to their non-disabled EL peers.

The current research provides simpler models to highlight how a state can determine the English language proficiency indicator to meet ESSA requirements for monitoring, achievement, and accountability. This study does not endorse any of the models or their calculations. This study has limitations, as results are not generalizable across states: First, the demographics of ELs and ELs with disabilities vary considerably by state. Second, the sample sizes for ELs and ELs with IEPs or 504 plans also vary by state.

This study provides technical guidance to states on how to apply methods for calculating overall composite scores for ELs whose IEPs or 504 plans exempt them from one or more domain assessments on ACCESS. The analyses and results provide clear and concise frameworks to approaching this complex accountability issue. Thus, the focus of the study is more on the methods that can be applied to shape accountability criteria rather than on the results from each model. In addition, the following procedures and calculations can be applied to compute alternate overall composite scores and proficiency levels for ELs missing one or more domains on WIDA Alternate ACCESS for ELLs (Alt ACCESS), the test that monitors academic language development for ELs with significant cognitive disabilities.[2]

Models for Deriving Overall Composite Scores

Across the WIDA Consortium, more than 2 million ELs took ACCESS in the 2017-18 academic year. About 250,000,[3] or 12% of identified ELs, had IEPs or 504 plans. Of those, about 5,000 or 2% had one or more missing domain scores. It is uncertain how many of the ELs with IEPs or 504 plans have specific statements in these documents that exempt them from being assessed in one or more domains.

Three conditions should be considered when selecting a model for deriving overall composite scores for ELs who did not take one or more domain assessments. First, the criteria should be easy to apply. Second, the model should have the potential to calculate the indicator that measures changes in the percentage of students making progress in achieving English language proficiency. Third, the approach should identify criteria for a district to determine when to reclassify a student as no longer needing English language support and thus exits English language programs. To exit language programs, a student must meet state standards. Each state has its own method for determining when students in the state have achieved English language proficiency.

This report examines four approaches for creating an indicator—an overall composite score —for ELs with IEPs and 504 plans who did not take one or more of the four ACCESS domain assessment scores. Model 1 substitutes the state-set minimum domain score a student needs to

[2] The Alternate English Language Learning Assessment project housed within the Wisconsin Center for Education Research has published information on assessment of English learners with the cognitive disabilities at http://altella.wceruw.org/background.html.
[3] This figure estimates the number of ELs classified as having 504 plans or IEPs. Two WIDA states do not report the number of ELs who have 504 plans or IEPs. Several WIDA states underreport the number of ELs with IEPs or 504 plans and/or do not disclose whether some ELs receive accommodations when taking ACCESS. In addition, some WIDA states report ELs have primary disabilities but do not indicate IEP or 504 plan status.

exit English language programs for the missing score. Model 2 derives the desired domain score from the average of the scores on the assessments the student did take. Model 3 averages z-scores (the number of standard deviations a score is from the mean) to determine the needed domain score. The fourth approach convenes experts to set a standard state-specific indicator of English language proficiency. For all models, states should determine how they will round their scores, composites, and levels when setting exit scores and criteria that students must meet to demonstrate they are proficient in the English language.

Model 1: Assign State's Domain Exit Score

In Model 1, the state has a minimum overall composite score that students need to exit English language programs. When an IEP or 504 plan excuses an EL from a domain assessment, Model 1 accounts for that needed score by assigning the state's minimum exit score to the missing domain in order to complete the calculation of the overall composite score (Figure 1). Model 1 includes four stages. The first is to identify the state's minimum exit score for each of the four domains. Those minimums are used as scores on each domain that students did not take. Then the weighting formula for ACCESS is used to calculate the overall composite score, which is then matched with the corresponding English language proficiency level that each state determines.

