

Student Grade Motivation As A Determinant Of Performance On The Business Major Field ETS Exam

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ABSTRACT

This paper examines the determinants of performance on the business major field achievement ETS exam with a focus on the impact of applying ETS exam scores to part of the capstone course grade as a performance incentive. The sample consists of 150 students at a midsized regional institution located in the Southwestern region of the United States. The empirical model employed controls for grade point average, standardized test scores (SAT/ACT), junior college transfer students, and gender. The results indicate that students are motivated to put forth significantly more effort when capstone course grade is impacted by ETS performance.

Keywords: Assessment, ETS Major Field Test in Business, Student Grades, and Student Motivation

INTRODUCTION

Assessment is an explicit obligation of modern academic programs. The Educational Testing Service's (ETS) exam in business is an external standardized measure of assessment widely used to assess undergraduate business programs. Standardized exams like the ETS business exam offers a convenient tool for benchmarking student general knowledge compared to students at other schools. Evidence supporting the correlation between ETS scores and a student's actual business knowledge is limited but is widely employed as a tool for analysis. The purpose of this paper is to evaluate the determinants of student performance on the ETS major field achievement exam with a focus on student motivation. The results of this study are derived at a public university located in the Southwestern part of the United States. The institution is mid-sized with a total enrollment of approximately 7,500 total students, 1,000 undergraduate business students, and 350 graduate business students.

This manuscript is organized as follows: First, a brief literature review is provided. The second section of the manuscript describes the data and model. The next section offers empirical results for the determinants of performance on the ETS exam. The final section offers conclusions and implications.

LITERATURE REVIEW

All collegiate business programs are tasked with the ongoing need for assessment (Bagamery, Lasik & Nixon, 2005; Martell & Calderon, 2005; Trapnell, 2005). Traditionally, accrediting bodies were focusing primarily on input measures (Peach, Mukherjee & Hornyak, 2007). Input measures could reflect characteristics of the students who attended the business program (Mirchandani, Lynch & Hamilton, 2001) or organizational factors such as the institution's reputation, faculty-student ratio, or number of faculty with terminal degrees (Peach, Mukherjee & Hornyak, 2007). For collegiate business programs aspiring to meet or maintain the standards of accreditation established by AACSB, this requires the schools of business have program learning goals and utilize direct measures that reflect student demonstration of achievement of these goals (Martell, 2007; Pringle & Michel, 2007). A traditional method of direct assessment of student learning involves standardized testing of general knowledge of a

subject area. ETS provides a series of major field achievement tests including a business field exam. The ETS major field exams are easily administered, relatively inexpensive, graded as part of the cost, and can be compared with results from other institutions. Two of the most serious concerns with ETS driven assessment include the observation that performance on a standardized exam is best predicted by performance on other standardized exams, and that exam performance may not be correlated with actual knowledge. Even with the limitations, Mirchandani, Lynch, and Hamilton (2001) conclude that standardized exams are attractive vehicles for program assessment.

A vast amount of research exists on the determinants of student performance on the ETS Major Field Test in Business. Mirchandani, Lynch, and Hamilton (2001) find that two types of variables are related to student performance on the ETS exam: input variables (SAT scores, transfer GPA, and gender) and process variables (grades in quantitative courses). They conclude that the SAT score is a dominant variable explaining most of the variation in ETS exam scores, although other variables including GPA and gender are also statistically significant. Black and Duhon (2003) employ a large sample of 297 students to determine student performance on the ETS exam. Their regression model reveals that GPA, ACT score, gender, and major are significant determinants of performance on the ETS exam. Bagamery, Lasik, and Nixon (2005) find gender, whether students took the SAT, and grades to be significant determinants of the ETS exam, while location, age, transfer status, and major are not significant.

Bycio and Allen (2007) contribute to the literature by showing that, in addition to GPA and SAT scores, student motivation is an important determinant of performance on the ETS exam. Bycio and Allen asked students about the degree to which they were motivated to take the Major Field Assessment Test in Business (MFAT-B) and the extent to which the maintenance of AACSB accreditation was important to them. The instrument employed used four items, each using 4-point scales, to assess student motivation to perform on the MFAT-B. In addition, performance on the ETS exam was tied to capstone course grade based on findings that student performance on the ETS is significantly enhanced relative to a group in which students are simply asked to take the test to aid accreditation (Allen & Bycio, 1997). They find that student motivation is significantly related to MFAT-B performance.

