AC 2009-1987: AN EVALUATION OF A NEW ENGINEERING RESIDENTIAL-COLLEGE INITIATIVE

Robert Ricks, Southern Illinois University, Carbondale

Rhonda Kowalchuk, Southern Illinois University, Carbondale

John Nicklow, Southern Illinois University, Carbondale

Loen Graceson-Martin, Southern Illinois University, Carbondale

Lalit Gupta, Southern Illinois University, Carbondale

James Mathias, Southern Illinois University, Carbondale

Jale Tezcan, Southern Illinois University, Carbondale

Kathy Pericak-Spector, Southern Illinois University, Carbondale

Evaluation of a New Engineering Residential College Initiative

Abstract

With support from the National Science Foundation, the College of Engineering (COE) at Southern Illinois University Carbondale (SIUC) has implemented an Engineering Residential College (ERC), which consists of a series of academic and non-academic programs targeting first- and second-year retention rates. The academic programs include engineering student designated (ESD) sections of core curriculum courses and revisions to the math curriculum. The non-academic programs include requiring first- and second-year engineering students to live in Engineering Student Designated (ESD) residence halls and providing Peer Mentor and Peer Tutor Programs. The project focuses on freshman and sophomore students because the retention rate in the COE historically has been lowest during the first two years (i.e., 64% and 70%, respectively for data from 1997 to 2004).

Components of the ERC were evaluated using a mixed-methods approach including forced-choice, Likert-type, and open-ended survey items and focus groups. Overall, the freshman student retention increased after the first year of implementation of the ERC by 7% over historical retention rates. This study found quantitative and qualitative evidence for the effectiveness of the ESD residence halls, Peer Mentor Program, Peer Tutor Program, and the ESD residence hall courses. However, evidence suggests that the revisions to the math curriculum did not contribute to improved student retention.

Introduction

Research on engineering students' persistence and success has received a great deal of attention in the literature. According to the National Academy of Engineering (NAE)[1], "Only 40-60 percent of entering engineering students persist to an engineering degree, and women and minorities are at the low end of that range. These retention rates represent an unacceptable systemic failure to support student learning in the field." (p. 40).

Noteworthy is that research has shown that predictors of retention change throughout the first two years of an engineering program and predictors of graduation vary across universities.[2] Tinto's[3] Student Integration Theory posits that students enter university with varied background characteristics and goal commitments which in turn influences their integration into the institution's environment and thus their performance in college. "Given individual characteristics, prior experiences, and commitments, … it is the individual's integration into the academic and social systems of the college that most directly relates to his continuance in that college" (p. 96).

With the support of a National Science Foundation (NSF) grant, the College of Engineering (COE) at Southern Illinois University Carbondale has implemented an Engineering Residential College (ERC), which consists of a series of academic and non-academic programs to address aspects of student integration with the goal of improving first- and second-year retention rates (see Figure 1). The academic programs include offering engineering student designated (ESD) sections of core curriculum courses in the residence halls and providing revisions to the math

curriculum in the form of introducing two Engineering Learning Skills (ENGR 111A and ENGR 111B) courses. The non-academic programs include requiring first- and second- year engineering students to live in Engineering Student Designated (ESD) residence halls and providing Peer Mentor and Peer Tutor Programs. The project focuses on freshman and sophomore students because the retention rate in the COE historically has been lowest during the first two years (i.e., 64% and 70%, respectively for data from 1997 to 2004).

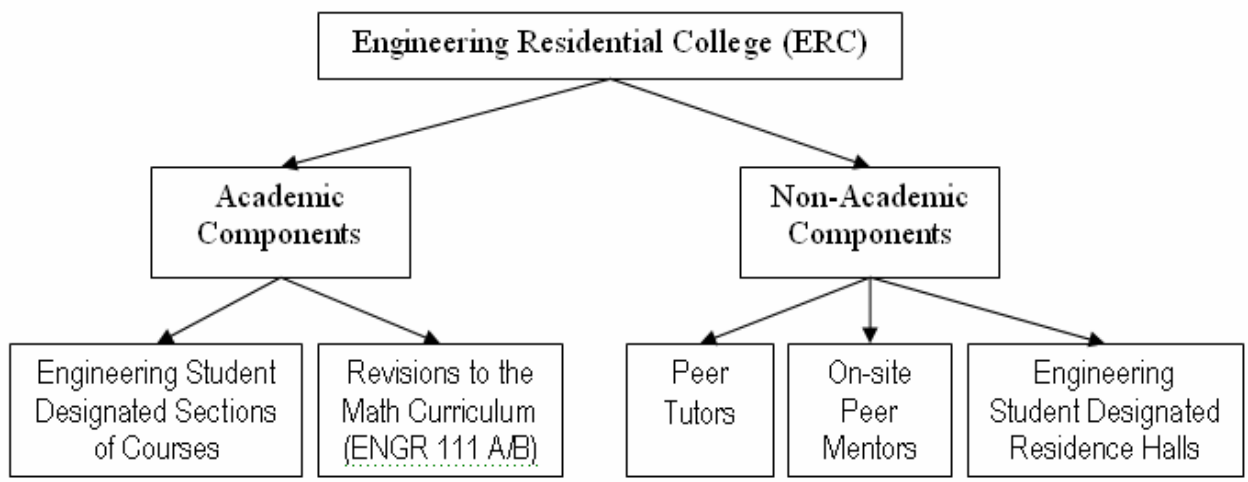

Figure 1. **Structure of Engineering Residential College Program**

The purpose of this study is to evaluate components of an Engineering Residential College targeting retention of first- and second-year engineering students. Objective outcome data and student opinion data were used to evaluate the ERC components during its first year of implementation during the 2007-2008 academic year. Objective outcome data include student academic performance data (e.g., grades) and student retention data. Student opinion data were elicited by survey research and focus groups. Data from the cohort of freshman students who entered the engineering program in the 2007-2008 academic year were used in this study. Specifically, only students having the status of being a freshman engineering student with 12 or less credit hours as of July 31, 2007, were considered in this study (N = 177). Retention data were computed based on student status as of May 16, 2008 [i.e., Retained in COE (n = 126 or 71%), Changed Major (n = 7 or 4%), Left University (n = 23 or 13%), and Academic Suspension (n = 21 or 12%)].

