CONNECTS COMMUNITIES: MAKING CONNECTIONS FOR SUCCESS

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Abstract—The CONNECTS Communities consist of first generation, high ability, low socio-economic students. CONNECTS has two primary concerns: 1) providing financial support and 2) creating a community of scholars to help in the transition to college and the commitment to academic excellence. The program consists of several components that are designed to address these concerns: 1) financial support – a scholarship is provided for those students who have high financial need. Other considerations of scholarship awards are: first generation, math SAT, parents educational attainment, location of high school, and size of graduating class, 2) community – students attend mandatory weekly discussions facilitated by faculty mentors. Discussion topics address the social need and impact of engineering; globalization; and personal development and learning. These discussions allow students to better understand who they are, form connection to an engineering career; and form an academic community. Research, literature and behavior profiles are utilized during seminars to further explore these topics. Future plans include clustering students in the same residence hall and course Learning Community (LC). These LC clustered students are in the same science, mathematics, and engineering courses. In addition, students will attend the same Fish Camp and the Engineering Welcome and participate in mentoring activities with upper division peers and/or industry engineers. In the pilot year of the program 39 students participated. All the students were Pell grant eligible and sixty percent were also first generation college students. The first semester retention rate of these students was 87.2%, while the college-wide retention rate for first semester students is 75%. The average GPA for CONNECTS participants was 2.8 while the average for all first year students in the College of Engineering is 2.54. In this paper, we will present this model program’s components and plans for the future.

Index Terms – At risk students, First Year Programs, Learning Communities, Retention

INTRODUCTION

For over three decades, national and state policy has focused on increasing postsecondary access for under-served groups, including low-income individuals, under-represented minorities, first-generation students, and students with disabilities. Yet, only 54 percent of recent high school graduates from low-income families pursue postsecondary education, compared to 88 percent of upper-income graduates. Only 17 percent of under-served students who start college earn bachelor’s degrees by age 24 compared with 52 percent of upper-income students. [1] As Mullen [2] states there is a disparity not only in the participation of women and ethnic minorities in the sciences and engineering, but depending on social class, there is a disparity on the selectivity of the university they choose or are allowed to attend. This disparity in attendance at selective institutions creates a larger difference in the economic benefits and career access once students complete their degree. Therefore it is important to ensure the participation of first generation and low income students at selective institutions like Texas A&M.

The September 1999 NACME Research Letter [3], reports the purchasing power of the federal Pell grant has declined while the cost of higher education has risen which in turn drives the cost of a college education up for the poorest segment of the population. This report states that selective institutions and large public universities, like TAMU, provide smaller financial aid awards. Therefore students who receive Pell grants at TAMU may be less likely to find the additional financial resources needed to cover the cost of attendance. On the other hand, the correlation between minority retention rate and institutionally funded financial aid is positive and statistically significant. The report also states that minority students have a greater probability of graduating from selective institutions. Therefore, for TAMU to be able to offer the high achieving, low income students financial support actually increases their chances of attending and graduating from college. [3]

For a significant number of the high financial need students the lower retention rate is also due to what Coleman [4] defines as social capital. The social capital of a student is a resource available from the structure of relations which facilitate certain activities, and in this case, activities that lead to success in the university setting.

The Look College of Engineering (COE) has about 1500 in-coming first year students each fall. Of these, approximately 30% or 450 students will be placed in pre-calculus. This determination is based on math SAT scores, a math placement exam, and courses completed in high school. This group is typically top 15% in their high school graduating class, so are high achievers. Most of these students come from small rural towns in Texas or inner city
When the COE participated in the NSF Foundation Coalition career which was built through the community of peers. An important reason was the commitment to an engineering reason they stayed in engineering and the second most evaluations, that peer support was the most significant program which began in 1992. The students told us through which clusters first year female engineering students in the CREW (Clusters of Resident Engineering Women) program first community building programs in the college was the community building in all retention programs. One of the retention. Based on this experience, the COE has that community building is one of the best models for time enrollment to complete degrees in these majors. Perceived need to finish a degree in four years in spite of the continuing stress of financing their education, and the tendency to be lower than these average numbers due, in part, to the degree. Retention of students with high financial need tends to be $13,326), graduated in the top 10% of their high school class (thus according to Texas law are guaranteed admission), scored above a 550 SAT math (indicating a good probability of adequate math preparation), and were first generation to college. For the first year students entering the Dwight Look College of Engineering (COE) at TAMU in Fall 1999, these criteria would have yielded 286 students (approximately 17% of the incoming first-year students) of whom 26% were under-represented minorities and 22% were women. While this pool represented significant diversity, it did not reflect the diversity of the state’s high school graduates. There is a significant number of students with high academic potential and high financial need who enter higher education; 44% actually enter college in Texas with 29.4% of these having $5000 or more financial need.

