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# *Reading Ability as a Predictor of Student Success in Business School*

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## *Abstract*

*For several years accounting faculty at a regional university observed that some of their students exhibited difficulty reading. This study of 235 sophomore, junior, and senior business majors enrolled in accounting classes examines the relationship between their reading abilities as measured by the Nelson-Denny Reading Test and their cumulative grade point averages (GPAs). The results indicate that students who have higher levels of reading comprehension and reading vocabulary have higher cumulative GPAs. Furthermore, the results indicate that about 16 percent of the students tested could not read at the first-year college level. This paper describes the testing and recommends that students' reading abilities be factored into the admission processes.*

Several studies (discussed and cited below) have shown that the ability to learn depends to a large degree on the ability to read. Usually, students who demonstrate superior reading comprehension and have larger reading vocabularies, obtain better grades. This paper represents a continuation and extension of the existing research to the study of business administration. The paper describes the results of measuring the reading abilities of 235 business students at a regional university and relates the results to the students' cumulative GPAs.

Considerable research relates reading skills to student performance. Wood (1982) reported positive correlations between the Nelson-Denny Reading Test scores for over 1,000 college freshmen and their course grades in general psychology, general sociology, introductory speech and general English writing. Wood (1988) found that "College grades appear to be best predicted by previous grades, either in high school or college ( $r = .3$  to  $.6$ ). The next best predictors of college grades tend to be scores on reading tests or general aptitude tests ( $r = .2$  to  $.4$ ) such as the Nelson-Denny Reading Test and the tests of the American College Testing Program (ACT) and Scholastic Aptitude Testing Program (SAT)" (p. 2). Wood continues, "Nelson-Denny Test scores and scores from ACT and SAT tests do function as reading tests and do predict the kind of college success that is measured by college grades" (p. 5).

Kessler and Pezzetti (1990) studied the impact of reading ability on exam performance in six psychology classes. They report, "While the results varied for each instructor, reading ability was shown to be significantly related to test performance. On the average, the high reading group out-performed the low group by 7 to 12 percentage points on each major exam. While test scores improved over the semester for both groups, the low readers never bridged this performance gap. As students drop over the course of the year (for a myriad of reasons), the number of poor readers declines at a greater rate than those with better skills" (p. 1).

Similarly, Iadevaia (1989) reported the results of using a Pearson correlation coefficient calculation in a study of 558 students conducted between 1983 and 1988. He found a correlation of ( $r = .32539$ ) between grades in an algebra-based physics course and the Nelson-Denny Reading Test results. He notes, "A possible conclusion was that the Nelson-Denny Reading score was the best predictor of a student's completion of PHY 121 with a passing grade" (p. 17). Iadevaia's results may be particularly interesting to business faculty trying to predict student success in quantitative business courses such as finance that depend heavily on the use of algebra.

Brown, et al. (1993) note, "The ability to read well is so important in our culture that it is often the principal cause of success or failure from the first grade of elementary school through college and into professional life" (p. 1). They continue, "The University of Minnesota collected data over a five-year period. Test scores were collected for three groups—those graduating with high distinction, those with distinction, and those on probation. As incoming freshmen, those graduating later with high distinction averaged at the 83rd percentile on the Nelson-Denny test, those with distinction at the 68th percentile, and those on probation at the 42nd percentile" (p. 8).

Existing research indicates that reading ability is important to academic achievement. Students who demonstrate superior reading skills appear to have a learning advantage.

## Research Design

During the end of the spring 1997 semester, a study was conducted to measure the reading ability of business students. The study included 235 participants, 131 females and 104 males, enrolled in day and evening classes. There were 100 sophomores, 86 juniors and 49 seniors. Students were tested using the Nelson-Denny Reading Test that measures reading comprehension, reading vocabulary, and reading

rate. The testing was conducted during regularly scheduled class periods by university faculty.

