Washington State Institute for Public Policy

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# TENTH-GRADE WASL IN SPRING 2006: OPEN-ENDED AND MULTIPLE-CHOICE QUESTIONS

To "increase understanding of the students who did not meet the standard in one or more areas of assessment," 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 data."[1]

**This report examines the relationship between student performance on multiple-choice and open-ended items on the 10th-grade Washington Assessment of Student Learning (WASL) in spring 2006.**

To this end, we analyze summative scores for multiple-choice and open-ended questions on the math and reading assessments of the WASL:

- ***Multiple-choice questions*** require students to select one answer from a set of possible answers; these answers are machine scored.
- ***Open-ended questions*** require students to provide their own short-answer or extended responses by summarizing, describing, or evaluating information; explaining and providing support for answers; and making inferences based on text or patterns. Open-ended responses are assessed by teams of scorers and may be awarded partial credit: short answer questions are worth 2 points and extended-response questions are worth 4 points.[2]

On average, student performance on different WASL question formats is strongly correlated—that is, students who do well in one format typically do well in the other. Correlations measure the degree of linear association between scores. The statistic ranges between -1.0 and +1.0, where 0.0 represents no association and ±1.0 indicates a perfect linear association.

**SUMMARY**

**This report examines the relationship between student performance on multiple-choice and open-ended items on the 10th-grade WASL in spring 2006.**

Open-ended and multiple-choice scores are strongly correlated, especially for math.

Students who do well on multiple-choice questions almost always do well on open-ended questions. Similarly, students who do well on open-ended questions also do well on multiple-choice questions.

These associations are stronger for math than for reading, which suggests that multiple-choice and open-ended questions assess similar kinds of skills in math, but less so for reading.

Achievement on open-ended questions and performance on the writing assessment of the WASL are also associated:

- Most students who did not meet standard in writing scored below the median on open-ended reading and math questions.
- A substantial percentage of students who met standard in writing scored above the median on open-ended reading and math questions.

Proficiency in writing appears to be a necessary but not sufficient condition for achieving above-median scores on open-ended questions.

For reading, the correlation between summative scores on multiple-choice and open-ended questions is 0.65; for math, the correlation is 0.83. By convention, correlations above 0.50 are considered to be strong.[3]

The following analyses examine performance on multiple-choice and open-ended questions in greater detail.

[1] SSB 6618, Chapter 352, Laws of 2006.

[2] http://www.k12.wa.us/Assessment/pubdocs/Scoring%20the%20WASL_FAQ%20100406.pdf

[3] Jacob Cohen. (1988). *Statistical Power Analysis for the Behavioral Sciences.* Hillsdale, NJ: Lawrence Erlbaum.

*Exhibit 1*
**MATH**
**Students Who Perform Well on Open-Ended Questions Also Do Well on Multiple-Choice Questions**

