Report on LSAMP and Enrollment, Retention and Graduation of Underrepresented Minority Students Majoring in Science, Technology, Engineering and Mathematics (STEM)

Author: Rosemary Hayes, Director
Consortium for Student Retention Data Exchange (CSRDE) at the University of Oklahoma Outreach
1700 Asp Ave., Norman, OK 73072 PHONE: 405-325-2158 EMAIL: csrde@ou.edu

Background

Established in August 1994, the Consortium for Student Retention Data Exchange (CSRDE) at the University of Oklahoma is composed of 473 member institutions from every state in the United States. These 4-year institutions are a diverse group of public and private colleges and universities. The purpose of the CSRDE is to provide a mechanism by which institutions interested in the issues surrounding retention and graduation can share retention data and compare their retention and graduation rates in the context of peer institutions. The comparative study of peers is common practice among institutional researchers in higher education. Information on how peers differ in terms of number of faculty, faculty salaries, enrollment, investment in research facilities and even student retention can provide both a context for issues and an impetus for change. As a data-sharing consortium focused on student retention, CSRDE is able to provide member institutions with retention and graduation benchmarks not available from national sources.

Every year since 1994 member institutions have contributed data on the retention and graduation of first-time full-time freshmen. Since 2000, the CSRDE has also collected retention and graduation data on first-time full-time science, technology, engineering and mathematics (STEM) majors. The results of the most recent STEM survey were published in the *2002-03 CSRDE STEM Report on the Retention and Graduation Rates of 1995-2001 Freshman Cohorts Entering in Science, Technology, Engineering and Mathematics Majors in 211 Colleges and Universities.*

This paper discusses some of the findings of the STEM report and re-examines them within the context of institutional participation in the Louis Stokes Alliance for Minority Participation (LSAMP). Using the data collected for the STEM report, this paper will review the retention and graduation rates of underrepresented minority (URM) STEM majors attending LSAMP institutions. Although it was not the original intent of the STEM survey to focus on the retention and graduation rates of LSAMP institutions, this initial re-examination of the data suggests that of the CSRDE institutions participating in the STEM survey, LSAMP institutions had higher retention and graduation rates for underrepresented minority STEM majors than did the non-LSAMP institutions.

STEM Survey Participants

The STEM survey was supported in part by NSF grant #REC9903426. Two hundred and eleven CSRDE member institutions participated in this study of first-time full-time STEM majors. The survey participants were a diverse group of public and private 4-year institutions. The chart below shows the breakdown of these institutions according to their Carnegie classifications and institutional control. In terms of LSAMP participation, 111 were non LSAMP institutions and 100 were identified as LSAMP institutions.

	Number of Institutions		
Classification	**Public**	**Private**	**Total**
Doctoral/Research-Extensive	51	1	52
Doctoral/Research-Intensive	29	7	36
Master's	84	19	103
Baccalaureate	12	4	16
Other	4	0	4
Total	180	31	211

Methodology

The STEM survey tracked the year-to-year retention and graduation rates of the first-time full-time degree-seeking freshman cohorts entering from 1995 through 2001. In addition to

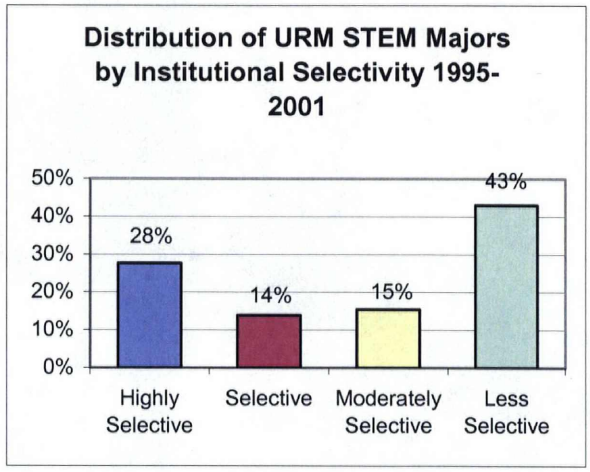
tracking the entire cohort the survey also followed a sub-cohort of these freshmen who indicated intent to major in the STEM fields. Each of these cohorts was followed from the fall of their first year enrollment through the fall of 2002.

The institutional contact at each participating member institution submitted the initial headcount, average ACT/SAT scores, as well as the retention and graduation rates from the second year through the seventh year for each of these seven cohort years. Cohort data were also provided by gender, race and ethnicity, and STEM intent. The data were reported at the cohort level, not unit record level. In addition, the institutional contact submitted select institutional and student characteristics, which facilitate making inter-institution comparisons. Researchers who have studied URM students encourage a more balanced approach, which also looks at institutional factors. For this reason, the survey collected student and institutional characteristics, in addition to retention and graduation data. The data were submitted in electronic format, and once received were audited and analyzed.