The focus of the ERC is to provide incoming engineering students with academic and social support and to assist students in the transition to college life. The ERC has the following five specific, measurable components that were available to most of the incoming freshman cohort of the 2007-2008 academic year:

1. Starting in the fall 2007 semester, all freshman engineering students were required to live in engineering student designated (ESD) residence halls. University housing allocated three residence halls in a premium university residential community to assist the COE in meeting this requirement.
2. The COE hired and trained 24 Peer Mentors to live with the freshmen and provide leadership and guidance. Peer mentors were selected based on high prior academic performance, good

communications skills, and class status. These mentors provided academic (e.g., attending class with the freshmen, leading study tables, and otherwise helping with their studies) and social (e.g., taking them to sporting, entertainment, and other university sponsored events) support to the students in the ERC.
3. The COE hired 10 Peer Tutors to provide free tutoring in the ERC for engineering-related and university core courses.
4. The COE elicited cooperation from the English and Speech Communication Departments to have one ESD section of first-semester Speech Communication and two ESD sections of first-semester English courses taught in the ERC.
5. The COE revised the math curriculum to provide Engineering Learning Skills (ENGR 111 A/B) courses in the ERC to prepare freshman engineering students for Calculus.

A goal for this study was to identify effective and sustainable components of the ERC contributing not only to retention of freshman engineering students but also to their future graduation. The results of this study may help identify the most and least effective components of the first year of the ERC.

Methodology

A mixed-methods, single group evaluation design was used for data collection and analysis. In the cases where repeated measures data were collected, only data from students completing both surveys were included for this evaluation. Additionally, student grades for targeted courses in the fall 2007 and spring 2008 semesters and overall retention status were used to identify the objective outcome of the first-year ERC program. Because of the focus of this initiative, all data collected and analyzed were restricted to those students meeting the above-mentioned definition of a freshman engineering student for the 2007-2008 academic year.

Several surveys were developed to evaluate the ERC program. Those surveys include: (a) a Residential College Follow-Up Survey (RCFS) administered at the end of the ENGR 101 course; (b) an Engineering Student Designated (ESD) Course Evaluation Survey administered in the ESD residence hall courses at the end of the fall semester; (c) a Peer Mentor Survey administered to the Peer Mentors at the beginning of the spring 2008 semester, (d) a Freshman Engineering Student Survey (FESS) administered at the beginning of the semester in the ENGR 101 course; and (e) an Engineering Student Exit Survey administered during the fall 2008 semester via mail to 51 students not returning to the College of Engineering for the fall 2008 semester. Additionally, comprehensive focus groups were conducted in each of the three ESD residence halls during the spring 2008 semester. With the exception of the focus groups, student identities were associated with student responses to permit tracking response patterns over time. Student retention status as of May 16, 2008, was also used to connect program effectiveness with the overall program objective of improving retention.

The five components of interest in the ERC initiative were evaluated using both separate and overlapping measures. The following paragraphs describe the data collection methodology for the following components of the ERC initiative: (a) Engineering Student Designated (ESD) Residence Halls; (b) Peer Mentor Program; (c) Peer Tutor Program; (d) ESD Residence Hall Courses; and (e) Engineering Learning Skills (ENGR 111 A/B) courses.

Engineering Student Designated (ESD) Residence Halls

The ESD residence halls were evaluated using multiple instruments and methods including: (a) 23 items on a survey (RCFS) administered in the Introduction to Engineering (ENGR 101) course at the end of the fall 2007 and spring 2008 semesters; (b) specific questions in focus groups during the spring 2008 semester; and (c) 5 items from the Exit Survey. Of the 23 items on the RCFS, 1 screened for those students who actually lived in the ESD residence halls and 22 were Likert-type items evaluating student attitudes toward specific aspects of the ESD residence halls during the fall 2007 and spring 2008 semesters. The spring 2008 focus groups were directed by 15 major themes, 11 of which were focused on aspects of the ESD residence halls. Additionally, students responded to a Freshman Engineering Student Survey (FESS) at the beginning of the fall 2007 and spring 2008 semesters in the ENGR 101 course. One item asked if the students would have chosen to live in the ESD residence halls had it not been a requirement of the program. Finally, COE retention data following the spring 2008 semester were examined based on self-reported residence status.

Peer Mentor Program

The Peer Mentor Program was evaluated using four survey items on the fall 2007 and spring 2008 RCFS, the Peer Mentor Survey administered to mentors at the beginning of the spring 2008 semester, specific questions in focus groups during the spring 2008 semester, and responses from the Exit Survey. Of the 4 items on the RCFS, 1 was used to screen for applicants who had interactions with Peer Mentor(s), and the remaining three were used to assess the frequency and nature of student contact with Peer Mentors in the residence halls. The Peer Mentor Survey contained a total of 59 items to assess the following aspects of the Peer Mentor Program: (a) Peer Mentor training and experience (7 items); (b) resources available to the Peer Mentors (3 items); (d) the nature and frequency of Peer Mentor interaction with students (38 items) and faculty and staff (3 items); and (e) and an assessment of key components of the Peer Mentor Program (6 items). Qualitative data was also incorporated from the spring 2008 focus groups. Finally, COE retention data following the spring 2008 semester were examined based on self-reported interaction with Peer Mentors.

Peer Tutor Program

The Peer Tutor Program was evaluated using six survey items from the fall 2007 and spring 2008 RCFS, responses to the Exit Survey, and COE retention data following the spring 2008 semester based on self-reported Peer Tutor use.