DATA AND MODEL

The purpose of this section is to develop an empirical model that can test student performance on the ETS exam. Davisson and Bonello (1976) propose an empirical research taxonomy in which they specify the categories of inputs for the production function of learning. These categories are human capital (admission exam score, GPA, discipline major), utilization rate (study time), and technology (lectures, classroom demonstrations). Using this taxonomy, Becker (1983) demonstrates that a simple production function can be generated which may be reduced to an estimable equation. While his model is somewhat simplistic, it has the advantage of being both parsimonious and testable. A number of problems may arise from this research approach (Chizmar & Spencer, 1980; Becker, 1983). Among these are errors in measurement and multicollinearity associated with demographic data. Despite these potential problems, there must be some starting point for empirical research into the process by which business knowledge is learned.

The choice as to what demographic variables to include in the model presents several difficulties. A parsimonious model is specified in order to avoid potential multicollinearity problems. While other authors have found a significant relationship between race or age and learning (Siegfried & Fels, 1979; Hirschfeld, Moore, & Brown, 1995), the terms are not significant in this study. A number of specifications are considered using race, age, work experience, and concurrent hours in various combinations. Inclusion of these variables into the model affected the standard errors of the coefficients but not the value of the remaining coefficients. For this reason they are not included in the model. University academic records are the source of admission and demographic information because of the potential biases identified in self-reported data (Maxwell & Lopus, 1994).

The model developed to analyze student learning relies on a production view of student learning. Assume that the production function of learning business concepts via the ETS exam can be represented by a production function of the form:

$$(1) Y_i = f(A_i, E_i, D_i, X_i),$$

where Y measures the degree to which a student learns, A is information about the student's native ability, E is information about the student's effort, D is a [0, 1] dummy variable indicating demonstration method or mode, and X is a vector of demographic information. As noted above, this can be reduced to an estimable equation. The specific model used in this study is presented as follows:

$$(2) \text{SCORE}_i = B_0 + B_1\text{ABILITY}_i + B_2\text{GPA}_i + B_3\text{TRANSFER}_i + B_4\text{FOREIGN}_i + B_5\text{GENDER}_i + B_6\text{GR10}_i + B_7\text{GR20}_i + u_i.$$

The dependent variable used in measuring effectiveness of student performance is percentile score (SCORE) on the ETS exam. Descriptive statistics of all variables employed in the model are presented in Table 1. The ETS exam is administered to senior business students in the research cohort enrolled in the undergraduate capstone strategic management course. The mean percentile score for the research cohort is the 50.83 percentile with a standard deviation of 35.40. The ETS score at a mean of approximately the 50th percentile combined with a large standard deviation of both very good and relatively poor student performances yields a research cohort that is very representative of a typical regional business program.

The student's academic ability (ABILITY) is based on the ACT entrance exam or SAT converted to ACT equivalency. The average ACT score for the research cohort is 21.34 (equivalent to 980 on the math/reading SAT or 1550 on the 2400-point SAT). The ABILITY variable via the ACT exam is used as a proxy of student innate ability before entering the university. Student ability as measured by the ACT exam is expected to have a positive impact on ETS score.

Grade point average (GPA) is included in model based on previous research indicating that grade point average is one of the primary positive determinants of student performance on the ETS exam. Student grade point average in the study for the cohort is 2.96 with a standard deviation of approximately half a grade at 0.47.

The variable TRANSFER is included in the model as a demographic variable controlling for students that completed at least twenty-five percent of their undergraduate education at an another institution. Over forty percent of the students in the research cohort are classified as transfer students with the majority transferring from a junior college. The transfer variable is expected to have a negative impact on ETS score as business core classes in economics, accounting, and business law at a junior college are not expected to meet the rigor of the courses at a university.

The demographic variable FOREIGN is included in the study to separate international students from domestic students. International students are often recruited to diversify the campus environment and raise the level of academic standards via performance on standardized entrance examinations like the ACT or SAT. International students often face unique language, psychic, and cultural challenges that might negate some of their innate ability and work ethic. Nine percent of the research cohort is classified as a foreign student.

The variable GENDER is included in the model based on the finding of previous researchers (Bagamery, Lasik & Nixon, 2005; Black and Duhon, 2003; Mirchandani, Lynch & Hamilton, 2001) that male student performance on the ETS exam is higher than female. The research cohort for this study is evenly divided between males and females.

The model includes the two student motivation variables, GR10 and GR20, where GR10 represents the case where percentage score on the ETS exam counts ten percent of the course grade in the business capstone course and GR20 applies percentage score on the ETS exam to twenty percent of the capstone course grade. The effort to tie student performance on the ETS grade as a motivator is consistent with Allen and Bycio (1997), but adds the wrinkle of comparing multiple levels of grading application at both the ten and twenty percent levels. Bycio and Allen (2007) provide nominal evidence that student motivation is an important determinant of performance on the ETS exam but their measure is based on a 4-point scale employing self-reported data without including a test group

versus control group for a course grade application. The author believes that employing a model where student course grade is significantly impacted by performance on the ETS exam is a stronger measure of motivation. One weakness of employing a capstone course grade as a motivator is the limited impact it can actually have on a student given that most senior business students are approaching 120 credit hours and one single course does not have a big impact on overall GPA.