General Findings on STEM Majors

1. Enrollment of URM minorities in STEM rising. From the cohort year 1995 through 2001, the enrollment of underrepresented minorities majoring in STEM increased by 13.7%. In comparing enrollment of LSAMP institutions with non LSAMP institutions it is interesting to see what percentage of the entire freshman STEM cohort is made up of URM students. The total headcount of all freshmen STEM majors during the reporting period was 562,652: 245,666 students were enrolled at non LSAMP institutions and 316,986 were enrolled at the LSAMP institutions. From 1995 through 2001 underrepresented minority students made up 11.8% of freshmen STEM cohorts at non LSAMP institutions, whereas URM students made up about 24% of the headcount of freshman STEM cohorts in LSAMP institutions. This is double the representation in non LSAMP schools.

2. Less selective institutions enrolled more freshman URM STEM majors than either highly selective, moderately selective, or selective institutions. In the research at the Consortium for Student Retention Data Exchange (CSRDE), one of the institutional variables that is important to colleges is the average ACT/SAT scores used for admission purposes. These scores are used to group institutions based on admission selectivity. The higher the average admission score used by the institution, the higher level of "Selectivity". Typically, the higher the selectivity of the institution, the higher the retention and graduation rates are. Although only 15 percent of the all entering freshman STEM majors from 1995-2001 were enrolled at less selective institutions, 43 percent of all URM STEM majors enrolled from 1995-2001 attended a less selective institution.



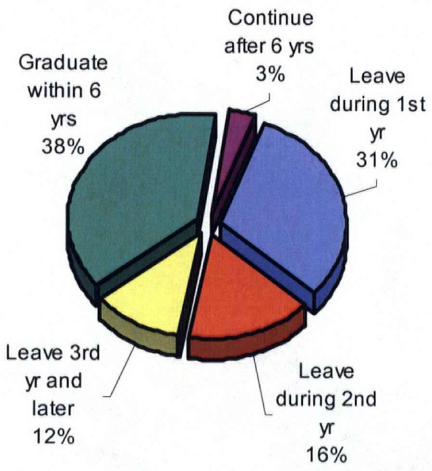
Also during this period, underrepresented minority students were not only enrolled in STEM majors in higher numbers at less selective institutions, they also constituted a higher percentage of the total STEM freshman headcount at the less selective institutions. URM students constituted 11% of the freshman STEM cohorts at highly selective institutions, whereas 53% of all freshman STEM majors at less selective institutions were underrepresented minorities.

3. Approximately 38 percent of all first-time full-time freshmen that began as STEM majors completed their degree within a STEM field within 6 years. Approximately 38

percent of the 1995 and 1996 first-time full-time freshmen that began as STEM majors completed their degree within 6 years, 59 percent left the institution or changed to a non-STEM major, and 3 percent were continuing in STEM majors but had not completed a degree 6 years later. The following chart depicts the within STEM graduation and departure rates by year of college. In this instance, departure rates include students who left the institution or who remained in the institution but changed to a non-STEM major. The departure rates are as follows: 31 percent in the first year, 16 percent in the second year and 12 percent in the third and subsequent years of their college career.

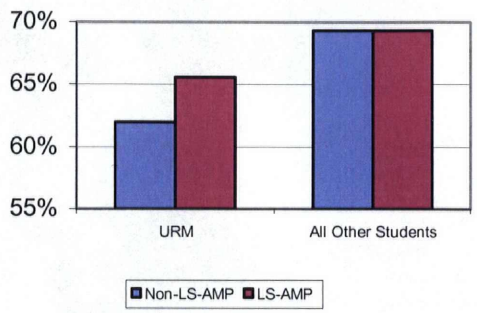
Of the 59 percent who did not complete a STEM degree within 6 years, 38 percent left the institution of origin. An additional 21 percent remained at their institution but changed majors to a non-STEM field.

Within STEM Graduation and Departure Rates of 1995-2001 STEM Majors



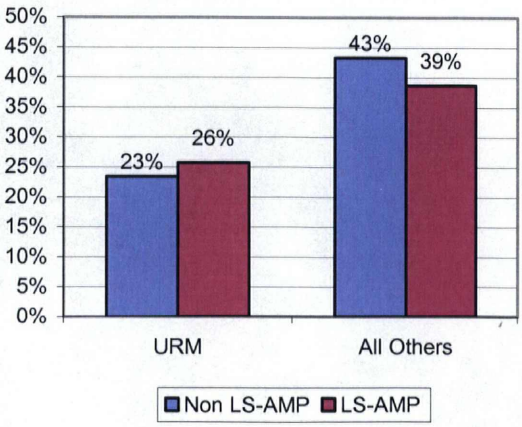
4. URM students, Retention and LSAMP. As was discussed earlier, first year retention is a problem for STEM majors. It is also a problem for all students in any major. However, STEM majors not only might leave the college or university, they may decide to switch majors to a non-STEM field. One of the interesting findings of these data when examined with regard to LSAMP is that historically from 1995-2001, URM students who begin as STEM majors and attend LSAMP institutions have on average a better first year retention rate than their URM STEM peers at non LSAMP schools. In 2001, 66% of the URM STEM majors returned the second year and continued in STEM at LSAMP institutions as compared with 62% for non LSAMP institutions.