The Nelson-Denny Reading Test was chosen as the measurement tool primarily because of its demonstrated usefulness in predicting academic success. In addition, it was chosen because of its wide acceptability over many years of use, its recent standardization on relevant populations (high school students and students from two-year and four-year colleges), and its minimization of gender and ethnic bias. In addition, the three stratifying variables (region, district enrollment, and socioeconomic status) were utilized in selecting participants in the standardization trials (Brown et al., 1993).

### Research Analysis

The students' scores using the Nelson-Denny Reading Test were analyzed using Chi-square, Pearson correlation coefficients and linear regression. Chi-square was used to test goodness of fit. The Pearson correlation coefficients were used to measure the strength of linear relationships. Linear regression was used to study the relationships among the variables as well as to summarize the data.

For Chi-square analysis, student scores on the reading comprehension, vocabulary, reading rate, and calculated reading grade equivalent (comprehension plus vocabulary) were divided into quintiles. The students' cumulative GPAs were also divided into quintiles. Then, the cumulative GPAs were compared with outcomes in each of the reading-measure quintiles. Continuous data were analyzed using the Pearson correlation coefficients and linear regression analysis. Relationships were considered to be statistically significant at the .05 level.

### Research Results

The research indicates statistically significant relationships between the dependent variable (students' cumulative GPAs) and the following three explanatory variables: 1) reading comprehension, 2) reading vocabulary and 3) calculated reading grade equivalent. However, a statistically significant relationship did not exist between students' reading rates and their cumulative GPAs.

The descriptive statistics underlying the calculated reading grade equivalents for the 235 students who were tested are included in Table 1. The Pearson correlation coefficients are shown in Table 2. The regression analysis results are shown in Table 3. The relationships between the four explanatory variables (students' reading comprehension, reading vocabulary, calculated reading grade equivalents, and reading rate) and their cumulative GPAs are shown in Tables 4 through 7 respectively.

As shown in Table 1, the students' scores indicate a fairly wide dispersion of calculated reading grade equivalents, ranging from a low of 4.1 to a high of 18.9 (the highest reading grade equivalent using the Nelson-Denny Reading Test), with a standard deviation of 3.32. Interest-

Table 1  
*Students' Calculated Reading Grade Equivalents*

Descriptive statistics	
Descriptive statistic	Calculated read grd. equiv.
Minimum	4.1
Maximum	18.9
Range	14.8
Mean	14.92
Standard Deviation	3.32
Median	15.6
Mode	16.3
Percentile	
	Calculated read grd. equiv.
25th	13.8
50th	15.6
75th	17.3

Table 2  
*Correlations Between Students' Cumulative GPAs and Vocabulary, Reading Comprehension, Reading Rate, and Calculated Reading Grade Equivalents*

Pearson correlation coefficients and probabilities					
	Voc.	Compre.	Rate	Rd. Gd. Eq.	Cum.GPA
Voc.	-	r=.7228 p=.000	r=.3350 p=.000	r=.9434 p=.000	r=.2878 p=.000
Compre.		-	r=.3182 p=.000	r=.8810 p=.000	r=.2680 p=.000
Rate			-	r=.3741 p=.000	r=.0871 p=.218
Rd. gd. eq.				--	r=.3076 p=.000
Cum. GPA					-

Note: Table heading abbreviations: Voc. = Vocabulary, Compre. = Comprehension, Rd. gd. eq. = Reading grade equivalent, Cum. GPA = Cumulative GPA.

Table 3  
*Cross-sectional Regression Results with Student Cumulative GPAs as Dependent Variable and Reading Vocabulary, Reading Comprehension, and Calculated Reading Rate Test Scores as Independent Variables*

GPA =	b <sub>0</sub>	+ b <sub>1</sub> Vocab.	+ b <sub>2</sub> Comp.	+ b <sub>3</sub> Rate
Bvalue	2.430	.007	.005	9.537e-.05
t-ratio	14.363	2.204	1.464	-.208
Prob.	.0000*	.0285*	.1445	.8351

\* Significant at the .05 level

R <sup>2</sup>	F-Value	Prob.
.09150	7.55389	.0001

ingly, 11 students (nearly five percent) had calculated reading grade equivalents of 18.9 (the highest obtainable calculated reading grade equivalent). Approximately 16 percent of the students in the study (38 students) had calculated reading grade equivalents below the thirteenth grade level.

