

# STATE BOARD OF EDUCATION

**HEARING TYPE:**       X   INFORMATION/NO ACTION

**DATE:**                March 12, 2007

**SUBJECT:**            **WASHINGTON STATE INSTITUTE FOR PUBLIC POLICY REPORTS  
ON WASL ISSUES**

**SERVICE UNIT:**     Edie Harding  
                              Executive Director

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## **BACKGROUND:**

The Washington State Institute for Public Policy (WSIPP) carries out practical, non-partisan research at legislative direction on issues of importance to Washington State. The Institute has a Board of Directors that represents the legislature, governor and public universities.

To "increase understanding of the students who did not meet the standard in one or more areas of assessment," the 2006 Washington State Legislature directed the Institute to conduct a "review and statistical analysis of Washington assessment of student learning data." The study direction also calls for a review of "options to augment the current system of assessments to provide additional opportunities for students to demonstrate that they have met the state learning standards."

Topics the staff has researched include: individual student characteristics and how they are associated with performance, alternative assessment options, textbook alignment with Washington State learning standards, association among subject areas, strand performance, open ended and multiple choice questions on the WASL, and effectiveness of the Promoting Academic Success (PAS) programs.

Institute staff will provide the Board with the highlights of their findings. A copy of two of the most recent reports "Washington Assessment of Student Learning: Tenth-Grade WASL in Spring 2006: How Individual Student Characteristics Are Associated With Performance" and "Alternative Assessment Options for High School Graduation: Interim Report" are provided behind this tab. For detailed information on other reports, please go to the WSIPP Web site <http://www.wsipp.wa.gov> under the education policy area.

## TENTH-GRADE WASL IN SPRING 2006: HOW INDIVIDUAL STUDENT CHARACTERISTICS ARE ASSOCIATED WITH PERFORMANCE

The 2006 Legislature directed the Washington State Institute for Public Policy (Institute) to conduct a "review and statistical analysis of Washington assessment of student learning [WASL] data."<sup>1</sup> In particular, the Institute was instructed to:

- Increase understanding of the students who did not meet standard in one or more subject areas;
- Identify the characteristics of these students; and
- Identify possible barriers to student success on the WASL.

**This report describes how student characteristics are individually associated with performance on the reading, writing, and math assessments of the 10th-grade WASL in spring 2006, and identifies groups of students with the lowest and highest met-standard rates.**

This analysis complements a report recently issued by the Institute that used multivariate statistical techniques to evaluate the relative association of different student characteristics on WASL performance.<sup>2</sup>

We begin with a brief discussion of the multiple factors that affect performance on the WASL. We then identify groups of low- and high-performing students. Finally, we present a series of graphs that display WASL met-standard rates for different categories of students. In particular, we consider the following student characteristics:

- Demographic traits (e.g., gender, race/ethnicity, poverty);
- Family background;
- Educational aspirations and performance; and
- School attendance records and study habits.

<sup>1</sup> SSB 6618, Chapter 352, Laws of 2006.

R. Barnoski & W. Cole. (2007). *Tenth-grade WASL in spring 2006: Relative strength of associations between student characteristics and met-standard rates*. Olympia: Washington State Institute for Public Policy, Document No. 07-01-2206.

### SUMMARY

This report describes how performance on the 10th-grade WASL in spring 2006 varied by student characteristics.

**Key finding:** A student's grade point average is the only student characteristic whose association with met-standard rates on the 10th-grade WASL is even moderately strong. Taken individually, all other student characteristics are weakly associated with WASL performance.

Groups of students with **met-standard rates less than or equal to 35 percent** had one or more of the following demographic characteristics in common:

- ✓ Minority status (African American, American Indian, Hispanic),
- ✓ In poverty,
- ✓ Non-English speaker,
- ✓ Disability status,
- ✓ Enrollment in special education, and/or
- ✓ Parent with less than a high school education.

These students, who represented 42.5 percent of WASL completers in spring 2006, accounted for approximately 75 percent of the students who did not meet standard in reading and writing, and 60 percent of students who did not meet standard in math.

Groups of students with **met-standard rates less than or equal to 35 percent** also shared one or more of the following performance-oriented characteristics:

- ✓ GPA below 2.5,
- ✓ Behind grade-level,
- ✓ Poor school attendance,
- ✓ Poor study habits, and/or
- ✓ No aspirations to pursue postsecondary education.

Only three groups of students had overall **met-standard rates above 75 percent**:

- ✓ GPA over 3.5
- ✓ Participation in a gifted/highly capable program, and/or
- ✓ Parent who attended post-graduate school.

## FACTORS AFFECTING STUDENT PERFORMANCE ON THE WASL

A student's performance on the WASL is a function of several factors. As illustrated in **Exhibit 1**, these factors include student characteristics, classroom instruction, curriculum alignment with state learning standards, school environmental factors, and extra assistance or remediation. As with any analysis, there are also factors that are unknown or cannot be readily measured.

**Classroom instruction** consists of factors such as teacher background, experience, and pedagogical style; teaching materials and technologies; teachers' rapport with students; and classroom environment (e.g., safety and disruptive behavior).

**Curriculum alignment** describes the extent to which classroom instruction and assessments such as the WASL are congruent with statewide learning standards (i.e., the Essential Academic Learning Requirements and Grade Level Expectations).

**School environment** encompasses an array of characteristics, including school leadership, professional development opportunities, staff collaboration, access to technological and financial resources, safety, and attendance policies.

**Extra assistance** refers to intervention programs designed to help students meet standard on the WASL. In 2006, for example, the Legislature provided \$28.5 million for the Promoting Academic Success (PAS) program.<sup>3</sup>

Finally, WASL performance is also a function of **student characteristics**. This report examines the percentage of students who met standard based on a variety of demographic and performance-oriented characteristics.

<sup>3</sup> R. Barnoski. (2006). *Summer 2006 Promoting Academic Success program: Influence on WASL retake scores—Revised*. Olympia: Washington State Institute for Public Policy, Document No. 06-12-2202. The Institute will continue to evaluate the success of PAS in a series of future reports.

We obtained data from three sources:

- 10th-grade WASL results for spring 2006,
- the Core Student Record System (CSRS) for school-year 2005–06 compiled by the Office of Superintendent of Public Instruction (OSPI), and
- Survey responses from the 2005 9th-grade Iowa Tests of Educational Development (ITED).

An appendix at the end of this report contains detailed data tables.

## LOW- AND HIGH-PERFORMING GROUPS OF STUDENTS

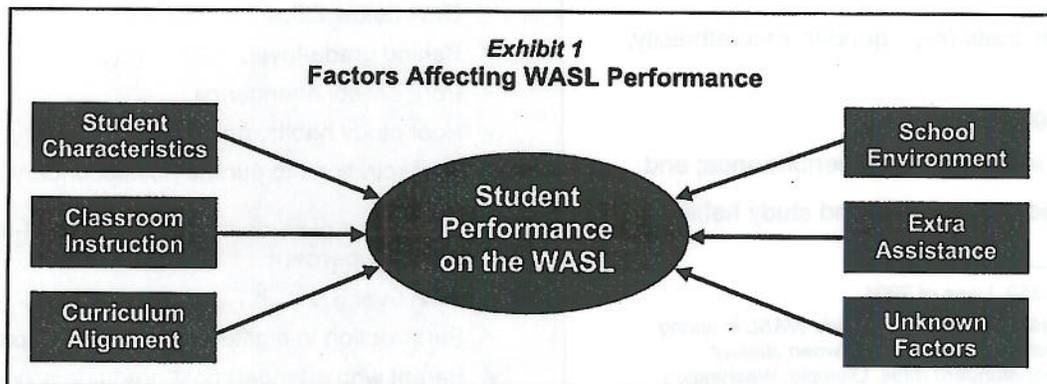
We begin by identifying student characteristics that are associated with relatively low and high met-standard rates on the WASL.

- The **low-performing group** is defined as students with met-standard rates of less than or equal to 35 percent.
- The **high-performing group** is defined as students with met-standard rates equal to or greater than 75 percent.

There are no common definitions or criteria for identifying low and high performance. We selected the lower bound, 35 percent, to correspond approximately with the percentage of "disadvantaged" students who met standard on the 10th-grade WASL in spring 2006.<sup>4</sup> As for the upper bound, 75 percent is roughly equivalent to the on-time graduation rate in 2005.<sup>5</sup> Meeting standard on the WASL is now a prerequisite for graduation; as such, we reasoned that the graduation rate furnishes a useful performance threshold for our analysis.

<sup>4</sup> "Disadvantaged" students have one or more of the following characteristics: minority group status, in poverty, non-English speaking, enrolled in special education, a disability, or a parent who did not finish high school. In spring 2006, 34.1 percent of these students met standard on the WASL (see Exhibit 2).

<sup>5</sup> R. Barnoski & W. Cole. (2006). *A historic look at the WASL and high school graduation*. Olympia: Washington State Institute for Public Policy, Document No. 06-09-2202.



## DEMOGRAPHIC CHARACTERISTICS

**Exhibit 2** displays results for demographic categories of students with met-standard rates of less than or equal to 35 percent on the 10th-grade WASL in spring 2006.

On average, students with low WASL performance had one or more of the following demographic characteristics:

- Belonged to a racial or ethnic minority group (African American, Hispanic, or American Indian),
- Were in poverty,
- Were non-English speakers or English language learners,
- Had at least one documented disability,
- Were enrolled in special education, and/or
- Had parents who did not finish high school.

African American, American Indian, and Hispanic students collectively represented 16.9 percent of students who completed the WASL; in spring 2006, the met-standard rate for these students was 28.6 percent.

Students living in poverty—defined as students who were eligible for free or reduced-price meal benefits, and/or who received services from the Title I Targeted Assistance or Migrant Education programs—represented the largest group of students with a met-standard rate of less than 35 percent. These students accounted for 27.4 percent of WASL completers and had a met-standard rate of 33.1 percent.

Students with disabilities, representing 6.6 percent of students who completed the WASL, had the lowest met-standard rate (11.1 percent).

Students who possess one or more of the characteristics in Exhibit 2 comprise 42.5 percent of WASL completers, of whom 34.1 percent met standard on the WASL. The bottom row of **Exhibit 3** shows the number of these students who did not meet standard in each subject-area assessment of the WASL. Students with at least one of the characteristics in Exhibit 2 account for 78 percent of students who did not meet standard in reading, 75 percent of students who did not meet standard in writing, and 60 percent of students who did not meet standard in math.