Figure 1: Model 1 – Assign State's Domain Exit Score

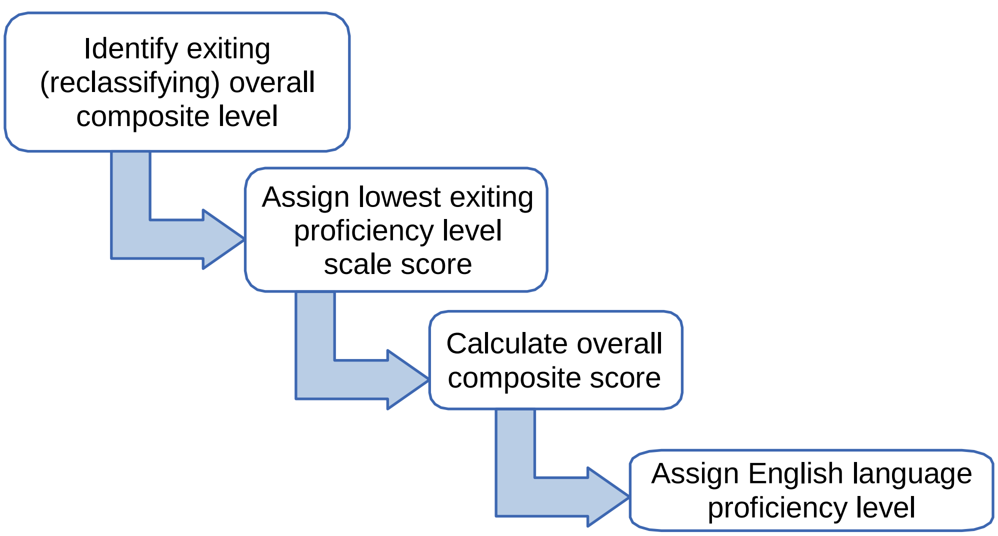


Table 1 provides sample minimum domain scores by grade for states with English language proficiency levels of 4.5 and 5.0, the most widely used exit criteria across the WIDA Consortium. Appendix A includes these and other examples of minimum domain scores for each grade for the four most common English language proficiency levels states uses as their exit criteria.

Table 1: Example Minimum Domain Exit Scores and Criteria

Grade	Exit Criteria = 4.5				Exit Criteria = 5.0			
	Listening	Speaking	Reading	Writing	Listening	Speaking	Reading	Writing
0	282	325	284	339	286	349	289	367
1	297	336	310	360	303	361	315	382
2	322	348	332	365	330	374	337	388
3	340	359	347	370	349	386	352	394
4	353	370	359	376	363	397	364	401
5	365	379	369	382	375	407	373	407
6	374	389	378	387	385	417	382	413
7	382	397	385	393	394	425	389	419
8	390	405	391	398	402	433	395	424
9	397	413	397	404	409	440	401	430
10	402	420	402	414	415	446	406	436
11	407	426	406	416	420	451	410	441
12	412	431	411	423	426	455	414	447

For example, under Model 1, Student A in Grade 9 has a statement in her IEP that allows her to not participate in the Writing test on ACCESS. She attends a high school in a state with an exit criteria of an proficiency level of 4.5. In this state, the minimum Writing exit score is 404. Student A received a 423 Listening score, a 432 Speaking score, and a 379 Reading score. To compute the overall composite score for Student A, a Writing score of 404 is assigned because it is the state's minimum domain score for a ninth-grader to exit English language services in her state.

The overall composite score for Student A can now be computed:

