

2006-1689: STUDENT DIVERSITY AT THE MERCER UNIVERSITY SCHOOL OF ENGINEERING: RETENTION AND GRADUATION

Andre Butler, Mercer University

André Butler is an assistant professor of environmental and mechanical engineering at Mercer University. His research interests include pollutant measurement of the ambient atmosphere (ozone and particulate matter), air quality health effects, and design and development of particulate matter measurement instruments.

Priscilla Hicks, Mercer University

Priscilla Hicks is an administrative coordinator at Mercer University. Her research interests include obesity and the onset of diabetes, prevalence of asthma among children who are exposed to secondhand environmental tobacco smoke, and HIV/AIDS.

Student Diversity at the Mercer University School of Engineering

Abstract

Many colleges and universities have developed strategies to increase diversity in their engineering programs. Such strategies include providing support services (mentoring, academic and professional development workshops, tutoring, etc.), summer programs, and focused recruitment of target student populations. Although results of these efforts, in general, indicate that some progress has been made over the years regarding the recruitment, retention, and graduation of under-represented minorities and women in engineering, significant discrepancies still exist and much work remains.

Over the past ten years at Mercer, African-Americans have comprised 17.1% of students enrolled in engineering, while women have comprised 31.1%, on average. In addition, African-Americans and women represent a sizeable fraction of each graduating class (14.8% and 32.0%, respectively). These numbers are higher than those observed in many other engineering schools across the country. Five-year graduation rates for African-Americans (as well as other under-represented minorities) and women at Mercer, however, are more in line with observations at other engineering schools.

The purpose of this paper is to investigate student-body diversity, retention, and graduation rates at the Mercer University School of Engineering in light of national trends. While a cursory look at the data may indicate a significant measure of success, there are always opportunities for improvement, some of which will be discussed.

Introduction

Mercer University, founded in 1833, is a small, private, comprehensive institution of higher learning located in Macon, GA. The school of engineering (MUSE) was begun in 1985 and earned accreditation from the Accreditation Board for Engineering and Technology (ABET) in 1990 for a Bachelor of Science in Engineering (BSE) degree with specialties offered in electrical, industrial, and mechanical engineering. MUSE hit its stride in the early 1990s, and now also offers specialties in biomedical engineering, computer engineering, environmental engineering, industrial management, and technical communication. Since that time, MUSE has had a good track record regarding attracting, retaining, and graduating minorities and women, particularly in view of national trends.

Much has been written concerning the need for attracting qualified minorities and women to engineering disciplines¹⁻⁴. Still, national enrollment figures indicate that most colleges and universities struggle to meet this need, and minority and female students remain under-represented. At Mercer, however, past performance indicates a level of success in this area that exceeds the national averages by roughly 50% for both African-Americans and women.

If attracting qualified students to engineering disciplines is the first step, then retaining them is clearly the second. Retention symbolizes student progress toward graduation and may be defined in several ways⁵⁻⁶. At MUSE, 64% of minority freshmen are retained to their sophomore year and just over 50% are retained to their junior year. The respective percentages for women are 64% and 57%. These values are slightly higher than national averages.

The final component of success as it relates to the matriculation of minorities and women in engineering is graduation. There are at least two ways to examine graduation data: (1) on a basis that focuses on a given year and the percentage of degrees awarded to particular groups during that year, and (2) on a basis that focuses on graduation rates and the percentages that graduate during a specific window of time (e.g., four, five, or six years after the freshman year). At MUSE, 16% of BSE degrees awarded annually are to minority students and 31% are to women. In addition, the five-year graduation rates for minorities and women at MUSE are 29% and 40%, respectively. These values do not differ significantly from national averages.

In the sections below, more details and data are provided and discussed in an effort to fully characterize student diversity at MUSE.

MUSE Enrollments from 1992-2004

The first step along the path of graduating appropriate numbers of minorities and women in engineering is attracting those groups to the field. Many colleges and universities have active and successful recruiting efforts that result in the identification and admission of qualified, under-represented students⁷⁻⁹. Mercer University does not specifically recruit either minorities or women for admissions, nor is Affirmative Action implemented. Under these circumstances, one might expect MUSE to exhibit woeful student diversity numbers. However, as shown in Figure 1, that is hardly the case. The data indicate that African-Americans and women comprise approximately 18% and 32%, respectively, of the incoming freshman class. Nationally, over the same time period, the numbers are roughly 13% and 20% for African-Americans and women, respectively⁵. Figure 2 takes a similar view of overall enrollments at MUSE, and indicates significant diversity throughout the program, and not just at the freshman year.

