Hilbert College

Predictors of EN 101 Final Grades

An examination of the Utility of Using Accuplacer Essay Test Scores

Ron W. Eskew, Ph.D., Director for Institutional Research and Assessment
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Research question: Are SAT or ACT scores better at predicting EN 101 final grades than are Accuplacer Essay scores?

Source: Dr. Amy Smith

Methodology:

Created database including variables SAT_{total}, $SAT_{writing}$, SAT_{verbal}, $ACT_{composite}$, $Accuplacer_{essay}$, High School GPA, and $EN101_{final\ grade}$. Data regarding Accuplacer Essay scores are available from fall 2008, however, in examining the database it became apparent that scores before spring of 2009 represented a different scale of measurement from those after that time. Before spring of 2009 scores on this test ranged from 0-12. After spring of 2009 scores ranged from 0-8. Discussion with campus staff involved in administering Accuplacer tests at Hilbert College indicated that no conversion formula was known for comparing these different measurement scales. Therefore, this analysis was restricted to data for students who enrolled and completed EN 101 from the fall semester of 2009 through the fall semester of 2012. This resulted in a sample of 557 students.

Variables:

Accuplacer Essay Score – Since the fall semester of 2009, a score of 4 or less on the Accuplacer Essay test has been used to indicate a need for remediation in writing skills and a recommendation that a student successfully complete EN 100 before enrolling in EN 101. Accuplacer Essay scores were available for 530 of the 557 students.

SAT/ACT scores – SAT scores are not required for admission to Hilbert College however they if submitted they may be used for placement and/or scholarship consideration. Still, since the fall of 2009, on average two-thirds (66%) of first-time-college applicants have submitted SAT scores and 17% have submitted ACT scores. For these analyses, the Writing score from the SAT was considered. The SAT Writing score was available for 520 (93%) of the sample. From the ACT, while the current ACT test contains an optional writing section, only the composite score is available in Hilbert's data files. ACT scores were available for 128 (23%) of the sample.

High School GPA – Each student's overall high school grade point average was collected. The GPA was based on a 0-100 scale.

EN 101 Final Grade – Final grades were recorded for the College Writing course. Only grades from A to F were included. Grades reflecting an Incomplete (I), Withdrawal (W), Audit (AU), and Passing (P) or Satisfactory (S) were excluded from the analyses. High school GPA was missing for five students in the sample.

Analyses:

Descriptive statistics were computed for each variable as presented in the tables below. Associations among pairs of variables were examined from cross-tabulation tables and correlation coefficients. The predictability of EN 101 final grades from selected variables was tested using regression analyses.

Results:

Table 1 summarizes the overall descriptive statistics for the five variables considered in this study. It was noted the mean final grade for EN 101 in this sample was a 2.7 on a 0 to 4 scale, equivalent to a B- letter grade with the most frequently occurring grade being a B. The average score on the Accuplacer Essay test was 5.23 out of a possible 8.

Table 1. Descriptive Statistics

		EN 101 Grade	SATWriting	ACTComb	ACCEssay	High School GPA
N	Valid	557	520	128	530	552
	Missing	0	37	429	27	5
Mean		2.734	439.94	20.24	5.23	85.7662
Median		3.000	440.00	20.00	5.00	85.7360
Mode		4.0	470	20[a]	5	85.00
Std. Deviation		1.2277	76.063	3.724	1.033	5.18910

a. Multiple modes exist. The smallest value is shown

Table 2 shows the distribution of EN101 final letter grades while Table 3 displays the distribution for Accuplacer Essay test scores.

Table 2. Distribution of Letter Grades in EN 101

		Frequency	Percent
	A	110	19.7%
	A-	73	13.1%
	B+	67	12.0%
	B	91	16.3%
	B-	42	7.5%
	C+	25	4.5%
Valid	C	39	7.0%
	C-	22	3.9%
	D+	9	1.6%
	D	17	3.1%
	D-	5	.9%
	F	57	10.2%
	Total	557	100.0

Table 3. Distribution of Accuplacer Essay Scores

		Frequency	Valid Percent	Cumulative Percent
	2	6	1.1	1.1
	3	19	3.6	4.7
	4	78	14.7	19.4
	5	226	42.6	62.1
Valid	6	160	30.2	92.3
	7	29	5.5	97.7
	8	12	2.3	100.0
	Total	530	100.0	

Based on a 'passing' score of 5 or above from the Accuplacer test, Table 3. Shows that almost 1 in 5 students who take this test do not pass and are placed into EN 100 for writing remediation.