**Exhibit 2**  
**Student Demographic Characteristics**  
Groups of Students With Met-Standard Rates  
Less Than or Equal to 35 Percent

Categories of students	Percent- age of students	Percentage met standard			
		All Three	Reading	Writing	Math
<b>All students</b>	100.0	54.2	86.3	84.3	54.9
<b>Race/Ethnicity</b>					
African American	4.4	26.5	73.6	73.3	26.5
Hispanic	9.9	28.0	68.3	65.7	28.6
American Indian	2.4	34.9	75.8	74.0	36.1
Any of the above	16.9	28.6	70.7	69.0	29.1
<b>Poverty</b>					
Free or reduced-price meal	27.1	33.2	73.2	71.0	34.1
Title I Migrant	2.3	17.3	56.9	53.4	19.3
Title I Targeted Assistance	1.8	16.5	56.4	54.0	17.8
Any of above	27.4	33.1	73.1	70.9	34.1
<b>Language</b>					
Primary language is not English	8.5	30.7	62.8	60.7	32.8
Primary language is Spanish	4.4	15.5	52.9	49.1	16.6
Non-Asian primary language	6.7	22.4	57.1	54.9	23.8
Bilingual program	4.3	12.0	41.4	38.7	16.1
English language learner	3.2	11.2	41.0	39.0	14.7
English as Second Language	0.2	9.2	21.6	17.8	11.2
<b>Disability</b>					
Special education	7.4	12.9	46.9	43.0	14.9
Has a disability	6.6	11.1	44.8	41.0	13.4
<b>Family Background</b>					
Parents did not finish high school	5.6	26.2	70.5	67.7	27.0
<b>Any of the above demographic characteristics</b>					
Yes	42.5	34.1	74.2	71.9	35.1
No	57.5	67.5	94.9	93.1	68.7

**Exhibit 3**  
**Students Who Did Not Meet Standard on the**  
**10th-Grade WASL in Spring 2006**

	Reading	Writing	Math
Students who completed the subject-area assessment	68,505	68,227	67,758
Students who did not meet standard (percentage of students who completed the assessment)	9,480 (14%)	10,841 (16%)	30,732 (45%)
Students who did not meet standard and who had at least one of the characteristics in Exhibit 2 (percentage of students who did not meet standard)	7,437 (78%)	8,083 (75%)	18,303 (60%)

## "PERFORMANCE-ORIENTED" CHARACTERISTICS

Exhibit 4 displays groups of students with met-standard rates on the 10th-grade WASL in spring 2006 at or below 35 percent by "performance-oriented characteristics," defined as characteristics that are a function of or related to a student's prior or current academic performance. For example, a student may adjust his or her educational aspirations based on prior achievement in classes or on tests.

With respect to performance-oriented characteristics, low-performing students:

- Had low GPAs,
- Were behind grade-level,
- Received services from a Learning Assistance Program,
- Had poor attendance records,
- Had poor study habits, and/or
- Did not aspire to continue their education beyond high school.

Students with a GPA of less than 1.0—representing 5.4 percent of students who took the WASL in spring 2006—had a 17.2 percent met-standard rate. Altogether, approximately one-quarter of the 36.4 percent of students with a GPA below 2.5 met standard on the WASL.

Students who received services from a Learning Assistance Program (3.5 percent of WASL completers in spring 2006) had the lowest met-standard rate—15.7 percent.

Exhibit 4 also shows that students who do not attend school regularly or who reported spending no time on homework also had low met-standard rates, but these students accounted for a small fraction of WASL completers.

Exhibit 5 displays WASL results for high-performing groups of students—that is, categories of students with met-standard rates of 75 percent or greater on the 10th-grade WASL in spring 2006.

Students with a GPA between 3.5 and 3.9 represented 22.3 percent of students who completed the WASL, and 86.6 percent of these students met standard in reading, writing, and math. Students with a GPA of 4.0, comprising 4.3 percent of WASL completers, had an overall met-standard rate of 96.7 percent.

The only other characteristics associated with met-standard rates above 75 percent were receipt of services from a gifted/highly capable program (2.4 percent of WASL completers) and students whose parent(s) hold an advanced post-graduate degree (17.7 percent of completers).

**Exhibit 4**  
**School Performance-Oriented Characteristics**  
**Groups of Students With Met-Standard Rates**  
**Less Than or Equal to 35 Percent**

Categories of students	Percentage of students	Percentage met standard			
		All Three	Reading	Writing	Math
All students	100.0	54.2	86.3	84.3	54.9
<b>Academic performance</b>					
GPA less than 1.0	5.4	17.2	60.3	57.5	17.8
GPA 1.0 to 1.9	16.7	20.3	70.2	66.3	22.8
GPA 2.0 to 2.4	14.4	32.5	81.1	77.7	35.4
GPA below 2.5	36.4	25.2	73.3	69.7	27.3
Behind grade level	2.5	22.2	60.3	56.6	21.0
Spends no time on homework	2.8	35.0	70.1	64.9	36.3
Adult helps with homework everyday	6.5	26.8	70.3	69.0	27.8
<b>Learning Assistance Program</b>					
Learning Assistance Program	3.5	15.7	64.1	59.0	17.6
<b>Enrollment/Attendance*</b>					
Enrolled less than 18 days during reporting month	1.2	28.8	69.4	64.9	28.7
Not enrolled in school	0.5	19.2	60.1	58.5	20.5
Attended less than 5 days during reporting month	0.5	28.2	64.5	62.0	28.1
Attended 6 to 10 days during reporting month	0.8	29.7	68.8	63.8	27.3
<b>Educational Aspirations</b>					
Not graduate high school	0.8	25.5	59.7	58.7	26.4
Graduate high school, no post-secondary	5.0	22.6	62.9	59.6	24.0
Vocational/trade school	19.1	33.5	78.3	74.5	36.1

\* The reporting month for attendance and enrollment data was October 2005.

**Exhibit 5**  
**Groups of Students with Met-Standard Rates Over 75 Percent**

Categories of students	Percentage of students	Percentage met standard			
		All Three	Reading	Writing	Math
GPA 3.5 to 3.9	22.3	86.6	98.3	97.7	87.3
GPA 4.0	4.3	96.7	99.2	98.8	97.2
Gifted/highly capable program	2.4	93.8	99.5	99.3	94.2
One parent attended post-graduate school	17.7	78.1	96.1	94.5	78.9

## WASL PERFORMANCE BY INDIVIDUAL CHARACTERISTICS

This section examines the relationship between student characteristics and WASL performance in greater detail.

### Demographic Factors

We begin with an analysis of the relationship between WASL performance and students' demographic characteristics.

#### Gender

In spring 2006, female students accounted for 49.6 percent of all 10th graders; correspondingly, 50.4 percent of students were male. Compared with male students, female students performed slightly worse in math, slightly better in reading, and substantially better in writing. Ninety percent of female students met standard in writing compared with 79 percent of male students.

#### Race/Ethnicity

White students, who accounted for nearly 75 percent of 10th graders in spring 2006, had the highest met-standard rate in reading (90 percent). Asian students, the second-largest minority group, had the highest met-standard rates in writing (88 percent) and math (63 percent). Met-standard rates in reading and writing were lowest for Hispanic students; conversely, African American students had the lowest average met-standard rate in math.

#### Primary Language Spoken

Students who speak English as their primary language had the highest met-standard rates in reading and writing.<sup>6</sup> Students who speak an Asian language had the highest met-standard rate in math. Among Spanish-speaking students, the largest foreign language group (4.4 percent of all students), 53 percent met standard in reading, 49 percent met standard in writing, and 17 percent met standard in math.

Exhibit 6: Gender

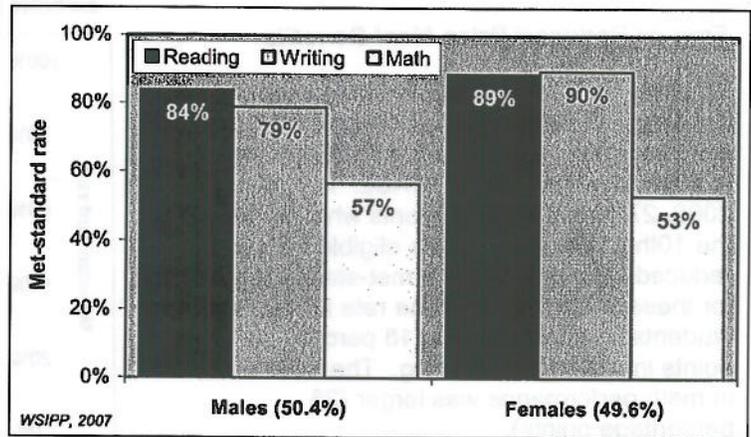


Exhibit 7: Race/Ethnicity

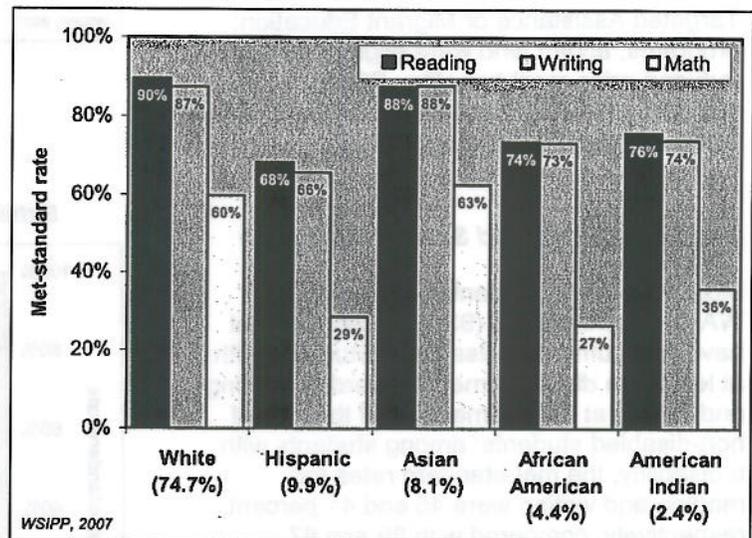
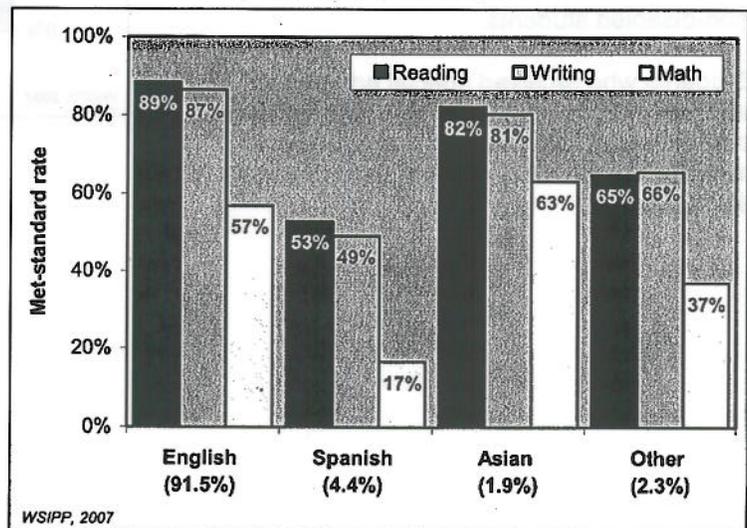


Exhibit 8: Primary Language Spoken



<sup>6</sup> In this exhibit, English-speaking students include students with missing language data, because the met-standard rates are identical.

### Free or Reduced-Price Meal Benefits

Eligibility for free or reduced-price meal benefits, a commonly used indicator of socioeconomic status, was also associated with performance on the WASL. In spring 2006, 27.1 percent of students who completed the 10th-grade WASL were eligible for free or reduced-price meals. The met-standard rate for these students trailed the rate for all other students by approximately 18 percentage points in reading and writing. The difference in math performance was larger (28 percentage points).

In this analysis, we define "poverty" status as students who received services from the Title I Targeted Assistance or Migrant Education programs, and/or who were eligible for free or reduced-price meal benefits. Slightly more students are considered to be in poverty when these additional criteria are included.

### Disability Status and Special Education

Most 10th-grade students who took the WASL in spring 2006 (93.4 percent) did not have a documented disability. Students with at least one disability met standard in reading and writing at approximately half the rate of non-disabled students: among students with a disability, the met-standard rates for reading and writing were 45 and 41 percent, respectively, compared with 89 and 87 percent for non-disabled students. In math, the met-standard rate for students with disabilities was less than one quarter that of non-disabled students.

Students who received special education services—6.5 percent of all 10th graders who participated in the WASL in spring 2006—met standard at rates similar to students with disabilities.