$$(423)0.15 + (432)0.15 + (379)0.35 + (404)0.35 = 402.30$$

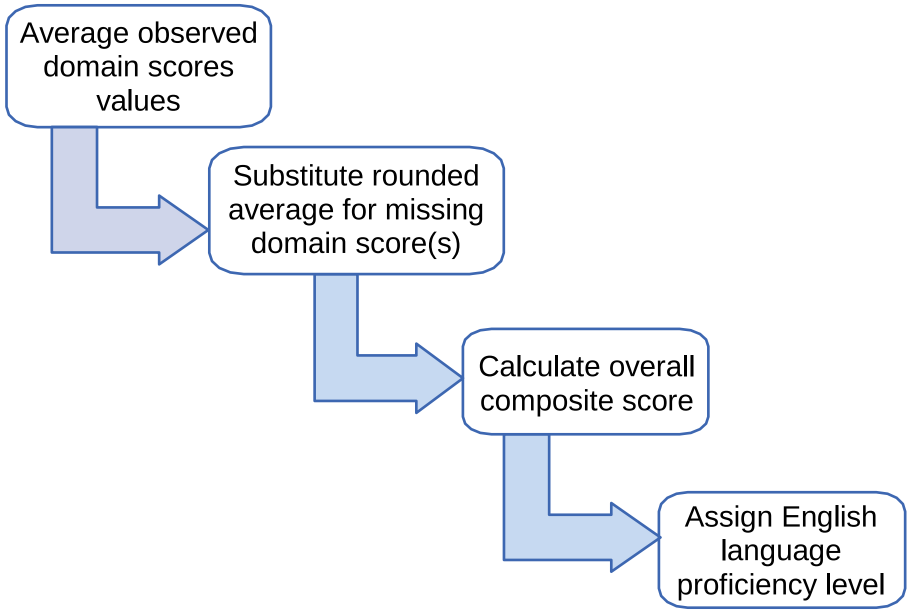
Overall composite scores are reported as whole numbers; Student A's score rounds to 402. An overall-composite-score-to-English-language-proficiency-level lookup table for the student's state shows 402 corresponds to a proficiency level of 4.5, which meets that state's criteria for the district to allow that student to exit English language programs.

The assumption underlying this model is that the missing domain score is the same as the state's domain exit score. The benefit of Model 1 is it is the easiest of the four approaches to apply. In addition, it provides an assumed gain as the missing score. Challenges to this method include producing an overall composite score that is higher than the observed domain scores for students and the need for a overall-composite-score-to-proficiency-level lookup table.

Model 2: Assign the Average Observed Domain Score(s)

Model 2 assigns the average observed domain score for a missing domain score for an EL with an IEP or 504 plan. The observed domain scores are what the student scored on each domain assessment. To account for unobserved domain scores, the observed scores are averaged from the one, two, or three scores in the domain tests that the student did take. Figure 2 outlines the steps.

Figure 2: Model 2– Assign Student's Average of Observed Domain Scores



Model 2 first computes the average of the observed domain scores and applies the rounded average as the missing domain(s). After each average is substituted for the missing domain score(s), the overall composite score can be calculated and the associated English language proficiency level looked up in the table.

For example, Student B in Grade 6 has a statement in his IEP that exempts him from the Speaking test on ACCESS. Student B attends a middle school in a state with an exit criteria of English language proficiency level 4.8. Student B received a 404 Listening score, a 319 Reading score, and a 316 Writing score. To compute Student B's substitute Speaking score, we calculate the mean of the three observed domain scores, which is 346 [(404 + 319 + 316) ÷ 3].

This value of 346 is used to calculate the overall composite score for Student B:

$$(404)0.15 + (346)0.15 + (319)0.35 + (316)0.35 = 334.75$$

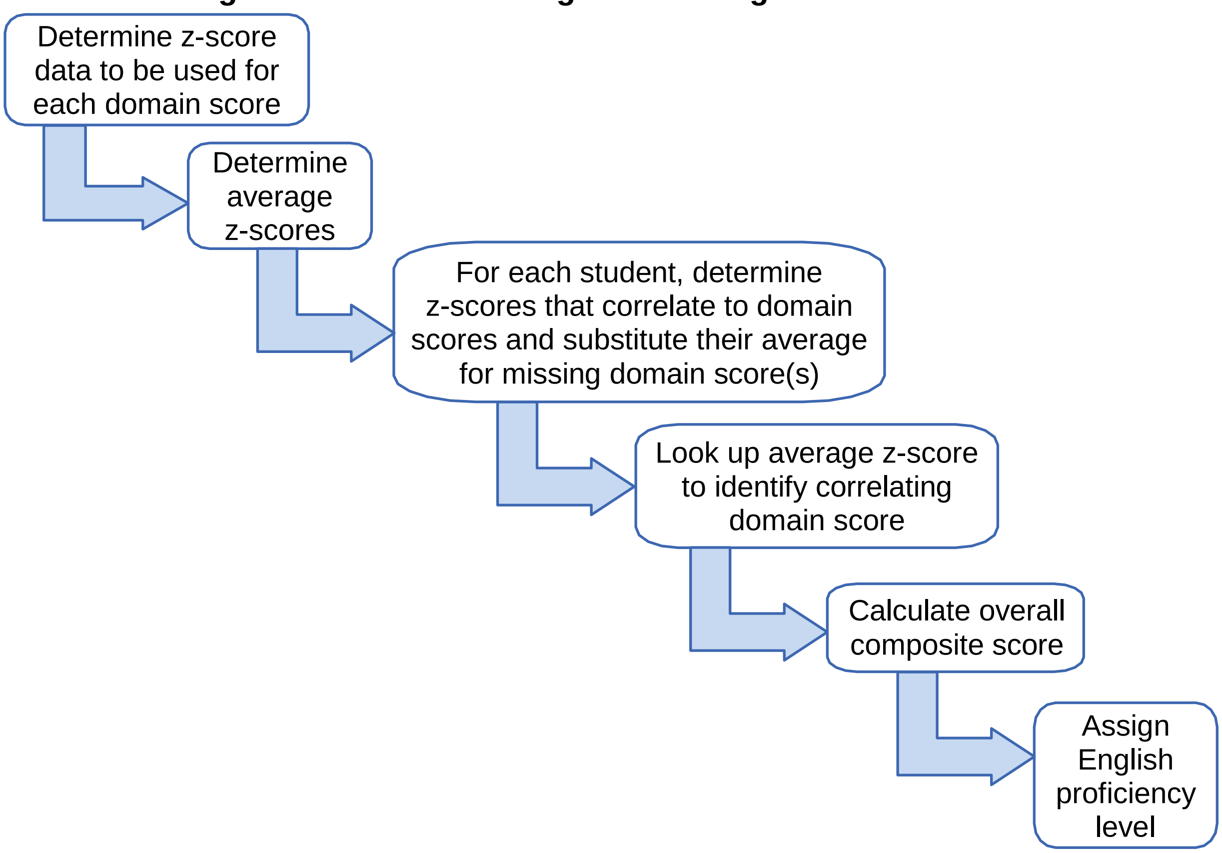
Since domain scores are presented as whole numbers, Student B has an overall composite score of 335. An overall-composite-score-to-English-language-proficiency-level lookup table shows the English language proficiency level of 3.2, which does not meet the state's exit criteria of 4.8.

The underlying assumption of Model 2 is the correlations among a student's domain scores are high. This model is easy to apply and to understand. A state can use its own data for the calculations. The model's drawbacks are that scores may skew too high or low if the correlations among domain scores are not high. Model 2 also requires a lookup table.

Model 3: Assign the Average Observed Z-score

For each missing domain score, Model 3 substitutes, by grade, the average observed z-scores, which can be calculated using the code in Appendix C. WIDA recommends states use the z-scores it calculates annually for each grade and domain across the WIDA Consortium to offset limitations caused by a state having very few ELs with IEPs or 504 plans who are missing domain scores. Figure 3 shows Model 3's six stages. First, the z-scores are established, by grade, for all observed domain scale scores. Second, the average domain-specific z-scores for each grade are determined.[4] Third, for each student missing a domain score, the z-scores that correspond to the domains in which the student was assessed are averaged. Fourth, the resulting average is looked up in a table to determine the correlating domain score. Fifth, the student's overall composite score is calculated, and, finally, the corresponding English language proficiency level is assigned from a second lookup table. Although domain-specific z-scores will have an exact domain score match, their averages will not and so will need to be rounded per state procedure as part of selecting the minimum domain scores for each grade that students need to achieve to be determined proficient in the English language.

Figure 3: Model 3 – Assign the Average Observed Z-score



[4] The use of state-specfic z-scores is not a best practice in states with low numbers of ELs with IEPs or 504 plans who are missing domain scores. WIDA recommends using the z-scores it calculates for each grade and domain across the WIDA Consortium to better gauge these students' English language proficiency.

