The Idaho Adequate Yearly Progress Formula

David L. Breithaupt, Tom C. Farley, and Rosemary Powers-Ardinger

Idaho State Department of Education

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Abstract

The Idaho Adequate Yearly Progress Formula is intended to meet the requirements of the No Child Left Behind Act of 2001. The formula provides a regression line with which to evaluate the academic progress of schools and includes those factors required by law as well as factors suggested by the U.S. Department of Education and Idaho State Code. This document includes a discussion of the No Child Left Behind Act of 2001 and establishes an achievement distribution to define the level of academic performance required for students to meet the proficient level or above. It also contains a discussion of the minimum number of students required for disaggregation of the data and public reporting. The construction of the formula as well as (1) examples of the impact each factor has on the formula result and (2) an example using the data from a rural Idaho high school are examined.

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The Idaho Adequate Yearly Progress Formula

Introduction

The No Child Left Behind Act of 2001 (NCLB) became effective January 8, 2002. This law is the reauthorization of the Elementary and Secondary Education Act of 1965 (ESEA) and is intended to focus on the academic achievement of students through accountability at all levels of public education.

Adequate Yearly Progress (AYP) is a key requirement of NCLB. AYP is a plan to hold each school accountable for the achievement of all students at the proficient level or above by the end of the 2013-2014 school year. AYP is to be determined for each school for the total student body as well as these subpopulations (No Child Left Behind Act, 2002, §1111(b)(2)(C)(v)):

For purposes of state assessments

- All Students
- Race/ethnicity
- Socio-economic status
- Students with disabilities
- Limited English Proficient (LEP)
- Gender
- Migrant

- For purposes of AYP under NCLB
 - All Students
 - Race/ethnicity
 - Social-economic status
 - Students with disabilities
 - Limited English Proficient (LEP)

Approximately 12,000 (5%) of Idaho's student population are in migrant programs.

Because of the impact of this population on education in Idaho, this population is also to be

included in the determination of AYP as per Federal NCLB statutory authority (see No Child

Left Behind Act, 2002, §1111(b)(2)(C)(i) and §1111(b)(3)(C)(xi)).

In AYP, there are four required achievement levels. These levels are

- 1. Below Basic The lowest level of achievement.
- 2. **Basic** The lower midrange, including students near proficiency.
- 3. Proficient The minimum level of achievement required under NCLB.
- 4. Advanced Proficient The highest level of achievement.

NCLB requires that all students achieve proficiency or above in reading and mathematics within 12 years of enactment. Schools, districts, and the State are to implement programs and AYP procedures that will help students that are *not* reaching proficiency improve academic achievement to the proficient level or above within this time frame. To ensure that all students achieve proficiency or above, AYP requires an average of 1/12 of the non-proficient students improve to proficiency every year for 12 years. Schools that do not meet AYP requirements for two consecutive years are placed in improvement programs. Specific sanctions are placed on schools that do not meet AYP requirements for five consecutive years (No Child Left Behind Act, 2002, §1116(b)(1)(A), §1116(b)(7), and §1116(b)(8)).

Achievement levels are based upon student scores on Idaho's statewide tests. During the baseline year, 2001-2002, scores are taken from the Iowa Test of Basic Skills/Test of Academic Proficiency (ITBS/TAP). For all subsequent years of NCLB, 2002-2003 through 2013-2014, scores will be taken from the Spring on-grade-level section of the Idaho Standards Achievement Test (ISAT).

NCLB Achievement Distribution

Adequate Yearly Progress is based on the assumption that student scores for each grade level are normally distributed as shown in

Figure 1.

In a norm-referenced, percentile-rank distribution of scores, the interquartile range, the region between the 25th percentile and the 75th percentile, is defined as "average" and



Figure 1. Normal distribution of Scores





Figure 2. Range of proficient scores on a norm-referenced, percentile-ranked distribution (ITBS/TAP)

includes 50% of the scores. The ITBS/TAP uses this type of distribution and the proficient level on ITBS/TAP is defined as this range of scores (see Figure 2). In a norm-referenced, percentile-rank distribution, below proficient is defined as below the 25th percentile, and above proficient is defined as above the 75th percentile.

The ISAT is built upon tests created by the Northwest Evaluation Association (NWEA). Results from these tests are reported in Rasch Unit (RIT) scores. The RIT uses an interval scale and is reported using means, standard deviations, and standard error of measurement. As the ISAT will be used to establish AYP in all subsequent NCLB years, it is reasonable to establish the NCLB Achievement Distribution using the mean and standard deviation rather than percentile rankings. Doing so also allows for the division of the interquartile range into two regions to incorporate the four

achievement levels required for NCLB and increases the academic requirements for a student to achieve the proficient level. Figure 3 superimposes the proficient level for the ISAT over the proficient level for the tests formerly used in the Idaho State Assessment Program.