Currently, Mercer is one of only two colleges/universities in the state of Georgia that offers baccalaureate degrees in engineering. So unlike many other states, students in Georgia who would like to study engineering in college while remaining close to home have only two choices: a large, public school (the Georgia Institute of Technology) in the heart of a large city (Atlanta) or a small, private school (Mercer) in a much smaller town (Macon). The clear choice for many students (African-Americans and women included) is Mercer, irrespective of non-existent recruiting practices.

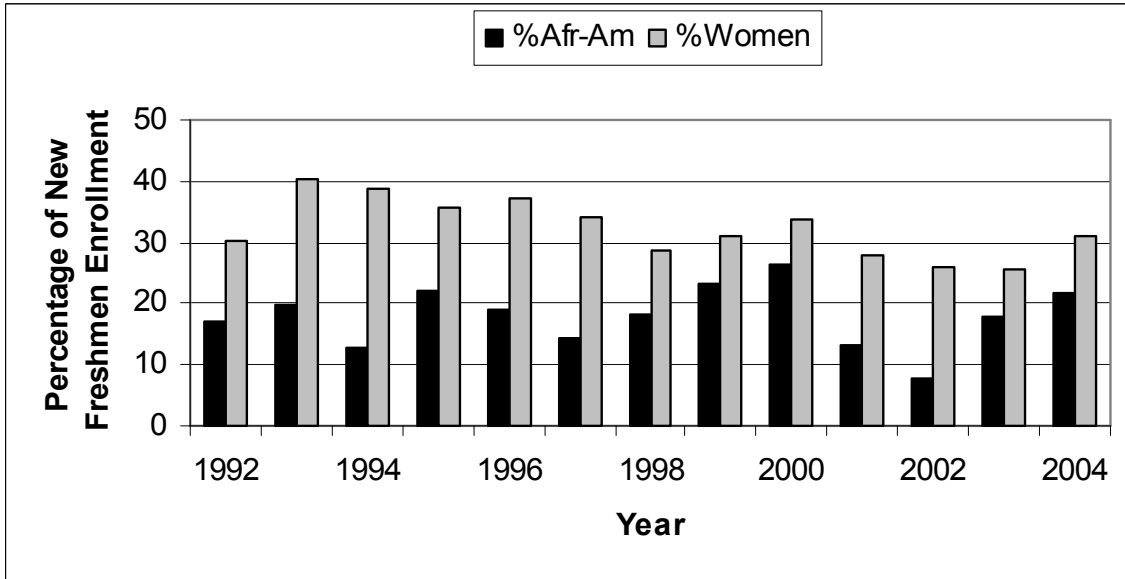


Figure 1. New freshmen at MUSE. The percentages of African-Americans and women enrolled, 1992-2004.



Figure 2. All students at MUSE. The percentages of African-Americans and women enrolled, 1994-2004.

MUSE Retention from 1992-2004

After African-Americans and women have been enrolled in an engineering program, the next important step is to ensure that they make steady, consistent progress toward graduation. Many schools of engineering have implemented novel retention models that

have helped keep under-represented engineering students on the right track¹⁰⁻¹³. MUSE has no programs to address these issues; however, the data indicate no apparent need for them. Figure 3 shows that African-Americans, Caucasians, and women in engineering are all retained at rates over 60%, on average, from the freshman to the sophomore year. MUSE's retention rate for African-Americans is slightly higher than the national average, and the rates for Caucasians and women are on par⁶. Mercer University (as a whole) endeavors to retain 80-90% of its students from one year to the next. Consequently, all the numbers achieved by MUSE show room for improvement, although it is instructive to note that there are no cultural or gender biases.