For example, in State A, a second-grader, Student C, has a Listening score of 404, which corresponds to a z-score of 1.35, meaning that the Listening score for Student C is over one standard deviation above the observed Listening scores across the WIDA Consortium for Grade 2. Student C's Speaking score is 263 (z-score = -0.94) and Writing score is 295 (z-score = - 0.10). Student C did not take the Reading assessment, so the three consortium z-scores for Listening, Speaking, and Writing are averaged: $\{[1.35 + (-0.94) + (-0.10)] \div 3 = 0.31\}$. According to State A's lookup table, the z-score average of 0.31 corresponds to a Reading score of 321.

Now, the overall composite score for Student C can be computed:

$$(404)0.15 + (263)0.15 + (321)0.35 + (295)0.35 = 315.65$$

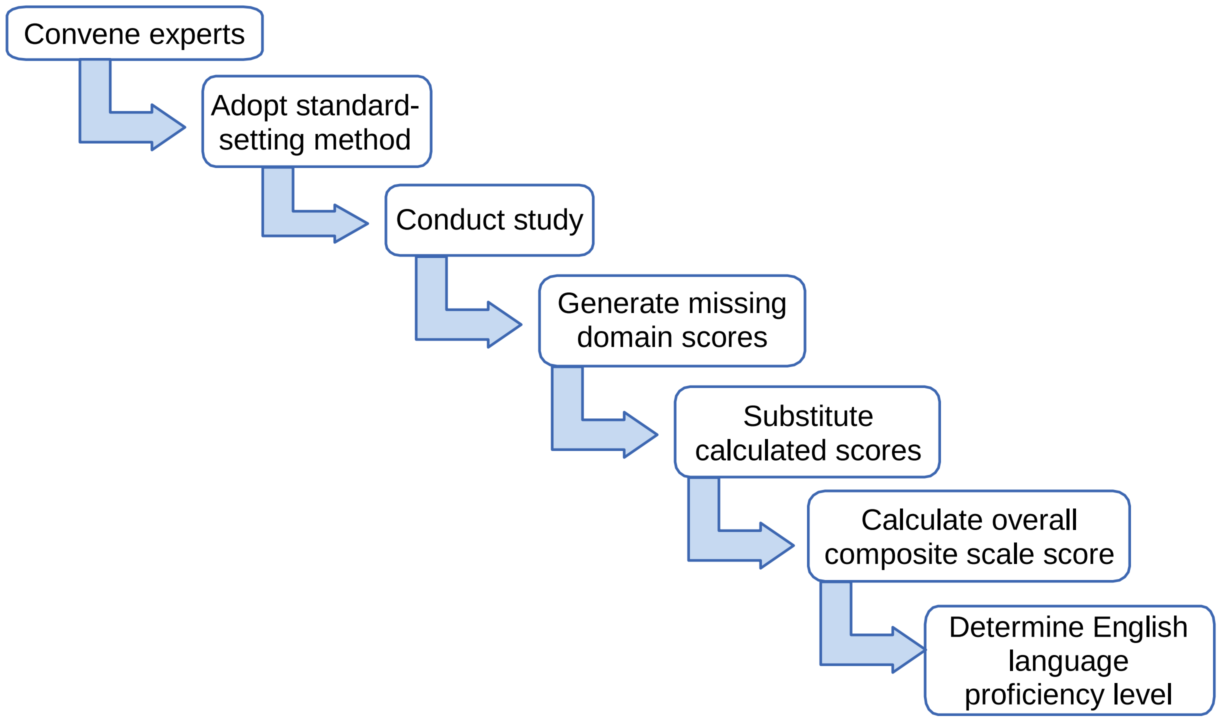
Since overall composite scores are whole numbers, Student C's score is 316. According to State A's overall-composite-score-to-English-language-proficiency level lookup table, 316 corresponds to an English language proficiency level of 3.6, which does not meet State A's exit criteria of 4.5.