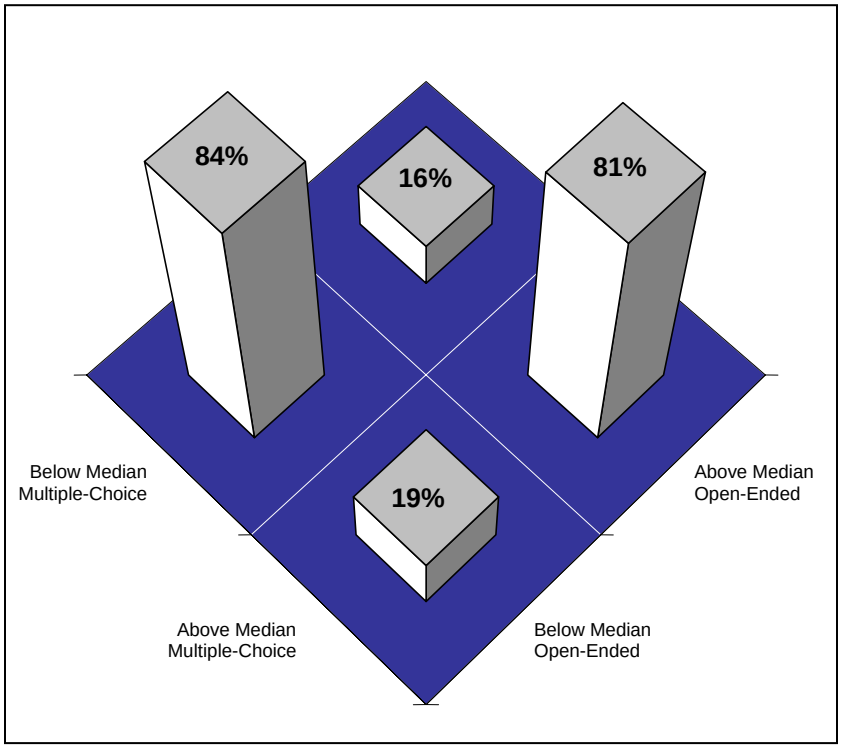
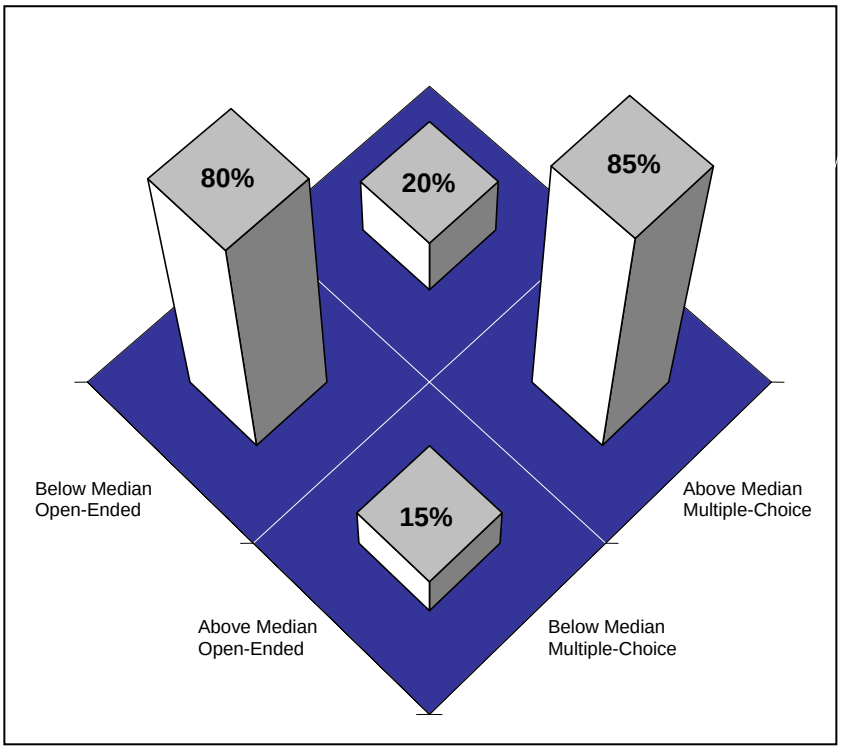



*Exhibit 2*
**MATH**
**Students Who Perform Well on Multiple-Choice Questions Also Do Well on Open-Ended Questions**




## MATH RESULTS

*Exhibits 1 and 2 demonstrate that, on average, students who perform well on multiple-choice questions in math also perform well on open-ended questions, and vice versa*.

**Exhibit 1** displays students' performance on open-ended math questions given their performance on multiple-choice questions. The chart compares students *above and below the median*—students who scored in the top and bottom 50 percent of the distribution for each question format in math. For example:

- 84 percent of students who scored below the median on multiple-choice math questions also scored below the median on open-ended questions.
- Conversely, 81 percent of students who scored above the median on multiple-choice math questions also scored above the median on open-ended questions.
- Comparatively few students performed above the median in one question format but not the other.

**Exhibit 2** presents similar data from a different perspective: it displays students' performance on multiple-choice math questions given their performance on open-ended questions. The trends are similar:

- Most students who scored above the median in one question format also scored above the median in the other.
- Likewise, few students receive above-median scores in one question format but not the other.