Exhibit 9: Eligibility for Free or Reduced-Price Meal Benefits

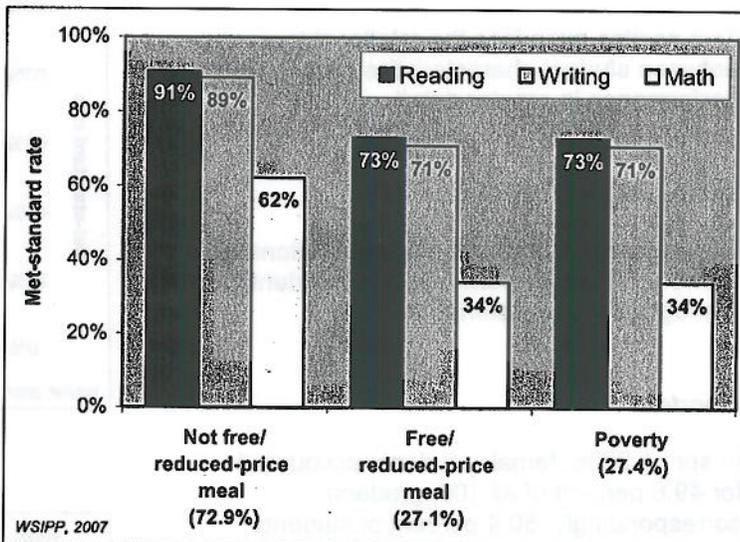
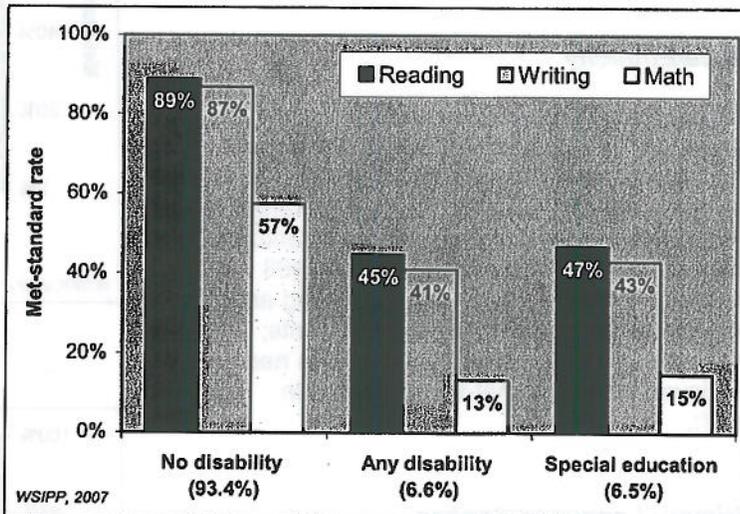


Exhibit 10: Disability Status and Special Education



## Family Background Factors

### Educational Attainment of Parents

Parents' educational attainment is an indicator of a student's family background. Students with at least one parent who graduated from college or attended graduate school had the highest met-standard rates on the WASL.<sup>7</sup> This pattern is particularly evident for math: 73 percent of students with at least one parent who graduated from college met standard in math compared with 55 percent of students whose parent(s) attended but did not graduate from college.<sup>8</sup>

### Use of Home Computer for School

A student's use of a home computer for school was positively associated with WASL results. Nearly 20 percent of 10th graders did not have a computer in their home one year before the WASL was administered.<sup>9</sup> Students who reported using a home computer for school had the highest met-standard rates for reading (91 percent), writing (90 percent), and math (62 percent).

Students with a computer at home, but who reported that it was not used for schoolwork, had much lower met-standard rates, especially in math. The results for students without a home computer are similar to those for students with a home computer but who did not use it for school. This suggests that it is the *use* of computers for school, rather than *access* to computers per se, that drives average WASL results upward.

Exhibit 11: Parents' Education

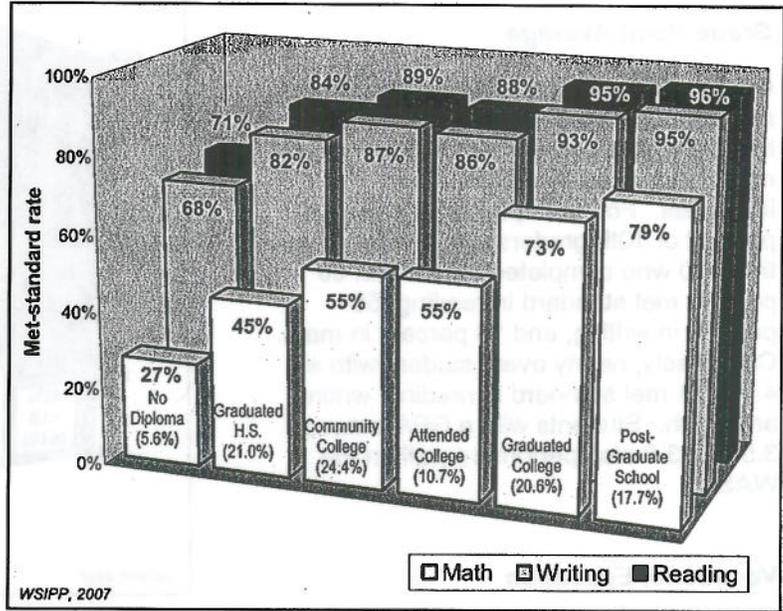
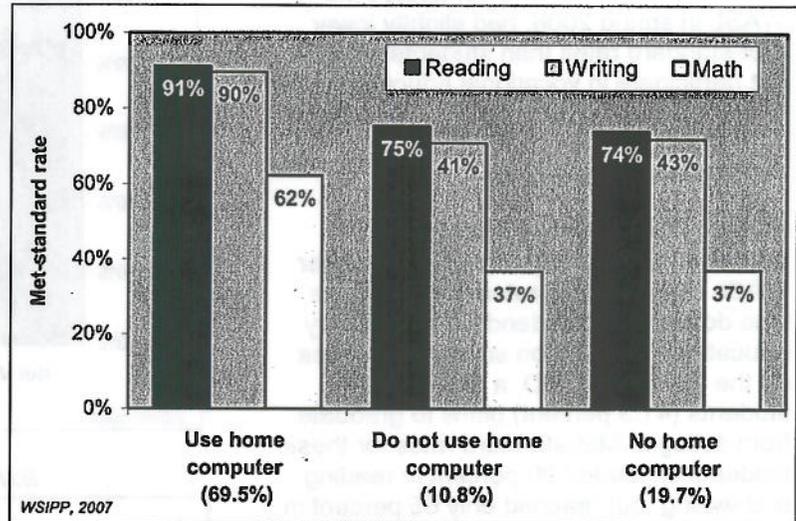


Exhibit 12: Use of Home Computer for School



<sup>7</sup> Based on students who answered this question on the 9th-grade Iowa Test of Educational Development survey; approximately 25 percent did not answer this item.

<sup>8</sup> The appendix disaggregates these data by reporting mother's and father's educational attainment separately.

<sup>9</sup> Based on students who answered this question on the 9th-grade Iowa Test of Educational Development survey; approximately 15 percent did not answer this item.

## Academic Performance and Aspirations

### Grade Point Average

Grade point average (GPA) was strongly related to WASL performance. As GPA increases, the percentage of students who met standard on the WASL also increases. For example, among the 5.4 percent of 10th graders with a GPA of less than 1.0 who completed the WASL, 60 percent met standard in reading, 58 percent in writing, and 18 percent in math. Conversely, nearly every student with a 4.0 GPA met standard in reading, writing, and math. Students with a GPA between 3.5 and 3.9 also performed well on the WASL.

### Vocational Education

Students who participated in vocational education programs, representing 34 percent of students who completed the WASL in spring 2006, had slightly lower met-standard rates than students who did not participate in vocational education.

### Educational Aspirations

Students who plan to continue their education beyond high school had higher WASL met-standard rates than students who do not plan to attend postsecondary education.<sup>10</sup> Based on survey responses on the 9th-grade ITED, a plurality of students (41.3 percent) plans to graduate from college. Met-standard rates for these students exceeded 90 percent in reading and writing, but reached only 65 percent in math. For the 22.7 percent of students who plan to attend graduate school, 75 percent met standard in math, 94 percent met standard in writing, and 95 percent met standard in reading.

<sup>10</sup> Based on students who answered this question on the 9th-grade Iowa Test of Educational Development survey; approximately 15 percent did not answer this item.

Exhibit 13: Grade Point Average

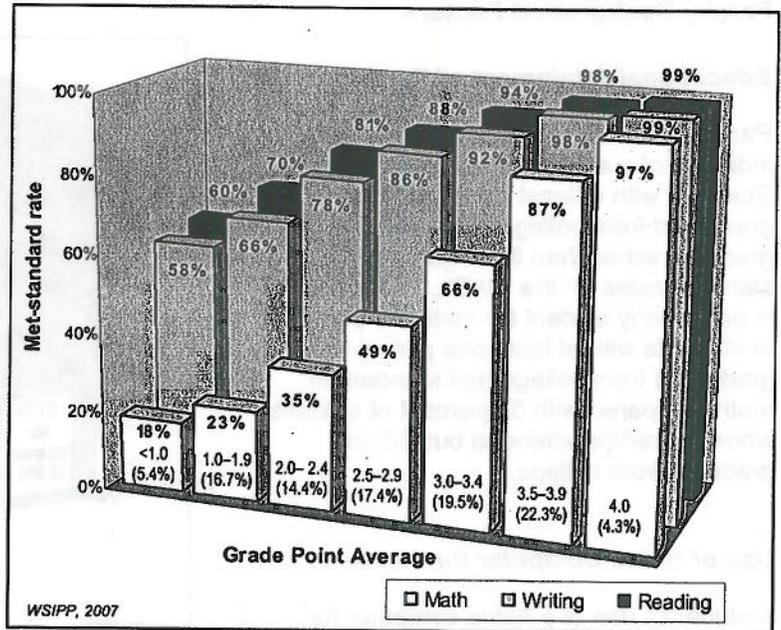


Exhibit 14: Vocational Education

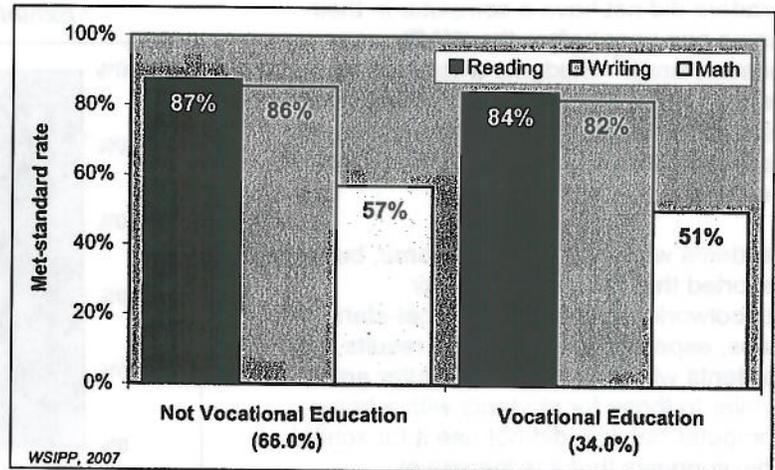
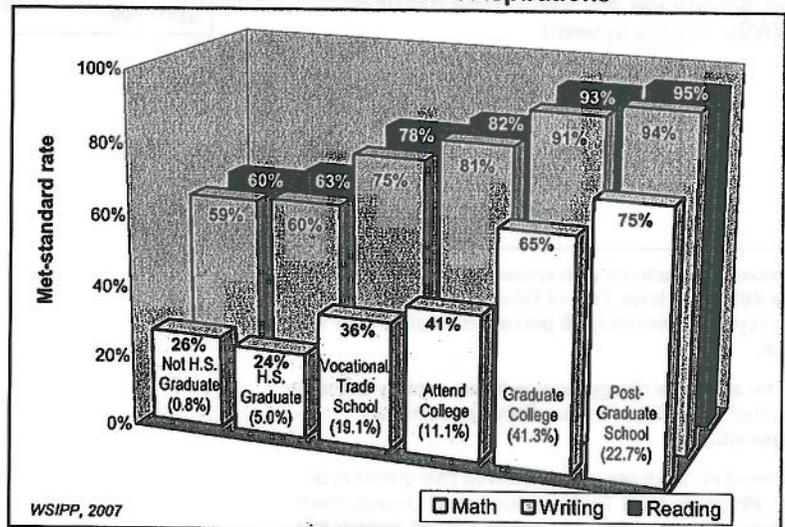


Exhibit 15: Educational Aspirations



## School Attendance and Study Habits

### Number of Days Attended

As the number of days a student attended school during October 2005 increased, met-standard rates also increased.<sup>11</sup>

Approximately 28 percent of students who attended 1 to 5 days of school in October 2005 met standard in math, compared with 62 percent in writing and 65 percent in reading. However, these students represented only 0.5 percent of all 10th graders.

