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ABSTRACT

A series of studies were conducted at Milwaukee Area Technical College (MATC) to determine the relationship of basic skills assessment test scores, sex, and race to student success for the following groups of fall 1985 students: 229 developmental studies (Crossover Program); 501 associate degree level students; 66 business and graphic arts students; 74 health students; and 49 technology students. Using multiple regression analyses, the study revealed: (1) reading and numerical scores were good predictors of success for Crossover students, while language test scores were less useful; (2) for Crossover students, there was no statistical evidence of a relationship between race and GPA, although there was a relationship between sex and GPA; (3) among associate degree students, language test scores and race appeared to have little relationship to grade point average (GPA), reading and numerical scores appeared to contribute to GPA, and males tended to get lower GPA's than females when all other measurable variables were equal; and (4) when the three groups of vocational/technical students were examined as a whole, reading scores, numerical scores, and sex were related to GPA. (EJV)

BASIC SKILLS ASSESSMENT

REPORTS 7861, 7862, AND 11862

THE RELATIONSHIP OF ASSET TEST SCORES, SEX, AND RACE TO SUCCESS IN THE DEVELOPMENTAL PROGRAM, THE ASSOCIATE DEGREE LEVEL PROGRAMS, AND THE ASSOCIATE DEGREE PROGRAMS IN BUSINESS, HEALTH, AND TECHNOLOGY AT MATC

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BASIC SKILLS ASSESSMENT

REPORT 7861

THE RELATIONSHIP OF ASSET TEST SCORES, SEX, AND RACE TO SUCCESS IN THE DEVELOPMENTAL PROGRAM AT MATC

JULY 1986

This report uses multiple regression to determine what relationships exist between the independent variables of sex, race, ASSET Reading score, ASSET Numerical score, ASSET Language score, and the dependent variable GPA for a sample of 229 Crossover students enrolled in fall of 1985. The resulting regression equation shows that ASSET Reading and ASSET Numerical scores contribute to GPA, but ASSET Language does not. The regression equation also shows that race is not a factor in Crossover GPAs, but sex is (a male student will get a lower GPA than a female student). The three variables (ASSET Reading, ASSET Numerical, and sex) contribute to 9% of the variance in GPA. It is recommended that additional research be conducted using non-cognitive dimensions.

During the Fall of 1985, entering students with high school GPAs below 2.00 (or GED scores below 250) were given ASSET tests in Reading, Numerical Skills, and Language. These students were then assigned to the developmental program (called "Crossover") if their ASSET Reading scores were less than 20.

The Crossover Program has been in existence since 1970 as the principle developmental program for students wishing to enter Associate Degree programs. This program has usually had a high minority enrollment (varying between 30% in 1972 to 75% in 1986).

MATC has been conducting a self examination regarding minority access to programs and minority success in programs. This self examination has addressed the issues of entry testing and remediation relative to minority students. The Crossover Program has been using entry testing and high school GPA for placement since it began. It, therefore, is a good place to look for information related to these issues.

The following questions have arisen regarding entry testing and remediation.

1. Are there relationships between entry test scores and student success?

2. Are there relationships between student sex and race and academic success?

To answer these questions, a step-wise multiple regression was performed on 229 Crossover students enrolled in Semester 1, 1985. This regression was to determine what relationships exist between the independent variables of sex, race, ASSET Reading score, ASSET Numerical score, ASSET Language score, and the dependent variable GPA. The variables sex and race were represented by indicator variables, that is, variables coded as 0 or 1. Sex was coded as 0 for female and 1 for male, and race was coded as 0 for White, and 1 for Non-White. A variable was included in the regression equation if the probability associated with the F-Test was less than or equal to 0.05.

These techniques resulted in the following regression equation:

GPA = 1.28 + (0.035)(ASSET READING) + (0.035)(ASSET NUMERICAL) - (0.30)(IF MALE)

This three-variable model accounted for 9% of the variance in GPA in Crossover students. This percentage is less than Pascarella, Smart, and Ethnington's (1986) 14-variable model which accounted for 19.7% of the variance in degree completion for community college students. Much of the variance in the Crossover students' GPA is determined by variables not measured in this study.