Figure 3. Increased academic performance requirement for NCLB

The *proficient* level for the ISAT includes a range of scores from -.25 standard deviation $(-.25_s)$ to +1 standard deviation on the NCLB Achievement Distribution. This includes



NWEA. Figure 4 shows the range of scores within the proficient level for all distributions.

The remaining three achievement levels required by NCLB are shown in Figure 5. The range of scores in the *basic* level fall between -1 and -.25 standard deviations in the NCLB



Figure 5. The NCLB Achievement Distribution:

- Below basic $<-1_s$
- Basic $-1_s -.25_s$
- Proficient $-.25_s +1_s$
- Advanced proficient >+1_s

Achievement Distribution and include approximately 24% of scores. The <u>below</u> <u>basic</u> level is the range of scores below the -1 standard deviation and the <u>advanced proficient</u> level is all scores above the +1 standard deviation. The below basic and advanced proficient levels include approximately 16% of scores each.

Minimum Number for Statistical Analysis and Reporting

To protect student privacy, NCLB requires each state to set a number (n) of students

below which, if there are fewer students in any subgroup, disaggregated data will not be reported

publicly (No Child Left Behind Act, 2002, \$1111(b)(2)(C)(v)(II)). Additionally, NCLB requires states to ensure that statistical analysis produces reliable and valid results (\$1111(b)(2)(C)(ii)) and measurement practice follows accepted professional testing and reporting standards (\$1111(b)(3)(C)(xiv)). In most professional publications and journals, accepted psychometric practice sets the parameters for statistical testing (see Hinkle, Wiersma, & Jurs, 1998). Three parameters are used to establish the minimum n below which statistical analysis and/or public reporting will not be done:

- Accuracy. The accuracy, or alpha- (α) level, of a statistical test indicates the probability of making an error in the analysis. The common alpha-level is 5%, or 5 chances out of 100 of making an error in judgment based on the outcome of the statistical analysis.
- Power. The power, or beta- (β) level, on a statistical test indicates the probability of detecting real differences in the data. The common beta-level is 80%, meaning that the difference must be greater than 80% before the analysis indicates a difference.

The third parameter is set by the State:

Precision. The precision (d) of the test, also known as effect size, indicates the range within which a difference in scores will not be detected. Precision is directly related to the alpha- and beta-levels, as well as the number of scores in the group. In Idaho, precision has been set at d = .75 standard deviations (.75_σ). Precision interacts with the NCLB Achievement Distribution in that the cut point of -.25_s and .75_σ ensure that a score within -1_s will not be placed at the below basic level.

The range of scores defining the proficient level in the NCLB Achievement Distribution is set at $-.25_s$ through $+1_s$. The basic level is set at -1_s through $-.25_s$. By setting d = $.75_{\sigma}$, the precision of the statistical analysis remains within $\pm 1_s$, minimizing the probability of placing a student whose test score lies at the cut point between basic and proficient (-.25_s) in the below basic level.

To set these three parameters at the levels indicated, a minimum of 16 discreet scores is required (Hinkle, Oliver, & Hinkle, 1985). Therefore, no disaggregated scores will be reported for subgroups with less than 16 students. Neither will statistical analysis be conducted on these subgroups' scores. These scores, however, *will* be included in the school's aggregate statistical analyses and reports. Table 1 summarizes the parameters for setting the number of scores required for analysis and reporting at n=16.

$\alpha = .05$	Accuracy of the test
$\beta = .80$	Power of the test
$d = .75_{\sigma}$	Precision of the test
n = 16	Minimum number required

Table 1. Minimum n for Statistical Analysis and Reporting

Selection of the Factors for the AYP Formula

NCLB requires that academic performance, as determined by a statewide on-grade-level test, be included in the formula for calculating AYP at all grade levels (No Child Left Behind Act, 2002, §1111(b)(3)). Additionally, graduation rate is a required factor for all diploma-granting high schools (§1111(b)(2)(C)(vi)). NCLB also requires a minimum of one additional factor in the AYP formula to accurately control for individual variations of the different states' student bodies. Selection of the additional factors is at the discretion of the individual states (§1111(b)(2)(C)(vii)). However, the factors selected for inclusion in the AYP formula may not

be used to dilute the number of schools or subgroups in need of improvement or to change the schools reported as not meeting AYP requirements (§1111(b)(2)(D)(ii)).

