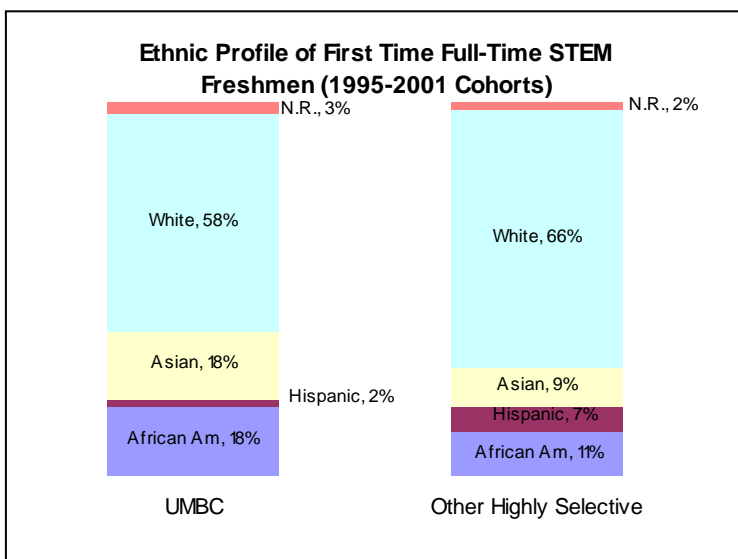


Retention and Graduation Rates for Majors in Science, Technology, Engineering, and Mathematics (STEM): Comparison of UMBC's STEM Students with STEM Students in Other Highly Selective Institutions

Office of Institutional Research July, 2004

Since 1994 the Consortium for Student Retention Data Exchange (CSRDE), based at the University of Oklahoma, has been collecting data on retention and graduation rates from selected 4-year degree awarding institutions. Among the reports that they generate from these data is the STEM Retention Report, summarizing the retention and graduation rates of freshman cohorts majoring in Science, Technology, Engineering and Mathematics (referred to hereafter as STEM students). In their analysis, institutions are classified as highly selective, selective, moderately selective, and less selective. Based on the average combined SAT score for the freshman class (>1100), UMBC falls into the highly selective institution category. This report will compare UMBC's STEM student retention and graduation data for the 1995-2001 cohorts to data for the same STEM student cohorts of all highly selective institutions. Below is a series of charts that summarize the ethnic and gender profiles of STEM students as well as graduation and retention rates. A comparison of SAT scores is also included. The data for the charts come from the CRSDE 2002-2003 STEM Retention Report and UMBC's survey response data. A synopsis of the data accompanies each chart.

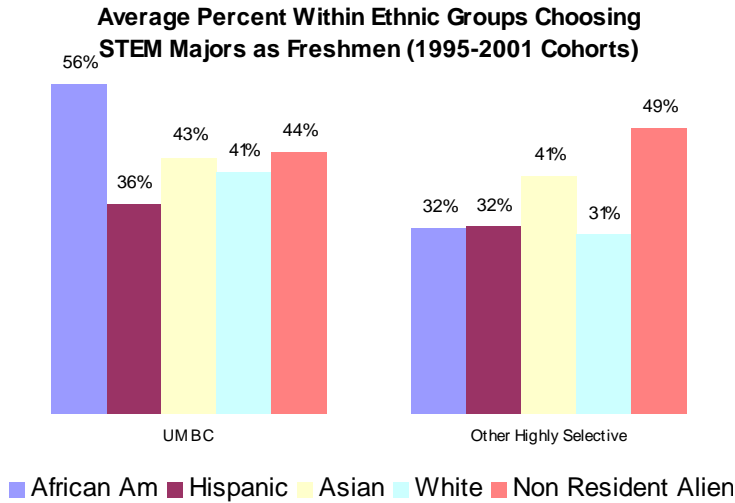
Ethnic Profile of First-Time Full-Time Freshman STEM Majors



Comparatively, UMBC attracted higher percentages of African American and Asian, and lower percentages of Hispanic students into its STEM programs from 1995 to 2001 than other highly selective institutions. This is, however, representative of the total student population entering UMBC as first-time full-time freshmen between 1995 and 2001, where on average, Asians, African Americans, and Hispanics comprise 18%, 14% and 2%

respectively. Because, on average, there were so few American Indian students attending UMBC as STEM majors between 1995 and 2001, their data are not presented separately in this report.

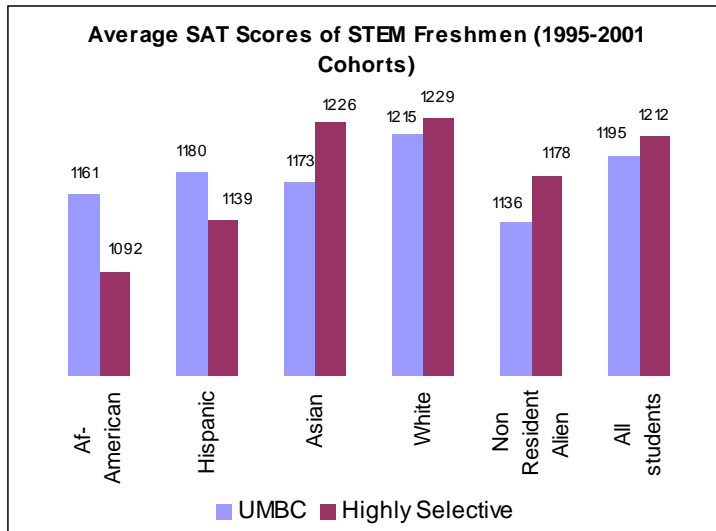
Percentage within Ethnic Group Choosing a STEM Major