Nearly half of students (49.2 percent) attended school for 20 or more days in the month. These students had the highest met-standard rates in reading (88 percent), writing (86 percent), and math (60 percent).

### Time Spent on Homework

Met-standard rates on the WASL increased as a student's self-reported time spent on homework increased.<sup>12</sup> The largest group of students (24.3 percent) reported spending between 4 and 6 hours per week on homework. More than 90 percent of these students met standard in reading and writing, and two-thirds met standard in math. Performance in math improved substantially among students who reported spending 7 to 9 hours on homework per week. The percentage of students who met standard in reading, writing, and math declined slightly among students who spent 10 or more hours on homework weekly.

### Time Spent Watching TV

As the number of hours that students spent watching TV during the school week increases, met-standard rates decrease, especially for math.<sup>13</sup> Of the 6.2 percent of students who reported watching 5 or more hours of TV, 36 percent met standard in math; this compares with a met-standard rate in math of 68 percent for students who did not watch TV during the school week.

<sup>11</sup> Attendance data reported in OSPI's Core Student Record System are based on October 2005 (fall enrollment) counts.

<sup>12</sup> Based on students who answered this question on the 9th-grade Iowa Test of Educational Development survey; approximately 15 percent did not answer this item.

<sup>13</sup> Ibid.

Exhibit 16: Days Attending School in Reporting Month

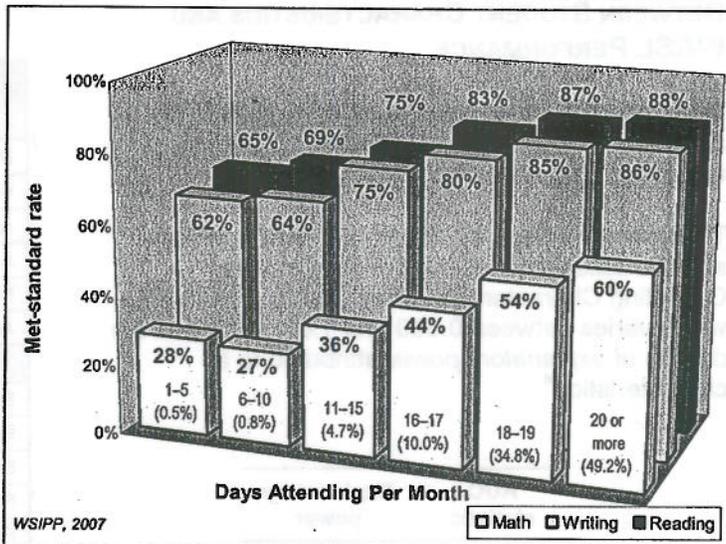


Exhibit 17: Time Spent on Homework Each Week

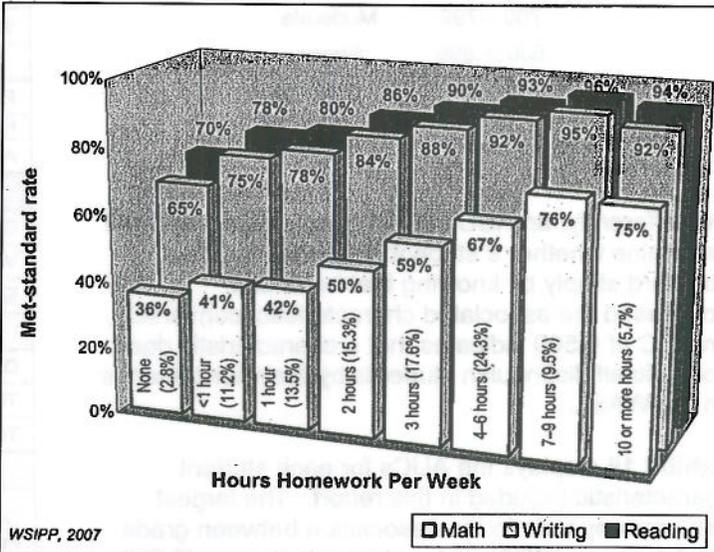
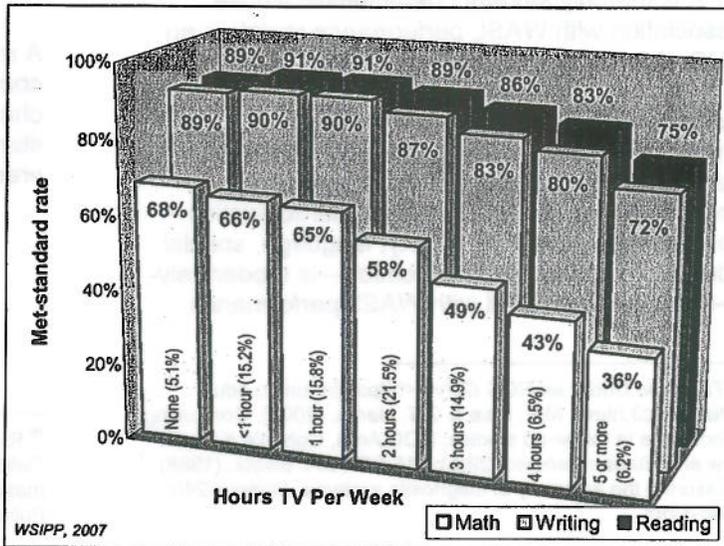


Exhibit 18: Hours Spent Watching TV



## MEASURING THE STRENGTH OF ASSOCIATION BETWEEN STUDENT CHARACTERISTICS AND WASL PERFORMANCE

This section summarizes the strength of the associations between each student characteristic and WASL met-standard rates.

The strength of association is measured using a statistic called the Area Under the Receiver Operating Characteristic Curve (AUC). The AUC, which varies between 0.500 and 1.00, describes the degree of *explanatory power* attributed to a characteristic.<sup>14</sup>

AUC statistic	Explanatory power
.500 – .599	None
.600 – .699	Weak
.700 – .799	Moderate
.800 – .899	Strong
.900 – .999	Very Strong
1.00	Full

Put differently, an AUC of 1.00 means that one could determine whether a student did or did not meet standard simply by knowing that he or she possessed the associated characteristic; conversely, an AUC of 0.500 indicates that a characteristic does not by itself distinguish students by their performance on the WASL.

Exhibit 19 displays the AUCs for each student characteristic included in this report. The largest AUC corresponds to the association between grade point average (GPA) and met-standard rates (0.780 for reading, 0.774 for writing, and 0.799 for math). GPA is the only student characteristic whose association with WASL performance registers an AUC of 0.700 or greater.

Considered individually, most student characteristics are weakly associated with meeting standard in each content area. However, a combination of six demographic characteristics—gender, race/ethnicity, poverty, language, special education, and parents' education—is moderately-to-strongly associated with WASL performance.

<sup>14</sup> *The Area Under an ROC Curve* <<http://jim.unmc.edu/dxtests/roc3.htm>>; M.E. Rice & G.T. Harris. (2005). Comparing effect sizes in follow-up studies: ROC Area, Cohen's *d*, and *r*. *Law and Human Behavior* 29(5): 615-620; J.A. Swets. (1988). Measuring the accuracy of diagnostic systems. *Science* 240: 1285-1293.

Exhibit 19  
Measuring the Strength of Associations: AUCs

Student Characteristics	Reading	Writing	Math
<b>Demographics</b>			
Males	0.550	0.602	0.518
White	0.603	0.585	0.573
African American	0.523	0.518	0.525
Asian	0.505	0.511	0.513
Hispanic	0.574	0.569	0.551
American Indian	0.510	0.509	0.509
<b>Primary Language</b>			
English speakers	0.561	0.554	0.527
English language learners	0.560	0.553	0.525
English spoken at home	0.586	0.583	0.552
Poverty	0.650	0.635	0.611
Free/reduced-price meals	0.647	0.633	0.610
<b>Disability/Special Education</b>			
Disability	0.606	0.593	0.547
Special education	0.612	0.600	0.551
<b>Family Background</b>			
Parents' education	0.680	0.667	0.666
Home computer for school	0.646	0.641	0.604
Access to the internet	0.621	0.611	0.587
<b>Academic Performance</b>			
GPA	0.780	0.774	0.799
Vocational education	0.530	0.530	0.530
Educational aspirations	0.689	0.684	0.677
<b>Attendance/Study Habits</b>			
Days attending school	0.560	0.552	0.571
Time spent on homework	0.670	0.665	0.648
Time spent watching TV	0.614	0.616	0.614
<b>Combination of Characteristics</b>			
Gender, Race/Ethnicity, Poverty, Language, Special education, Parents' education	0.800	0.798	0.736

A multivariate analysis conducted by the Institute concluded that demographic and performance-oriented characteristics are strongly predictive of who meets standard in reading and writing, but are somewhat less predictive of who meets standard in math.<sup>15</sup>

<sup>15</sup> R. Barnoski & W. Cole. (2007). *Tenth-grade WASL in spring 2006: Relative strength of associations between student characteristics and met-standard rates*. Olympia: Washington State Institute for Public Policy, Document No. 07-01-2206.