Typically, 70% of students enrolling in the College are retained through the first-year of study and 57% of these same students are retained through the first two years of these curricula at Texas A&M University (although over 85% of these students graduate from Texas A&M University). Once engineering students reach their junior year in course work, 98% graduate with an engineering degree. Retention of students with high financial need tends to be lower than these average numbers due, in part, to the continuing stress of financing their education, and the perceived need to finish a degree in four years in spite of the fact that the average student will take over 4.5 years of full-time enrollment to complete degrees in these majors.

The COE has an understanding, through experience, that community building is one of the best models for retention. Based on this experience, the COE has community building in all retention programs. One of the first community building programs in the college was the CREW (Clusters of Resident Engineering Women) program which clusters first year female engineering students in the residence hall. There has been very good success with this program which began in 1992. The students told us through evaluations, that peer support was the most significant reason they stayed in engineering and the second most important reason was the commitment to an engineering career which was built through the community of peers. When the COE participated in the NSF Foundation Coalition (FC), one of the most important components of the experimental models was clustering the students, teaming, and clustering the courses. Therefore, in 1998 when the FC model was institutionalized, Learning Communities (LC) were formed that every first year student can select. The LC is a community building model. TAMU is part of the TX LSAMP program. Through evaluation and detailed assessment, the AMP programs confirm that making an environment for students that demonstrate to them that they are special and valued, is of the utmost importance to academic success. Clustering in various programs, role models, and building community are key concepts to reinforcing individual uniqueness. The AMP believes these are the critical factors in minority programs that have made the retention difference.

Further, the COE has student organizations that build community through common cultures: NSBE (National Society of Black Engineers); MAES (Society of Mexican American Engineers and Scientists); SHPE (Society of Hispanic Professional Engineers); and SWE (Society of Women Engineers). Before the Hopwood court decision that ended program participation based on race, the TAMU MEP (Multi-ethnic Engineering Program) had summer bridge programs and study sessions for Hispanic and African American students that built communities of scholars. The aforementioned student organizations have tried to fill the voids left by these programs.

**WHAT IS THE CONNECTS PROGRAM?**

In the currently funded NSF CSEMS grant for 2001-2003, the COE again created a community of scholars (named the program CONNECTS) to increase retention and commitment to a career in a STEM field. The CONNECTS program provided financial support and designed a semester long seminars series and academic information on: globalization, career awareness, and learning good academic study skills. These weekly seminars were designed to increase social capital and provide an academic community of peers and faculty. Below are some of the highlights of the current program.

The theme for the weekly seminar series was globalization. Dr. Malavé discussed issues dealing with globalization. He talked about areas such as the economy on a global scale, environmental issues, political issues, diversity issues, and information technology. Evelio Grillo, a nationally known scholar in the field of Latino and African American issues, spoke about his book, “Cuban America/Black America”. He spoke briefly about his book, but mostly about his life experiences. He was able to give the students a window into what role diversity has played in America in the last 60 years. The students responded well to the author, his outlook on life, and his positive attitude. Dr. Malavé also spoke about his life experiences. The students were able to compare diversity issues experienced by the
two men in two different eras. The students also attended a Diversity Workshop sponsored by Montgomery-Watson Harza Company.

In the beginning of the fall semester in 2001 and 2002, Dr. Walter Bradley, retired mechanical engineering professor, [from Quest Learning] presented a seminar on Time Management and Success Study Skills. Students learned how to create good study habits, improve note taking skills, quicken their reading pace, set goals, and use time wisely.

