

**ANALYZING STUDENT ETS MAJOR FIELD TEST IN BUSINESS (ETS-MFTB)
STUDENT PERFORMANCE SCORES AT AN AACSB ACCREDITED INSTITUTION:
PREDICTING AND EXPLAINING THE INFLUENCE OF PARTICIPATING IN ONLINE
COURSES**

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ABSTRACT

The two purposes of this research effort were (a) to determine if selected variables were significant predictors of student performance scores on the Educational Testing Service Major Field Test in Business (ETS-MFTB) and (b) to determine if selected variables explained a significant proportion of the variance in student performance scores on the ETS-MFTB in Business at an AACSB accredited institution. Variables examined in this research effort included age, gender, high school GPA, percentage of common courses completed online, race, and SAT superscore. The variable percentage of common courses completed online was of particular interest in this study given the steady growth in online courses and the limited literature including similar variables. Findings revealed that age, gender, high school GPA, and SAT superscore were significant predictor and explanatory variables of student scores on the ETS-MFTB. About 42% of the variance in student performance scores on the ETS-MFTB was explained by these four variables. An implication for practice was discussed. Recommendations for future research efforts were also offered.

Keywords: ETS Major Field Test in Business; Online Course Participation; AACSB accredited

INTRODUCTION

An extensive review of the literature suggests a strong, steady interest by researchers in exploring factors influencing student performance scores on the ETS-MFTB (e.g., Bagamery, Lasik, & Nixon, 2005; Bielinska-Kwapisz, Brown, & Semenik, 2012; Bycio & Allen, 2007; Chowdhury, & Wheeling, 2013; Contreras, Badua, Chen, & Adrian, 2011; Hahn, Bowlin, & Welch, 2012; Jingyo, 2014; Ling, Bochenek, & Burkander, 2015; Mirchandani, Lynch, & Hamilton, 2001; Ritchie, Rodriguez, Harrison, & Wates, 2014; Simmons, Jones, & Bolt, 2015; Ward, Yates, & Song, 2010; Ward, Yates, & Song, 2012). As noted by Ling, Bochenek, and Burkander (2015), standardized tests, such as the ETS-MFTB, are used to measure student performance outcomes. Vitullo and Jones (2010), explained stakeholder accountability for student performance outcomes has influenced assessment practices in higher education. To better understand what variables influenced student performance scores on standardized tests such as the ETS-MFTB, researchers have proposed numerous predictive and exploratory models (e.g., Bielinska-Kwapisz & Brown, 2013; Finnegan, 2012; Settage & Wollscheid, 2015; Terry, Mills, Rosa, & Sollosy, 2009).

For example, Settage and Wollscheid (2015) proposed a regression model to analyze the predictive and explanatory variables influencing student performance scores on the ETS-MFTB. Variables in their model included ACT score, age at test completion, gender, GPA within major, and major (i.e., accounting or marketing). Their model also included the total number of courses completed in accounting, economics, finance, law, management, and marketing. Settage and Wollscheid (2015) reported that ACT score, age at test completion, gender (male), and GPA within major were positively related to student scores on the ETS-MFTB. Settage and Wollscheid (2015) also noted that the major marketing was negatively related to student scores on the ETS-MFTB.

In a related study, Bielinska-Kwapisz and Brown (2013) explored student performance scores on the ETS-MFTB. The focus of their study was on the differences in scores on the ETS-MFTB based on gender. Bielinska-Kwapisz and Brown (2013) initially stated that males scored statistically significantly higher on the ETS-MFTB than did females. After controlling for critical thinking inference score, Bielinska-Kwapisz and Brown (2013) reported that gender was no longer

was significant. They postulated that critical thinking could be responsible for gender differences reported in earlier studies.

An investigation of student performance scores on the ETS-MFTB was conducted by Terry, Mills, Rosa, and Sollosy (2009). Specifically, Terry, Mills, Rosa, and Sollosy (2009) explored college GPA, standardized test scores (SAT/ACT), junior college transfer, gender, and student motivation with a special focus on students completing courses online. They reported that standardized test scores (ACT/SAT) and college GPA as significant predictors of student scores on the ETS-MFTB. Further, gender, junior college transfer, student motivation, and international status were not found to be significant predictors of student performance scores on the ETS-MFTB. Terry, Mills, Rosa, and Sollosy (2009) reported that student performance scores for those completing multiple online courses were lower but not significantly lower.

