

An Academic Residential Program for Engineering and Technology Students

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Introduction

Recent studies have illustrated the importance of activities beyond the classroom to enhance undergraduate student retention. For example, three out-of-classroom activities which can help students succeed during the freshman year are informal contact with faculty, participation in study groups, and involvement in campus activities.¹⁻⁵ The College of Engineering and Engineering Technology at Northern Illinois University recognized the need to improve the freshman year experience to facilitate student retention. As a part of the College's on-going assessment activities, the College initiated in Fall 1992 a pilot academic residential program open to all College majors (electrical engineering, industrial engineering, mechanical engineering, and technology). This residential program is a structured, co-operative effort between the College and Northern's Office of Student Housing Services (OSHS) to facilitate the above out-of-classroom activities. The program facilitates-faculty-student and student-student interactions and offers scheduled, academic-related activities. This paper describes the goals of the College's academic residential program, faculty and student participation, program requirements and activities, student evaluations, and program impact on student retention.

Background

Two factors provided impetus for the College to offer an academic residential program. First, the College wanted to offer engineering and technology students attending a large public university the academic and social opportunities afforded by a "small college atmosphere." Northern is a comprehensive public university serving approximately 16,000 undergraduate students and 8,000 graduate students. The College has 960 undergraduate students and 180 graduate students. At large universities such as Northern, an engineering or technology student may be the only such major on his/her residence hall floor, making it difficult to form study groups at the residence hall or to readily benefit from upperclass mentors. In addition, the required freshman courses in mathematics, science, and general education are often large lecture classes attended by different majors across campus, making it difficult for freshmen to identify and develop a cohesive, focused study group with other students of similar majors and academic goals.

Second, because eight other academic units outside the College were already operating successful academic residential programs in co-operation with the OSHS, model programs and mechanisms for program initiation were readily available. Other academic residential programs currently offered at Northern include business, computer science, foreign languages, health professions, hearing impaired interest, honors, music, and political science.



Therefore, the College's academic residential program was initiated with the following goals:

- improve freshman retention;
- facilitate use of study groups;
- provide frequent faculty-student interactions;
- help students develop career plans;
- provide upperclass mentors for freshmen;
- help students use time management skills; and
- improve student use of campus resources.

The program structure has three main components: informal faculty-student contact outside the classroom through scheduled, academic-related activities; facilitation of study groups; and involvement in campus activities. This program differs from traditional engineering residence halls where engineering majors are housed together but no formal program structure is provided by engineering college faculty. Other examples of residential programs are the Freshmen in Sciences and Engineering House at Pennsylvania State University for women and minority students, the Residential Option for Students in Engineering Science at Michigan State University, the Women in Science and Engineering wing in a University of Michigan residence hall,⁶ and the Douglass College Women's Residence Hall at Rutgers University.

Academic Residential Program Operation

The operation of the College's academic residential program requires coordination among the OSHS, College faculty, and program resident assistant (RA). This section describes the residence hall facility, faculty coordinator and advisors, student and program RA selection, and program requirements and activities.

Residence Hall Facility. The program is located on a co-ed, quiet lifestyle residence hall floor that houses a maximum of 54 students including the program RA. The floor shares a large lounge area with the adjoining co-ed, quiet lifestyle health professions interest program, which also houses 54 students. The quiet lifestyle designation means that conversations, music, and other noise must be kept to a level that cannot be heard from room to room or hallway to room. The College maintains two personal computers and a printer in a small room on the floor that is accessible by program participants only. The computers are networked to the university and college computing facilities. In addition, professional and technical magazines and journals are available in the lounge area.

Faculty Coordinator and Advisors. Five faculty members from the College serve as the faculty coordinator and faculty advisors for the program. The faculty coordinator is the program founder and the Associate Dean of the College (first author). The faculty coordinator provides the College interface with the OSHS and the program RA. The Associate Director of Housing (second author) developed the model for the academic residential programs at Northern and coordinates all these programs. The faculty coordinator meets monthly with the Associate Director of Housing and program RA to discuss program status and meets annually with the faculty coordinators of the other academic residential programs to exchange ideas. The faculty advisors are from the College's four departments. The third author serves as a faculty advisor. Because the College personnel process considers faculty teaching, research, and service in the merit, tenure, and promotion process, the College acknowledges the importance of this program by considering service as a faculty coordinator or advisor for this program as a regular College committee assignment. The faculty coordinator, advisors, and program RA collectively plan the program schedule for each semester, regularly attend program activities, and review the student evaluations at the end of each semester for input into next semester's program structure.