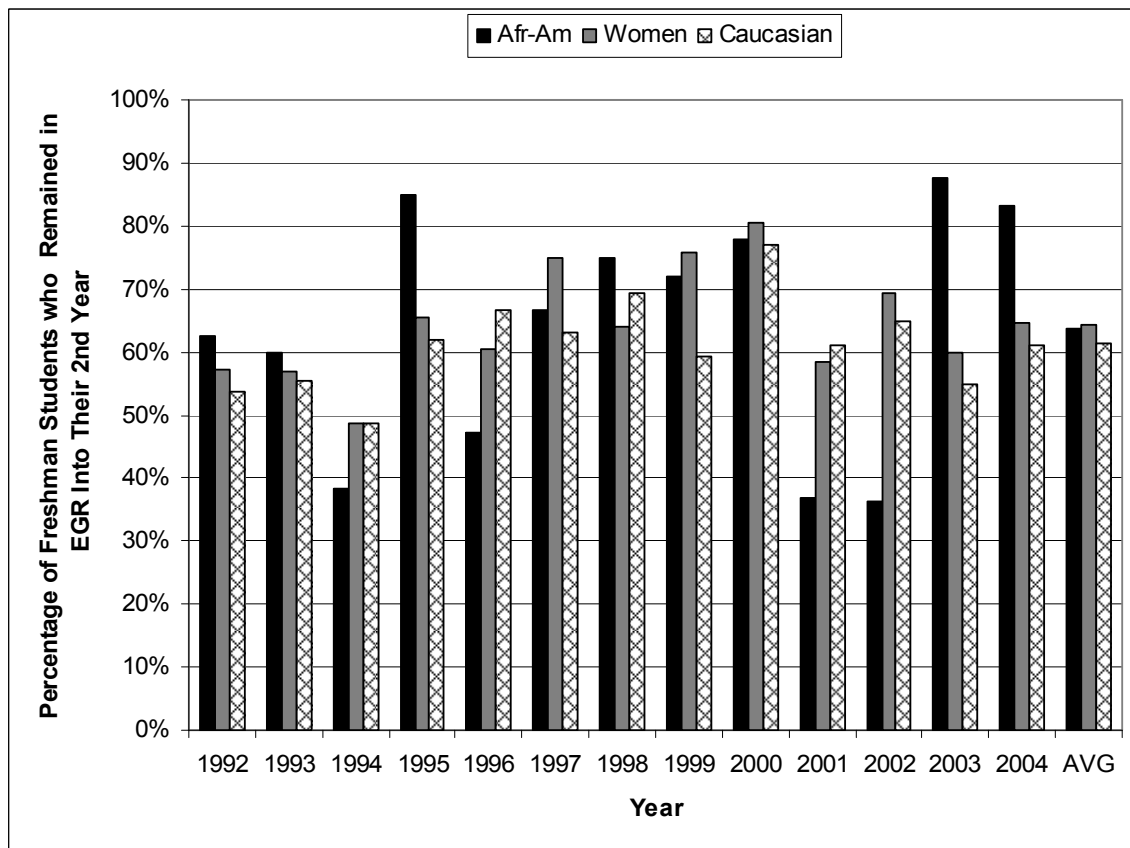


Figure 3. Retention from the freshman to the sophomore year at MUSE, 1992-2004.

Figure 4 displays the percentages of freshman students who are retained through the junior year. The data indicate two-year retention rates of over 50% for all three groups, again demonstrating that there are no cultural or gender biases in this measure. Of special interest in both figures are the years in which retention for African-Americans exceeded the rates for both women and Caucasians. The years in question tended to represent those with the highest numbers of African-American students enrolled as new freshmen.