The percentage of African Americans at UMBC who chose a STEM major as freshmen between 1995 and 2001 was 24 percentage points higher than that of other highly selective institutions. For Whites it was 10 percentage points higher. All other UMBC ethnic groups were not substantially different in their likelihood to choose a STEM major from those of other highly selective institutions. Although CRSDE reported that there was a significant change

in the percentage of Non-Resident Aliens from 1995 to 2001 in highly selective institutions as a whole, there was no such trend in UMBC’s Non-Resident Alien population over the same six-year period. There was, however, a decrease in the proportion of Asians that chose a STEM major as freshmen from 1995 to 2001, dropping from 49% to 39%. There were virtually no differences in the percentages of males and females choosing STEM majors between UMBC and other highly selective institutions.

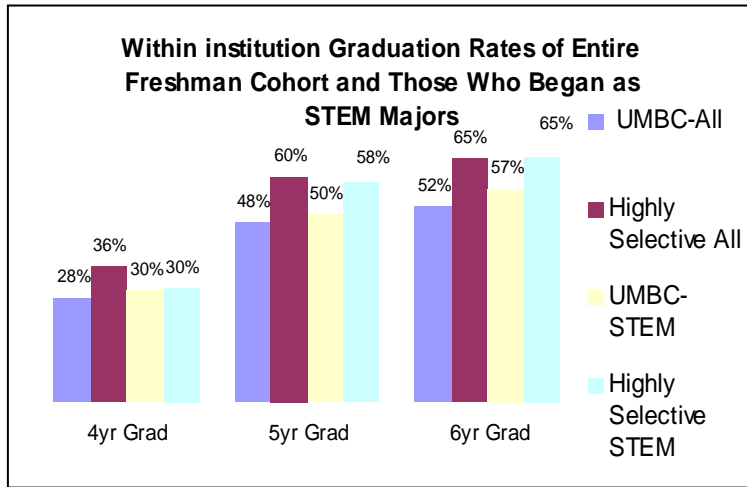
SAT Scores of STEM Freshmen



In the years 1995 through 2001, the average SAT score for all STEM students at UMBC was 1195. This was slightly lower than the average of 1212 for all other highly selective institutions during the same period. When SAT scores are broken down by ethnic group the gap in scores between UMBC and students from other highly selective institutions reversed in the African American and Hispanic ethnic groups. UMBC’s African American STEM students

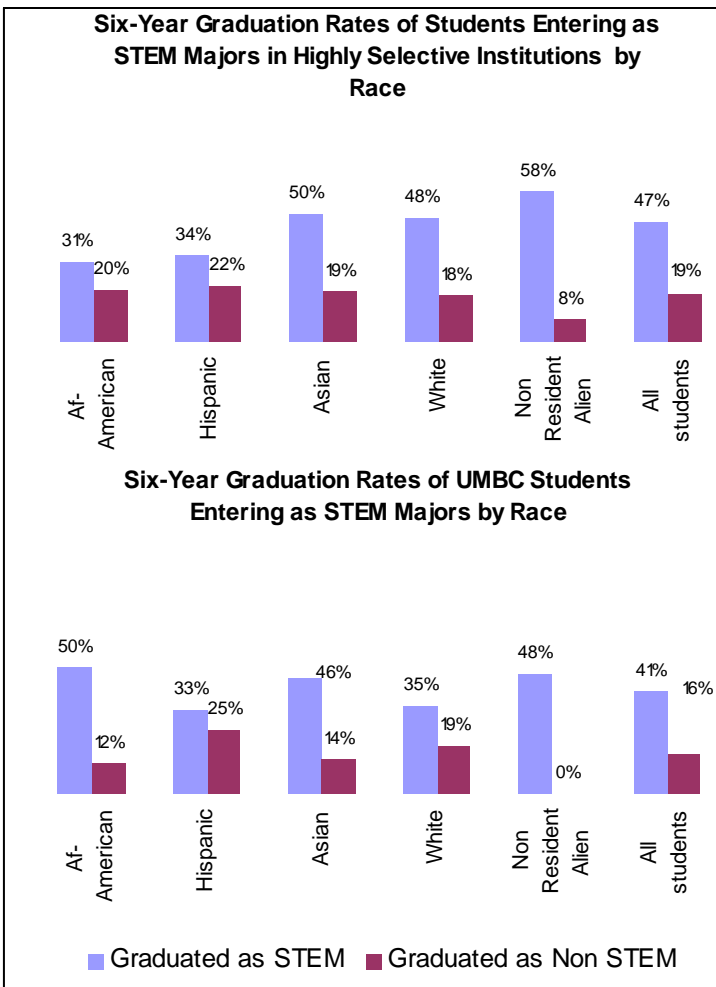
between 1995 and 2001, on average, had combined SAT scores of 1161, which was 69 points higher than the average SAT scores for African American students in other highly selective institutions. Hispanics, on average, had SAT scores that were higher than their counterparts’ scores at other highly selective institutions but the gap was not as great as that of African Americans. All other ethnic groups at UMBC had average SAT scores that were lower than those of students at other highly selective schools.