ESD Residence Hall Courses

Students in ESD residence hall courses were asked to complete a 16-item ESD Course Evaluation Survey during the last week of class in the fall 2007 semester. The first 14 items were Likert-type and evaluated the classroom facilities (5 items), course location (7 items), and engineering student designation (i.e., the fact that enrollment was generally restricted to engineering students) (2 items). The final two items asked students to specifically identify aspects they liked and disliked about having courses in the ERC. COE retention data following

the spring 2008 semester were examined based on ESD residence hall course enrollment status for the fall 2007 semester.

Engineering Learning Skills Courses-ENGR 111 (A/B)

The ENGR 111 (A/B) courses (fall 2007 only) were evaluated using a single group pre- post-survey design. Tapia's 40-item Attitude Toward Mathematics Inventory (ATMI)[4] was used with permission to evaluate student attitudes. ENGR 111 (A/B) students were asked to respond to the ATMI during the first and last week of the fall 2007 semester. Finally, COE retention data following the spring 2008 semester were examined based on ENGR 111 (A/B) enrollment status for the fall 2007 semester.

Results

Of the 177 freshman engineering majors, 157 (89%) were enrolled in ENGR 101 during the fall 2007 or spring 2008 semester. A total of 114 (73%) freshmen enrolled in ENGR 101 responded to the Residential College Follow-up Survey administered at the end of each semester.

A total of 61 students were enrolled in ESD sections of university core courses at the end of the fall 2007 semester. Of those students, 49 (80%) were freshman engineering students; 5 freshmen were enrolled in two ESD residence hall courses. Of the 44 freshman engineering students, 34 (77%) responded to the ESD Course Evaluation Survey for at least one course.

During the fall 2008 semester, 51 freshman engineering students who did not return to the engineering program were invited to respond to an Exit Survey. Of these, 9 (18%) responded to the survey.

Overall, 23 engineering students living in the ESD residence halls participated in one of three focus groups held for one hour each on separate nights during the spring 2008 semester. Due to inadequate participation, these groups were not screened for student class level; however, Peer Mentors and Peer Tutors were not permitted to participate.

Of the 64 freshmen enrolled in the ENGR 111 (A/B) courses during the fall 2007, 47 (73%) responded to the ATMI administered at the beginning of the semester, 32 (50%) responded at the end of the semester, and 28 (44%) responded to the survey both times.

ESD Residence Halls

A total of 97 freshman indicated on the RCFS that they lived in the ESD residence halls during the 2007-2008 academic year. Table 1 displays their pattern of responses to selected residence hall items.

Table 1
ESD Residence Hall Evaluation Items

				Percent of Responses (n = 97)					
#	**Item**	***M***	***sd***	**SA**	**A**	**N**	**D**	**SD**	**NR**
70	Living in the residence hall helped me develop a sense of community with my fellow engineering students	3.93	1.02	32.0	42.3	15.5	7.2	3.1	0.0
71	I was more socially active as a result of living in the residence hall	3.76	1.05	25.8	41.2	19.6	10.3	3.1	0.0
72	**(R)** Living in the residence hall restricted my personal freedom	3.14	1.33	15.5	18.6	18.6	30.9	16.5	0.0
73	I liked that the residence hall was primarily occupied by engineering majors	3.51	1.15	20.6	35.1	23.7	13.4	6.2	1.0
74	I developed close personal friends as a result of living in the residence hall	3.97	0.93	28.9	48.5	13.4	6.2	2.1	1.0
75	**(R)** Living in the residence hall isolated me from students studying other academic disciplines	2.50	1.09	15.5	44.3	17.5	17.5	4.1	1.0
76	Living in the residence hall helped my academic performance	3.44	1.04	14.4	36.1	32.0	11.3	5.2	1.0
77	I was satisfied with the residence hall social activities	3.57	0.89	11.3	47.4	28.9	9.3	2.1	1.0
78	**(R)** I was not able to study effectively in the residence hall	3.09	1.10	9.3	20.6	26.8	36.1	6.2	1.0
79	Living in the residence hall helped me to adjust to university life	3.84	0.85	15.5	62.9	10.3	7.2	2.1	2.1
80	Living in the residence hall helped me to develop friendships	3.98	0.82	23.7	57.7	12.4	5.2	1.0	0.0
81	**(R)** I was not able to resolve conflicts with my roommate	3.84	1.13	7.2	4.1	15.5	41.2	29.9	2.1
82	My experience in the residence hall improved my opinion of SIUC	3.55	0.89	12.4	42.3	34.0	8.2	2.1	1.0
90	I am more confident in my choice to attend SIUC as a result of living in the residence hall	3.60	0.99	16.5	42.3	28.9	7.2	4.1	1.0
91	I am more confident in my ability to successfully complete the engineering program as a result of living in the residence hall	3.41	1.11	14.4	39.2	23.7	15.5	6.2	1.0

Note: n = sample size, M = mean, sd = standard deviation, SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree, NR = No Response.
Items were coded on a 1-5 scale (1 = Strongly Disagree to 5 = Strongly Agree).
Items beginning with **(R)** have their scores reversed so that higher means indicate more positive responses.