Two lookup tables are needed to apply this method: one for a domain-specific z-score to domain score, the other to correlate the overall composite score to the English language proficiency level. The underlying assumption of Model 3 is that the distribution of observed domain scores is normal for each grade in the state. As with Model 2, this approach assumes a high positive correlation among domains. The benefit to applying this model is that domain score distributions are often observed to be normal. The model's drawbacks include its complexity and the need to have multiple lookup tables to compute values. Moreover, given the constraints for applying this model to specific subgroups (e.g., ELs with IEPs or 504 plans exempting them from one or more domain test), the number of students eligible for this analysis may be small.

Model 4: Conduct an Activity to Set Standards and Create Procedures for Calculating Overall Composite Scores

Model 4 involves conducting an activity to set standards and create a procedure for determining scores missing due to student exemptions from the domain assessment. Figure 4 presents the steps to calculate an overall domain score for ELs with IEPs or 504 plans who have one or more missing domain scores.

Figure 4: Model 4 – Conduct a Standard-setting Activity



Model 4 convenes experts in education for ELs and students with disabilities to conduct a standard setting activity to create a state- or district-specific procedure to account for missing domain scores. These experts may then adopt a standard-setting method, examine the WIDA English language proficiency levels, and conduct one or more studies to identify and account for missing domain scores. After they conclude their studies and multiple reviews, the overall composite scores are calculated and the associated English language proficiency levels are looked up.

Model 4's underlying assumption is that in-state experts are better decision-makers than analysts of score distributions because they are aware of the needs of the state's student population. This model is beneficial because it uses local, state-specific experts and local decision-making criteria. In addition, peer reviewers often accept this method. The challenge is that convening such panels of experts can be time-consuming and may be expensive.

Summary

The models presented this report are intended to support state monitoring, achievement, and accountability determinations and to help states complete the first step in meeting ESSA requirements by creating an English language proficiency indicator. The benefits and drawbacks of applying the four models are summarized in Table 2. This report does not endorse or critique any particular model but rather provides ideas to states on how to creating an indicator of English language proficiency for ELs with IEP and 504 plans that exempt them from taking one or more domain assessments. This report also highlights how a state can apply one or more of these frameworks to facilitate decision-making.

Table 2: Model Assumptions, Benefits, and Drawbacks

Model	Assumptions	Benefits	Drawbacks
Designate exit score(s)	Missing domain score is met	• Easiest model to apply • Easy to understand	• May provide inflated scores, so students may exit English language programs prematurely • Requires lookup table
Apply average observed domain score(s)	High correlation among domain scores	• Easy to apply • Easy to understand • State can calculate with own data	• Provides substituted scores that might be too high or low if correlations are low • Requires lookup table
Assign average z-scores	Normal observed domain score distribution and high correlation among domain scores	• Frequently observed assumption about domain score distributions	• Is complex • Requires multiple lookup tables
Conduct a standard-setting activity	State experts are better decision-makers than analysts who calculate score distributions	• Often accepted by peer reviewers • Reliance on local, state-specific experts and criteria	• Requires standard-setting expertise • Is labor intensive • Requires substantial financial investment

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Appendix A
Sample State Domain Exit Scores English Language Proficiency Levels Exit Criteria

Appendix A lists by grade examples of minimum domain scores for the four most common English language proficiency levels states and districts use to determine when to reclassify a student as no longer needing English language support and thus able to exit English language programs.

5 Grade	Domain Exit Criteria															
	Listening				Speaking				Reading				Writing			
	4.0	4.5	4.8	5.0	4.0	4.5	4.8	5.0	4.0	4.5	4.8	5.0	4.0	4.5	4.8	5.0
K	278	282	285	286	301	325	340	349	279	284	287	289	311	339	356	367
1	291	397	301	303	311	336	351	361	304	310	313	315	337	360	373	382
2	314	322	327	330	322	348	364	374	326	332	335	337	341	365	379	388
3	331	340	346	349	332	359	376	386	342	347	350	352	346	370	385	394
4	343	353	359	363	342	370	386	397	354	359	362	364	351	376	391	401
5	354	365	371	375	350	379	396	407	364	369	372	373	356	382	397	407
6	363	374	381	385	360	389	406	417	373	378	381	382	361	387	403	413
7	370	382	390	394	369	397	414	425	380	385	388	389	367	393	409	419
8	377	390	397	402	377	405	422	433	386	391	394	395	372	398	414	424
9	383	397	404	409	385	413	429	440	392	397	400	401	378	404	420	430
10	389	402	410	415	393	420	436	446	397	402	405	406	385	414	426	436
11	394	407	415	420	400	426	441	451	402	406	409	410	391	416	431	441
12	398	412	421	426	407	431	446	455	407	411	413	414	398	423	438	447