In a similar work, Finnegan (2012) sought to determine the influence of distance education coursework on student performance scores on the ETS-MFTB. Variables included in this study were age, gender, general education course GPA, major GPA, race, major, participation in distance education coursework, and semester standing. Finnegan (2012) reported that “All else being equal, those Urban students who completed more of their studies at a distance performed better on the MFT-B compared to their counterparts favoring traditional classroom-based study” (p. 123).

NEED FOR THE STUDY

There has been considerable research exploring the predictor and explanatory variables of student performance scores on the ETS-MFTB. This research effort built upon these earlier studies by including the commonly explored variables of age, gender, high school GPA, race, and SAT superscore. In addition to these commonly explored variables, the percentage of common courses completed online was explored for its predictive and explanatory potential. This inclusion of the variable percentage of common courses completed online is significant in that very few studies have included such variables despite the tremendous growth in online course and program offerings in business. As Terry, Mills, Rosa, and Sollosy (2009) stated, “The statistically insignificant results associated with the completion of multiple business courses in the online instruction mode is particularly interesting as a continuation of the literature examining the effectiveness of online instruction” (p. 115). Thus, this research effort builds on the few studies (e.g., Finnegan, 2012; Terry, Mills, Rosa, & Sollosy, 2009) exploring student performance scores on the ETS-MFTB and participation in online classes while controlling for other commonly included variables. The ETS-MFTB was mapped by the faculty to confirm alignment with common course content.

PURPOSE

The two purposes of this research effort were (a) to determine if selected variables were significant predictor of student performance scores on the ETS-MFTB and (b) to determine if a significant proportion of the variance in student performance scores on the ETS-MFTB is explained by selected variables at an Association to Advance Collegiate Schools of Business (AACSB) accredited institution. Explicit to this study, the selected predictor and explanatory variables were: age, gender, high school GPA, percentage of common courses completed online, race, and SAT superscore. Specifically, answers to the following two research questions were pursued:

1. Are selected variables significant predictors of student performance scores on the ETS-MFTB at an AACSB accredited institution?
2. Is a significant proportion of the variance in student performance scores on the ETS-MFTB explained by selected variables at an AACSB accredited institution?

METHODOLOGY

The methodology section includes a discussion of the data collection and data analysis procedures.

Data Collection Procedures

Student records at the institution where the research effort was conducted served as data sources. Specifically, data analyzed in this research effort had been collected as part of normal assurance of learning or university institutional effectiveness processes. The ETS-MFTB is completed in the senior capstone management course during selected semesters. Completing the ETS-MFTB is a course requirement. As an incentive for students to do their very best, performance scores on the ETS-MFTB are 10% of the final course grade. Student data regarding age, gender, high school GPA, percentage of common courses completed online, race, and SAT superscore were extracted from university institutional effectiveness records. Following Institutional Review Board (IRB) approved protocol, student ETS-MFTB scores and data from university institutional effectiveness records were matched with age, gender, high school GPA, percentage of common courses completed online, race, and SAT superscore by a research consultant to maintain anonymity by the researchers. Since this research effort analyzed historical records, it was classified as a non-human subject study by the IRB.

Data Analysis Procedures

The descriptive statistics of means and standard deviations were used to describe participant characteristics. Stepwise multiple regression was used to determine if selected variables predicted and explained a significant proportion of the variance in student performance scores on the ETS-MFTB. The criterion variable for this study was each student's total performance score on the ETS-MFTB. The predictor and explanatory variables for this study were age, gender, high school GPA, percentage of common courses completed online, race, and SAT superscore. The predictor and explanatory variables were selected for inclusion in this research effort because of their previous presence in similar studies and their accessibility through institutional records. For the purpose of data analysis, females were coded as 0 and males were coded as 1. Regarding race, white was coded as 0 and all others were coded as 1. Common courses completed online percentage was determined by dividing the number classes completed online by 14. There are 14 courses in the college of business curriculum that all students complete regardless of major. In addition, these 14 courses had been mapped to confirm alignment with the ETS-MFTB for assurance of learning purposes at the AACSB accredited institution where this research effort was conducted.