Of interest from Table 1 is:

- 81% of respondents agreed that living in the residence hall helped them develop friendships (item 80) with mean of 3.98 (*sd* = 0.82)
- 78% of respondents agreed that living in the residence hall helped them adjust to university life (item 79) with mean of 3.84 (*sd* = 0.85)
- 74% of respondents agreed that living in the residence hall helped them develop a sense of community with their fellow engineering students (item 70) with mean of 3.93 (*sd* = 1.02)
- 59% of respondents agreed that they were more confident in their choice to attend SIUC as a result of living in the residence hall (item 90) with mean of 3.60 (*sd* = 0.99)
- 59% of respondents agreed and 22% disagreed that living in the residence hall isolated them from students studying other academic disciplines (item 75) with recoded mean of 2.50 (*sd* = 1.09)
- 56% of respondents agreed and 20% disagreed that they liked that the residence hall was primarily occupied by engineering majors (item 73) with mean of 3.51 (*sd* = 1.15)
- 54% of respondents agreed and 22% disagreed that they were more confident in their ability to successfully complete the engineering program as a result of living in the residence hall (item 91) with mean of 3.41 (*sd* = 1.11)

When asked on the FESS (*n* = 87) whether they would have chosen to live in the residence halls had it not been a requirement of the program, 48 (55%) freshman respondents indicated they would have lived in the residence hall anyway. However, 21 freshmen respondents (24%) indicated that they would not have lived in the residence hall, and 16 (18%) indicated that they were unsure whether or not they would have lived in the residence hall. Two freshman FESS respondents did not respond to this question.

Focus group comments about the residence halls were generally positive. When asked what they thought about the residence halls, student responses included:

- "I think it's pretty awesome how everybody your living with is all taking the same classes so your just sitting in your room doing homework, you don't have to sit in your room. You can sit in the hallway and anybody you see walk by could be somebody who could help you with your homework."
- "It's really easy to make friends too. Ya'll live together; ya'll take the same classes together. You can't help but just become friends with each other."
- "I liked how when we first moved in, on your floor everybody will come to your room and introduce themselves and let you know which room they're in and if you ever need something to come by and just knock on the door. Everybody was just so friendly. The RA was there to help you with basically anything you needed. It is just a good atmosphere for new people trying to get to know a new set of friends and everything."

However, some student responses were less positive. One student commented, "…I like being able to get to meet people and stuff but I sort of don't like some of SIUC housing regulations and red tape you gotta deal with when you want to get something done." Another noted:

> I like the idea of having buildings that are dedicated just to engineering but I don't like the fact that we are forced to live here because some people who live here really don't want to and it's not like they bring it down it's just that why should they have to? I think it should be by choice.

During one of the focus group discussions, students also expressed concern about the requirement to continue living in the residence halls through the sophomore year of college.

All 9 freshman Exit Survey respondents indicated having some experience in the residence halls. Most of the freshman respondents who lived in the residence halls expressed satisfaction with the aspects measured on the survey (see Table 2). Respondents expressed the most satisfaction (67% satisfied) with the overall college experience and interactions with other students. Respondents expressed the least satisfaction (44% satisfied) with overall sense of community among engineering students and availability of campus social activities. The only aspect of the residence halls with which no respondent expressed dissatisfaction was interactions with other students.

Table 2
Satisfaction with Selected Items from Exit Survey

	Percent of Responses (n = 9)				
Aspect	**Very Satisfied**	**Satisfied**	**Neutral**	**Dissatisfied**	**Very Dissatisfied**
Living in the Residence Hall	11.1	44.4	22.2	22.2	0.0
Interaction with other students	22.2	44.4	33.3	0.0	0.0
Availability of campus social activities	11.1	33.3	44.4	11.1	0.0
Overall sense of community among engineering students	11.1	33.3	44.4	11.1	0.0
Overall college experience	22.2	44.4	11.1	22.2	0.0

Table 3 compares the retention status for the freshman RCFS respondents (n = 114) who self-reported living in the residence halls and those who did not. Because this data is based on a subset of the total freshmen cohort (N = 177) and the sample of freshmen not reporting living in the residence hall is small, one must cautiously interpret the results. It is noteworthy that regardless of reporting living in the residence hall or not, the retention rates (79% and 88%, respectively) were higher than the overall freshman cohort retention rate (i.e., 71%).

Table 3
Retention Status of Freshman ESD Residence Hall Residents

	Not in Residence Hall (n = 17)		**In Residence Hall** (n = 97)	
Status	**Frequency**	**Percent**	**Frequency**	**Percent**
Retained in COE	15	88.2	77	79.4
Changed Major	1	5.9	3	3.1
Left University [a]	1	5.9	8	8.2
Academic Suspension	0	0.0	9	9.3

Note: [a] Left SIUC for reasons other than academic suspension

Peer Mentor Program

The Peer Mentor Program was evaluated using 4 survey items on the fall 2007 and spring 2008 RCFS, the Peer Mentor Survey administered to mentors at the beginning of the spring 2008 semester, specific questions in focus groups during the spring 2008 semester, and responses from the Exit Survey. Of the 4 items on the RCFS, 1 was used to screen for applicants who had interactions with Peer Mentor(s), and the remaining three were used to assess the frequency and nature of student contact with Peer Mentors in the residence halls. The Peer Mentor Survey contained a total of 59 items to assess Peer Mentor training and experience (7 items), resources available to the Peer Mentors (3 items), the nature and frequency of Peer Mentor interaction with students (38 items) and faculty and staff (3 items), and an assessment of key components of the Peer Mentor Program (6 items). Finally, one of the 15 themes discussed during the spring 2008 focus groups was exclusively regarding the Peer Mentor Program.

A total of 114 freshman engineering students responded to the RCFS. Of those respondents, 67 (59%) indicated that they had interacted with a Peer Mentor during the semester. The frequency of their interaction was measured in categories from daily to once during the semester. Most (78%) of the freshman who indicated that they interacted with a Peer Mentor did so at least once per week. A total of 46 (69%) freshman respondents who interacted with Peer Mentors indicated that the availability of Peer Mentors made their semester experience at SIUC somewhat easy or very easy.

Table 4 shows the nature of Peer Mentor interactions with students according to freshman respondents. The respondents who interacted with Peer Mentors most frequently indicated that they received academic advice (69%), received personal advice (54%), and attended social activities together (54%). Very few respondents (22%) indicated that they were aware of Peer Mentors attending class together with them.