*Exhibit 3*
**READING**
**Students Who Perform Well on Open-Ended Questions Also Do Well on Multiple-Choice Questions**

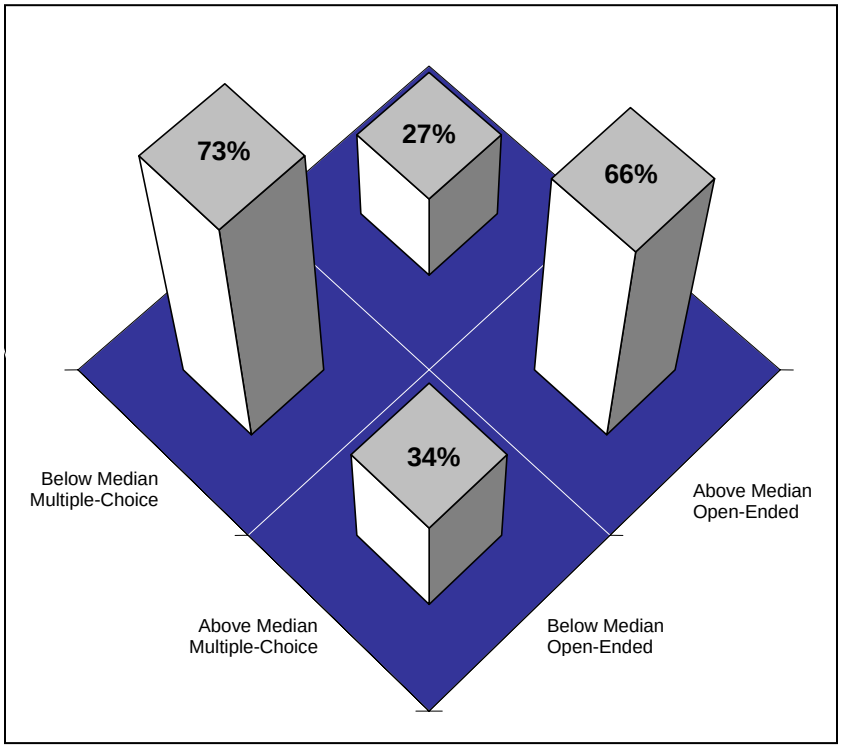
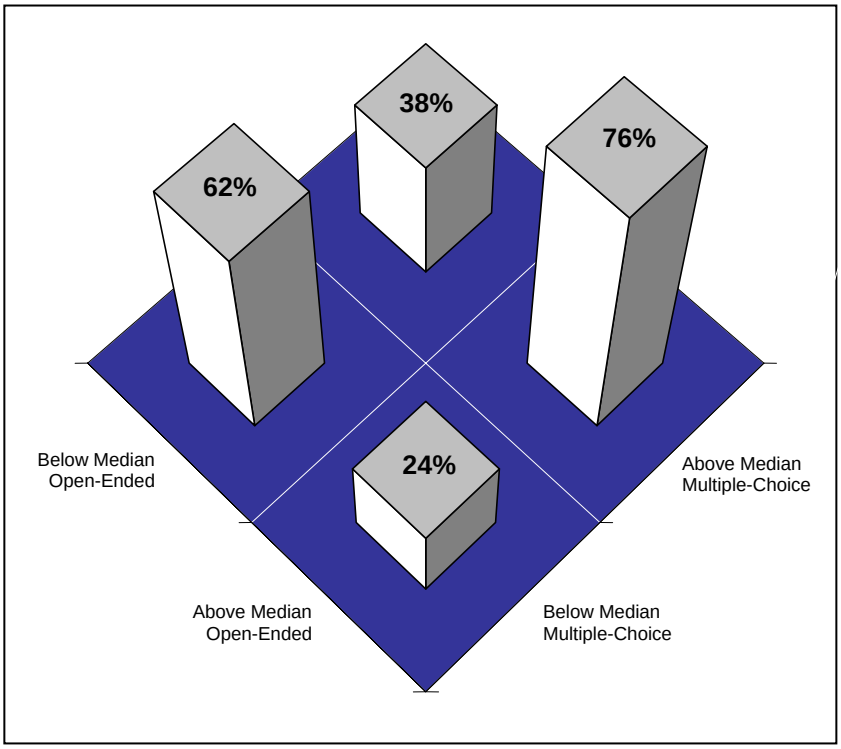



*Exhibit 4*
**READING**
**Students Who Perform Well on Multiple-Choice Questions Also Do Well on Open-Ended Questions**




## READING RESULTS

*Exhibits 3 and 4 replicate the analysis of item-format results for reading. Students who perform well on one question format in reading also perform well on the other, although the relationship is not as strong for reading as for math*.