Student Selection. The academic residential program is available to all College majors and is advertised to students in four ways:

- . all academic residential programs are listed as a housing option on the university housing application;
- . the program is advertised in undergraduate College recruiting brochures and at open houses throughout the year;
- . the program is advertised in the College's student newsletter published each semester; and
- . the program is presented to parents and students during the university's summer orientation program.

The largest interest in the program has typically come from incoming freshman engineering students; however, upperclass and transfer students are encouraged to participate as role models for freshmen. Since engineering and technology students share a number of common freshman year mathematics, chemistry, English, and general education courses, it was believed that the engineering and technology mix of students would work well. However, the greatest interest has come from engineering majors. Students are selected to provide a mix of freshmen, upperclass and transfer students, and the College's four majors. Table 1 shows a profile of the students participating during the first four years. To be considered for the program, students are required to submit an application form and a brief one-page essay describing their interests in engineering or technology and in participating in this particular program. The applications are reviewed by the faculty coordinator and advisors. To be considered for the initial year (1992-93) of the program, freshman students were required to have minimum composite ACT scores of 19 and upperclass students were required to have a minimum cumulative grade point average (GPA) of 2.00 on a 4.00 scale. Due to the demand for the program in subsequent years, incoming freshmen were required to have a minimum composite ACT score of 24 and currently enrolled and transfer students were required to have a minimum cumulative GPA of 2.30. Students in the program are considered for the subsequent year only if they fulfill all the current year program and minimum cumulative GPA requirements. About thirty percent of the students return to the program each year.

Table 1 - Academic Residential Program Student Demographics

	<u>1992-93</u>	<u>1993-94</u>	<u>1994-95</u>	<u>1995-96</u>
By classification:				
Freshmen	28	19	26	21
Upperclassmen				
Native	6	16	14	23
Transfer	2	10	4	6
Total	36	45	44	50
By major:				
Electrical engineering	17	16	17	22
Industrial engineering	0	5	7	4
Mechanical engineering	15	21	17	21
Technology	4	3	3	3
Total	36	45	44	50

Program Resident Assistant Selection. The program RA is jointly selected by the OSHS and the faculty coordinator and lives on the program's residence hall floor. In addition to regular RA duties required by the OSHS, the RA also works with the faculty coordinator and advisors to plan and publicize program activities. During the program's initial year, the program RA was a senior majoring in human and family resources who had --



served during the prior year as an RA on a regular residence hall floor. During the past three years, the program RAs have been engineering majors who have participated in the program during the previous year.

Program Requirements and Activities. As their commitment to the program, each semester the students are required to:

- . participate in two scheduled, academic-related program events per month;
- . use a personal time management calendar;
- contribute to a “maintenance-free” computer room;
- abide by the residence hall quiet lifestyle rules;
- participate in two, on-campus events; and
- submit an end-of-semester program evaluation.

Students receive a brochure at the start of each semester outlining the program requirements and activities schedule. Because the engineering and technology curricula are demanding, only two academic-related program activities are required per month, where one of the activities is an informal lunch or dinner with the faculty coordinator and advisors. Lunches and dinners with faculty in the residence dining hall are scheduled biweekly; free meal tickets provided by the OSHS. Table 2 lists the various program activities that have been offered to focus on academic skills, career, and professional development. Several of these activities are scheduled each month in order to offer students a choice of activities and times to fit into their schedules. The College provides bus service for industrial tours and trade shows.

Table 2 - Academic Residential Program Academic-Related Activities

<u>Informal Activities</u>	<u>Guest Speakers</u>	<u>Skills Seminars</u>	<u>Field Trips/Tours</u>	<u>Team Projects</u>
Fall kick-off party	Dean	Study skills	National laboratories	Design competition
Lunches/dinners	Department Chairs Faculty •Lab tours •Research projects Campus resources •Co-op Education •Career Planning	Team building Time management	•Fermi •Argonne Industry (examples) •Power plant •Caterpillar, Inc. •Motorola Industry trade shows	Academic Bowl

In addition to the scheduled academic activities, each semester the students must attend two on-campus events and submit one-page evaluations of their impressions of the events. This helps students to develop an affiliation with the university and to become familiar with university resources. The on-campus events may be

- . cultural (e.g., attend or participate in a play, concert, or museum exhibit);
- . professional (e.g., attend an engineering or technology student organization meeting, attend a campus lecture, or serve as a laboratory tour guide for College open houses);
- . social (e.g., attend a campus dance); or
- . recreational (e.g., participate in intramural sports, use the recreation facilities, or attend an athletic event).