The relationship between the students' reading comprehension scores and their cumulative GPAs was statistically significant at the .05 level using Chi-square ( $P > .00054$ ) as well as when using Pearson correlation coefficients, ( $r = .2680$ ).

The relationship between the students' reading vocabulary test scores and their cumulative GPAs was statistically significant at the .05 level using Chi-square ( $P > .00037$ ) as well as when using Pearson correlation coefficients, ( $r = .2878$ ). The regression analysis (Table 3) indicates that reading vocabulary is the most important factor affecting cumulative GPAs.

As noted above, calculated reading grade equivalent represents a combined measure of reading comprehension and reading vocabulary. Since the students' cumulative GPAs were very highly correlated with their reading comprehension and reading vocabulary scores, it is not surprising that their cumulative GPAs are also highly correlated with their calculated reading grade equivalents at the .05 level using Chi-square ( $P > .00000$ ) as well as when using Pearson correlation coefficients, ( $r = .3076$ ). Clearly, those students who demonstrate superior reading comprehension and have larger reading vocabularies have higher cumulative GPAs.

The relationship between the students' reading rate scores and their cumulative GPAs was not statistically significant at the .05 level using Chi-square ( $P > .54073$ ). Nor was it significant when using Pearson correlation coefficients. The data are presented in Table 7.

### Conclusions And Recommendations

The study results clearly indicate statistically significant relationships between students' reading comprehension and reading vocabulary scores on the Nelson-Denny Reading Test and their cumulative GPAs. Students who have higher levels of reading comprehension and larger reading vocabularies generally have higher cumulative GPAs. Fur-

thermore, students' cumulative GPAs were highly correlated with their calculated reading grade equivalents at the .05 level with  $P > .00000$ . However, although the relationship between reading ability and students' GPAs is statistically significant as shown in Table 3, reading ability only explains about nine percent of the variation in students' GPAs. Obviously, there are other factors that affect student performance. As noted earlier, Wood (1988) indicated that college students' grades are best predicted by previous high school and college grades.

The students' reading rate scores were not statistically significant predictors of their cumulative GPAs. This is not surprising since understanding highly technical materials may take considerable time, including, for example, performing the calculations associated with accounting or finance textbook examples. Materials written for different purposes should be read at different rates. Thirty-nine percent of the students with reading rates in the two lowest quintiles had cumulative GPAs in the highest quintile. Reading comprehension and vocabulary are the clear predictors of students' cumulative GPAs, not reading rate.

Many colleges already test entry-level freshmen for reading skills. Weiner and Bazerman (1995) report that when information about student reading level is sought, it is commonly taken from basic skills reading tests required by the state for entering college freshmen. Examples of these include the Texas Academic Skills Program, the Georgia Collegiate Placement Examination, and the Florida College Level Academic Skills Test. These tests are screening devices used to place students in regular or remedial tracks. Unfortunately, the existing admissions testing processes (and

Table 4  
*Students' Cumulative GPAs and Reading Comprehension Test Scores*

Reading comprehension test scores (quintiles)						
		Lowest			Highest	
GPAs	(quin.)	1	2	3	4	5
Lowest	1	24.4%	48.6%	18.5%	10.0%	2.9%
	2	31.1%	8.6%	22.2%	15.0%	22.9%
	3	24.4%	14.3%	16.7%	21.7%	22.9%
	4	8.9%	17.1%	22.2%	26.7%	22.9%
Highest	5	11.1%	11.4%	20.4%	26.7%	28.6%

Note: Table heading abbreviation: quin. = quintiles.

Table 5  
*Students' Cumulative GPAs and Reading Vocabulary Test Scores*

Reading vocabulary test scores (quintiles)						
		Lowest			Highest	
GPAs	(quin.)	1	2	3	4	5
Lowest	1	28.3%	34.9%	17.6%	15.2%	2.3%
	2	26.1%	20.9%	11.8%	21.7%	20.9%
	3	26.1%	27.9%	17.6%	17.4%	11.6%
	4	10.9%	7.0%	29.4%	23.9%	27.9%
Highest	5	8.7%	9.3%	23.5%	21.7%	37.2%

Note: Table heading abbreviation: quin. = quintiles.