The factors to be included in the Idaho AYP Formula are academic performance, graduation rate, attendance rate, and stability rate. These factors have been included in the formula to (1) provide a clear indicator of the performance of Idaho schools and their curriculum and (2) meet the legal requirements of NCLB and Idaho State Code:

- Academic performance. Academic performance is determined by the proportion of students in each school and subgroup who achieve the proficient level or above. As stated previously, the cut point for the proficient level is set at -.25_s. Academic performance is a required part of the AYP formula for all schools.
- **Graduation rate.** Graduation rate is determined using the definition and formula provided by the National Center for Educational Statistics. This formula determines the proportion of students who graduate and receive a diploma or otherwise complete high school. Graduation rate is a required part of the AYP formula for all diploma-granting high schools.
- Attendance rate. Attendance rate is the full-year average daily attendance
 (ADA) as determined by the Idaho Code (see Idaho Code, 2002, §10-1002). This factor is included in the AYP formula because of the correlation between school attendance, participation, and academic performance.
- **Stability rate.** Stability rate is defined as the number of students continuously enrolled at the school divided by the total number of students who are enrolled for at least part of the school year. Inclusion of a stability factor in the Idaho adequate yearly progress (AYP) formula is *not* an attempt to provide an excuse

for failing to address the academic needs of any student or group of students. Rather, it provides a means to more accurately reflect the performance and needs of each school as they work to meet the accountability requirements of the Idaho State Board of Education, the Idaho State Legislature, and the U.S. Department of Education. Given the mobility of Idaho's public school students, it is unwise to exclude the stability factor from the AYP formula. The stability factor is required in the Idaho AYP Formula to address these issues:

- <u>Statistical</u>. NCLB requires that all statistical analysis be conducted to yield reliable and valid results (No Child Left Behind Act, 2002, §1111(b)(2)(C)(ii), see also Gay & Airasian, 2000). Stability of the student body is an extraneous variable over which the school has absolutely no control. Including the stability factor in the formula establishes a statistical control for a percentage of the students who add or withdraw from the school during the school year. There are two statistical consequences of removing this factor from the formula:
 - a. Reduced Reliability. Test-retest reliability (the extent to which the results of the measure remain stable from analyses at different times) of the analysis is reduced. With a highly mobile student population, measurement is with a different cohort of students for each analysis, depending upon when their actual test date was during the testing window. Additionally, there is the potential for a larger variance in the results, both positive and negative, from one year to the next. Inclusion of the stability factor will stabilize scores over time. This

will provide a single target that is more stable, predictable, and dependable with which the school will be judged.

- b. Reduced Validity. Construct validity (the extent to which the measure actually reflects the construct it is intended to measure) is reduced. In other words, decisions about the school would be based on factors that have little to do with the quality of the teachers, administration, or delivery of the curriculum and instruction. Inclusion of the stability factor reduces the effect of student mobility on the measure's results and more accurately reflects the true nature of each school. This will provide the basis for a more appropriate interpretation of the results.
- Legal Precedent. There are legal precedents at both the state and federal levels that include stability of the student body as a factor in accountability and AYP. These precedents deal with the use of test scores for students who move frequently, are Limited English Proficient (LEP), and/or immigrants to the United States.
 - a. State Level. During the 2001 legislative session, the Idaho Legislature enacted Idaho Code §33-1616. This section deals with accountability for schools for teaching reading as measured by the Idaho Reading Indicator (IRI). The legislature acknowledges that the stability of the student body is a critical factor in the accountability process. Under this law, students who are not enrolled for 90% of the total possible days of attendance at a single school during the period

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between the Fall and Spring administrations of the IRI are *excluded* from the accountability requirements for that school.

b. **Federal Level.** The No Child Left Behind Act of 2001 requires that statistical procedures be in place to account for fluctuations in the student populations (No Child Left Behind, 2002,

1111(b)(2)(C)(vii). Additionally, NCLB allows schools to exclude students in LEP programs from statistical analysis and reporting for a period of three years, and in some cases five years, from the time the student immigrated to the United States (111(3)(C)(x)).

Thus, the inclusion of the stability factor meets the legal definition provided by both the NCLB legislation and Idaho Code.

3. <u>Appropriate Distribution of Resources</u>. Idaho receives a fixed level of federal resources to support the requirements of NCLB. Analysis of the results of the AYP formula determines which schools are to receive support through these resources and at what level. Erroneously placing a school on an improvement program when it is unnecessary will siphon resources *away* from schools where it is truly needed for instructional improvement and *into* schools that only appear to require support because of high mobility among students.

