THE USE OF ACHIEVEMENT INDICES IN STATE ACCOUNTABILITY SYSTEMS

AS PART OF THE EVERY STUDENT SUCCEEDS ACT (ESSA)

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Introduction

The U.S. Department of Education (ED) provided feedback to several states recently regarding the states' ESSA plan. Among other issues, ED raised questions regarding the use of indices for the achievement indicator. ED expressed concerns that some of the states' index systems allowed the performance of high achieving students to "mask" the performance of lower achieving students. There is no question that ESSA allows for index systems where additional points can be awarded to schools for students that score above the proficient level. Given this allowance, I argue that index systems offer a powerful way to incentivize continued improvement for students and schools without disenfranchising lower performance individuals. This does not negate the ESSA requirement to report the percentage of students scoring at the proficient level and above for all students and by student group.

The Rationale for Index Approaches

Index systems are designed to award points to schools (or other entities) for students scoring at different achievement levels. Almost all states and consortia report performance at four or five achievement levels. An index system would provide different points for each level of achievement. There is not a specific formula for how to provide points for the different levels of achievement. Rather, the determination of points is a policy decision designed to best represent the state's values.

Many states employed achievement indices during the No Child Left Behind (NCLB) era, but due to the requirements of the law, states were not allowed to provide more points than they awarded to a proficient score for any levels beyond proficient. In spite of this limitation, states still felt that index systems helped shift the focus from the "bubble students" (i.e., those who scored just below proficient) to a broader range of students. However, many states used more complete index systems (i.e., those that differentiate among all achievement levels) as part of their state accountability systems and now that ESSA provides similar flexibility, several states

have proposed such index systems as part of their state plans. To help ground the discussion, I present three examples of fairly typical index systems below.

Achievement Level	Index Points: Simple Translation	Index Points: Linear Transformation	Index Points: Reduced Level 4
1	1	0	0
2	2	50	50
3	3	100	100
4	4	150	125

Figure 1. Examples of three common achievement indices.

- ✓ The "simple translation" index system assigns the same number of points as the achievement level. Such an approach works well in systems where all indicators are converted to a 1-4 scale for reporting purposes and for straightforward aggregation approaches.
- ✓ The "linear transformation" generally uses an interval-based system where all index points are equally spaced. The starting or ending values do not matter since a simple linear transformation is applied. For example, we could easily create an index system with values of 100, 150, 200, and 250 that would have the same meaning as the example shown above. With this approach, the values are typically selected to match the weight or influence assisgned to academic acheivement in an overall index.
- ✓ Finally, given the concern about "masking" the performance of lower achieving students, the "reduced level 4" example index system uses equal intervals for the first three levels, but then awards the highest scoring students only one-half of an interval. As I show later, such an approach does not eliminate the possibility of masking the performance of lower achieving students.

Masking Performance

ED's main concern with the use of index systems in several states was the potential that the points awarded to higher achieving students could mask the performance of lower achieving students. I start this discussion with several assertions and a definition.

1. Masking is observed when the performance of students scoring above the proficient level (e.g., Level 4) obscures the performance of those students scoring below the proficient levels (e.g., Levels 1 and 2). This occurs when the average index value or the indicator score makes it appear that on average students in the school are performing well.

2. As long as more points are allowed to be awarded to the highest achievement level (e.g., Level 4), masking the performance of lower achieving students is theoretically possible depending on the distribution of student performance in the state.
3. There are more and less appropriate methods for testing the degree to which a given index system is masking the performance of lower achieving students. The fairest test of masking is one where students are equally distributed among the achievement levels reported in the particular state.
4. States are required to report the number and percentage of students scoring at each of the achievement levels on the state assessment in English language arts, mathematics, and science for all students and for each student group defined in ESSA. This transparent reporting mitigates any potential masking that might occur when the raw achievement results are converted to an indicator.

I offer some examples to explain these assertions. Let's assume an equal (flat) distribution of performance across achievement levels (e.g., 25% of students in each of four levels). I then apply the various index models to this same distribution. To compute the index values, I simply multiply the index values by the number (or percentage) of students scoring at that particular level. For the sake of these examples, assume that there are 100 students in the school, with 25 scoring at each of the four achievement levels. We then multiply the index values by the number of students in each level (25) to arrive at the index points. The average index score is shown below for each of the three examples. This average value is fed into the accountability system, but it is typically transformed back to the original scale by dividing by the average number of students scoring at each level (in this case 25) to arrive at the "indicator value."

	Simple Translation		Linear Transformation		Reduced Level 4	
Achievement Level	Index Values	Index Points	Index Values	Index Points	Index Values	Index Points
1	1	25	0	0	0	0
2	2	50	50	1250	50	1250
3	3	75	100	2500	100	2500
4	4	100	150	3750	125	3125
Average Points		**62.5**		**1875**		**1718.75**
Indicator Points		**2.5**		**75**		**68.75**

Figure 2. Indicator values for three example achievement indices.

As seen in Figure 2, the indicator points for all three examples are below the index values for Level 3, which means that, on average, the students in a school with these indicators points

would be considered performing below the proficient level. Masking would have been evident if the average would have been at or above the index points associated with the proficient level. Therefore, masking did not occur for any of these examples.

So what would it take for masking to occur? I created a highly fictionalized example below (Figure 3) to illustrate potential masking. In this example, the school of 100 students has 20 students each scoring at Levels 1 and 2, 60 students scoring at Level 4, and none at Level 3. Even with this extreme example, the average index value was just 3.0, which might make it seem like students in this school, on average, were scoring proficient. Of course, as noted in the fourth assertion above, the state and the school will still have to provide reports to all stakeholders so this type of achievement gap will be reported transparently.

Achievement Level	Index Values	# of Students	Index Points
1	1	20	20
2	2	20	40
3	3	0	0
4	4	60	240
Average Points			**75**
Indicator Points			**3.0**

Figure 3. Example achievement index to illustrate masking.

Is it possible to avoid the potential for masking if states can provide more points for Level 4 than they do for Level 3? Quite simply, no! Figure 4 below portrays another extreme example to illustrate this point. Assume the state awarded 3.1 points for students scoring at Level 4. Even with this miniscule increase in points compared to Level 3, a distribution such as the fictional distribution shown below can result in masking.

Achievement Level	Index Values	# of Students	Index Points
1	1	2	2
2	2	3	6
3	3	0	0
4	**3.1**	95	294.5
Average Points			**75.625**
Indicator Points			**3.025**

Figure 4. Example achievement index to illustrate masking.

The examples presented in Figures 3 and 4 show that it is possible for masking to occur with extreme distributions, but this is why it makes the most sense to evaluate the masking potential with equal (flat) distributions (assertion #3 above). In other words, ruling out indices with any potential to "mask" low performance is overly broad and risks eliminating virtually any proposed system.

Conclusion

Many states are employing achievement indices as part of their ESSA-required school accountability systems. They are doing so to recognize achievement and changes in achievement along the performance distribution rather than the very narrow focus of proficient during the NCLB era. Such an approach to continuous improvement fits with states' theories of action and is permitted by ESSA. I have argued that masking the performance of low achieving students may occur in cases of extremely unlikely performance distributions, but as long as the law allows states to provide additional points for advance performance, such masking is theoretically possible. Most importantly, states are required to report for all students and for each student group, the number and percentage of students scoring in each of the achievement levels reported for the state assessment system. ESSA requires both a reporting and accountability system, so taken together, it is essentially impossible to hide (mask) the performance of low achieving students as a whole or for any student group. Therefore, any achievement indices similar to the ones depicted in Figure 1 above should be permitted under ESSA.