Residential Innovations for Engineering Students

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Abstract

Clustering engineering students in the residence halls has proven to be a successful strategy for student retention at the University of Wyoming (UW). This model is based on the highly successful theme floors offered by many housing departments on campuses across the nation. Since the first students that were selected to live on the Engineering Floor during the Fall 1995 semester, an ever-increasing number of students are choosing this arrangement, an indicator of the success of this living arrangement.

A survey, conducted to ascertain student attitudes about the living environment and the perceived benefits of the program, is discussed in this paper. Students are very positive about the innovative living environment. Improved retention and academic performance statistics are reported, thereby demonstrating that the Engineering Floor is an effective method of improving student success in engineering programs.

Introduction

Student retention can be improved through a variety of strategies. One such strategy, the *community building* model,[1] has produced impressive results for minority student success. This model promotes a high level of collaborative learning through various mechanisms including clustering students in courses and providing student study centers. Given the overwhelming success that has been achieved in minority engineering programs nationwide, the University of Wyoming has expanded these components of the community building model to student living environments, i.e. on-campus housing, for all engineering students. This innovative strategy, and how it impacts student retention, is addressed in this paper.

The central theme of the community building model is collaborative learning, which greatly enhances student learning through deeper understanding of content material. Institutions that have strongly embraced collaborative learning have discovered not only improved academic performance, but improved retention and student satisfaction with the learning experience, improved oral communication skills, and higher student self esteem.[1] An essential condition to promoting collaborative learning is creating an environment where the students can conveniently interact and are comfortable doing so. Clustering students in a living environment is an obvious solution to creating this environment.

Additional components of the community building model have also been implemented at UW. Two courses, Orientation to Engineering and Introduction to Engineering Computing, expose students to computer tools to improve academic productivity, provide academic survival skills, and introduce them to the engineering profession. Structured study groups have been established to guide students in using cooperative learning techniques. In addition, students

have been clustered in common sections of Calculus I, Chemistry, English Composition, Introduction to Engineering Computing, and Orientation to Engineering through a procedure that has been labeled "Power Groups."[2, 3] Groups of 20 students thus have the same homework, exams, and course preparation and can readily collaborate on course material.

UW Program

Engineering Floor

The first students were selected to live on the Engineering Floor during the Fall 1995 semester. Each floor of the residence halls accommodates approximately 50 students (assuming that all rooms have double occupancy), with half of the students in separate wings of the floor. This arrangement has proven to be suitable for coed living environments. The table below depicts the number of students choosing this living arrangement since the inception of the program.

Table 1. Engineering Floor Residents

Year	Freshmen		Upperclassmen		Total
	Male	Female	Male	Female	
1995	18	16	5	2	41
1996	14	7	9	8	38
1997	17	14	8	5	44
1998	41	12	16	9	78

The generally increasing numbers of students choosing this arrangement is an indicator of the success of the floor. In fact, in the 1998 fall semester, Housing & Residence Life doubled the space allocated to engineering floors in order to accommodate most of the students requesting a room on the engineering floor. This second floor, in a separate dorm, was reserved for male students. In response to input from the residents, Housing will accommodate engineering students on contiguous floors in a single dorm, in a coed living environment this fall.

Upperclassmen are currently given the choice of returning to the engineering floor. Table 1 also enumerates the upperclass students that have chosen to live on the floor. These students are choosing to return to campus, and not opting to live in apartments, thus increasing the number of students on university housing contracts. This indicates that the benefits of the residential learning environment, such as study groups and social interaction, are important to students.

As the program has expanded, additional resources and services have been added. The study lounge on the floor has been converted to a computer lab, with equipment and software that is identical to the engineering science labs in the engineering building. Computer equipment has also been installed on the second engineering floor.

An advisory committee of engineering faculty meets regularly to evaluate new developments and programs. These faculty members also interact on a one-to-one basis with the residents and offer study sessions or make presentations on topics of interest to the residents such as advising, study skills, and general information on engineering curricula and careers.

Two resident assistants (RAs), both engineering students, live on the floor with the students and are responsible for arranging special activities, e.g. programming, for the residents. One RA is a housing employee, and is trained and supervised by the housing department. The other is an engineering college employee and has responsibility for the computer resources. The engineering RA also provides support for the residents, which often involves tutoring, study skills, and career development. Programming efforts conducted for both floors by the RAs have included picnics and ice cream socials, finals study sessions, resume writing/internships, and information sessions on tutoring and advising. The RAs have also met with the residents and discussed academic progress, how to improve academic performance, where to get help, and provided information on stress relievers.