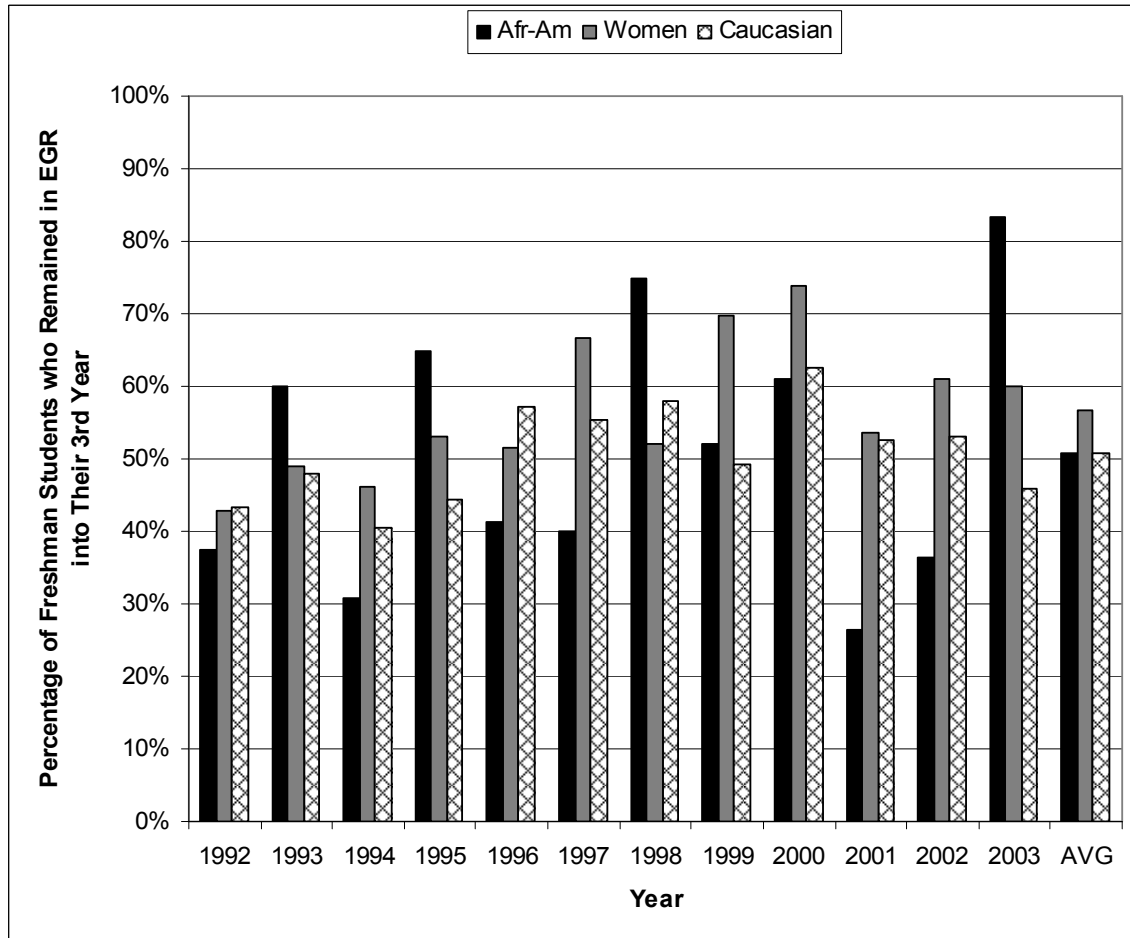


Figure 4. Retention from the freshman to the junior year at MUSE, 1992-2003.

MUSE Graduation from 1992-2005

The ultimate measure of successfully matriculating under-represented student populations is graduation. Over the past quarter-century, minorities and women have made significant strides in the numbers earning undergraduate degrees in engineering, although the proportions have changed very little⁵. At MUSE, 15% of BSE degrees are awarded to African-Americans and 32% to women, on average. These percentages exceed the national averages, which are 5% and 20%, respectively¹⁴. Transfer students, who comprise 18% of the new students at MUSE on average, graduate in three years at roughly the same rates that new freshmen students graduate in five years.

Graduation may also be investigated by assessing the groups' graduation rates during a specified time window. Figure 6 shows five-year graduation rates for students at MUSE.