How can this regression equation be interpreted? First, the variables excluded from the equation (ASSET Language and race), appear to have little relationship to GPA. Second, the ASSET Reading score has the potential of contributing more to the GPA than the ASSET Numerical score because there are 40 Reading test items and 32 Numerical test items. But, in fact, their Reading score contributes less because students with scores above 20 are usually not programmed into Crossover. Third, all other measurable variables being equal, a male student will get a lower GPA than a female student. Fourth, other factors not measured in this study contribute to the variance in GPA for Crossover students.

Conclusion

The ASSET Reading and ASSET Numerical scores can be used to determine a student's potential for success in the Crossover Program, while the ASSET Language score is not as useful. The ASSET Reading correlation is especially interesting because the reading score is used to select students for Crossover and therefore has a restricted variance. There is no statistical evidence of a relationship between race and GPA in the Crossover Program, although there is a relationship between sex and GPA. This sex and GPA relationship is consistent with almost all previous research on predicting college and grade point average (Astin: p. 93). This research should be continued using non-cognitive dimensions (Tracey and Sedlacek).

REFERENCES

Astin, A. (1982) Minorities in American Higher Education. San Francisco: Jossey-Bass.

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Tracey, T., and W. Sedlacek, A Description and Illustration of a Model for Conducting Student Retention Research. Research Report #13-80, University of Maryland.

BASIC SKILLS ASSESSMENT

REPORT 7862

THE RELATIONSHIP OF ASSET TEST SCORES, SEX, AND RACE TO SUCCESS IN ASSOCIATE DEGREE LEVEL PROGRAMS AT MATC

JULY 1986

This report uses multiple regression to determine what relationships exist between the independent variables of sex, race, ASSET Reading score, ASSET Numerical score, ASSET Language score, and the dependent variable GPA for a sample of 501 Associate degree level students enrolled in fall of 1985. The resulting regression equation shows that ASSET Reading and ASSET Numerical scores contribute to GPA, but ASSET Language does not. The regression equation also shows that race is not a factor in Associate Degree GPAs, but sex is (a male student will get a lower GPA than a female student). The three variables (ASSET Reading, ASSET Numerical, and sex) contribute to 13.5% of the variance in GPA. It is suggested that additional research be conducted using non-cognitive dimensions.

During the Fall of 1985, entering students in Associate Degree programs were given ASSET tests in Reading, Numerical Skills, and Language. Some of these students were then assigned to the developmental program (called "Crossover") if their ASSET Reading scores were less than 20 and their high school GPAs were below 2.00. The other students enrolled in regular Associate Degree or College Parallel programs.

MATC has been conducting a self examination regarding minority access to programs and minority success in programs. This self examination has addressed the issues of entry testing and differing achievement of minority students.

The following questions have arisen regarding student performance in Associate Degree and Crossover programs.

1. Are there relationships between entry test scores and student success?

2. Are there relationships between student sex and academic success?

3. Are there relationships between race and student success?

To answer these questions, a step-wise multiple regression was performed on 501 Associate Degree students enrolled in Semester 1, 1985. This regression was to determine what relationships exist between the independent variables of sex, race, ASSET Reading score, ASSET Numerical score, ASSET Language score, and the dependent variable GPA. The variables sex and race were represented by indicator variables, that is, variables coded as 0 or 1. Sex was coded as 0 for female and 1 for male, and race was coded as 0 for White, and 1 for Non-White. A variable was included in the regression equation if the probability associated with the F-Test was less than or equal to 0.05.

These techniques resulted in the following regression equation:

GPA = 1.46 + (0.028)(ASSET READING) + (0.027)(ASSET NUMERICAL) - (0.26)(IF MALE)

This three-variable model accounted for 13.5% of the variance in GPA. This compares favorably to 9% of the variance as reported for Crossover students alone (BSA Report 7861). The percentage is less than Pascarella, Smart, and Ethnington's (1986) 14-variable model which accounted for 19.7% of the variance in degree completion for community college students.