Table 4
Types of Peer Mentor Interactions

Type of Interaction	**Frequency**	**Percent** (n = 67)
Received personal advice	36	53.7
Received academic advice	46	68.7
Attended class together	15	22.4
Attended mentor-led study group	11	16.4
Attended sporting event together	27	40.3
Attended social activities together	36	53.7
Other	23	34.3

Of the 9 freshman Exit Survey respondents, 7 (78%) reported interacting with Peer Tutors. Three (43%) reported being satisfied, and none reported being dissatisfied.

Of the 27 students hired by the College of Engineering as Peer Mentors during the 2007-2008 academic year, 24 (89%) responded to a Peer Mentor Survey delivered to them at the beginning of the spring 2008 semester.

Most of the mentors (88%) responded that they shared a great deal of their own personal experiences with their mentees. In contrast, only 7 (29%) provided a great deal of personal advice or other emotional support to their mentees. Table 5 lists the personal issues discussed by the mentors with their mentees in order of frequency. The top two personal issues discussed were "balancing study and social activities" (96%) and "living with a roommate" (83%). The bottom four personal issues discussed were "breaking problem habits" (17%), "leaving family" (17%), "disability" (4%), and "girls" (4%).

Table 5
Responses to Question about Personal Issues Discussed With Mentees (n = 24)

Frequency (Percent)	**Personal Issues**
23 (95.8%)	Balancing study and social activities
20 (83.3%)	Living with a roommate
17 (70.8%)	Student finance
16 (66.7%)	Moving to a new environment
14 (58.3%)	Balancing study and work activities
13 (54.2%)	Facing peer pressures (e.g., alcohol, drugs, sex, etc.)
12 (50.0%)	Managing conflict resolutions
11 (45.8%)	Connecting with a new friendship group
9 (37.5%)	General health and well being
7 (29.2%)	Becoming self-reliant in managing health/stress
6 (25.0%)	Forming positive health habits
4 (16.7%)	Breaking problem habits
4 (16.7%)	Leaving family
2 (8.3%)	Other (please specify): (1) girls, (1) "I had a lot of issues dealing with other people"
1 (4.2%)	Disability

Table 6 displays the responses to selected items (i.e., 37, 39, 44, 45, 46, 48, 49, and 50) about establishing a relationship with mentees. These items were measured using a 5-point Likert-type scale from "Strongly Disagree" (1) to "Strongly Agree" (5). All of the mentors selected "Agree" or "Strongly Agree" for item 37, mean of 4.42 (sd = 0.58), and item 39, mean of 4.42 (sd = 0.50), indicating that the mentors believed they were able to establish positive relationships and communicate effectively with their mentees. Overall, the mean response for each of these items was at or above the "agree" (4.00) level.

Table 6
Responses to Items Related to Establishing a Relationship with Mentees

				Percent of Responses (n = 24)					
#	**Item**	***M***	***sd***	**SA**	**A**	**N**	**D**	**SD**	**NR**
37	I was able to establish positive relationships with my mentees	4.42	0.58	45.8	50.0	4.2	0.0	0.0	0.0
39	I was able to communicate effectively with my mentees	4.42	0.50	41.7	58.3	0.0	0.0	0.0	0.0

				Percent of Responses (n = 24)					
#	**Item**	***M***	***sd***	**SA**	**A**	**N**	**D**	**SD**	**NR**
44	I was able to listen to mentee concerns using active listening skills	4.29	0.69	41.7	45.8	12.5	0.0	0.0	0.0
45	I was able to assist my mentees in solving their problems	4.21	0.66	33.3	54.2	12.5	0.0	0.0	0.0
46	My mentor-mentee relationships were a good fit	4.17	0.70	33.3	50.0	16.7	0.0	0.0	0.0
48	I was able to help nurture my mentees' growth by providing thoughtful, timely, candid, and constructive feedback	4.00	0.66	20.8	58.3	20.8	0.0	0.0	0.0
49	I was able to build a relationship of mutual respect with each of my mentees	4.25	0.53	29.2	66.7	4.2	0.0	0.0	0.0
50	My mentees trusted me enough to share their personal thoughts and feelings	4.21	0.66	29.2	66.7	0.0	4.2	0.0	0.0

Note: n = sample size, M = mean, sd = standard deviation, SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree, NR = No Response.

A forced-choice item asked whether mentors encouraged students to attend residence hall activities. Of the respondents, 19 (79%) indicated that they did. Table 7 lists responses to an open-ended follow-up item eliciting which specific activities mentors encouraged their students to attend. The top two activities that respondents encouraged their mentees to attend were: hall council (58%) and movie night (42%).

Table 7
Residence Hall Activities Encouraged by Peer Mentors (n = 19) [a]

Activity	**Frequency (Percent)**
Hall Council	11 (57.9%)
Movie night	8 (42.1%)
RA Sponsored Programs/Hall Activities	5 (26.3%)
Game night	4 (21.1%)
Capture the flag	3 (15.8%)
Study Groups	3 (15.8%)
Sports Fest	2 (10.5%)
Other responses [b]	7 (31.6%)

Note: [a] One mentor was excluded because he or she indicated that all associated mentees lived off campus and did not express much interest in residence hall programs.
[b] Other responses include: alcohol awareness, ice cream, intramural sports, football, and workshops.

Several items addressed some aspect of helping students with studies and leading students at a study table. In response to one of the items, which specifically asked how often the mentors formed mentor-led study groups with students, 19 (79%) respondents marked that they formed study groups at least once per week with 6 (25%) forming study groups 4 or more times per week and 10 (42%) forming study groups 2-3 times each week. All of the mentors provided at least some academic advice or course related support to their mentees with 23 (96%) providing "a great deal" of academic or course related support.

Table 8 lists the academic and course related issues discussed with mentees sorted by frequency. The top two issues identified by the mentors were "finding their way around campus" and "scheduling/registering for classes". The bottom three issues were "deciding to leave or change schools" (38%), "giving presentations" (29%), and "library resources" (25%).