The AYP Formula

As described above, the Idaho Adequate Yearly Progress Formula includes variables for *academic performance* for all schools and *graduation rate* for secondary schools as required by

NCLB. In addition, variables for *attendance rate* and *stability rate* for each school are included. When extended over the 12 years of NCLB, the AYP formula provides a regression line for the individual school. It does not indicate the performance of individual students. Each school is required to have all students at the proficient level or above in each grade level.

The general formula for AYP is

$$\boldsymbol{\theta} = \left(\frac{1-X}{12-Y}\right) * 100$$
 Formula 1

where

 θ = coefficient of progress used to determine adequate yearly progress.

- X = overall percentage of students who meet or exceed the established level of Proficient (defined at the 50th percentile or above on the 2001 Iowa Test of Basic Skills/Test of Academic Proficiency or at the -.25_s or above on all subsequent years of the Spring on-grade-level ISAT).
- Y = the number of years NCLB has been in effect, 0 (2001-2002) through 12 (2013-2014).
- **Note:** During the final year of the NCLB legislation (2013-2014), variable Y, NCLB year, regresses to 11. This prevents the denominator of the AYP formula from becoming 0.

Calculating X

The variables for academic performance, attendance rate, graduation rate, and stability rate are interactive in nature, with academic performance carrying the most weight. Therefore, academic performance is squared, then multiplied with the attendance and graduation rates. The resulting product is divided by the stability rate as follows:

$$X = \frac{\left(P^2 * T * G\right)}{S}$$
 Formula 2

where

 P^2 = academic performance on state achievement tests.

T = average daily attendance.

G = graduation rate.

S = stability rate.

Stability rate (S) is defined as the number of students who are continuously enrolled divided by the total number of students who are enrolled for any part or all of the school year.

The formula for stability rate is

$$S = \left(\frac{C}{C + 0.33(A_1 + W_1) + 0.67(A_2 + W_2) + A_3 + W_3}\right)$$
 Formula 3

where

C = number of students continuously enrolled.

A = number of students added to enrollment during each ADA reporting period.

W = number of students withdrawing from enrollment during each ADA reporting

period.

By substituting Formula 3 for S in Formula 2, X is calculated using

$$X = \frac{\left(P^2 * T * G\right)}{\left(\frac{C}{C + 0.33(A_1 + W_1) + 0.67(A_2 + W_2) + A_3 + W_3}\right)}$$

Formula 4

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When Formula 4 is substituted for X in Formula 1, the complete Idaho AYP Formula is given as

$$\theta = \left(\frac{1 - \left[\frac{\left(P^2 * T * G\right)}{\left(\frac{C}{C + 0.33(A_1 + W_1) + 0.67(A_2 + W_2) + A_3 + W_3}\right)}\right]}{12 - Y}\right) * 100$$
 Formula 5

where

 θ = coefficient of progress.

- P^2 = academic performance on state achievement tests.
- T = average daily attendance.
- G = graduation rate.

C = continuously enrolled students.

- A = added students during each ADA reporting period.
- W = withdrawing students during each ADA reporting period.

Y = NCLB year.

Note: Variable G, the graduation rate, applies only to diploma-granting high schools.
 For junior high schools, middle schools, and elementary schools, this variable is *not* included in the AYP formula.

Formula 5 applies to the total student body for each district and building, and is applied to each disaggregated sub-group as required by NCLB where $n \ge 16$.

Using the Idaho AYP Formula

To show the impact of each variable on AYP, consider a high school with 500 continuously enrolled students. For the purposes of this analysis, this fictitious school has no added or withdrawing students, and has 100% attendance, graduation, and academic performance.

Academic Performance

For the baseline year, academic performance (P^2) is determined by the percentage of students who achieved proficiency or higher on the 2001 administration of the ITBS/TAP. For all subsequent NCLB years P^2 will be determined by the percentage of students achieving proficiency or higher on the Spring administration of the on-grade-level Idaho Standards Achievement Test (ISAT).

Because academic performance (P) is squared (P^2), the AYP requirement is curved. Required AYP for schools with low and moderate achievement is slightly higher than for schools with higher achievement.

In Figure 6 (next page), all other variables are held constant while academic performance is graphed from 0% to 100% of students at the proficient level or above.



Figure 6. Academic Performance

Attendance Rate

Attendance rate (T) is calculated using the state's Average Daily Attendance for each school. In Figure 7, all other variables are held constant while attendance rate is graphed from 0% to 100%.