To examine how well the Accuplacer does in predicting EN 101 grades Table 4 shows the crosstabulation of Accuplacer scores to EN101 grades. This crosstabulation produces a statistically significant association between Accuplacer scores and EN 101 final grades, $\chi^2 = 97.461$ (66), $p = .007$. A

closer examination of the table shows that at the lowest Accuplacer score of 2, none of the six students subsequently earned a grade above a C in EN 101. However, with higher Accuplacer scores the distribution of EN 101 grades becomes more diverse. Still there appears to be a general trend for higher Accuplacer scores to be associated with higher letter grades, especially at the extremes (Accuplacer scores of 7 and 8). While the lowest Accuplacer score of 2 was clearly more likely to be associated with a subsequent EN 101 grade of F, it was not clear that the likely of an F decreased for increasingly higher Accuplacer scores of 3 and above. In fact of those scoring a 3 on Accuplacer, 15.8% earned an F grade in EN 101. Of those who scored an 8 on Accuplacer, 16.7% likewise earned an F in EN 101. Actually a 7 on the Accuplacer seemed to do best in predicting higher final grades as no one at this score earned less than a C- in College Writing. Perhaps not surprisingly, it was the mid-range scores that seemed to have the most difficulty in predicting success or failure in EN 101. For example an Accuplacer score of 5 was the most commonly awarded score representing 43% of all scores. For those students scoring a 5, 16% earned an A grade compared to 19% of the overall sample, while 12% earned an F, compared to 11% of the overall sample.

Table 4. **Crosstabulation of Accuplacer Essay Scores by EN101 Final Grades**

			EN101 FINAL GRADE												Total
			A	A-	B	B-	B+	C	C-	C+	D	D-	D+	F	
ACC Essay Score	2	Count	0	0	0	0	0	1	0	0	1	0	0	4	6
		% within ACCEssay	0.0%	0.0%	0.0%	0.0%	0.0%	16.7%	0.0%	0.0%	16.7%	0.0%	0.0%	66.7%	100.0%
	3	Count	3	1	2	1	2	3	1	0	2	0	1	3	19
		% within ACCEssay	15.8%	5.3%	10.5%	5.3%	10.5%	15.8%	5.3%	0.0%	10.5%	0.0%	5.3%	15.8%	100.0%
	4	Count	7	14	10	7	9	7	7	2	4	2	3	6	78
		% within ACCEssay	9.0%	17.9%	12.8%	9.0%	11.5%	9.0%	9.0%	2.6%	5.1%	2.6%	3.8%	7.7%	100.0%
	5	Count	36	23	41	19	25	20	9	15	5	2	5	26	226
		% within ACCEssay	15.9%	10.2%	18.1%	8.4%	11.1%	8.8%	4.0%	6.6%	2.2%	0.9%	2.2%	11.5%	100.0%
	6	Count	37	21	27	13	27	6	3	7	4	1	0	14	160
		% within ACCEssay	23.1%	13.1%	16.9%	8.1%	16.9%	3.8%	1.9%	4.4%	2.5%	0.6%	0.0%	8.8%	100.0%
	7	Count	11	6	6	2	1	1	1	0	0	0	0	1	29
		% within ACCEssay	37.9%	20.7%	20.7%	6.9%	3.4%	3.4%	3.4%	0.0%	0.0%	0.0%	0.0%	3.4%	100.0%
	8	Count	5	2	1	0	0	1	1	0	0	0	0	2	12
		% within ACCEssay	41.7%	16.7%	8.3%	0.0%	0.0%	8.3%	8.3%	0.0%	0.0%	0.0%	0.0%	16.7%	100.0%
Total		Count	99	67	87	42	64	39	22	24	16	5	9	56	530
		% within ACCEssay	18.7%	12.6%	16.4%	7.9%	12.1%	7.4%	4.2%	4.5%	3.0%	0.9%	1.7%	10.6%	100.0%