How can this regression equation be interpreted? First, the variables excluded from the equation (ASSET Language and race), appear to have little relationship to GPA. This is consistent with the study conducted with Crossover students alone. Second, the ASSET Reading and Numerical scores contribute to students' GPAs and therefore should be considered when advising students. Third, all other measurable variables being equal, a male student will get a lower GPA than a female student. Fourth, even though the three variables account for 13.5% of the variance in GPA, other non-cognitive variables should be considered (Tracey and Sedlacek).

Conclusion

The ASSET Reading and ASSET Numerical scores can be used to determine a student's potential for success in the Associate Degree programs at MATC (including Crossover), while the ASSET Language score is not useful. There is no statistical evidence of a relationship between race and GPA in Associate Degree level programs, although there is a relationships between sex and GPA. This sex and GPA relationship is consistent with almost all previous research on predicting college and grade point average (Astin: p. 93). It may be beneficial to continue this research using non-cognitive dimensions (Tracy and Sedlacek).

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Astin, A. (1982) Minorities in American Higher Education. San Francisco: Jossey-Bass.

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Tracey, T., and W. Sedlacek, A Description and Illustration of a Model for Conducting Student Retention Research. Research Report #13-80, University of Maryland.

BASIC SKILLS ASSESSMENT

REPORT 11862

THE RELATIONSHIP OF ASSET TEST SCORES, SEX, AND RACE TO SUCCESS IN ASSOCIATE DEGREE PROGRAMS IN BUSINESS, HEALTH, AND TECHNOLOGY AT MATC

NOVEMBER 1986

This report uses multiple regression to determine what relationships exist between the independent variables of sex, race, ASSET Reading score, ASSET Numerical score, ASSET Language score and the dependent variable of GPA for three samples of Associate Degree level students enrolled in fall of 1985; sixty-six business students, seventy-four health students, and forty-nine technology students. The resulting regression equations show that ASSET Reading scores contribute to GPA, but ASSET Numerical and ASSET Language do not. This differs from a previous study of 501 Associate Degree students (including these three samples) that showed both ASSET Reading and ASSET Numerical scores contributing to GPA. The difference may be due to the nature of the mathematical demands of the curriculum in each of the three samples. (see Report 7862). As in previous studies, it is suggested that additional research be conducted using non-cognitive dimensions.

During the fall of 1985, entering students in Associate Degree programs were given ASSET tests in Reading, Numerical Skills, and Language. Complete ASSET scores are available for sixty-six students in Business and Graphic Arts, seventy-four students in Health, and forty-nine students in Technology.

MATC has been conducting a self-examination regarding minority access to programs and minority success in programs. This self-examination has address the issues of entry-testing and differing achievement of minority students.

The following questions have arisen regarding student performance in Associate Degree and Crossover programs.

1. Are there relationships between entry test scores and student success?

2. Are there relationships between student sex and academic success?

3. Are there relationships between race and student success?

To answer these questions, step-wise multiple regressions were performed on each group of students. These regressions were to determine what relationships exist between the independent variables of sex, race, ASSET Reading score, ASSET Numerical score, ASSET Language score, and dependent

variable GPA. The variables sex and race were represented by indicator variables, that is, variables coded as 0 or 1. Sex was coded as 0 for female and 1 for male, and race was coded as 0 for White, and 1 for Non-White. A variable was included in the regression equation if the probability associated with the F-test was less than or equal to 0.05.

BUSINESS AND GRAPHIC ARTS

These techniques resulted in the following regression equation for the sixty-six students in Business and Graphic Arts:

GPA = 1.58 + (0.042)(ASSET READING) - (0.48)(if male)

This two-variable model accounted for 13.6% of the variance in GPA. This compares favorably to 13.5% of the variance as reported for a three-variable model derived for 501 Associate Degree students (BSA Report 7862). The percentage is less than Pascarella, Smart, and Ethnington's (1986) 14-variable model which accounted for 19.7% of the variance in degree completion for community college students.