The students also elect floor officers and, with the help of the program RA, schedule their own informal social events and outings, including several joint activities, such as a hayride in the Fall, with the adjoining health professions floor.



Student Evaluations

At the end of each semester, students complete devaluation about their experiences in the program. The evaluations reveal that students perceive that the program has fostered good study skills because they have actively participated in floor study groups, have practiced good time management, and have benefited from informal tutoring by upperclass students in the program. The academic activities which students prefer the most are the industrial tours, faculty/guest speakers, and the Academic Bowl night.

Impact on Freshman-to-Sophomore Year Engineering Student Retention

To illustrate the impact of the academic residential program on freshman-to-sophomore engineering retention, freshmen entering the College in Fall 1992 as engineering majors were tracked as two groups, each group only including students with composite ACT scores of 19 or higher: (1) engineering majors who participated in the program (designated below as "participants") and (2) engineering majors who did not participate in the program but lived in residence halls (designated below as "nonparticipants"). (Note: The number of technology majors participating in the program was too low to provide meaningful data.) Table 3 shows that the College's academic residential program appears to contribute positively to engineering student - retention from the freshman-to-sophomore year. Sixty-four percent of the freshman participants in Fall 1992 returned as sophomore engineering majors in Fall 1993; whereas only 44 percent of the freshman nonparticipants returned as sophomore engineering majors. The null hypothesis that the freshman-to-sophomore retention rates for participants and nonparticipants are equal is rejected at the 0.03 significance level (z-statistical .87).

Table 3 -. Freshman-to-Sophomore Year Retention of Freshman Engineering Students Entering Fall 1992 with Composite ACT Scores of 19 or Higher

	<u>Number Entering Fall 1992</u>	<u>Number Returning Fall 1993</u>	<u>Proportion Returning from 1992</u>
Participants in Residential Program	28	18	0.64
Nonparticipants in Residential Program	93	41	0.44

It is recognized, however, that a variety of factors, in addition to participation in the academic residential program, may influence the higher rate of retention of the program participants than nonparticipants. The College is currently working with the OSHS to develop longitudinal studies for this program, which will treat the locations of residency as the primary independent variables. The participants and nonparticipants will first be compared based on factors such as ACT score, high school graduation class rank, parents' education, and parents' estimated income to determine if any significant differences exist between these groups when they begin their college career. These groups will then be compared over subsequent years using factors such as cumulative GPA at the completion of the freshman year, residence hall occupancy during the third year, retention in the original academic area of interest at the time of graduation, and cumulative GPA at graduation.

Conclusions

The College's academic residential program provides an academic and social enrichment experience for students beyond the classroom. The success of the program is demonstrated by the number of students who return to the program each year and the preliminary observed, positive effects on fi-eshrnan-to-sophomore year -

retention., The successful operation of this program is largely attributed to generous faculty participation and support from the OSHS. In February 1994, these nine academic residential programs at Northern were collectively recognized as "Model Programs of Academic Success Programming" by the American College Personnel Association Commission III Student Residence Programs. As the demand for the program increases, the College may expand the program and request additional residence hall space.

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References

1. Landis, R. B., "Academic Gamesmanship: Becoming a 'Master' Student," Chicago, IL: National Action Council for Minorities in Engineering, Inc., 1987.
2. Hacket, G., N. E. Betz, J. M. Casas, and I. A. Rocha-Singh, "Gender, Ethnicity, and Social Cognitive Factors Predicting the Academic Achievement of Students in Engineering," *Journal of Counseling Psychology*, Vol. 39, No. 4, 1992, Pp. 527-538.
3. Light, R. J., "The Harvard Assessment Seminars: First Report, 1990," Cambridge, MA: Harvard University, 1990.
4. Light, R. J., "The Harvard Assessment Seminars: Second Report, 1992," Cambridge, MA: Harvard University, 1992.
5. Ludwig, D., J. A. Harden, and R. H. Pusey, "Effects of Group Study on Student Performance in Freshman Engineering Courses," *Proceedings, 1993 ASEE Annual Conference: Shaping Our World Century II*, Vol. 1, pp. 643-648.
6. Panitz, B., "University of Michigan, WiSE Women," *ASEE Prism*, March 1995, p. 15.

Biographical Information

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