First-year Retention Rates of Fall 2001 Freshman STEM majors who returned to continue in STEM



5. Freshman URM STEM majors graduated within STEM fields and within 6-years at a higher rate in LSAMP institutions. The class of 1996 is the most recent class for which our survey captured six-year graduation data. Within the 1996 class of URM STEM majors enrolled at LSAMP institutions 26% graduated within six years in STEM, as compared to 23% of the URM STEM students enrolled in non LSAMP schools.

Percentages of STEM majors who graduate in STEM within 6 years

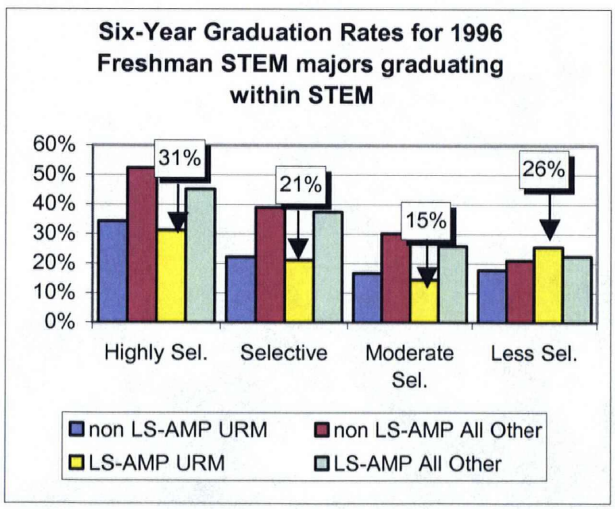


Typically graduation rates are related to the admission selectivity of the institutions, the higher the ACT/SAT admission scores used (selectivity), the higher the graduation rates.

However there is something very interesting happening within those LSAMP schools which use less selective admission scores. As shown in the chart below, the graduation rates are higher (26%) for URM STEM students than the graduation rates for their peers at moderately selective (15%) and selective (21%) LSAMP institutions in this study.

The graduation rates for URM STEM majors graduating in STEM at less selective LSAMP are higher than that of their URM peers at moderately selective and selective non-LSAMP institutions as well.

In terms of actual numbers of URM STEM graduates, we found that the less selective LSAMP schools graduated more URM students in STEM fields compared to any other LSAMP institutions. This is due in part to the large number of URM STEM majors enrolled at these institutions



Discussion and Future Research

This brief report is intended to provide a snapshot view of some of the interesting findings of our most recent study of the retention and graduation rates of first-time full-time STEM majors with a special focus on the retention and graduation rates of STEM majors attending LSAMP and non LSAMP institutions. There are several areas that are worthy of further study:

1. We need to renew our focus on the factors that contribute to the high first-year departure rates (34.6%) for URM STEM majors at LSAMP institutions.

2. More URM STEM students attend less selective institutions. How do the institutional/systemic strategies for support of URM students vary by institutional selectivity? What factors play a role in the departure of STEM students in general and what can be done from an institutional perspective to retain them? With the concentration of research dollars at more selective institutions, we need to look at how to bring more research experience to where the URM students are situated: less selective institutions.

3. URM STEM students who are staying in LSAMP institutions have a slightly better retention and graduation rate in the STEM field than their non LSAMP peers. While we celebrate the achievement of LSAMP there is still much work to do. We would make significant inroads in the supply of STEM graduates if we could retain and graduate the URM students at least at the same rate as the non-URM students.

CSRDE at the University of Oklahoma through the annual STEM survey has developed an extensive database for benchmarking the retention and graduation of STEM majors. All LSAMP institutions are encouraged to join and contribute retention and graduation data. If your institution is interested in joining CSRDE so that you may participate in the annual survey and have this type of comprehensive information available to benchmark your efforts, please contact us at csrde@ou.edu.

Retention and Graduation Rates of Freshman STEM majors Within STEM Fields

	2001 STEM Cohort 2nd Year Continuation Rates		1996 STEM Cohort 6 Year Graduation Rate	
Institution and Selectivity Type	Other Students	URM	Other Students	URM
Non LSAMP				
Highly Selective	76.3%	70.1%	52.4%	34.3%
Selective	69.1%	66.4%	39.0%	22.3%
Moderately Selective	59.0%	55.8%	30.2%	16.7%
Less Selective	56.4%	61.3%	21.1%	17.8%
Total	69.9%	62.6%	43.3%	23.4%
LSAMP				
Highly Selective	77.3%	73.1%	45.2%	31.3%
Selective	64.5%	61.5%	37.5%	21.2%
Moderately Selective	67.8%	59.2%	26.0%	14.6%
Less Selective	60.7%	63.2%	22.5%	25.6%
Total	71.4%	65.4%	38.8%	25.7%

Note: Highly Selective-Act above 24.0 or SAT above 1100; Selective-ACT 22.5 or SAT 1045-1100
Moderately Selective-ACT 21.0-22.4 or SAT 990-1044; Less Selective-ACT below 21 or SAT below 990.