How can this two-variable regression equation be interpreted? First, ASSET language and race variables were excluded from this equation, just as they were excluded in previous studies (BSA Reports 7861, 7862). In addition, the ASSET Numerical variable was excluded although it was included in previous studies. Second, the ASSET Reading score contributes to students' GPAs and therefore should be considered when advising students. Third, all other measurable variables being equal, a male student will get a lower GPA than a female student. Fourth, even though the two variables account for 13.6% of the variance in GPA, other non-cognitive variable should be considered (Tracey and Sedlacek).

How does this regression equation relate to national performance on the ASSET Reading test? According to ACT, a Reading score of 18 or less on the 40 item test was obtained by the low 25% of high school seniors and a score of 30 or greater was obtained by the top 40%. Substituting a score of 19 into the equation for males and females would generate probable minimum GPAs for students in the top 75% of high school students. This yields the following projected GPAs:

GPA (male) = 1.58 + (.042)(19) - (0.48)
GPA (male) = 1.90

GPA (female) = 1.58 + (.042)(19)
GPA (female) = 2.38

These numbers would reinforce the decision to suggest a reading fundamentals course to business students with ASSET Reading test scores below 19.

HEALTH (NON-NURSING)

Nursing students are required to take the ACT and not the ASSET and are therefore not included in this analysis. The multiple regression techniques were applied to the seventy-four non-nursing health occupations students with the following results:

GPA = 1.85 + (0.031)(ASSET READING) - (0.35)(if male)

In this case the two-variable model accounted for 11% of the variance in GPA.

How can this two-variable regression equation be interpreted? First, as with the business students, ASSET Numerical, ASSET Language, and race variables were excluded from this equation. Second, as with the business students, the ASSET Reading score contributes to health students' GPAs and therefore should be considered when advising students. Third, all other measurable variables being equal, a male students will get a lower GPA than a female student. Fourth, even though the two variables account for 11% of the variance in GPA, other non-cognitive variables should be considered.

How does this regression equation relate to national performance on the ASSET Reading test? If we substitute a score of 19 into the equation, we get:

GPA (male) = 1.85 + (.031)(19) - (0.35)
GPA (male) = 2.09

GPA (female) = 1.85 + (.031)(19)
GPA (female) = 2.44

These numbers would suggest a reading fundamentals course to health students with ASSET Reading scores below 19.

TECHNICAL

A multiple regression equation was calculated for the forty-nine technology students:

GPA = 1.51 + (.039)(ASSET READING)

This single variable model accounted for 10.8% of the variance in GPA.

How can this one variable regression equation be interpreted? First, the low female enrollment in technology may have contributed to the lack of a sex-difference variable in the equation. Second, as with all other cases, race and ASSET Language scores do not appear to be predictors of success.

Third, as in all cases, the ASSET Reading score contributes to GPA and therefore should be considered when advising students. Fourth, this one variable accounts for only 10.8% of the variance in GPA and therefore other non-cognitive variables should be considered.

How does this regression equation relate to national performance on the ASSET Reading test? If we substitute a score of 19 into the equation, we get:

$$GPA = 1.51 + (.039)(19)$$
$$GPA = 2.25$$

This result would suggest a reading fundamentals course for technical students with ASSET Reading scores below 19.

SUMMARY

When all Associate Degree students are examined as a group, the derived multiple regression equation involves three predictor variables: ASSET Reading score, ASSET Numerical score, and sex. When each of the major career clusters (Business, Health, Technology) are examined separately, the ASSET Numerical scores are no longer in the regression equations. This is probably because each career cluster curriculum demands a different level of mathematics. As in previous studies, it is suggested that additional research be conducted using non-cognitive dimensions.

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Astin, A. (1982) Minorities in American Higher Education. San Francisco: Jossey-Bass.

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