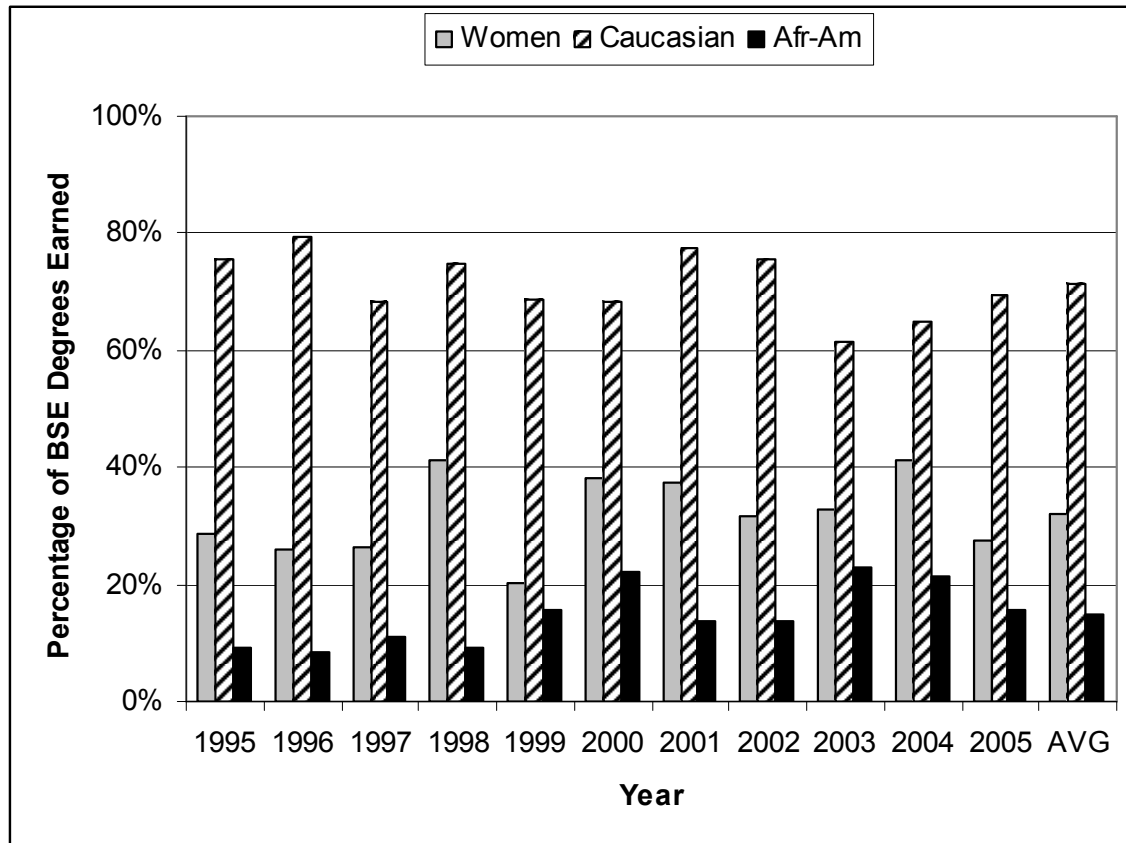


Figure 5. Percentage of students earning BSE degrees at MUSE, 1995-2005.

The data show that, on average, 29% of African-Americans and 40% of women graduate from MUSE within five years. The percentage for African-Americans is somewhat lower than that reported by other schools of engineering in the region, while that for women is on par with other reports¹⁵⁻¹⁶. These numbers seem to indicate the existence of either a larger than expected attrition of African-American students after the junior year, or a typical time to degree completion in excess of five years. Figure 7 shows that over 50% of African-Americans at MUSE persist to graduation in six years or more, although African-American women have a higher success rate than African-American men. This number includes both new freshmen and transfers. Figure 8 shows that over 60% of women persist to graduation in six years or more, although African-American women have a lower success rate than women on the whole.

Summary and Conclusions

Over the years, MUSE has enjoyed a reasonably successful track record of attracting and retaining minorities and women. Characteristics of the University, such as its small size and location away from large, metropolitan areas, make the engineering program an attractive in-state alternative to many students. Neither Mercer University as a whole nor MUSE engages in any intentional efforts to attract and retain under-represented students.