Costs associated with the engineering floor are minimal. The computer network is provided and maintained by the university, while the computer equipment, four PCs and a printer for each floor, is provided by the engineering college. Funding for programming events is provided by Housing & Residence Life. These expenditures are more than justified by the increased retention and satisfaction of the residents.

University-wide Freshman Interest Groups (FIGs) Project

Somewhat as an outgrowth of the successful Engineering College's Power Groups and Engineering Floor, the University of Wyoming has developed a Freshman Interest Groups (FIGs) project that is campus-wide. Based on a model from the University of Missouri, FIGs involves a group of no more than 20 students with similar educational goals who take selected classes together and share a common living arrangement. This project was initiated for the Fall 1998 semester and initial assessment will begin during the Spring 1999 semester. The University administration has committed to a minimum 3-year trial period for FIGs.

Results

Engineering Floor Residents Survey

With the increased demand for engineering floor housing this fall, an additional floor was devoted to engineering students. In order to determine what services and arrangements are important or necessary for the students, a survey was distributed to the residents on the coed floor. The survey results will be used to further improve the housing program and to design additional programs for retaining engineering students.

The survey includes demographic information on the students – gender, major, college attendance by parents, high school involvement, college GPA. The students were also asked to respond about their time demands including the number of hours spent studying, attending class, working, socializing, and about their social habits including involvement in college and/or residence hall activities. Additional attitudinal questions on the survey include:

- Reasons for selecting the engineering floor
- Satisfaction with residential environment
- Study habits and intellectual interactions with peers
- Sharing and dealing with personal problems

The survey was completed by 14 students (8 females and 6 males), almost one-half of the residents on the coed floor. A sample of the survey results is given in Table 2.

Table 2. Survey Results

Reasons for choosing engineering floor			
	1st Choice	2nd Choice	3rd Choice
Computer Lab	4	5	2
Study Groups	4	1	5
Friends	3		2
Family/friends advice	2	1	2
Tutoring	1	5	

Location and cost were least stated as reasons for selecting the floor.

The residents on the floor have decidedly different attitudes about academic performance than the average UW freshman. Only 18% of UW freshmen students spend more than 20 hours per week studying; 28% of the engineering floor residents report studying 20 hours or more each week. The average fall semester GPA for UW freshmen was 2.76 while the average GPA for engineering residents was 3.0. Over 70% of the residents feel they study more because they live on the floor and as a result have improved GPAs. They attribute the improved performance to association with other engineering students (100%), the engineering RAs (85%), and the computer lab (80%). The residents routinely study together (60% study with floor residents more than 4 times each week) and participate in discussions about courses they are taking or other topics.

All of the residents recommend the engineering floor to incoming freshmen students, and all but two found the floor environment met their expectations.

Academic Performance Data

In addition, Table 3 presents the quantitative data that has been collected on students choosing to live on one of the engineering floors.

Table 3. Engineering Floor Residents Academic Performance

	High School GPA		Composite ACT Score		Fall Semester GPA		Fall-to-Fall Retention	
Semester	Floor*	All**	Floor*	All**	Floor*	All**	Floor*	All**
Fall 1995	N/A	N/A	N/A	N/A	2.95	2.80	80%	63%
Fall 1996	N/A	N/A	N/A	N/A	3.06	2.82	61%	56%
Fall 1997	3.67	3.60	26.1	26.0	3.03	2.94	71%	66%
Fall 1998	3.49	3.48	24.3	24.6	2.76	2.82		

N/A = not available
* All new freshmen on the engineering floor(s)
** All new freshmen in engineering

Even though composite ACT scores and high school GPAs are not readily available for the

semesters prior to Fall 1997, it is fair to assume from the Fall 1997 and Fall 1998 data that students who choose to live on the engineering floor are not statistically different from those who do not. However, examining both the semester GPA and the fall-to-fall retention within the engineering college, the residents on the floor consistently show higher values in both of these measures. However, the fact that Fall 1998 GPAs, which include students on the second floor, do not reflect higher GPAs for floor residents, has led to the restructuring of the engineering floors and RA duties.

Conclusions

Improved retention has demonstrated that the Engineering Floor is an effective method of improving student success in engineering programs. The program can be implemented at an institution with little effort through the cooperation of Housing & Residence Life, and is a winning situation for both the academic department and university housing. The engineering college increases its student population and the university retains additional students in the residence halls.

In addition to retention, the Engineering Floor provides a mechanism for enhanced academic performance. This is due in part to the ease at which students can form and work within study groups constituted with students in the same classes.

Bibliography

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