The procedure outlined by Hair, Anderson, Tatham, and Black (1998) was used to assess multicollinearity, the correlation among independent variables. Specifically, Hair, Anderson, Tatham, and Black (1998) explained, "variables with tolerance values below .19 (or above a VIF of 5.3) would have a correlation of more than .90" (p. 193). Correlations above .90 indicate multicollinearity. Specific to this research effort, the lowest tolerance value and the highest VIF value were 0.74 and 1.35, respectively. These values are well within the acceptable limits outlined by Hair, Anderson, Tatham, and Black (1998) for assessing multicollinearity. All tests of statistical significance were set at $\alpha = .05$. The procedure for reporting effect size outlined by Kotrlik and Williams (2003) is included in the findings.

RESULTS

Participant characteristics and the two research questions provide a framework for presenting the results.

Participant Characteristics

The presentation of participant characteristics was based on the 404 student records included in this research effort. The average age of participants was 21.94 (SD = 0.80) with a range of 20 to 25. By race, 368 (90.12%) participants were white and 36 (8.88%) participants were all other races. By gender, females accounted for 247 (61.13%) and males 157 (38.87%), respectively. The average participant high school GPA was 3.36 (SD = 0.45) with a range of 1.90 to 4.50. The average student SAT superscore was 1548.38 (SD = 164.78) with a range of 1120 to 2040. The average student score on the ETS-MFTB was 155.41 (SD = 11.73) with a range of 124 to 194.

Research Question One

Research question one sought to determine if selected variables were significant predictors of student performance scores on the ETS-MFTB. As shown in Table 1, the variables age, gender, high school GPA, and SAT superscore were significant predictors of student performance scores on the ETS-MFTB. High school GPA and SAT superscore were positively related to student scores on the ETS-MFTB. Males scored higher than did females and older students scored higher than did younger students on the ETS-MFTB. The other variables examined in this study, percentage of common courses completed online and race, were not significant predictors of student scores on the ETS-MFTB.

Research Question Two

Research question two sought to determine if selected variables explained a significant proportion of the variance in student performance scores on the ETS-MFTB explained by selected variables. As shown in Table 2, results of stepwise multiple regression analysis indicated that the variables age, gender, high school GPA, and SAT superscore explained significant proportions of the variance in student scores on the ETS-MFTB. Specifically, these four variables explained about 42% of the variance in student scores on the ETS-MFTB. The other variables examined in this study, percentage of common courses completed online and race did not explain significant proportions of the variance in student scores on the ETS-MFTB. The effect size for this analysis was determined using R^2 . According to Kotrlík and Williams (2003) a “. . . simple measure of effect size is the multiple regression coefficient R^2 ” (p. 4). Cohen (as cited in Kotrlík & Williams, 2003) stated that an R^2 of $>.26$ is a large effect size. Thus, at $R^2 = .417$, a large effect size was observed for this analysis.

Table 1. Stepwise Regression Analysis for Predicting ETS-MFTB Student Performance Scores (N = 404)

| Source of variance | SS | df | MS | F | p |
|--------------------|-----------|-----|----------|--------|---------|
| Regression | 23125.424 | 4 | 5781.356 | 71.403 | <0.000* |
| Residual | 32306.368 | 399 | 80.968 | | |
| Total | 55431.792 | 403 | | | |

Variables in the Model

| Variables | B | SE B | Beta | t | p |
|-----------------|--------|--------|--------|--------|--------|
| SAT superscore | 0.042 | 0.003 | 0.586 | 13.568 | <0.000 |
| Gender | -4.070 | 0.967 | -0.169 | -4.207 | <0.000 |
| High School GPA | 2.978 | 1.165 | 0.114 | 2.555 | 0.011 |
| Age | 1.289 | 0.581 | 0.088 | 2.219 | 0.027 |
| (Constant) | 54.086 | 14.068 | | | |

Variables not in the Model

| Variables | t | p |
|----------------|-------|-------|
| Race | 0.345 | 0.730 |
| Percent Online | 0.088 | 0.930 |

Note. *Significant at $\alpha = .05$

Table 2. Stepwise Regression Analysis for Explaining the Proportion of Variance in ETS-MFTB Student Performance Scores (N = 404)

| Source of variance | SS | df | MS | F | p |
|--------------------|-----------|-----|----------|--------|---------|
| Regression | 23125.424 | 4 | 5781.356 | 71.403 | <0.000* |
| Residual | 32306.368 | 399 | 80.968 | | |
| Total | 55431.792 | 403 | | | |

Variables in the Model

| Variables | R^2 | Cum. R^2 | F | p |
|-----------------|-------|------------|---------|--------|
| SAT superscore | 0.376 | 0.376 | 241.720 | <0.000 |
| Gender | 0.402 | 0.027 | 17.825 | <0.000 |
| High School GPA | 0.410 | 0.008 | 5.365 | 0.021 |
| Age | 0.417 | 0.007 | 4.923 | 0.027 |

