
# *Are Scores on the* HSTW *Assessment Related to Students' Self-Reported Educational Experiences?*

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**March 2008**

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Introduction

*High Schools That Work* is a school improvement initiative that was inaugurated by the Southern Regional Education Board in 1987. At present, more than 1,200 *HSTW* sites in 32 states are using the framework of *HSTW* Goals and Key Practices to raise student achievement. To assess progress in school improvement and student achievement, one key component of *HSTW* is the *HSTW* Assessment, consisting of three subject tests (mathematics, reading, and science) and the *HSTW* Student Survey. Certain responses to selected questions in the Student Survey are used to construct indices measuring the degree of implementation of the *HSTW* Key Practices. In 2007, ETS undertook a study to determine if the indices of Key Practices are predictive of students' performance on the *HSTW* Assessment subject tests.

Statistical analyses using data for students who took the 2006 *HSTW* Assessment were conducted to determine the relationships between the indices, based on responses to various questions in the *HSTW* Student Survey, and scores on each of the three subject tests. These analyses were undertaken to determine the predictive validity of values on the indices for forecasting performance on each of the subject tests. The results are based on a total sample of more than 61,000 students who took the 2006 *HSTW* Assessment. The 11 indices of Key Practices are as follows:

1. High Expectations
2. Literacy Across the Curriculum
3. Numeracy Across the Curriculum

4. Engaging Science
5. Completion of *HSTW*-Recommended Curricula
6. Integrating Academic and Career/Technical Studies
7. Quality Career/Technical Studies
8. Quality Work-Based Learning
9. Timely Guidance
10. Perceived Importance of High School Studies
11. Quality Extra Help

Correlation Results

A common statistic used to measure the degree of association between two variables is the Pearson correlation coefficient, which ranges from -1.00 to +1.00, and is usually referred to simply as a correlation. Pearson correlations only measure linear (or straight-line) association; there are other statistical measures of associations that are more appropriate when one is interested in assessing more complex relationships between two variables (for example, a quadratic relationship). Positive correlations indicate that high values on one variable tend to be associated with high values on the second variable, and also that low values on the two variables tend to occur together. Negative correlations mean that high values on one variable tend to be associated with low values on the other variable. Since correlations are symmetric — that is, the correlation of variable A with variable B is the same as the correlation of B with A — it does not matter which variable is labeled first or second. As a general guide, in the social sciences, correlations between .00 and .20 are considered to be small; .21 to .50 to be moderate; and .51 to 1.00 to be large. It is also important to recognize that correlations only measure the degree of

association, which is a weaker relationship than a cause-and-effect relationship between two variables.

Pearson correlation coefficients were computed to determine the degree of association between values on the indices and scores on the *HSTW* Assessment. The two *HSTW* Student Survey indices with the highest correlations with scores from the *HSTW* Assessment are indices #5 (Completion of *HSTW*-Recommended Curricula) and 4 (Engaging Science). Index #5 had the highest correlations with the Assessment scores, with values of .30 (Mathematics), .31 (Reading), and .36 (Science), while the correlations for index #4 were .26 (Mathematics), .27 (Science), and .28 (Reading). The indices with somewhat lower correlations were #1, 2, 8, and 10, while indices #3, 6, 7, 9, and 11 had the lowest correlations, on average, with the *HSTW* Assessment scores. The matrix of correlation coefficients between the indices and assessment scores is shown in Table 1. Because of the large sample size used in this study, all of the correlations reported in Table 1 are considered to be highly statistically significant.

Regression Results

Values on the *HSTW* Student Survey indices were used to predict *HSTW* Assessment scores in the three subject areas. Regression analysis is a common statistical technique for determining which, if any, variables are useful in predicting values of an outcome measure. In this study, scores on each of the three subject tests were used as outcome measures in separate regression analyses, with all 11 indices initially available to predict the assessment scores. A specific version of regression analysis is forward stepwise multiple regression analysis, which uses a statistical criterion to determine the best subset of variables to use as predictors from a larger set of variables, leaving out variables that do not significantly improve the prediction. Using forward

stepwise multiple regression analysis, we were able to determine which of the 11 indices should be used to best predict the assessment scores.