Table 8
Academic and Course Related Issues Discussed With Mentees (n = 24)

Frequency (Percent)	**Academic and Course Related Issues**
22 (91.7%)	Finding their way around campus
22 (91.7%)	Scheduling/registering for classes
18 (75.0%)	Adjusting to the academic environment
18 (75.0%)	Interacting or communicating with instructors
17 (70.8%)	Grading policies/procedures
17 (70.8%)	How to study
16 (66.7%)	Test taking strategies
15 (62.5%)	Preparing an assignment or report
15 (62.5%)	Time management issues
14 (58.3%)	University resources
13 (54.2%)	What to do about missed classes or late assignments
13 (54.2%)	Working in groups
11 (45.8%)	Taking lecture notes
10 (41.7%)	Changing majors
9 (37.5%)	Deciding to leave school or change schools
7 (29.2%)	Giving presentations
6 (25.0%)	Library resources
2 (8.3%)	Other (please specify): (1) "good communication skills," (1) "Scholarship info, book buying tips, GPA worries, summer classes, summer jobs"

Items 41, 43, 47, 51, 52, 53, 55, 57, 58, and 59 were all measured on a 5-point Likert-type scale from "Strongly Disagree" (1) to "Strongly Agree" (5) and addressed miscellaneous aspects of the Peer Mentoring experience (see Table 9). The mean response to these items ranged from 3.46 to 4.33 indicating an overall moderate level of agreement with these items. The three items with the highest mean responses were item 59, "I used my mentee contact time effectively," with mean of 4.33 (sd = 0.56), item 41, "I was able to answer mentee questions about university life," with mean of 4.25 (sd = 0.61) and item 52, "I adjusted my approach to working with each mentee as our relationship developed throughout the semester," with mean of 4.21 (sd = 0.51). The three items with the lowest mean responses were item 53, "I regularly evaluated my mentees' progress toward their goals," with mean of 3.46 (sd = 0.88), item 47, "I was able to establish accountability guidelines for my mentees," with mean of 3.50 (sd = 0.98), and item 55, "I encouraged my mentees to reflect on their progress toward their goals," with mean of 3.63 (sd = 0.92).

Table 9
Miscellaneous Aspects of the Peer Mentoring Experience

				Percent of Responses (n = 24)					
#	**Item**	***M***	***sd***	**SA**	**A**	**N**	**D**	**SD**	**NR**
41	I was able to answer mentee questions about university life	4.25	0.61	33.3	58.3	8.3	0.0	0.0	0.0
43	I was able to assist mentees to set up social support networks	3.83	0.76	16.7	54.2	25.0	4.2	0.0	0.0
47	I was able to establish accountability guidelines for my mentees	3.50	0.98	20.8	20.8	45.8	12.5	0.0	0.0
51	I was able to establish ground rules for communicating with my mentees	3.71	0.86	20.8	33.3	41.7	4.2	0.0	0.0
52	I adjusted my approach to working with each mentee as our relationship developed throughout the semester	4.21	0.51	25.0	70.8	4.2	0.0	0.0	0.0
53	I regularly evaluated my mentees' progress toward their goals	3.46	0.88	12.5	33.3	41.7	12.5	0.0	0.0
55	I encouraged my mentees to reflect on their progress toward their goals	3.63	0.92	20.8	29.2	41.7	8.3	0.0	0.0
57	I was able use feedback to motivate my mentees to action	3.71	0.81	20.8	29.2	50.0	0.0	0.0	0.0
58	I was able to help my mentees manage their time effectively	3.83	0.64	12.5	58.3	29.2	0.0	0.0	0.0
59	I used my mentee contact time effectively	4.33	0.56	37.5	58.3	4.2	0.0	0.0	0.0

Note: n = sample size, M = mean, sd = standard deviation, SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree, NR = No Response.

Table 10
Self-Reported Level of Positive Mentor Influence on Students Mentored (n = 24)

	Frequency (Percent) of Responses			
Area of Influence	**A great deal**	**Some**	**Not at all**	**No Response**
Personal challenges	6 (25.0%)	16 (66.7%)	1 (4.2%)	1 (4.2%)
Intellectual/academic challenges	19 (79.1%)	5 (20.8%)	0 (0.0%)	0 (0.0%)
Physical challenges	3 (12.5%)	15 (62.5%)	6 (25.0%)	0 (0.0%)
Interpersonal challenges	6 (25.0%)	15 (62.5%)	2 (8.3%)	1 (4.2%)
Career/lifestyle challenges	10 (41.7%)	12 (50.0%)	2 (8.3%)	0 (0.0%)
Other (please specify): (1) patience, (1) study habits	2 (8.3%)	0 (0.0%)	0 (0.0%)	22 (91.7%)

The Peer Mentors also reported their perceived level of positive influence on students they mentored (see Table 10). Overall, most of the mentors believed they positively influenced their students "some" or "a great deal" with "personal challenges" (92%), "intellectual/academic challenges" (100%), "physical challenges" (75%), "interpersonal challenges" (88%), and "career/lifestyle changes" (92%). Mentors identified "intellectual/academic challenges" as the area where they had the most positive influence with 19 (79%) of the mentors responding that they had "a great deal" of influence in this area.

Mentors were also asked an open-ended question, "What did you like most about the Peer Mentoring Program?" Of the 23 respondents, 10 (44%) Peer Mentors listed that what they liked most about being a mentor was being able to help their mentees. For example, some responses were, "I have always enjoyed helping younger students/friends. It was nice to have a job where I can do that"; "The chance to help those students who want and need the help"; and "I liked helping people out, and getting involved." Other common responses included meeting new people, 3 (13%), and positive impact, 2 (9%). The remaining 8 (35%) mentors provided miscellaneous or distinct responses.