**Exhibit 3** portrays student performance on open-ended reading questions given performance on multiple-choice questions.

- 73 percent of students with below-median scores on multiple-choice reading questions also had below-median scores on open-ended questions.
- Conversely, 66 percent of students with above-median scores on multiple-choice reading questions also had above-median scores on open-ended questions.
- 34 percent of students who scored above the median on multiple-choice questions received below-median scores on open-ended questions.

**Exhibit 4** illustrates student performance on multiple-choice reading questions given performance on open-ended questions.

- Again, the majority of students who scored above the median in one question format for reading also scored above the median in the other.
- 24 percent of students who scored above the median in open-ended reading questions received below-median scores on multiple-choice questions.
- 38 percent of students with open-ended scores below the median in reading had multiple-choice scores above the median.

## Relationship Between Open-Ended Results and Performance in Writing

Open-ended questions require students to *write* a response; as such, one might expect to find an association between achievement on open-ended questions and performance on the writing assessment of the WASL.

**Exhibit 5** depicts the percentage of students with above-median scores on open-ended reading questions who met and did not meet standard on the writing assessment. Thirteen percent of students who did not meet standard in writing scored above the median on open-ended reading questions compared with 57 percent of students who met the writing standard.

***Exhibit 5***
**Performance on Open-Ended Questions in *Reading* by Performance in Writing**

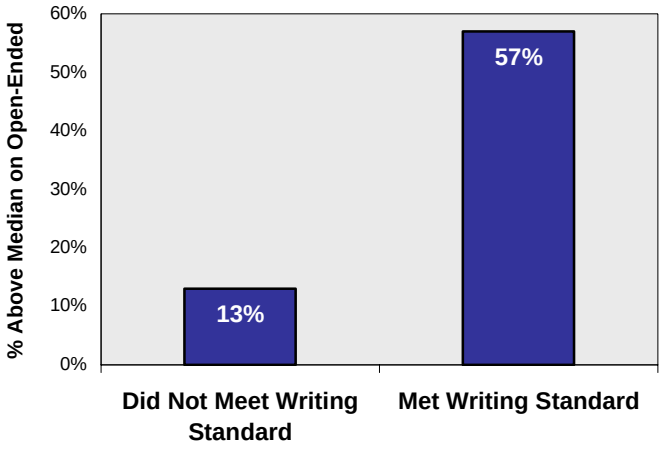
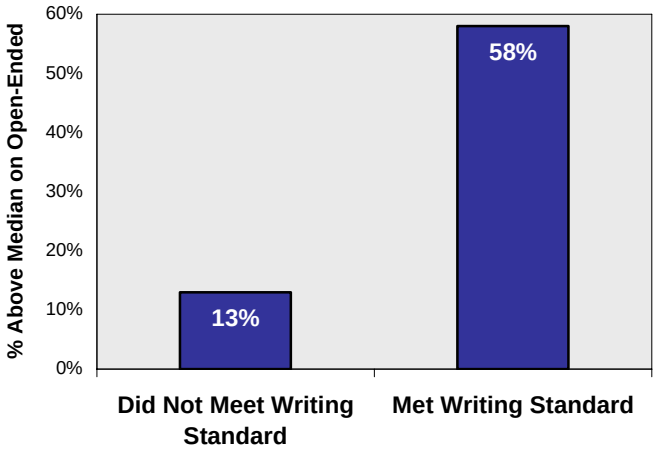



**Exhibit 6** shows that the relationship between writing and open-ended math responses is nearly identical to that for open-ended reading responses. As with reading, 13 percent of students who did not meet standard in writing scored above the median on open-ended math questions compared with 58 percent of students who met the writing standard.

***Exhibit 6***
**Performance on Open-Ended Questions in *Math* by Performance in Writing**




In sum, 87 percent of students (100% minus 13%) who did not meet standard in writing also scored below the median on open-ended reading and math questions.

Conversely, nearly 60 percent of students who met standard in writing received above-median scores on open-ended questions. This means that approximately 40 percent of students who met standard in writing nevertheless scored below the median on open-ended questions.

*This suggests that proficiency in writing is a necessary but not sufficient condition for achieving above-median scores on open-ended questions*.

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