Figure 7. Attendance Rate

Graduation Rate

Figure 8 shows the same information for Graduation Rate (G). Graduation is the number of graduates divided by the number of students in the senior class. Graduation rate is included in the Idaho AYP Formula only for degree-granting high schools. As with the earlier graphs, all other variables are held constant while graduation rate is graphed from 0% to 100%.



Figure 8. Graduation Rate

Continuously Enrolled Students

The number of continuously enrolled students (C) has *no impact* on the Idaho AYP Formula. Table 2 (next page) shows that the impact on Required AYP/Year is 0.00% for all schools regardless the size of the student body.

Number of Students	Impact on AYP		
1	0.00%		
5	0.00%		
10	0.00%		
15	0.00%		
20	0.00%		
25	0.00%		
50	0.00%		
75	0.00%		
100	0.00%		
150	0.00%		
200	0.00%		
300	0.00%		
400	0.00%		
500	0.00%		
600	0.00%		
700	0.00%		
800	0.00%		
900	0.00%		
1000	0.00%		
1100	0.00%		
1200	0.00%		
1300	0.00%		
1400	0.00%		
1500	0.00%		
1600	0.00%		
1700	0.00%		
1800	0.00%		
1900	0.00%		
2000	0.00%		

Table 2. Continuously Enrolled Students Impact on AYP

Students Added During the Year

The stability of the student body (S) is a factor in student performance on academic measures. In addition to students moving as a part of family life, Idaho is an agricultural state

with a large migrant student population. While this remains a great concern, a student body that is constantly changing also has a tendency to mask the actual performance of the school and the effectiveness of the curriculum.

Figure 9 shows how students added to enrollment during the school year will mitigate the required AYP per year. In this figure, all other variables are held constant and the number of students added varies from 0 to 200 (0% to 40%).



Percent of Student Body Added During the School Year

Figure 9. Students Added

Students Withdrawing During the Year

As with students added, students leaving the school pose a problem that masks the actual performance of the school. Figure 10 (next page) shows how including the number of students withdrawing from enrollment during the year mitigates the required AYP per year. As with students added, all other variables are held constant and students withdrawing is varied from 0 to 200 students (0% to 40% of the student body).



Figure 10. Students Withdrawing

NCLB Year

NCLB year (Y) is the number of years the No Child Left Behind Act of 2001 has been in effect. The baseline year, year 0, is 2001, and the final year, year 12, is 2014. NCLB year has

no direct impact on required AYP per	NCLB Year		Impact on AYP	
year. However, the divisor for the	0	Baseline	0.00%	
AYP formula is reduced by one each	1	2003	0.00%	
	2	2004	0.00%	
year that passes. If all other variables	3	2005	0.00%	
	4	2006	0.00%	
remain equal, the required AYP per	5	2007	0.00%	
year rate will become larger. Table 3	6	2008	0.00%	
	7	2009	0.00%	
shows the impact of NCLB year on	8	2010	0.00%	
	9	2011	0.00%	
AYP.	10	2012	0.00%	
	11	2013	0.00%	
	12	2014	0.00%	

Table 3. NCLB Year Impact on AYP

AYP Example

Table 4 is example of the Idaho AYP Formula using 2001 data from a small rural high school. This school had 56.18% of the student body, or 59 students, at or above the proficient level during the 2001-2002 school year.



Table 4. AYP Formula Example

To meet AYP goals, this school is required to help five additional students reach the proficient level during the first year of NCLB, 2002-2003, for a total of 64 students at or above the proficient level. If this school meets this AYP goal, the academic performance factor for NCLB year 2 will increase to 62.32% for the 2003-2004 AYP calculation.

Summary

The Idaho Adequate Yearly Progress Formula has been designed to meet the requirements of the No Child Left Behind Act of 2001. The AYP formula includes the required factors of academic performance and graduation rate (diploma-granting high schools only), as well as the factors of attendance and stability of the student body. The formula has the strength to apply to all schools regardless of size and to be effective through all years NCLB is in effect.

The selection of the factors to include in the AYP formula and the construction of the formula itself is intended to provide a clear indicator upon which to base decisions about the

faculty, administration, and curriculum at each school. The formula is not intended to shield any school or group from the requirements of AYP. Rather, the Idaho AYP Formula is one indicator among many that will combine to reveal the strengths and weaknesses of each school.

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Author Note

David L. Breithaupt, Research and Evaluation; Tom C. Farley and Rosemary Powers-Ardinger, Bureau of Federal Programs.

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Correspondence concerning this document should be addressed to

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