To further examine the relationship of the Accuplacer scores, as well as the other measured variables, to EN 101 grades correlation coefficients as presented in Table 5. These show that while the Accuplacer scores show a significant relationship to EN 101 Final Grades, $r = .221$ (528), $p < .001$, this relationship is rather small. About 5% of the variance in EN 101 grades can be accounted for by knowing the Accuplacer scores. Interestingly, the correlations with EN 101 grades are larger for each of the three other variables: SAT Writing scores, $r = .316$ (518), $p < .001$, ACT Composite scores, $r = .456$ (126), p <

.001, and for High School GPAs, r = .499 (552), p < .001. Using High School GPAs it is possible to account for almost 25% of the variance in EN 101 grades compared to only 5% accounted for the Accuplacer scores. While the ACT composite score was almost as strongly related to College Writing grades as was High School GPAs, it must be noted that the ACT Composite correlation was based on a much smaller sample size (only 128 had both an ACT score and EN101 grade). Smaller samples can produce somewhat less stable correlation coefficients, although the correlation reported here does suggest this may be a relationship worth considering further.

Table 5. Correlations

		EN 101 Grade	ACCEssay	SATWriting	ACTComb	HighSchoolGPA
	Pearson Correlation	1	.221**	.316**	.456**	.499**
EN 101 Grade	Sig. (2-tailed)		.000	.000	.000	.000
	N	557	530	520	128	552

**. Correlation is significant at the 0.01 level (2-tailed).

One additional way to consider how well these variables can predict EN 101 outcomes is to look at constructing a regression model. To simplify this analysis, only the Accuplacer score, SAT Writing score and the High School GPA were entered into the model as predictors of EN 101 final grades. The ACT composite score was not included because to do so would dramatically reduce the number of cases on which the analysis could be run. The results of the regression analysis are presented in Table 6.

Table 6. Multiple Regression on EN 101 Final Grades

Model		Unstandardized Coefficients		Standardized Coefficients
		B	Std. Error	Beta
1	(Constant)	-7.428	.814	
	High School GPA	.118	.009	.491***
2	(Constant)	-7.712	.811	
	HighSchoolGPA	.112	.010	.464***
	ACCEssay	.159	.049	.129**

** p < .01 and *** p < .001

For the second step in the model where Accuplacer scores are used in combination with High School GPAs, the amount of variance explained is r^2 = .26%. This is an increase in just over 1% of variance explained when using High School GPA alone.

Another way to understand these regression findings is to consider the equation for predicting EN 101 grades each model offers. Using only High School GPA the best estimate of a final grade in EN 101 is given by the equation:

EN101 Grade = -7.43 + (High School GPA x .118)

If we also include the Accuplacer score to the equation we get:

EN101 Grade = -7.71 + (High School GPA x .112) + (Accuplacer score x .159)

Conclusions:

The initial question asked was whether SAT or ACT scores were any more accurate in predicting success or failure in EN 101 than was the use of Accuplacer Essay scores. To that question the answer is that SAT Writing scores are about equal and maybe slightly more helpful in this purpose compared to Accuplacer scores. While ACT composite scores appear to be much better at predicting EN 101 grades the fact that a relatively small proportion of our students report ACT scores makes their use limited. However, clearly the best predictor variable among those readily available at the time of admission is the student's high school grade average as reported on his or her transcript. The accuracy of using the high school grade average as a predictor can be enhanced somewhat although relatively modestly by using it in conjunction with the Accuplacer score.

These results should raise some question about the utility of the Accuplacer scores as they are currently used in placing students in the Freshman College Writing course or requiring them to first successfully pass a remediation course (EN 100). Basing that decision solely on the Accuplacer score and using eventual performance in EN 101 as a criteria, there is fairly strong evidence from this analysis that a rather high percentage of students may be unnecessarily enrolled in EN 100. This has consequences because we know from studies elsewhere that taking remediation courses is associated with lowered retention rates. Even for those who persist, one or more remediation courses in the first year of college can put them behind in their progress toward degree and/or create a situation where the degree is more expensive (by requiring an extra semester), or they feel it necessary to take additional credits in later semesters to make up lost time.

If consideration of using High School averages either to supplement or to replace Accuplacer scores, it might be worthwhile to examine students' high school transcripts in greater detail in a subsequent analysis. For example it might be that individual averages in certain writing based courses are even more predictive than the overall grade point average. The present data do not provide that level of detail and such a study would need to be based on a smaller sample size for which individual student transcripts could be reviewed.