In summary, for both mathematics and science, the best set of predictors consisted of indices #5 (Completion of *HSTW*-Recommended Curricula), 8 (Quality Work-Based Learning), and 4 (Engaging Science). For reading, the best set of predictors consisted of indices #5, 4, 8, and 1 (High Expectations). As a measure of predictive validity, the multiple correlation coefficient (R) was calculated to be .38 for mathematics, .37 for reading, and .34 for science. Squaring the multiple correlation coefficient yields an index for proportion of variance explained in the assessment scores, which ranges from .12 (or 12 percent) for science to .15 (or 15 percent) for mathematics. In other words, 12 percent to 15 percent of the variation in students' performance on the *HSTW* Assessment is related to three or four of the indices from the *HSTW* Student Survey. As a point of comparison, this is roughly the same degree of predictive validity for SAT scores in forecasting first-year college grades. The indices are listed in the order of importance in the regression equations reported in Table 2. For all three assessment scores, the remaining indices added little to the predictive power of the indices already mentioned.

Summary

The results from these analyses provide strong empirical support for the importance of several of the *HSTW* indices of curriculum and instructional practices as related to student achievement. The results from this study indicate that the single most important predictor of *HSTW* Assessment scores is the degree of completion of the *HSTW*-recommended academic curricula. Students who completed the recommended curricula had significantly higher scores on all of the 2006 *HSTW* Assessment subject tests than students who did not. In addition, several other

indices were significant incremental predictors of student achievement, including Engaging Science, Quality Work-Based Learning, and High Expectations. Clearly, these indices are capturing important evidence about curriculum and instructional practices, and the findings of this study indicate that these key practices can, and do, produce higher student scores on the *HSTW* Assessment in all three subjects.

**Table 1**

**Correlation Coefficients Between Indices and *HSTW* Assessment Scores**

| Index # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| Mathematics | .17 | .14 | .14 | .26 | .36 | .04 | .04 | .19 | .14 | .16 | .12 |
| Reading | .21 | .18 | .13 | .28 | .31 | .07 | .08 | .20 | .14 | .19 | .15 |
| Science | .15 | .15 | .12 | .27 | .30 | .06 | .06 | .18 | .11 | .13 | .11 |
| N | 59510 | 59510 | 59510 | 59510 | 59510 | 39753 | 44762 | 44762 | 59510 | 59510 | 59510 |

Note: All correlations listed are statistically significant at $p < .01$ using a one-tail test based on the sample sizes included in the table.

Note: The sample sizes vary by index due to different amounts of missing data on the Student Survey questions.

Indices of Key Practices:

1. High Expectations
2. Literacy Across the Curriculum
3. Numeracy Across the Curriculum
4. Engaging Science
5. Completion of *HSTW*-Recommended Curricula
6. Integrating Academic and Career/Technical Studies
7. Quality Career/Technical Studies
8. Quality Work-Based Learning
9. Timely Guidance
10. Perceived Importance of High School Studies
11. Quality Extra Help

**Table 2**

**Summary of Forward Stepwise Multiple Regression Analysis for Indices Predicting *HSTW* Mathematics (N = 31343)**

| Variable | B | s.e.(B) | Beta | t-statistic | sig. (p <) |
|---|---|---|---|---|---|
| (intercept) | 238.88 | 0.883 | | | |
| Index #5 | 12.92 | 0.257 | 0.277 | 50.26 | .001 |
| Index #8 | 4.83 | 0.197 | 0.131 | 24.50 | .001 |
| Index #4 | 5.81 | 0.250 | 0.130 | 23.25 | .001 |

Multiple R = .384.

**Summary of Forward Stepwise Multiple Regression Analysis for Indices Predicting *HSTW* Reading (N = 30672)**

| Variable | B | s.e.(B) | Beta | t-statistic | sig. (p <) |
|---|---|---|---|---|---|
| (intercept) | 214.31 | 0.949 | | | |
| Index #5 | 8.71 | 0.253 | 0.194 | 38.39 | .001 |
| Index #4 | 6.21 | 0.252 | 0.144 | 24.67 | .001 |
| Index #8 | 4.67 | 0.194 | 0.131 | 24.08 | .001 |
| Index #1 | 4.34 | 0.248 | 0.099 | 17.47 | .001 |

Multiple R = .370.

**Summary of Forward Stepwise Multiple Regression Analysis for Indices Predicting *HSTW* Science (N = 31231)**

| Variable | B | s.e.(B) | Beta | t-statistic | sig. (p <) |
|---|---|---|---|---|---|
| (intercept) | 221.96 | 1.121 | | | |
| Index #5 | 11.92 | 0.327 | 0.205 | 36.50 | .001 |
| Index #8 | 9.10 | 0.317 | 0.163 | 28.67 | .001 |
| Index #4 | 5.62 | 0.250 | 0.122 | 22.44 | .001 |

Multiple R = .343.