**APPENDIX:**  
**10th-Grade WASL Results in Spring 2006**

**Exhibit A1**  
**Students' Demographic Characteristics**

Categories of students	Percentage share of students	Percentage met standard		
		Reading	Writing	Math
<b>Total</b>	<b>100.0</b>	<b>86.3</b>	<b>84.3</b>	<b>54.9</b>
<b>Gender</b>				
Female	49.6	88.7	89.7	53.1
Male	50.4	83.9	78.9	56.6
<b>Race/Ethnicity</b>				
White	74.7	89.6	87.4	59.7
Hispanic	9.9	68.3	65.7	28.6
Asian	8.1	87.6	87.8	62.6
African American	4.4	73.6	73.3	26.5
American Indian	2.4	75.8	74.0	36.1
Multiethnic	0.5	86.1	85.1	48.0
Non-Asian minorities	16.9	70.7	69.0	29.1
<b>Poverty</b>				
Free or reduced lunch eligibility	27.1	73.2	71.0	34.1
Migrant	2.3	56.9	53.4	19.3
Title I	1.8	56.4	54.0	17.8
Any one of the above	27.4	73.1	70.9	34.1
None of the above	72.6	91.1	89.2	62.4
<b>Language</b>				
<b>Student's primary language</b>				
English	91.5	88.5	86.5	56.9
Spanish	4.4	52.9	49.1	16.8
Asian	1.9	82.3	80.5	63.3
Other	2.3	65.0	65.7	37.0
Non-Asian Foreign Language	6.7	57.1	54.9	23.8
Bilingual	4.3	41.4	38.7	16.1
<b>Language spoken at home</b>				
Only English	61.0	89.8	87.9	59.5
Sometimes another language	25.5	83.9	82.5	51.1
More often another language	13.5	74.3	71.3	40.4
English as a Second Language	0.2	21.6	17.8	11.2
English Language Learner	3.2	41.0	39.0	14.7

**Exhibit A2**  
**Students' Disability and Special Needs Status**

Categories of students	Percentage share of students	Percentage met standard		
		Reading	Writing	Math
No disability	93.4	88.9	86.9	57.4
Any disability	6.6	44.8	41.0	13.4
Specific learning disabilities	4.0	41.6	36.6	10.7
Health	1.7	50.2	46.3	14.6
Emotional/behavioral	0.4	45.0	41.8	16.3
Autism	0.2	59.6	62.0	30.9
Communication	0.2	61.4	62.2	32.0
Hearing	0.1	57.8	67.9	26.8
Mental Retardation	0.1	1.9	8.9	0.0
Visual	<0.1	61.9	60.9	22.7
Orthopedic	<0.1	70.6	66.7	36.8
Deafness	<0.1	25.0	29.4	5.9
Multiple disabilities	<0.1	42.9	41.7	20.0
Traumatic brain	<0.1	25.0	30.8	18.2
Deaf/blindness	<0.1	100.0	100.0	100.0
Special education services	7.4	46.9	43.0	14.9
Section 504	1.2	85.8	81.9	50.2
Learning Assistance Program	3.5	64.1	59.0	17.6
Individual Education Plan	<0.1	25.0	16.0	12.5

*Note:* Section 504 refers to the component of the Rehabilitation Act of 1973 which prohibits discrimination on the basis of a disability. Students with a Section 504 plan are considered disabled but do not meet the eligibility criteria for receipt of special education services because the disability can be accommodated.

**Exhibit A3**  
**Academic Performance and Aspirations**

Categories of students	Percentage share of students	Percentage met standard		
		Reading	Writing	Math
Grade point average*				
Less than 1.0	5.4	60.3	57.5	17.8
1.0 to 1.9	16.7	70.2	66.3	22.8
2.0 to 2.4	14.4	81.1	77.7	35.4
2.5 to 2.9	17.4	88.3	85.8	48.6
3.0 to 3.4	19.5	93.7	92.4	66.0
3.5 to 3.9	22.3	98.3	97.7	87.3
4.0	4.3	99.2	98.8	97.2
Gifted/highly capable program	2.4	99.5	99.3	94.2
Behind grade level	2.5	60.3	56.6	21.0
Vocational education				
Not vocational education	65.9	87.4	85.5	57.1
Vocational education	34.1	84.2	82.0	50.5
Educational aspirations (ITED)				
Not graduate high school	0.8	59.7	58.7	26.4
Graduate high school	5.0	62.9	59.6	24.0
Vocational trade school	19.1	78.3	74.5	36.1
Attend college	11.1	81.7	80.6	41.2
Graduate from college	41.3	93.1	91.5	64.7
Attend post graduate school	22.7	94.7	93.5	75.0

\*6.4% of students were missing a GPA

**Exhibit A4**  
**Students' Attendance Record**

Categories of students	Percentage share of students	Percentage met standard		
		Reading	Writing	Math
Not enrolled	0.5	60.1	58.5	20.5
Enrolled fewer than 18 days during reporting month	1.2	69.4	64.9	28.7
Days attended this month				
1 to 5 (up to one week)	0.5	64.5	62.0	28.1
6 to 10 (up to two weeks)	0.8	68.8	63.8	27.3
11 to 15 (up to three weeks)	4.7	74.6	75.2	35.8
16 to 17	10.0	82.7	79.8	43.9
18 to 19	34.8	86.8	85.0	53.9
20 or more	49.2	88.1	86.1	59.9
Unexcused absences this month				
None	89.9	87.2	85.2	56.4
One	5.8	81.0	78.2	43.9
Two or more	4.2	72.5	72.6	35.2

**Exhibit A5**  
**Students' Self-Reported Study Habits**

Categories of students	Percentage share of students	Percentage met standard		
		Reading	Writing	Math
Adult help with homework				
Never	34.5	88.5	86.2	60.6
1-2 times a month	39.8	91.7	89.8	63.2
1-2 times a week	19.1	84.0	82.5	47.4
Everyday	6.5	70.3	69.0	27.8
Time spent on homework each week				
None	2.8	70.1	64.9	36.3
Less than 1 hour	11.2	78.3	74.8	41.0
1 hour	13.5	80.2	78.1	41.6
2 hours	15.3	85.5	83.7	49.6
3 hours	17.6	89.9	88.4	58.7
4-6 hours	24.3	93.4	91.6	66.6
7-9 hours	9.5	95.8	94.9	75.6
10 or more hours	5.7	93.6	92.2	75.1
Hours a day spent watching TV				
Not at all	5.9	89.1	88.6	67.8
Less than 1 hour	17.9	90.9	90.1	65.9
1 hour	18.6	91.3	89.7	64.9
2 hours	25.2	89.0	86.7	57.8
3 hours	17.4	85.5	83.2	49.2
4 hours	7.7	82.8	80.0	42.9
5 or more hours	7.2	75.3	71.7	36.1

**Exhibit A6**  
**Family Background: Parents' Education**

Categories of students	Percentage share of students	Percentage met standard		
		Reading	Writing	Math
<b>Mother's education (ITED)</b>				
Did not finish high school	8.2	74.5	72.1	31.6
Graduated high school	19.5	87.4	84.7	50.6
Community/technical school	17.0	90.3	88.4	58.6
Attended 4-year college	6.7	89.6	88.0	59.9
Graduated 4-year college	12.8	95.7	94.2	76.4
Post graduate school	7.4	96.0	94.1	78.6
Not sure	13.4	79.0	77.3	45.6
<b>Father's education (ITED)</b>				
Did not finish high school	8.5	75.8	72.5	33.6
Graduated high school	18.6	87.2	84.5	50.6
Community/technical school	12.9	90.4	88.1	58.4
Attended 4-year college	5.9	89.6	88.0	59.7
Graduated 4-year college	12.1	95.7	94.1	76.5
Post graduate school	9.6	96.7	95.5	81.3
Not sure	17.4	80.3	79.0	44.6
<b>Parent's education—either mother or father</b>				
Did not finish high school	5.6	70.5	67.7	27.0
Graduated high school	21.0	84.5	81.9	44.7
Community/technical school	24.4	89.4	87.2	55.3
Attended 4-year college	10.7	87.6	86.0	54.7
Graduated 4-year college	20.6	94.7	93.1	72.8
Post graduate school	17.7	96.1	94.5	78.9

**Exhibit A7**  
**Access to Technology at Home**

Categories of students	Percentage share of students	Percentage met standard		
		Reading	Writing	Math
<b>Use home computer for school</b>				
Yes	69.5	91.2	89.6	62.2
No	10.8	75.4	70.9	36.9
No home computer	19.7	74.1	72.0	37.3
<b>Internet access at home</b>				
Yes	73.5	90.2	88.3	60.7
No	26.5	75.1	72.9	37.9

1. The following information is required to be provided to the relevant authorities in order to ensure compliance with the relevant legislation. The information should be provided in the following format:

2. The information should be provided in the following format:

3. The information should be provided in the following format:

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9. The information should be provided in the following format:

10. The information should be provided in the following format:

For further information, please contact:  
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*Washington State  
Institute for  
Public Policy*

The Washington State Legislature created the Washington State Institute for Public Policy in 1983. A Board of Directors—representing the legislature, the governor, and public universities—governs the Institute and guides the development of all activities. The Institute's mission is to carry out practical research, at legislative direction, on issues of importance to Washington State.

February 2007

## Alternative Assessment Options for High School Graduation: Interim Report

The 2006 Legislature directed the Washington State Institute for Public Policy (Institute) to "explore options to augment the current system of assessments to provide additional opportunities for students to demonstrate that they have met the state learning standards."<sup>1</sup>

**This report reviews the three options currently used in Washington's assessment system and considers four additional alternatives.**

The study legislation directs the Institute to consult with experts and stakeholders to identify assessment options for review. The appendix to this report summarizes the consultation process and the content of stakeholder input received to date.

The Legislature also requested that the Institute's interim report "include recommendations on at least two alternative assessment options, alternative methods, procedures, or performance measures that were reviewed."<sup>2</sup> Based on the following review, the Institute recommends that:

**1) The number of alternative assessment options should be limited.**

*Feedback from stakeholders indicates that the complexities involved with implementing alternative assessments increase as the number of options increase.*

**2) An option's potential to improve student outcomes should be balanced with the cost and complexity of its implementation.**

*Given two alternative assessments with the same potential to increase met-standard rates,<sup>3</sup> the option that is the least costly and difficult to implement is preferred. In light of our first recommendation, we propose that more effective options should supplant less effective ones.*

<sup>1</sup> SSB 6618 § 2 (1), Chapter 352, Laws of 2006.

<sup>2</sup> SSB 6618 § 2 (3), Chapter 352, Laws of 2006.

<sup>3</sup> Throughout this report, "met-standard" rates refer to the percentage of students who meet state learning standards on the Washington Assessment of Student Learning (WASL).

### Summary

The 2006 Legislature directed the Institute to "explore options to augment the current system of assessments to provide additional opportunities for students to demonstrate that they have met the state learning standards."

Students in Washington are required to "meet standard" on the 10th-grade reading, writing, and math Washington Assessment of Student Learning (WASL) to graduate from high school. The 2006 Legislature authorized three alternative assessment options to provide students who do not meet standard on the WASL twice with additional ways to demonstrate academic achievement: the Collection of Evidence (COE), GPA subject-area cohort, and PSAT/SAT/ACT exam scores.

In most other states with alternative assessment options, few students (2 percent or less) graduate by taking an alternative assessment. In Washington, nearly 50 percent of students in the class of 2008 are currently or potentially eligible to take an alternative to the WASL.

This report examines the three alternative assessments authorized in Washington as well as college placement exams, comprehensive achievement tests, overall GPA, and segmented math exams. The review finds that standardized tests and grade-based options are relatively inexpensive and easy to implement, but have low potential to increase the percentage of students who meet standard. Washington's COE has higher potential to increase met-standard rates, but incurs greater implementation costs and complexities. In contrast, diagnostic segmented math exams have lower implementation costs but high potential to improve student outcomes.

