Retaining Female and Minority Students with EMC^2 Scholars Program

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Abstract

This paper details our highly successful scholarship and academic support program to retain and graduate students in four academic departments: Mechanical Engineering, Mathematics, Computer Engineering and Computer Science (EMC^2). The EMC^2 Scholars Program is supported by a 4-year grant from the National Science Foundation's CSEMS Program and matching funds from the Rochester Institute of Technology. The paper describes the processes for selection of scholars and renewal of scholarship, and includes data on departmental distribution, student demographics and retention. It describes programmatic elements that worked or did not work in retaining students in CSEMS degree programs. Successful EMC^2 program elements may be deployed elsewhere to retain female and minority students.

Introduction

In Fall 2002-3, the National Science Foundation (NSF) awarded a 4-year grant of $392,000 from its 2002 CSEMS program[1,2]. Rochester Institute of Technology (RIT) is providing $526,500 in matching funds to support the scholarships. The EMC^2 Scholars Program is a collaborative effort of four academic programs: Mechanical Engineering, Mathematics, Computer Engineering, and Computer Science. The goal of this scholarship program is to retain and graduate academically talented students in the four participating units. The scholars receive $1,000 per quarter until they complete their first co-op experience. The pre-co-op support does not exceed seven quarters. NSF and RIT are each contributing $500 per quarter per scholar. After their first co-op experience, the scholars retain the $500 per quarter scholarship from RIT until they graduate at the end of 12 academic quarters.

We have been successful in developing a partnership among the four academic departments, and the coordination mechanisms with supporting units that include the Undergraduate Admissions, Financial Aid, Registrar's Office, Academic Support Center, and Career Services[3,4]. This paper describes the relationships and mechanisms we have developed with these supporting units to administer the EMC^2 program.

Selection of Scholars and Scholarship Renewal

Each Spring/Summer, the Senior Associate Director of Financial Aid identifies all eligible 1st year applicants offered admission to RIT, and selects ~33 (50% more than scholarships

available) for EMC^2 scholarships based on financial need and academic potential. From this group, approximately 21 1st year students choose RIT and accept the EMC^2 scholarship. She also provides the Program Administrator a list of all eligible 2nd and 3rd students sorted by financial need and cumulative GPA. Together, they select appropriate number of students for a total of 62 EMC^2 scholarship awards.

Of the 62 EMC^2 scholars supported each year with $1,000/quarter scholarships, approximately 50% are matriculated in mechanical engineering, 30% in computer engineering, 15% in computer science, and 5% in the mathematics program. If a scholar transfers out of the four participating academic departments, his/her scholarship is not renewed in the following academic year. If a scholar's quarterly GPA falls below 2.50 for two sequential quarters, again the scholarship is not renewed in the following academic year. In either case, a new scholarship recipient is selected at the same year-level within the same department based on financial need and academic performance. Table 1 summarizes the departmental distribution for each of the academic years (AY):

Table 1: Distribution of Scholars in the Four Participating Departments

Academic Year (AY)	Departments				Total #
	Mechanical Engineering	Computer Engineering	Computer Science	Mathematics	
2002-3	31	19	9	3	62
2003-4	46	28	13	4	91
2004-5	62	39	16	8	125

The data in the table above shows clearly that the EMC^2 program is maintaining its 50-30-15-5 departmental distribution target.

Student Demographics and Retention

In selecting students for scholarship awards, for comparable financial need and academic performance, preference is given to female and minority students (under-represented groups such as African Americans, Native Americans and Latin Americans)[5]. Table 2 below summarizes the student demographics:

Table 2: Demographic Distribution of EMC^2 Scholars

Academic Year	Total #	Gender		Ethnicity*					
		Male	Female	WC	AA	LA	NA	AP	UR
2002-3	62	43	19	39	7	7	0	6	3
2003-4	91	76	15	69	8	3	2	6	3
2004-5	125	103	22	86	10	13	3	10	3

*Ethnicity Key
WC = Caucasian; AA = African American; LA = Latin American; NA = Native American; AP = Asian American or Pacific Islander; UR = Not Reported

The data in the table above shows that the proportion of female students among the EMC^2 scholars is significantly higher than that within the four participating departments. Similarly, the proportion of African Americans, Latin Americans and Native Americans (AALANA population) among the EMC^2 scholars is also significantly higher than that within the four participating departments.

Each quarter, the Registrar's Office provides the Program Administrator a customized report containing personal and academic information on each EMC^2 scholar. The report helps in identifying students that

1. need academic intervention,
2. have left the participating academic programs, or
3. are on Deans' Lists for superior academic performance.

The report is also useful in quarterly updates of NSF-CSEMS database and preparation of the annual report to NSF as required by the conditions of the grant.