There was also a series of seminars and activities on career focus and skills needed to be successful as an engineer. A resume workshop was presented to reinforce the importance of having a resume and how to make it the most effective. The students were then required to attend the engineering career fair to discuss engineering, internships, and career issues with the engineers who were recruiting. The TAMU Placement Center presented information on internships and co-ops to the students. The students learned how to register with the Career Center and also received tips about resumes and interviewing. An end of semester trip was taken to Halliburton in Houston, Texas.

OUTCOMES AND LESSONS LEARNED

The retention after one year of the CONNECTS Program is 87.2% as compared to the COE’s 70% and the average GPA for the group is 2.823 as compared to the freshman average of 2.54. Two of the CSEMS students have maintained a 4.0 GPA. While we consider these statistics successful, we also know that not every individual student was successful. Fifty percent of the first year students did not have the 2.75 GPA to retain their scholarship for the program and/or they left engineering. While overall data can tell one story, we know that individual success is what is truly important. We know from programs such as the CREW and LC that one of the most important components to successful academics is a peer support system. So, we plan to increase the peer community by further connecting the students, as well as leadership, and faculty.

WHAT HAPPENS NEXT?

The plans for an expanded and more comprehensive CONNECTS program will build on the past CONNECTS Program, with much enhanced community building and academic mentoring. The title is descriptive of what the goal of the program is: to CONNECT first generation, low income, high achieving CSE students to:

- peers
- engineers in industry,
- faculty,
- academic and leadership resources, and
- the field of engineering.

We plan to accomplish this goal through several CONNECTions for the students, which include:

1) living together in the same residence hall: one grouping of women and another grouping for men which builds on a successful residence hall clustering for women (CREW);
2) registering for the same Learning Community (pre-calculus, engineering chemistry, and engineering seminar) that have demonstrated retention success;
3) providing industry and faculty mentors to CONNECTS participants which has proven valuable to other students;
4) providing the financial support necessary for access to a selective Texas university;
5) providing consulting and industry workshops that build both academic and leadership skills; and
6) attending bridging programs as a group to create community.

Particular attention will be paid to the Introduction to Engineering course, their first semester course that ties pre-calculus and engineering chemistry together. A peer teacher will be in both the engineering seminar and the math course. The two-hour Introduction to Engineering course will be used to teach the students what engineers do and demonstrate how math and chemistry are used in engineering. The CONNECTS scholars will be at the pre-calculus level. One of our goals is to create a learning environment in this course where faculty members routinely and simultaneously address the areas of student cognition, fit, and self-efficacy related to STEM fields. In particular, the students that we see as ‘at risk’ are those students who do not have strong mathematical reasoning skills, in spite of the fact that they may have taken and passed several math courses. These students can get through math, but it has not been integrated into the set of tools they use for reasoning on problems. If we think of this in terms of a learning taxonomy, such as Bloom’s [5] where the stages are knowledge, comprehension, application, analysis, synthesis, evaluation, the students we are focusing upon are capable in mathematical knowledge, comprehension, and minimal application. They have come to believe that they are adequate in math because they received adequate or good grades for these levels, and when they are faced with tasks involving application, analysis, synthesis and evaluation, they cannot explain their own deficiencies. Many just decide that they cannot do math, and most question whether math at these levels is really necessary for the career they aspire to enter. Often these students receive reinforcing messages that it is acceptable to not be able to operate with higher reasoning math skills. Often it is these thoughts surrounding their math reasoning skills, with its associated self-efficacy levels, that determine if a student believes that they ‘fit’ in a STEM major. Therefore, we plan to develop curricular and pedagogical demonstrations to simultaneously develop the...
students' math reasoning skills (MRS), their self-efficacy for utilization of MRS and success in STEM fields, and their perception of fitting in the major and the field.

The academic preparation will be the cornerstone of the program by providing a strong base in time management, goal setting, and study skills. Mentors (faculty, industry, and student) will enhance the other program components and build community with non-peers.

CONCLUSIONS

The NSF sponsored pilot CONNECT S Program, while it had measurable success, it did not achieve all we planned or hoped. The continuation and enhancement of the academic community surrounding this group of “at risk” students is imperative. The State of Texas must be able to provide the support for students who can be admitted to a selective institution, but do not have the academic and confidence skills to persist and graduate. Demographic data reinforces that educating the citizenry of Texas is at a critical juncture and institutions of higher education must be able to support students at different levels of entry before there is truly equal opportunity.

REFERENCES