Appendix B
Example Mean Scale Score Values by Domain and Grade

Grade	Listening	Reading	Speaking	Writing
0	269	188	374	205
1	325	293	259	260
2	332	317	269	299
3	353	334	279	318
4	409	354	313	336
5	412	355	313	342
6	387	344	322	324
7	395	351	322	328
8	400	359	324	334
9	387	373	307	353
10	392	380	313	361
11	394	384	318	366
12	394	385	320	368

Appendix C
Programming Code for Z Score Analysis

```
*THE FOLLOWING CODE APPLIES DOMAIN-SPECIFIC Z SCORE TO CALCULATE
COMPOSITE SCORES FOR ELS WITH LESS THAN FOUR DOMAIN SCORES;

* You must first run the programming call to acquire the State’s dataset; The current dataset
looks at scale score values for the 2017-2018 school year.

*The sql statement creates the dataset for you to analyze ACCESS. The table created for your
dataset is designated as A. Please rename dataset to fit your state's needs;

************* Calculating z scores*************************
proc sort data = A; by grade; run;
proc standard data = A mean=0 std=1 out=Alt_stand;
format _numeric_ 9.3;
by grade;
var scale_score_listening scale_score_reading scale_score_speaking scale_score_writing; run;
data Alt_stand1; set Alt_stand
        (keep =
                drc_student_identifier grade
                scale_score_listening--pl_writing
                reported_mode
                iep_status
        );
rename scale_score_reading=zread
        scale_score_listening=zlist
        scale_score_speaking=zspeak
        scale_score_writing=zwrit;
run;
data alt_comp1; set A
        (keep =
                drc_student_identifier
                scale_score_reading
                scale_score_listening
                scale_score_speaking
                scale_score_writing
        );
run;
proc sort data = alt_comp1; by drc_student_identifier; run;
proc sort data = Alt_stand1; by drc_student_identifier; run;

********************* Creating a combined z score file;******************
data z_score;
merge Alt_stand1 alt_comp1;
by drc_student_identifier;
run;

* Creating domain z score lookup tables;
data z_list; set z_score (keep = grade zlist scale_score_listening); run;
proc sort data = z_list nodup; by grade zlist; run;
```

```
data z_read; set z_score (keep = grade zread scale_score_reading); run;
proc sort data = z_read nodup; by grade zread; run;
data z_speak; set z_score (keep = grade zspeak scale_score_speaking); run;
proc sort data = z_speak nodup; by grade zspeak; run;
data z_writ; set z_score (keep = grade zwrit scale_score_writing); run;
proc sort data = z_writ nodup; by grade zwrit; run;

data z_score; set z_score;
if scale_score_listening = . then domain_miss = 1;
if scale_score_reading = .  then domain_miss = 1;
if scale_score_speaking = . then domain_miss = 1;
if scale_score_writing = . then domain_miss = 1;
run;

***************** Creating missing domain iep file;**********************
data z_iep; set z_score;
avg_z = mean (of zread zlist zspeak zwrit);
where domain_miss = 1;
run;

data z_iep_l; set z_iep;
where zlist = .;
run;

data z_iep_s; set z_iep;
where zspeak = .;
run;

data z_iep_r; set z_iep;
where zread = .;
run;

data z_iep_w; set z_iep;
where zwrit = .;
run;

data z_iep_miss;
merge z_iep_l z_iep_s z_iep_r z_iep_w;
by drc_student_identifier;
run;

****************Creating z score  lookup  tables  by  domain******************
data z_score_lookup;
merge z_read z_list z_speak z_writ;
run;
```