**3) Alternative assessments that are diagnostic should be considered.**

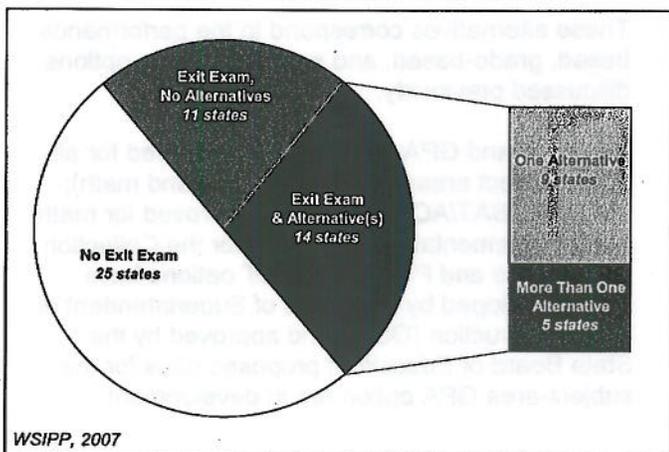
*Once developed, diagnostic exams are relatively inexpensive to administer and have the greatest potential to increase met-standard rates, because they can be used to identify areas in need of improvement.*



**Exhibit 2**  
**Types of Substitute Exams**

Type of Exam	Examples/Details
College admissions	PSAT, SAT, ACT
College placement	ASSET, COMPASS, ACCUPLACER
Comprehensive achievement	National Assessment of Educational Progress (NAEP), Iowa Test of Educational Development (ITED), Iowa Test of Basic Skills (ITBS), Measures of Academic Progress (MAP), Comprehensive Test of Basic Skills (CTBS)
Career skill certification	Industry-specific certification exams; ACT Workkeys
General Educational Development (GED)	This option assumes that students would stay in high school to graduate after they obtain a GED
End of course	Exams administered at the end of specific courses by content area, including "segmented" math exams
Language proficiency	Test of English as a Foreign Language (TOEFL); Washington Language Proficiency Test (WLPT)

**Exhibit 3**  
**States by Exit Exam Status and Number of Authorized Alternatives**



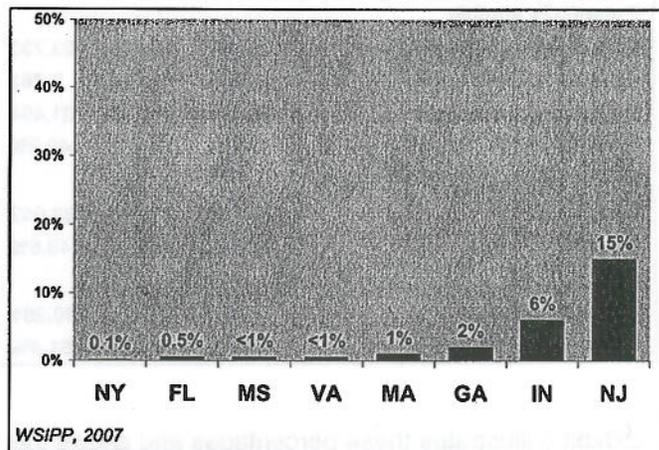
Of the 14 states that have authorized an alternative assessment option, nine states<sup>11</sup> authorize a single option and five states<sup>12</sup> authorize more than one option (see Exhibit 3). Washington and Indiana authorize all three types of alternative assessment options.<sup>13</sup>

**Student Eligibility for Alternatives**

In all 14 states that have authorized alternative assessments for high school graduation, students must first take the state exit exam at least once before pursuing an alternative. In Washington, students are required to take and not meet standard on the WASL twice before becoming eligible to take an alternative assessment.

In other states, relatively few students take alternative assessments. Exhibit 4 displays the percentage of students who graduated by taking an alternative assessment in eight states that track this information. In six of these states, 2 percent or fewer of high school graduates in 2005 took an alternative assessment. In New Jersey, 15 percent of high school graduates participated in an alternative assessment; because of this relatively high percentage, education and business leaders in New Jersey have decried alternative assessments as a "loophole" around state learning standards.<sup>14</sup>

**Exhibit 4**  
**Percentage of Students Graduating Via Alternative Assessments, Other States 2005**



<sup>11</sup> Alabama, Arizona, Florida, Georgia, New Jersey, North Carolina, Virginia, Mississippi, and Ohio.

<sup>12</sup> Idaho, Indiana, Massachusetts, New York, and Washington.

<sup>13</sup> In Indiana, substitute test scores and performance-based assessments are both linked with grades. For example, to graduate by taking a substitute exam alternative (in this case a workforce readiness assessment), Indiana students must also maintain a C average in courses required for high school graduation.

<sup>14</sup> C. Gewertz. (2006). Raising bar in N.J. includes closing test loophole. *Education Week* 26(8): 1-14.

A much larger share of Washington students will likely use alternative assessments as a pathway to graduation. Exhibit 5 displays the number of Washington students currently and potentially eligible to take an alternative assessment by subject area. To be "eligible" for an alternative assessment, a student must have not met standard on the WASL twice.

Currently, more students are eligible to take an alternative assessment in math compared with reading and writing: to date, 6,548 students have taken the math WASL twice without meeting standard. An additional 31,494 students are potentially eligible to take an alternative math assessment: 23,733 did not meet standard on their first try and 7,761 have not yet taken the WASL due to absence or other reasons.<sup>15</sup>

Overall, for the class of 2008, up to 21 percent of Washington students in reading, 22.3 percent in writing, and 48.6 percent in math could take an alternative assessment to graduate from high school.

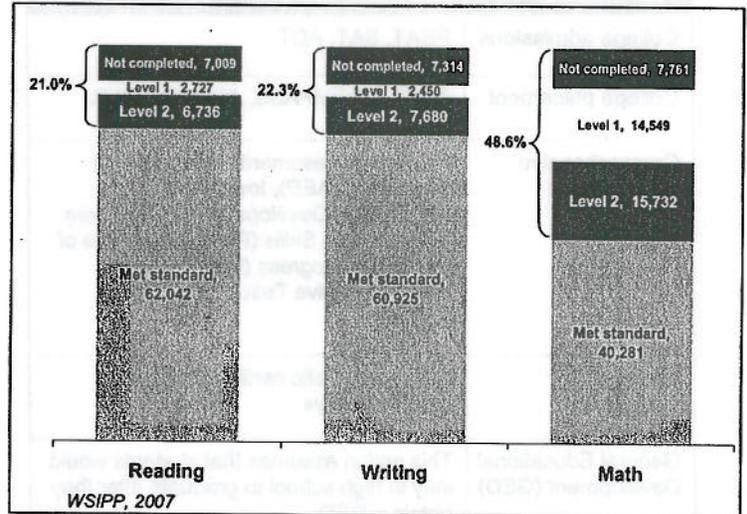
**Exhibit 5**  
**Washington Class of 2008 Students by Eligibility for Alternative Assessment Options**

	Reading	Writing	Math
<b>Students slated to take the spring 2006 WASL</b>			
Total	78,514	78,369	78,323
<b>Currently eligible</b>			
Did not meet standard twice	1,058	831	6,548
Percentage currently eligible	1.3%	1.1%	8.4%
<b>Potentially eligible</b>			
Did not meet standard once	8,405	9,299	23,733
Have not yet taken WASL	7,009	7,314	7,761
Total potentially eligible	15,414	16,613	31,494
Percentage potentially eligible	19.6%	21.2%	40.2%
<b>Currently or potentially eligible</b>			
Total	16,472	17,444	38,042
Percent	21.0%	22.3%	48.6%
<b>Not eligible</b>			
Met standard	62,042	60,925	40,281
Percentage not eligible	79.0%	77.7%	51.4%

Exhibit 6 illustrates these percentages and shows the performance levels of students who have not yet met standard. For example, of the 9,463 students who have taken but not yet met standard on the reading WASL, 2,727 students performed at Level 1 (Below Basic) and 6,736 performed at Level 2 (Basic). In contrast, 62,042 students performed at Level 3 (Proficient) or Level 4 (Advanced) on the reading WASL.

<sup>15</sup> A forthcoming Institute report will examine the characteristics of students in the class of 2008 who have not yet completed the WASL.

**Exhibit 6**  
**Class of 2008 Students by WASL Status**  
(Based on Spring and Summer 2006 WASL Results)



### WASHINGTON'S ALTERNATIVE OPTIONS

The 2006 Washington State Legislature approved three alternative assessment options that students may use to meet high school graduation requirements:

- Collection of Evidence (COE),
- GPA Subject-Area Cohort, and
- PSAT/SAT/ACT substitute exam scores.<sup>16</sup>

These alternatives correspond to the performance-based, grade-based, and substitute exam options discussed previously.

The COE and GPA options were approved for all three subject areas (reading, writing, and math); the PSAT/SAT/ACT option was approved for math only. Implementation guidelines for the Collection of Evidence and PSAT/SAT/ACT options have been developed by the Office of Superintendent of Public Instruction (OSPI) and approved by the State Board of Education; proposed rules for the subject-area GPA option are in development.

<sup>16</sup> ESSB 6475, Chapter 115, Laws of 2006. These options are distinct from the Washington Alternate Assessment System (WAAS) for special education students. Results from those alternate assessments are covered in a separate Institute report: W. Cole & R. Barnoski. (2006). *Tenth-grade alternate assessments for special populations: Summary results*. Olympia: Washington State Institute for Public Policy. Available at: <<http://www.wsipp.wa.gov/rptfiles/06-11-2202.pdf>>.

**Performance-based assessment: Collection of Evidence.** The Collection of Evidence (COE) is a portfolio of classroom work samples prepared by students. Teachers oversee the compilation process. OSPI developed content guidelines and administrative protocols for implementing the COE.<sup>17</sup> The COE will be centrally scored by a panel of trained teachers.

The legislation that authorizes the COE option contains special provisions for career and technical education (CTE) students.<sup>18</sup> CTE student work samples must be relevant to their CTE program and also address general state learning standards (the Essential Academic Learning Requirements or EALRs). Students using this option must also attain a state or nationally recognized industry certificate or credential.

**Grade-based option: GPA subject-area cohort.** Under this option, a student's GPA in English/language arts or math classes is compared with the average GPA for a "cohort" of six or more students who: attended the same school, took the same subject-area courses, and met or slightly exceeded standard on the WASL. If the student's subject-area GPA is equal to or higher than the cohort's average GPA, the student is deemed to have met standard in that subject area. OSPI is currently developing rules for implementing this option, subject to approval by the State Board of Education.<sup>19</sup>

**Substitute exams: PSAT/SAT/ACT (math only).** A student who does not meet standard on the math WASL twice can substitute his or her score from the math section of the PSAT, SAT, or ACT.<sup>20</sup> Exhibit 7 displays the scores students must obtain on each of these tests to meet standard. The State Board of Education set these cut scores based on an OSPI analysis of the SAT and WASL results.<sup>21</sup> School districts submit a form to OSPI to document the students who become eligible for high school graduation under this option.<sup>22</sup>

<sup>17</sup> These guidelines and protocols were approved by the State Board of Education on October 27, 2006. The OSPI-developed COE handbook can be found at: <<http://www.k12.wa.us/assessment/CAAoptions/pubdocs/CAAoptionsHandbook2007.pdf>>.

<sup>18</sup> ESSB 6475 § 1 (6) (b), Chapter 115, Laws of 2006.

<sup>19</sup> For more detail, see: <<http://www.k12.wa.us/ProfPractices/adminresources/RulesProcess/WebNotice392-501.doc>>.

<sup>20</sup> Students can use PSAT, SAT, or ACT scores obtained prior to taking the WASL or take one of these exams later.

<sup>21</sup> J. Wilhoft. (2006). *Using mathematics portion of SAT, ACT, or PSAT as an alternative for the Certificate of Academic Achievement*. Olympia: Office of Superintendent of Public Instruction. See:

<<http://www.sbe.wa.gov/meetings/lastmeeting/nov06/SAT-ACT-PSATcuts.ppt>>.

<sup>22</sup> For a copy of this form, see: <<http://www.k12.wa.us/assessment/CAAoptions/pubdocs/1632.doc>>.

**Exhibit 7**  
**Washington "Met-Standard" Cut Scores for PSAT, SAT, and ACT Math Tests**

	PSAT	SAT	ACT
Washington cut score	47	470	19
Minimum possible score	20	200	1
Maximum possible score	80	800	36

## ASSESSMENT OPTIONS REVIEW

The 2006 Legislature directed the Institute to "explore options to augment the current system of assessments to provide additional opportunities for students to demonstrate that they have met the state learning standards."<sup>23</sup> For this report, the Institute reviewed the three options authorized in Washington State:

- Collection of Evidence;
- GPA Subject-Area Cohort; and
- PSAT/SAT/ACT substitute exam scores.