Variables not in the Model

| Variables | t | p |
|--|-------|-------|
| Race | 0.345 | 0.730 |
| Percentage Common Courses Completed Online | 0.088 | 0.930 |

Note. *Significant at $\alpha = .05$

CONCLUSIONS AND DISCUSSION

Data were limited to the 404 ETS-MFTB student performance scores collected as part of the assurance of learning processes or as part of normal university institutional effectiveness processes at an AACSB accredited institution. Thus, generalizing past the data analyzed is not appropriate. The ensuing conclusion is presented with that caveat recognized. As supported by data in Tables 1 and 2, the variables of SAT superscore, gender, high school GPA, and age combine to form a significant predictor and explanatory model of student scores on the ETS-MFTB at the AACSB-accredited university where this research effort was conducted. About 42% of the variance in student performance scores on the ETS-MFTB was explained by these four variables. The percentage of common courses completed online and race were not found to be a significant predictor and explanatory variables in this research effort.

The results of this research effort are consistent with the work of Settag and Wollscheid (2015) in that similar variables were significant in their model. Specifically, Settag and Wollscheid (2015) reported ACT score, GPA, gender (male), and age at test completion were positively related to ETS-MFTB student performance scores. In the current research effort, age, gender (male), high school GPA, and SAT superscore were significant predictor and explanatory variables of student performance scores on the ETS-MFTB. The current research effort is inconsistent with the results of Bielinska-Kwapisz and Brown (2013) regarding the impact of gender on student performance scores on the ETS-MFTB. Specifically, Bielinska-Kwapisz and Brown (2013) initially reported that male student performance scores were significantly higher on the ETS-MFTB than were female student performance scores. After controlling for critical thinking inference scores, Bielinska-Kwapisz and Brown (2013) reported that gender was no longer significant. They postulated that critical thinking could be responsible for gender differences reported in earlier studies (Bielinska-Kwapisz & Brown, 2013). It is possible that the gender differences in student performance scores on the ETS-MFTB might be reduced or eliminated in the current research effort if critical thinking had been controlled as in the Bielinska-Kwapisz and Brown (2013) study.

Regarding the influence of online course participation, this research effort is consistent with the work of Terry, Mills, Rosa, and Sollosy (2009). Specifically, Terry, Mills, Rosa, and Sollosy (2009) reported that student performance scores on the ETS-MFTB for those completing multiple online courses were lower but not significantly lower. In the current research effort, the percentage of common online courses completed was not found to be significant but it was positive. Finnegan (2012) reported that student performance scores on the ETS-MFTB were better for those completing more courses via distance education compared to those electing traditional face-to-face class instruction. The results of the current research effort, and the work of Finnegan (2012) and Terry, Mills, Rosa, and Sollosy (2009) are positive for institutions offering online courses and using the ETS-MFTB for assessment purposes, but more study is needed to confirm these results in multiple settings.

IMPLICATION FOR PRACTICE

The results of this research effort have a positive implication for practice at the AACSB accredited institution where it was conducted. Specifically, finding that the percentage of common courses completed online was not found to be a significant predictor or explanatory variable is important. These results are important given that all common business courses at the AACSB accredited institution where the research effort was conducted are offered online. The entire bachelor's degree in business administration is available online and the bachelor's degree in logistics and supply chain management is in the final planning phases to be offered online.

FUTURE RESEARCH RECOMMENDATIONS

Based on the results of this study, and the review of the related literature, the following recommendations for future research efforts are presented:

1. This research effort should be replicated in the future. Such a research effort would confirm the consistency of results overtime at the AACSB accredited institution where it was conducted. It is possible that the predictor and explanatory variables revealed in this research effort could change if there are shifts in its student profile.

2. A research effort that explores additional variables for their predictive and explanatory ability is warranted. The data analyzed in this research effort had been collected as either part of the assurance of learning process or as part of normal university institutional effectiveness processes. A deeper dive into the data available through normal university institutional effectiveness processes might reveal additional predictor and explanatory variables of student performance scores on the ETS-MFTB.
3. A research effort that explores the predictor and explanatory variables on other assessments to determine influencers of student performance scores is necessary. Not all institutions use the ETS-MFTB for assurance of learning purposes and the predictor and explanatory variables for those assessments could be different.

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