Another open-ended question asked, "What did you like least about the Peer Mentoring Program?" Of the mentors, 20 (83%) responded. Initiating social activities was a frustration for 2 (10%) mentors. They felt that students had "…developed their own network of friends and want to maintain their own regular activities." Also, 2 (10%) thought that the other mentors either were not "team players" or not working and still getting paid. In regards to the mentees, 2 (10%) felt that the mentees were "too dependent" or impatient, 3 (15%) thought the Peer Mentor Program lacked direction and role definition for the mentors, and the other 7 (35%) mentors gave miscellaneous or distinct responses. These miscellaneous responses included: "the program was too formal," "The HR's [Head Residents] are rude…," "…mentees live off campus…," "dealing with drama," "less choice on housing options…," and 2 (10%) "nothing."

Four items addressed mentor perceptions regarding program effectiveness. One of the items specifically asked, "To what extent do you think the mentoring program helps students develop a sense of personal responsibility?" All of the respondents indicated that the program helps students "some" (63%) or "a great deal" (38%).

Another item asked the mentors about the necessity for them to live in the residence hall. Of the 24 respondents, 22 (92%) marked "yes" and 2 (8%) marked "no." In response to an open-ended follow-up question, Mentors indicated that seeing students on a daily basis helped them build relationships and allowed students to feel more comfortable coming to mentors with questions. Mentors also indicated that living in the residence halls made them more available to their students and thus, made it more convenient for mentees.

Peer Mentors were asked an open-ended item about how the Peer Mentor Program was effective. Nearly all respondents, 23 (96%) responded. Of the mentors, 6 (26%) thought the program aided students in the social arena. Other mentors, 6 (26%) felt that providing their time and open support helped students with problems that may never have been addressed otherwise, and 3 (13%) mentors felt they were effective in providing academic help, either in increasing the chances the student would attend class or helping with homework. The remaining 8 (35%) mentors listed miscellaneous or distinct responses.

Finally, mentors responded to an open-ended item about how the Peer Mentor Program could be improved. All mentors responded to this question. Some mentors, 5 (21%), felt that an increase in activities, including activities between mentors and mentees, between residence halls, and between academic majors would be beneficial. Other mentors, 3 (13%) believed there should be more meetings for mentors to get together, possibly every two weeks or once a month. Another 3 (13%) mentors thought that requiring attendance from mentees or applying a reward system to increase involvement might be beneficial. Another 2 (8%) mentors thought that additional

faculty or even "head mentors" could help organize study sessions, and 2 (8%) mentors suggested more training should be given about routine questions, such as SIUC as a whole and also housing rules, and internet problems. Another 9 (38%) mentors provided miscellaneous or distinct responses such as "I don't know," "None," "Everything is good," and "Training needs a revamping."

To some extent, participants in the focus groups validated the responses to the RCFS and the Peer Mentor Survey. The focus group participants wove comments about the Peer Mentor Program into responses to virtually all of the questions. Most of the comments were extremely positive. For example:

- "…I like the fact that we have the Peer Mentor thing, so that if you have any questions you can go ask any of the guys on the floor who you know are Peer Mentors, because they usually either have the answer or can find someone that would…."
- "I know I have been able to get help from a lot of Peer Mentors when I have needed it and it has been a very, very, I guess promising alternative to just trying to look up the answers in the text book. You have a person-to-person interface when it comes to finding help, but yeah, that's my two cents on it."
- "...It was a nice surprise to find that we have Peer Mentors to help us…"
- "…The Peer Mentors, they help us a lot. I know they help me with Math problems and stuff like that, so that is what I like most about it."
- "I think the thing that was, just the whole thing when we arrived they had the Peer Mentors help you move in and I think it was just a warm and open atmosphere from the very beginning when you got here. That was one thing that really got me and was awesome."
- "I really like the Peer Mentors. One of my better friends here is actually a Peer Mentor."
- "It is cool though because they really connected with you. Not just on the academic level but socially too."

However, some focus group participants also expressed concerns about Peer Mentor performance. The following exemplify these types of concerns:

- "I guess how some of the Mentors are never here, maybe stress to them how important it is for them to be around, even if they don't feel the need to, still they should be just in case. It is really their job and they obligated to be here for us."
- "I applied for a Peer Mentor for next year and I think it is very important that all of them are there and willing to help. It is really disappointing to see that a lot of them just blow it off like it is just a paycheck when to us it is more than a paycheck."

Table 11 compares the retention status for the freshman RCFS respondents who reported interacting with Peer Mentors with those who did not. This table illustrates two important outcomes related to the goals of the project. First, the percent of freshmen returning to the COE is approximately 16% higher for those who reported Peer Mentor interactions versus those who did not. Second, freshmen reporting no interaction with Peer Mentors were almost three times more likely to leave SIUC under academic suspension.

Table 11
Retention Status of Freshmen Interacting with Peer Mentors

	No Peer Mentor Interaction Reported (n = 46)		Peer Mentor Interaction Reported (n = 67)	
Status	**Frequency**	**Percent**	**Frequency**	**Percent**
Retained in COE	33	71.7	59	88.1
Changed Major	2	4.3	1	1.5
Left University [a]	5	10.9	4	6.0
Academic Suspension	6	13.0	3	4.5

Note: [a] Left SIUC for reasons other than academic suspension

Peer Tutor Program

A total of 32 freshman respondents (28%) to the RCFS acknowledged having used the Peer Tutor Program. Of those using the service, only 12 (38%) reported using it at least once per week and 12 (38%) reported using it at most 2 or 3 times during the semester.

Table 12 displays for what courses the respondents sought tutoring. Most of the Peer Tutor Program use was for Math courses (e.g., ENGR 111 A/B, MATH 111 and MATH 150). Only 3 of the respondents used the Peer Tutor Program for the ENGR 101 course and 1 respondent used it for a non-math, non-engineering course (ENGL 120).