Graduation Rates



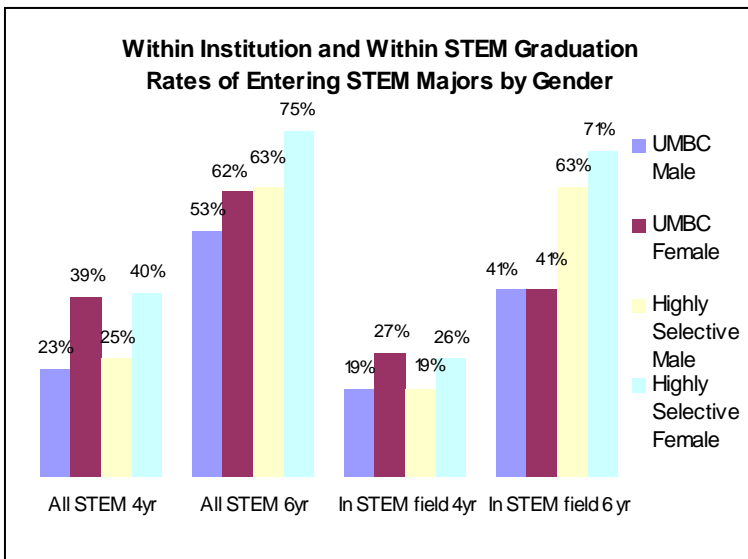
The average four-year graduation rate for all students in the 1995 through 1998 cohorts at UMBC was 28%. This was substantially lower than the average rate at other highly selective institutions participating in the CSRDE survey (36%). However, students entering as STEM majors at UMBC had the same four-year graduation rate (30%) as STEM majors at other highly selective institutions. The gap between the graduation rates of all students at UMBC and all

students at other highly selective institutions widened approaching the 5th and 6th year after matriculation. The same was true of the STEM students, but here the trend was less pronounced.



While UMBC students who chose a STEM major as freshmen in the 1995-1996 cohorts had lower six-year graduation rates than those at other highly selective institutions, there were significant differences in the graduation rates of specific ethnic groups. UMBC's African American STEM students from the 1995-1996 freshman cohorts had a six-year graduation rate that was higher than their fellow students at other highly selective institutions (62% for UMBC and 51% for other highly selective). Furthermore, 50% of UMBC's African American STEM students graduated with a STEM degree, as opposed to only 31% at all other highly selective institutions. Hispanics and Asians at UMBC had rates comparable to those of other highly selective institutions but Whites and Non-Resident Aliens did not, with those entering as STEM students in the 1995 and 1996 cohorts having graduation rates 12 and 18 percentage points lower than those at

other highly selective institutions, respectively.



For all those entering UMBC as STEM students from 1995 to 2001, graduation rates for women were higher than those for men in every category except for the six-year graduation rate which was 41% for both sexes. Institution-wide (graduating in any major), the average UMBC male student entering as a STEM major had lower four-year (23% compared to 25%) and six-year (53% compared to 63%) graduation rates than their

counterparts in other highly selective institutions. For those entering and graduating in STEM fields, UMBC males had a comparable four-year graduation rate to males at other highly selective institutions (19%), but had a much lower six-year rate (41% as opposed to 63%). Four-year graduation rates for UMBC female STEM majors were virtually the same as women in other highly selective institutions for both those who graduated with a STEM degree and in any field institution-wide. Six-year graduation rates for UMBC STEM women graduating with a STEM degree, much like the men, were much lower (41%) than graduation rates for the same group at other highly selective institutions (71%).

Conclusions

UMBC stands out in comparison with other highly selective institutions in its ability to attract, educate, and graduate African American STEM students in a timely manner. The high six-year graduation rate of 1995 and 1996 African American STEM students is indicative of the support that they received from programs such as the Meyerhoff Scholarship Program which, while not exclusively a program for African Americans, has supported the success of a large number of African American students.

At the same time, it is evident that more focus needs to be given to the overall retention and graduation rates of UMBC STEM students both within STEM majors and institution-wide. For all those entering as STEM students UMBC's six-year rates were lower than those at highly selective institutions by nine percentage points, with the gap being four percentage points for those STEM students graduating with a STEM degree. As an Honors University with a strong emphasis on the Sciences and Engineering, the campus should identify and address factors that might help improve the retention and graduation rates of these students as well as all UMBC students.

References

Hayes, R. (2003). The retention and graduation rates of 1995-2001 freshman cohorts entering into science, technology, engineering and mathematics majors in 211 colleges and universities.(2002-03 STEM Retention Report). Norman: The University of Oklahoma, Center for Institutional Data Exchange and Analysis. (Data used with permission of CSRDE)

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