RESULTS

Results from the ordinary least squares estimation of equation (2) are presented in this section and Table 2. The sample cohort is derived from students taking the ETS exam from 2002-2007. The total usable sample size is 150, with 88 students eliminated from the global sample of 238 because of incomplete information, usually relating to the lack of ACT/SAT scores (Douglas & Joseph, 1995). None of the independent variables in the model have a correlation higher than .64, providing evidence that the model specification does not suffer from excessive multicollinearity. The equation (2) model explains over 45 percent of the variance in performance on the ETS exam. Four of the eight independent variables in the model are statistically significant.

Two of the statistically significant variables are ABILITY and GPA. The empirical results imply that student score on the ETS exam are directly related to academic ability measured by the ACT college entrance exam and academic performance measured by college grade point average. The statistically significant impact of standardized entrance exam scores and grade point average is consistent with previous research. The significance of the ABILITY variable could simply be based on the observation that students with innate academic ability for standardized exams perform at a relatively high level on the ETS exam. The results relating to the ACT exam are somewhat tempered by the observation that 37% of the students in the initial sample were eliminated primarily for not having an official ACT/SAT score posted with the university. The positive and significant impact of GPA on ETS exam score is anticipated as students with high grades are more likely to learn and retain core business information than students with a relatively low grade point average. Consistent with Mirchandani et al. (2001), overall GPA has a strong internal validity and provides a measure of student performance related to the curriculum of the school.

The three demographic variables in the model are not statistically significant. The TRANSFER variable yields a negative coefficient but the variable is not statistically significant (t-stat of 0.86). There appears to be little difference in performance on the ETS exam for transfer students versus native students. The demographic variable controlling for foreign student performance is positive, with international students scoring five percentile points higher on the ETS exam than domestic students, but not statistically significant. The statistical insignificance of the FOREIGN variable is consistent with the existing literature. The GENDER coefficient associated with males is negative but highly insignificant. Unlike previous research, the results of this study do not find any evidence of a gender differential with respect to performance on the ETS exam.

The two student motivation variables are both positive and statistically significant. The results provide evidence that students are motivated to study and put forth effort on the ETS exam when scores are applied to the capstone course grade. A ten percent application to capstone course grade results in an 11.84 increase in the ETS percentile score and a twenty percent application to course grade results in a 15.84 percentile score increase. The results clearly indicate a significant student response to the grade motivator but might be somewhat unique to this research cohort based on the middling mean ETS score and large standard deviation. It is a mathematical improbability that a research cohort comprised of students with average ETS scores well above the 50th percentile would have an equivalent result. The positive and significant result is primarily applicable to programs that struggle at or below the 50th percentile on the ETS exam and need to employ a tangible incentive in order to get students to explicitly put forth a significant and serious effort on the ETS exam instead of simply treating it as a required task with little or no direct benefits or penalties. The results also imply that a ten percent grade incentive is strong enough to motivate students to put forth significant effort, although the twenty percent grade incentive does yield a coefficient that is five percentile points larger. The determination of a ten or twenty percent grade motivator should probably be at the discretion of the course instructor for the capstone course given that both are significant.

CONCLUSION

This study examines the determinants of student performance on the ETS business exam at a regional university. Consistent with previous research, the results find that academic ability measured by the college entrance exam and student grade point average are the primary determinants of student performance on the ETS exam. The empirical results indicate that counting performance on the ETS in a range of ten to twenty percent as part of the capstone course grade significantly increases performance on the ETS exam. Course grade as a motivating factor is an important consideration for business programs attempting to find ways to enhance program quality as a form of direct assessment to accrediting agencies. Gender, transfer student status, and international student classification do not appear to have an impact on student ETS exam performance.

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Table 1
Summary Statistics

Variable	Mean	Std. Deviation
SCORE	50.83	35.40
ABILITY	21.34	4.14
GPA	2.96	0.47
TRANSFER	0.43	0.50
FOREIGN	0.09	0.29
GENDER	0.50	0.50
GR10	0.20	0.40
GR20	0.22	0.42

Table 2
Estimation of Equation (2)

Variable	Coefficient	t-statistic
Intercept	-96.899	-6.37
ABILITY	3.522	5.54*
GPA	20.831	3.66*
TRANSFER	-0.481	-0.10
FOREIGN	7.500	0.94
GENDER	-0.427	-0.09
GR10	11.845	2.04*
GR20	15.848	2.82*

Notes: R-square = .4465, F = 16.36, *p<.05, and n = 150.