The Institute also reviewed four additional options:

- College placement exams that evaluate students' readiness for college-level courses in reading, writing, and math (such as ASSET, COMPASS, and ACCUPLACER);
- Comprehensive achievement tests (such as the Iowa Test of Educational Development and National Assessment of Educational Progress);
- Overall GPA (based on grades from all courses, without reference to subject area); and
- Segmented math exams (two types):
  - 1) End-of-course exams that function as a summative assessment (i.e., determine whether students have mastered the content), and
  - 2) Diagnostic exams that contain a sufficient number of items to identify student strengths and weaknesses in a given subject area or "strand."<sup>24</sup> Diagnostic

<sup>23</sup> SSB 6618 § 2 (1) Chapter 352, Laws of 2006.

<sup>24</sup> As the WASL is currently designed, individual strands do not contain enough test items to ensure reliability. Increasing the number of items that correspond to a particular strand would increase the reliability of test results, which could then be used to diagnose areas in need of improvement. W. Cole & R. Barnoski. (2006). *Tenth-grade WASL strands: Student performance varies considerably over time*. Olympia: Washington State Institute for Public Policy, Document No. 06-11-2205.

exams can be administered during and at the end of a course.<sup>25</sup>

**Legislative Review Criteria.** We reviewed each of these options according to the following criteria established in the legislative study assignment:

- Compliance with RCW 28A.655.061(1), which states that “alternative assessments for each content area shall be **comparable in rigor** to the skills and knowledge that the student must demonstrate on the Washington assessment of student learning”;
- **Reliability** in measuring a student’s ability to meet state learning standards;
- Whether assessment procedures or methods could be **standardized** across the state;
- **Costs** for implementation; and
- **Challenges to implementation**, including any legislative action necessary for implementation.

In addition to these legislative criteria, we examined each option according to the anticipated impact on student outcomes: **the potential to increase met-standard rates.** If the goal of alternative assessments is to enable “students to demonstrate achievement of the state standards in content areas in which the student has not yet met the standard,”<sup>26</sup> then an effective option should, in addition to satisfying the criteria established by the Legislature, also serve to increase overall met-standard rates.

The following sections summarize the Institute’s findings to date according to these review criteria. Alternative assessment options are grouped by their potential to increase met-standard rates. The report does not evaluate the cultural appropriateness of alternative assessments, another legislatively mandated review criterion; our work on this complex topic is ongoing and will be addressed in a forthcoming report.

<sup>25</sup> The 2006 Washington State Legislature directed OSPI to develop “a new tenth grade mathematics assessment tool that: (i) presents the mathematics essential learnings in segments for assessment; (ii) is comparable in content and rigor to the tenth grade mathematics WASL when all segments are considered together; and (iv) can be used to determine a student’s academic performance level.” ESSB 6386 § 512 (2) (a), Chapter 372, Laws of 2006.

<sup>26</sup> RCW 28A.655.065(2).

### **Substitute Exams and Grade-Based Options: Low Potential to Increase Met-Standard Rates**

Substitute exams and grade-based options have a low potential to increase met-standard rates.

Nationally available **substitute exams**, such as college admissions tests, college placement tests, and comprehensive achievement tests, are relatively inexpensive, easy to implement, and standardized. Moreover, through the process of establishing cut scores, a level of rigor comparable to the WASL can be established.

However, met-standard rates are unlikely to increase substantially if substitute exams are comparable in rigor, because similar levels of academic preparation and skill are required for students to perform well on all these tests. Exhibit 8 displays correlations between SAT and WASL scores. Correlations range between 0 and 1, with higher correlations indicating stronger associations between exam scores.

The correlations between SAT math scores, which students may currently use to substitute for performance in math after two unsuccessful attempts to meet standard, and WASL math scores exceed 0.70. These moderately strong correlations mean that, on average, students who do poorly on the math WASL w also do poorly on the SAT and ACT. WASL reading scores are also moderately correlated with SAT verbal scores (0.63) and suggest a similar relationship.

**Exhibit 8  
Correlations Between SAT and WASL Scores**

Reading WASL and SAT Verbal	Writing WASL and SAT Verbal	Math WASL and SAT Math
0.63	0.19	0.79

Source: Institute analysis of SAT and WASL data. WASL data include 10th grade scores from 2001–02 and 2002–03 covering approximately 46,000 students (the precise number varies by subject area). Covering the same students, the SAT data are from 2004 and 2005.

Prior research has found similar relationships between WASL and other test scores. Exhibit 9 displays correlations reported in prior studies for comparison purposes. College admissions and comprehensive achievement test scores correlate more strongly with WASL scores than do college placement test scores. Across all types of tests, correlations with WASL scores are strongest in math.

**Exhibit 9**  
**Prior Studies' Correlations Between**  
**Substitute Exam and WASL Scores**

	Reading	Writing	Math
<b>College admissions tests</b>			
SAT	0.60	0.38	0.75
ACT	0.64	0.41	0.71
<b>College placement tests</b>			
ASSET	0.48	0.43	0.60
COMPASS	0.38	0.36	0.43
ACCUPLACER	0.34	0.37	n/a
<b>Comprehensive achievement tests</b>			
NAEP (grade 4)	0.60	n/a	0.68
NAEP (grade 7)	0.61	n/a	0.76

Sources: D. McGhee. (2003). *The relationship between WASL scores and performance in the first year of university*. Seattle: University of Washington Office of Educational Assessment; D. Pavelchek, P. Stern, & D. Olson. (2002). *Relationship of the Washington Assessment of Student Learning (WASL) and placement tests used at community and technical colleges*. Olympia: Washington State University-Social & Economic Services Research Center; K. Sprigg. (2005). *Relationship between performance on the 2003 National Assessment of Educational Progress and Washington Assessment of Student Learning*. Olympia: Office of Superintendent of Public Instruction.

The content and format of tests designed for different purposes (e.g., to measure college readiness rather than mastery of state learning standards) may not perfectly match the skills and knowledge measured by the WASL. An in-depth study conducted by Dr. David Conley and staff at the Center for Educational Policy Research examined the feasibility of implementing various alternative assessment options in Washington.<sup>27</sup>

As part of Dr. Conley's study, substitute test items and content descriptions were compared with Washington's math standards (the EALRs). This analysis found that, of the tests examined, between 0 and 31 percent of EALRs are covered by substitute exams (see Exhibit 10). Unless test items are purposefully selected to align with the skills and knowledge measured by the WASL, the content match will generally be much less than 100 percent.

<sup>27</sup> ESHB 2195, Chapter 19, Laws of 2004 directed OSPI to "develop options for implementing objective alternative assessments." This legislative direction initiated the comprehensive study released in 2005 by the Center for Educational Policy Research. *Study of alternative methods to the Washington Assessment of Student Learning (WASL): Feasibility study*. Eugene, OR: CEPR, available at: <[http://www.s4s.org/upload/WASL%20Final%20Report\\_093005.pdf](http://www.s4s.org/upload/WASL%20Final%20Report_093005.pdf)>.

**Exhibit 10**  
**Percentage of Math EALRs Covered by**  
**Selected Substitute Exams**

Type	Details	Average	Range
College admissions	SAT, 4 tests (L1-L4)	17%*	0.6% to 31%*
Other states' end-of-course exams	8 tests from: TX, TN, GA, VA, SC, IN, and Alberta, Canada (2)	17%	3% to 30%
ACT Workkeys	Applied Mathematics exam	14%	n/a
Industry certification exams	9 tests: NCCER (Masonry, Carpentry, HVAC, Construction, Core, Electrical, and Welding), Microsoft (70-310 and 70-210).	3%	0% to 11%

\* For SAT, the match is likely higher than 17% because college readiness content requires mastery of high school level math. Source: Center for Educational Policy Research. (2005). *Study of alternative methods to the Washington Assessment of Student Learning (WASL): Feasibility study*. Eugene, OR: CEPR.

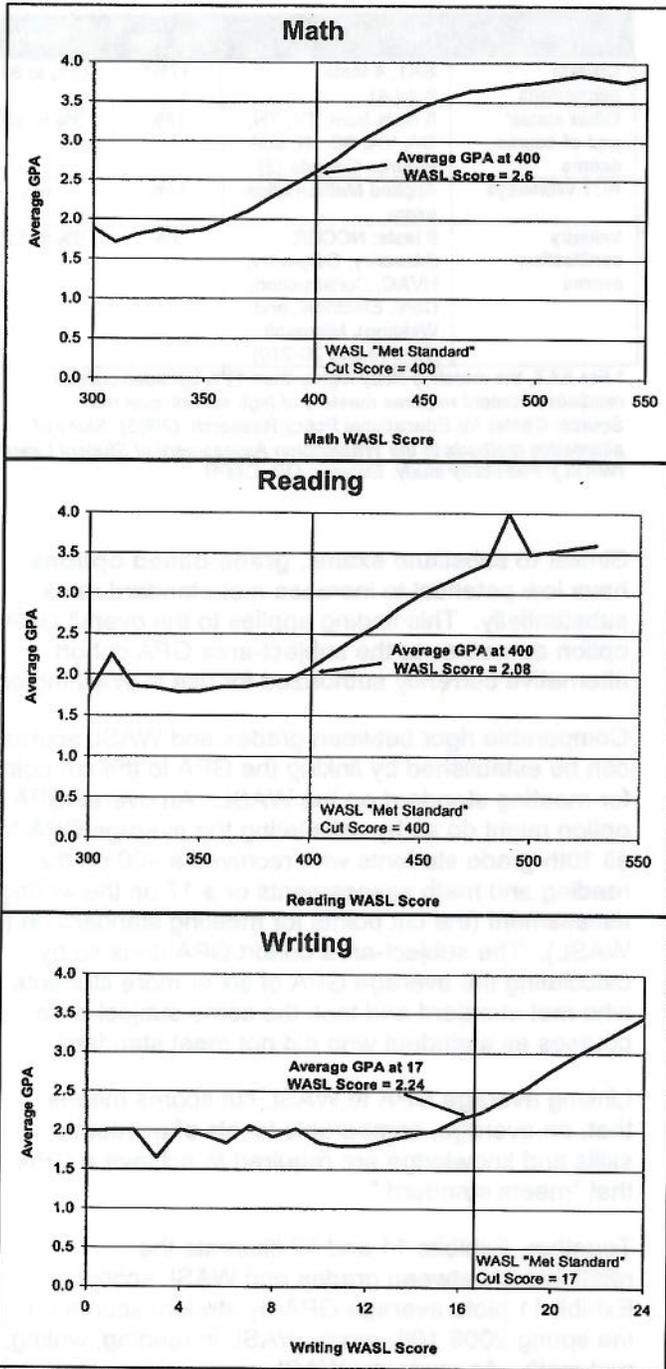
Similar to substitute exams, **grade-based options** have low potential to increase met-standard rates substantially. This finding applies to the overall GPA option as well as to the subject-area GPA cohort alternative currently authorized for use in Washington.

Comparable rigor between grades and WASL scores can be established by linking the GPA to the cut points for meeting standard on the WASL. An overall GPA option might do so by calculating the average GPA for all 10th-grade students who received a 400 on the reading and math assessments or a 17 on the writing assessment (the cut points for meeting standard on the WASL). The subject-area cohort GPA does so by calculating the average GPA of six or more students who met standard and took the same subject-area courses as a student who did not meet standard.