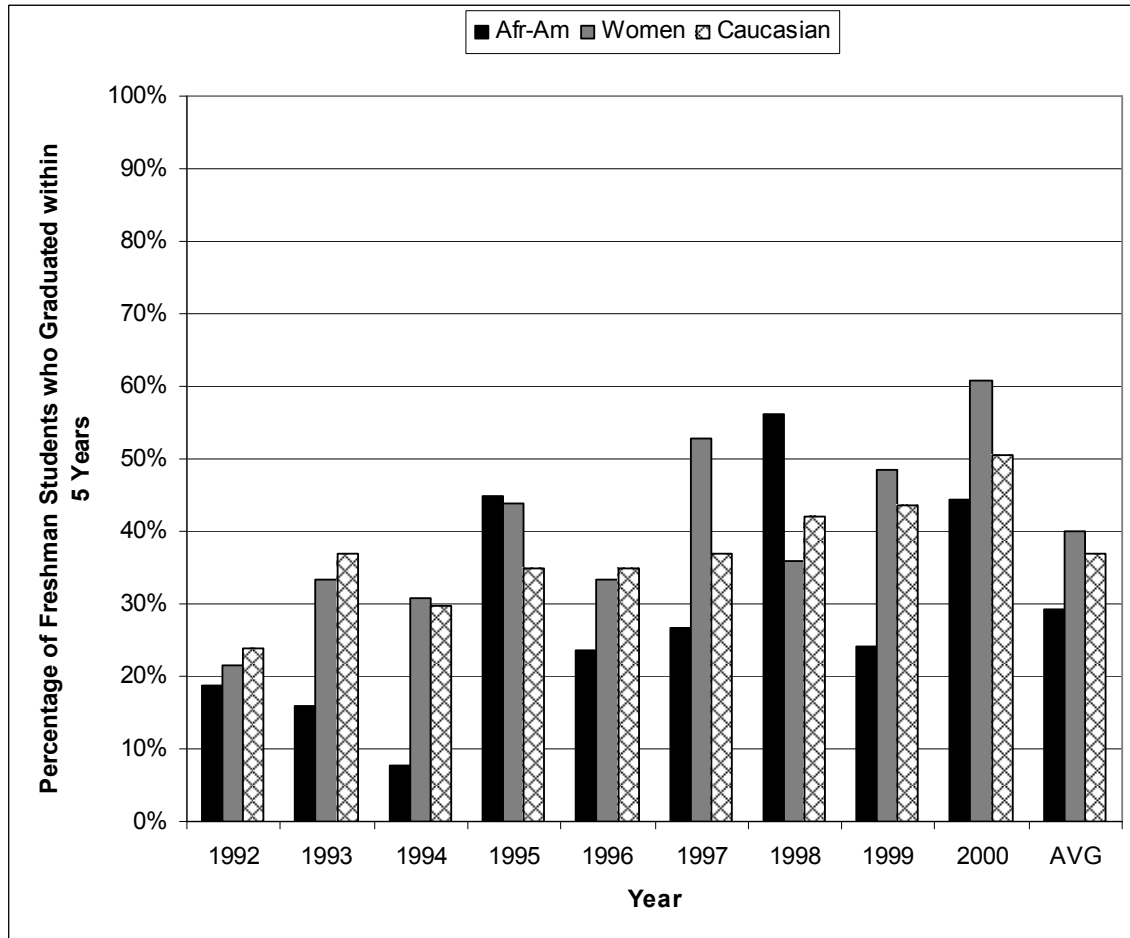


Figure 6. Five-year graduation rate at MUSE, 1992-2000. The year represents the beginning of matriculation for the student.

It is unclear whether the success achieved in these areas are sustainable, or if it is merely a by-product of serendipity.

The data also suggest that graduation classes at MUSE are more diverse with respect to under-represented groups than other schools across the nation, although five-year graduation rates may lag slightly. Since graduation is the ultimate measure of the successful matriculation of students (irrespective of race or gender), it is clear that Mercer University (and indeed most colleges and universities) have room for improvement.