Students needing academic intervention are asked to meet with their departmental EMC^2 faculty advisor to identify and enroll in an appropriate program of the Academic Support Center. Students that have transferred out of the EMC^2 programs are sent an email informing them of the discontinuance of scholarship at the end of the academic year. Students on the Deans' Lists are sent a congratulatory email in addition to normal recognitions.

At the end of each academic year, the EMC^2 program's retention figures exceed the institution's averages — at each year level and within each program. In table 3 below, **EMC^2** represents scholars retained in the four participating departments, **CSEMS** represents scholars who transferred to other CSEMS disciplines at RIT, **Other** represents scholars who transferred to non-CSEMS disciplines at RIT, and **Left** shows scholars who left RIT.

Table 3: Retention Data on EMC^2 Scholars

AY	Total	EMC^2 Programs at RIT	CSEMS Programs at RIT	Other Programs at RIT	Left RIT
2002-3	62	48	6	5	3
2003-4	91	89	1	1	0
2004-5*	125	124	0	0	1

* at the end of Fall quarter only

The data above shows clearly that the EMC^2 program has been very successful in retaining students within the CSEMS disciplines (including the EMC^2 disciplines) at RIT. In the first year, 3 scholars (5%) left RIT and an early intervention strategy was implemented. In subsequent years, the retention rate has been nearly 100%. A lesson learned from the EMC^2 program is that early intervention can prevent a student from a downward spiral of academic performance. Some departments have adopted this early intervention strategy with their full student body. Early results are quite promising.

Program Elements and their Assessment

In Spring 2002-3, 1st year scholars met bi-weekly in groups of five with a faculty moderator to improve their learning skills and study strategies[6]. The program was designed by the Director of Learning Development Center (now known as the Academic Support Center). These scholars were simultaneously enrolled in the institute-wide non-credit First Year Experience course as well as the mandatory departmental Freshman Seminar course. The scholars reported that there was much overlap in the three activities. Based on the feedback from the scholars, in subsequent years these activities were streamlined and better integrated in the two-quarter Freshmen Seminar course now taken by all incoming 1st year students. During AY2004-05, the FYE course and departmental freshman seminars are being further integrated as part of an institute-wide pilot program. We anticipate incorporation of the lessons learned across the entire campus in AY2005-06.

Early each Fall quarter, all EMC^2 scholars, participating staff and faculty are invited to a reception and dinner at the RIT Inn. The Program Administrator makes welcoming remarks followed by an elegant sit-down dinner. During desserts and coffee, participants are asked to introduce themselves. The event provides an opportunity to collect information from each scholar that is required by NSF to update their CSEMS database. This Fall, scholars were asked to provide feedback and concrete suggestions to enhance their experience at RIT. An overwhelming majority of issues were non-academic. Many of the suggestions and concerns have been echoed in other student surveys at RIT, and are being addressed by the RIT administration. EMC^2 faculty assessed the dinners to be a highly successful event promoting camaraderie and pride.

Each quarter, the Program Administrator reviews the academic performance of each scholar. If a scholar's quarterly GPA falls below 2.50, he/she is asked to meet with the departmental EMC^2 faculty advisor to identify and enroll in an appropriate academic support program[7]. RIT has an excellent support infrastructure to meet students' academic and non-academic needs. The retention data in the previous section shows that this quarterly review process has been effective.

Last two Spring quarters, we wanted to hold a year-end get-together. However, we were unable to find an appropriate evening during the last four weeks of the quarter because of conflicts with already scheduled major institute or college events. The Spring get-together would have been an excellent opportunity to collect formal feedback from the scholars about the EMC^2 program elements. We hope to schedule it earlier in the upcoming Spring quarter.

Encouraged by the success of EMC^2 program, a group of faculty in engineering and engineering technology wrote another proposal to NSF last year and were successful in obtaining another 4-year grant[7]. They hope to recruit additional transfer students from 2-year colleges, retain and graduate them[8]. They will be using many of the elements of the EMC^2 program.

Conclusions

1. EMC^2 Scholars Program has been successful in developing a partnership among the four academic departments, and the coordination mechanisms with supporting units that include the Undergraduate Admissions, Financial Aid, Registrar's Office, Academic Support Center, and Career Services.

2. The program has successfully maintained its 50-30-15-5 departmental distribution target.

3. Proportion of female and minority students in the EMC^2 program is significantly higher than that within the four participating departments.

4. The program's retention rates exceed RIT's averages –at each year level and within each academic program.

5. Successful EMC^2 program elements are now being deployed in the Multi-department Engineering and Engineering Technology Transfer (MEET) Scholars Program[7].

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