Linking average GPA to WASL cut scores means that, on average, comparable levels of academic skills and knowledge are required to achieve a GPA that "meets standard."

Together, Exhibits 11 and 12 illustrate the relationship between grades and WASL scores. Exhibit 11 plots average GPA by student scores on the spring 2006 10th-grade WASL in reading, writing, and math. As students' WASL scores increase, so does average GPA.

**Exhibit 11**  
**Average GPA by WASL Scores on the**  
**Spring 2006 10th-Grade WASL**

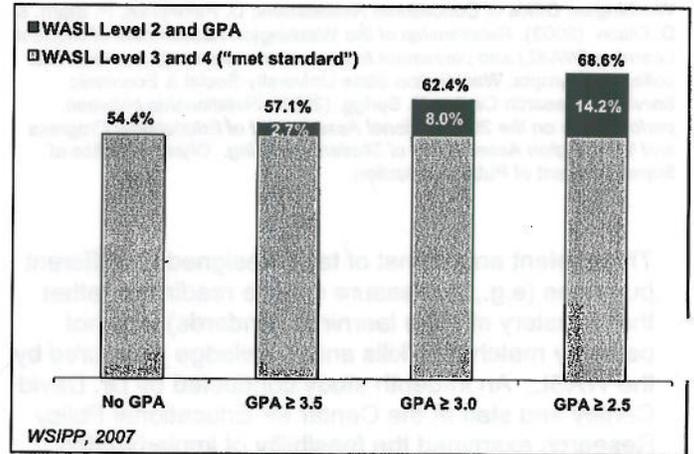


WSIPP, 2007

The average GPA for students whose scores on the math WASL equaled the "met-standard" cut point (400) is 2.6; the corresponding GPA for students who received a 400 on the reading WASL is 2.08. Finally, the average GPA for students who received a 17 on the writing WASL is 2.24.

Exhibit 12 illustrates the potential impact on met-standard rates for three hypothetical overall GPA thresholds. The first bar in Exhibit 12 shows that 54.4 percent of 10th-grade students who completed the spring 2006 WASL met standard in reading, writing, and math.

**Exhibit 12**  
**Overall Met-Standard Rates: Different GPA**  
**Thresholds Indexed to WASL Score**



The next three bars show how met-standard rates would increase if the graduation requirement were re-defined to include students who achieve a level 2 on the WASL and maintain a GPA of greater than or equal to 3.5, 3.0, and 2.5, respectively. If the GPA threshold were set at 3.5, an additional 2.7 percent of 10th-grade students in 2006 would have met standard. If the GPA threshold were set at 3.0, the met-standard rate would increase by 8 percentage points; at 2.5, the met-standard rate would have increased by 14.2 percent. This analysis demonstrates that lowering the GPA threshold would result in somewhat higher met-standard rates.

Another issue with using overall GPA as an alternative assessment is that grades may or may not measure student mastery of the state learning standards. Whether grades measure a student's performance with respect to the EALRs depends on the classes he or she takes, as well as the

curriculum, instruction, and assessment measures used by teachers.<sup>28</sup>

The overall GPA measure includes grades from all the classes a student takes regardless of subject area and, therefore, may not be comparable in content or rigor to subject-area WASL assessments. The subject-area GPA cohort option includes a student's grades only in relevant subject-area courses (such as math); however, those classes do not necessarily align with 10th-grade-level standards.

The subject-area GPA cohort measure is less reliable than the overall GPA option, because it is based on fewer courses and fewer students. An overall GPA option examines the GPA of all students in a given grade, whereas the subject-area GPA cohort option is based on as few as six students and may include only a handful of high school math courses.

Additionally, tying grades to high school graduation could have the unintended consequence of inflating grades (i.e., artificially increasing average grades over time). Grade inflation poses the greatest problem for the subject-area GPA cohort option. Because the subject-area GPA is based on a small number of courses, an inflated grade in any one course would be influential. Conversely, inflated course grades would have a lesser impact on a student's overall GPA, which is based on a much larger number of courses.

The overall GPA and Washington's subject-area cohort GPA options also differ with respect to implementation costs and complexities. Exhibit 13 outlines key differences between the two options.

The overall GPA option would not incur any significant costs, because students' GPAs are already collected by school districts and reported to OSPI electronically. The subject-area GPA cohort option, however, necessitates collection and analysis of transcript data—not currently available electronically statewide—to calculate subject-specific GPAs. The initial cost of this option will therefore be relatively high, as school districts and the state invest in data system improvements.

**Exhibit 13**  
**Two Grade-Based Options:**  
**Distinguishing Features**

	GPA Subject-Area Cohort	Overall GPA
Pre-determined minimum GPA	No	Yes
Courses Included	Within subject area	All
Size of student comparison group	Small (within school)	Large (statewide)
Data currently collected electronically statewide	No	Yes
Potential for grade inflation	High	Low

The GPA subject-area cohort option also requires the identification of at least six students from the same school who took the same subject-area courses and who met standard on the WASL. This requirement limits the feasibility of this option for small districts. A 2006 pilot study of this option, a continuation of the extensive research conducted by the Center for Educational Policy Research for OSPI, found that 56 percent of sampled students in Washington schools did not have a comparison cohort available in math: fewer than six students in the schools these students attended took the same math classes and met standard on the WASL.<sup>29</sup>

**Performance-Based and Diagnostic Options:**  
**Higher Potential to Increase Met-Standard Rates**

Alternative assessment options with a higher potential to increase met-standard rates include performance-based options (such as Washington's Collection of Evidence) and diagnostic segmented math exams.<sup>30</sup>

Comparable academic skills and knowledge are still required to perform well on these assessments, but these options are more closely tied to classroom instruction and, therefore, have the potential to provide useful feedback for teachers and students.

<sup>28</sup> Classroom-based assessments include measures such as quizzes, tests, and homework. Some teachers also consider factors such as student attendance in assigning grades.

<sup>29</sup> Center for Educational Policy Research. (2006). *Alternative assessment pilot project*. Eugene, OR: CEPR, Appendix K, p. 2.

<sup>30</sup> The focus here is on math, because Washington's math met-standard rates are much lower than reading and writing met-standard rates.

For example, the **Collection of Evidence (COE)** is a compilation of classroom work samples prepared by students under teacher supervision. Students may revise most work samples that are deemed insufficient according to the COE guidelines.<sup>31</sup> This revision process may improve students' work and would thereby boost met-standard rates. Additionally, the content of the COE is designed to measure student mastery of the EALRs, and the process for compiling and scoring work samples has been standardized by OSPI.

Similarly, **segmented math exams** have the potential to increase met-standard rates because they are linked with classroom instruction and cover material that is taught in classes. In contrast, at present there is no guarantee that students have received instruction in the standards tested on the WASL. Currently, OSPI is developing segmented math exams as well as standardized math curricula and instruction materials.<sup>32</sup>

Additionally, whereas the overall reading, writing, and math WASL exams are reliable measures of student learning, "strands" include an insufficient number of test items (questions) to diagnose strengths and weaknesses reliably.<sup>33</sup> For example, the math WASL measures whether students have mastered math EALRs generally, but does not reliably measure whether students are proficient in geometry or algebra. A diagnostic test would include a sufficient number of items in each strand to provide reliable feedback regarding specific math skills. If the segmented math exams are designed to be diagnostic, there may be potential to increase met-standard rates substantially.

Segmented math exams require some initial investment in test and curriculum development, but once implemented the ongoing costs would be relatively low. In contrast, the COE is a time-intensive assessment that requires teacher and student involvement in assigning, completing, and verifying work samples. School administrators must also verify that the COE represents the

student's work. Some school administrators consulted for this study stated that the intensity of work involved in the COE is difficult to sustain; others commented that having multiple, complex alternative assessment options is in itself a challenge for schools.

Exhibit 14 on the following page summarizes these findings regarding alternative assessment options reviewed to date. The options are grouped by their potential to increase met-standard rates.

## INITIAL RECOMMENDATIONS

Some alternative assessment options are relatively inexpensive and easy to implement, but their potential to increase met-standard rates may be low. Other options have a greater potential to increase met-standard rates, but may be more costly and complex to implement.

Therefore, the Institute recommends that an **assessment option's potential to improve student academic outcomes should be balanced with the costs and complexity of implementing it.** If options are comparable in terms of their potential to improve assessment outcomes—as well as their reliability, validity, rigor, and standardization—lower-cost alternatives are preferred to higher-cost options.

For example, both the Collection of Evidence and segmented math exam options have high potential to increase met-standard rates. However, the options vary in their costs and complexity: the COE is costly and difficult to implement, whereas segmented exams are easy to implement and, after some initial development costs, relatively inexpensive. Therefore, all else being equal, segmented exams are preferable to the COE.

Also, to reduce implementation complexities and minimize confusion for students, parents, and educators, the Institute recommends that **the total number of alternative assessments should be limited.** This recommendation is based on feedback the Institute received from various stakeholders (see the appendix).

The Institute also recommends that the state **consider adopting a math assessment alternative that is diagnostic.** For example, a segmented math WASL can be designed to include a sufficient number of content-area items to permit its use as a diagnostic assessment. Such an exam would have the potential to increase met-standard rates without

<sup>31</sup> Students may revise most, but not all, portions of the COE. They may not revise or receive help with the two "on-demand" work samples required as part of the COE. See: <<http://www.k12.wa.us/assessment/CAAoptions/pubdocs/CAAOptionsHandbook2007.pdf>>, p. 2.

<sup>32</sup> Direction in ESSB 6386 § 512 (2) (a), Chapter 372, Laws of 2006.

<sup>33</sup> For more information about WASL strands see W. Cole & R. Barnoski (2006). *Tenth-grade WASL strands: Student performance varies considerably over time*. Olympia: Washington State Institute for Public Policy. <<http://www.wsipp.wa.gov/rptfiles/06-11-2205.pdf>>.

incurring prohibitive costs or logistical difficulties for schools or districts. To render this recommendation consistent with the preceding one, however, assessments with diagnostic capabilities should supplant alternative assessments that are either ineffective or more costly or complex to implement.

**2007 WORKPLAN**

Pursuant to its mandate to review alternatives to augment the state's existing assessment system, the Institute will continue examining the cultural

appropriateness of alternative assessment options, including a review of the research literature, consultations with assessment experts and stakeholder groups, and analysis of assessment data.

The Institute will also review additional alternative options, including the General Educational Development (GED) credential, career skill certification exams, diagnostic tests such as Measures of Academic Progress (MAP), and various "multiple measures" approaches. A final report is due December 1, 2007.

**Exhibit 14  
Alternative Assessment Options Review: Summary of Findings**

	Comparable rigor	Comparable content	Reliable	Low costs	Easy to implement	Standardized process
<b>Options with low potential to increase met-standard rates</b>						
Substitute exams*	Yes	No	Yes	Yes	Yes	Yes
Subject-Area GPA Cohort	Yes	Depends on curriculum and instruction	Yes	No (initial) Yes (ongoing)	No (initial) Yes (ongoing)	Yes
Overall GPA	Yes	Depends on curriculum and instruction	Yes	Yes	Yes	Yes
<b>Options with higher potential to increase met-standard rates</b>						
Collection of Evidence	Depends on implementation	Depends on implementation	Depends on implementation	No	No	Yes
Segmented math exams	Yes	Yes	Yes	No (initial) Yes (ongoing)	Yes	Yes

\* Substitute exams reviewed include: college admissions (PSAT/SAT/ACT), college placement (ASSET, COMPASS, ACCUPLACER), and comprehensive achievement tests (such as ITED and NAEP).