Table 6  
*Students' Cumulative GPAs and Calculated Reading Grade Equivalents*

Calculated reading grade equivalents (quintiles)						
		Lowest			Highest	
GPAs	(quin.)	1	2	3	4	5
Lowest	1	24.4%	47.7%	11.3%	10.8%	6.0%
	2	31.1%	20.5%	15.1%	10.8%	22.0%
	3	26.7%	11.4%	24.5%	27.0%	12.0%
	4	8.9%	9.1%	24.5%	29.7%	28.0%
Highest	5	8.9%	11.4%	24.5%	21.6%	32.0%

Note: Table heading abbreviation: quin. = quintiles.

Table 7  
*Students' Cumulative GPAs and Reading Rates*

Reading rates (quintiles)						
		Lowest			Highest	
GPAs	(quin.)	1	2	3	4	5
Lowest	1	23.4%	24.1%	16.1%	15.4%	17.8%
	2	23.4%	14.8%	25.8%	25.0%	13.3%
	3	21.3%	22.2%	12.9%	21.2%	20.0%
	4	17.0%	14.8%	35.5%	15.4%	24.4%
Highest	5	14.9%	24.1%	9.7%	23.1%	24.4%

Note: Table heading abbreviation: quin. = quintiles.

remediation programs) do not assure that all students can read at the college level.

One reason for this problem may be that the basic skills reading tests are typically not power tests that show deeper levels of vocabulary and inferential reading ability. Unlike many basic skills reading tests, the Nelson-Denny Test scores, for example, indicate those students who need further reading vocabulary development as well as those who have difficulties with reading comprehension. Consequently, the use of a test like the Nelson-Denny Reading Test as a part of a business admissions process could both identify more accurately those students who are poor readers as well as substitute for basic skills reading tests.

The high degree of correlation between reading grade equivalents as an explanatory variable and students' cumulative GPAs, as well as the very broad range of student calculated reading grade equivalents (4.1 to 18.9), further suggests that students' reading grade equivalents be measured as a part of an additional screening process for admitting students to business programs (and perhaps other programs as well). Students who cannot read at the thirteenth grade level (or some other minimum level) could be required, for example, to take remedial courses in reading and/or accepted for admission on a probationary basis.

In summary, the data point to the critical importance of students having good reading skills if they are to succeed in business programs. Furthermore, this study shows that basic skills screening does not identify or eliminate all marginal or needy students. Consequently, some students with weak reading skills are admitted to business programs. An important issue is how to assure they receive the help they need to succeed.

Brozo (1990) notes that reading is an interactive process. "This means that a student's ability to comprehend is not fixed or constant; rather, comprehension will vary across texts, tasks and settings (prior knowledge and interest are two powerful factors that contribute to variability on reading tasks)" (p. 523). Brozo further states, "The goal of interactive (reading) assessment, therefore, is to discover the conditions under which a student will succeed in reading, rather than merely describing a student's current status as a reader" (p. 523). "The goal of assessment is not the identification of a disability but rather the specification of the conditions under which a particular student will learn" (p. 527).

Brozo (1990) notes, "Many poor secondary readers bring to the classroom a long history of failure and, likely, a repertoire of strategies designed to avoid reading, so solutions are not simple" (p. 327). The article includes a series of five strategies that can be employed to improve students' reading and learning that may be applicable at the college level as well as at the secondary level.

Finally, it is important to note that there are differences in the performance on reading tests among African-Americans, Latino, and Native American students, as well as students for whom English is a second language. The critical factors underlying these differences are poverty and English proficiency (Garcia and Pearson, 1992). They note, "Differences between Anglo students and students of color are substantially reduced when comparisons are limited to students from the same income levels and similar proficiency in standard English" (p. 340). The development and implementation of policies to measure business students' reading ability and to provide programs to assist them need to consider these differences.

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