Acknowledgements

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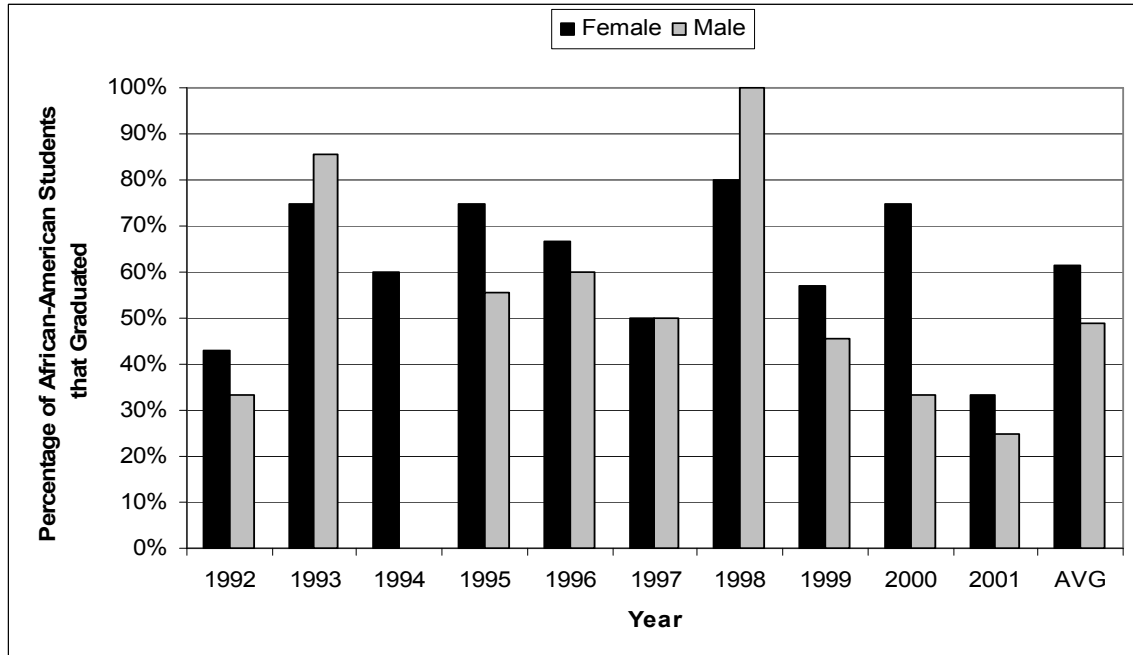


Figure 7. Annual graduation rates for African-American students at MUSE (any number of years to graduation), 1992-2001. The year represents the beginning of matriculation for the student.

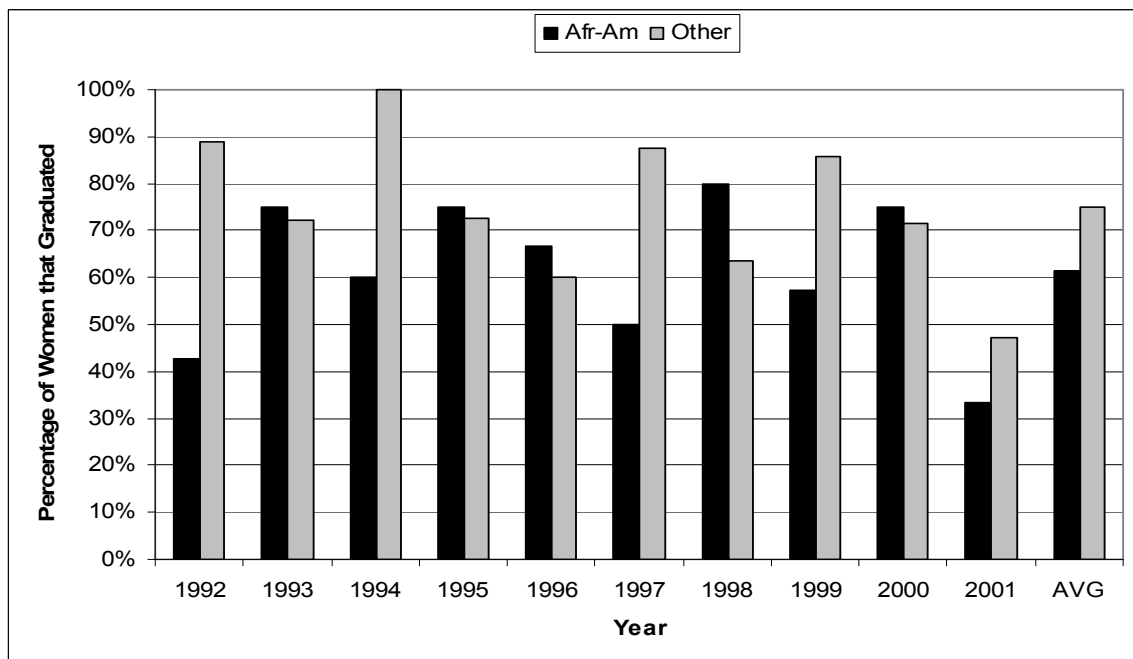


Figure 8. Annual graduation rates for women at MUSE (any number of years to graduation), 1992-2001. The year represents the beginning of matriculation for the student.

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