Table 12
Courses for which RCFS Respondents Sought Tutoring

Course	Frequency	Percent [a]
ENGR 101-Introduction to Engineering	3	9.4
ENGR 111(A/B)-Engineering Learning Skills	11	34.4
MATH 111-Pre-Calculus	8	25.0
MATH 150-Calculus I	10	31.3
Other [b]	2	6.3

Note: [a] Percents based on 32 respondents.
[b] Other courses included ENGL 120-Advanced Freshman Composition and MATH 250-Calculus II

Most of the freshman RCFS respondents who used the Peer Tutor Program (69%) indicated that they were satisfied with the service. However, 2 (6%) did indicate dissatisfaction. Only 21 freshman respondents (66%) indicated that the Peer Tutor Program made their semester experience easier, but no students indicated that it made their semester experience more difficult. Almost all of the respondents (94%) indicated that they would recommend the Peer Tutor Program to other first-year engineering students.

Most of the Exit Survey respondents, 8 (89%), indicated that they used the Peer Tutor Program. Of these respondents, 3 (38%) indicated that they were satisfied with the Peer Tutor Program and only 1 (13%) indicated dissatisfaction.

Table 13 compares the retention rates of RCFS respondents who reported using the Peer Tutor Program versus those who did not. The data show approximately equal retention rates; however, freshman RCFS respondents not reporting Peer Tutor use were more than three times more likely to leave SIUC under academic suspension than those who reported using the Peer Tutor Program.

Table 13
Retention Status of Freshman Reporting Peer Tutor Use

	No Peer Tutor Use Reported (n = 81)		**Peer Tutor Use Reported** (n = 32)	
Status	**Frequency**	**Percent**	**Frequency**	**Percent**
Retained in COE	65	80.2	27	84.4
Changed Major	1	1.2	2	6.3
Left University [a]	7	8.6	2	6.3
Academic Suspension	8	9.9	1	3.1

Note: [a] Left SIUC for reasons other than academic suspension

ESD Residence Hall Courses

A total of 44 freshman engineering students participated in the ESD residence hall courses. Five of the freshmen were enrolled in two ESD residence hall courses. Most of the freshmen, 34 (77%), completed an ESD Course Evaluation Survey.

Likert-type items were used to quantitatively evaluate the ESD residence hall courses based on 3 general categories: (a) classroom environment (5 items—see Table 16 for specific items); (b) classroom location (6 items—see Table 18 for specific items); and (c) engineering student designation (ESD)/restricted enrollment (2 items—see Table 20 for specific items). One additional Likert-type item asked if students would recommend having more courses taught in the residence halls. Besides the Likert-type items, two open-ended items, one soliciting things the respondents liked about having course(s) in the residence halls and one soliciting things the respondents did not like about having course(s) in the residence halls, contributed to the evaluation of the residence hall courses. These items were categorized based on whether the response related to classroom environment, classroom location, or ESD/restricted enrollment. Within each classification, items were grouped based on common themes.

Table 14
Descriptive Statistics for Evaluation of Residence Hall Course Characteristics

Characteristic	***n***	**Min/Max**	**Median**	**Mean**	***sd***
Classroom (5 items)	34	1.40/5.00	3.60	3.48	0.85
Location (6 items)	34	1.17/5.00	3.50	3.30	1.05
ESD Enrollment (2 items)	34	1.00/5.00	3.25	3.10	1.05

Note: Items are coded on a scale from 1.00 to 5.00 so that higher means indicate more positive responses.

Overall, mean response scores seem to indicate that students generally, although not strongly, liked having courses in the residence hall (see Table 14). Classroom environment had the highest

mean score (M = 3.48, sd = 0.85) and median of 3.60. ESD enrollment restrictions had the lowest overall mean score (M = 3.10, sd = 1.05) and median of 3.25.

Table 15 displays the frequency that the open-ended responses addressed the three ESD characteristics from above. A comparison between Table 14 and Table 15 reveals some inconsistency between the scale responses and the open-ended responses. The scale responses indicated the highest level of satisfaction was with the classroom environment; however, 80% of the open-ended responses to item 15, "Name 3 things you did not like about taking this course in the residence hall," were about the classroom environment. Whereas, 33% of responses to item 14, "Name 3 things you liked about taking this course in the residence hall," were about the classroom environment. Furthermore, 51% of the responses to item 14 were about location with only 14% of the responses to item 15 being about location. The low frequency of open-ended responses to both item 14 and item 15 related to the ESD enrollment seem to be consistent with the scale score suggesting that most respondents did not have a strong opinion one way or another about this characteristic.

Table 15
Frequency of Categorized Open-Ended Responses to Likes and Dislikes about Residence Hall Courses

	Item 14-Liked		**Item 15-Disliked**	
Characteristic	**Frequency**	**Percent**	**Frequency**	**Percent**
Classroom	26	32.9	67	79.8
Location	40	50.6	12	14.3
ESD Enrollment	6	7.6	3	3.6
Other	7	8.8	2	2.3
Total	**79**	**99.9** [a]	**84**	**100.0**

Note: Respondents were asked to provide 3 responses to the "liked" item and 3 responses to the "disliked" item. Percents based on actual response counts, not respondents.
[a] Total percents may not equal 100 due to rounding.

Table 16 displays the frequency data for the five evaluation items associated with the residence hall course classroom environment. Noteworthy is that responses were most positive toward item 1 where 71% of respondents disagreed and only 9% agreed that the classroom was too noisy to learn effectively, with recoded mean of 3.79 (sd = 1.04). The higher mean responses to general classroom environment questions (items 1, 2, and 5) versus environment questions related to comfort (items 3 and 4) also seem to be reflected in the open-ended responses. The standard deviations near 1.00 for all of these items indicated a high degree of variability in student responses.

Table 16
Classroom Environment Evaluation Items

				Percent (n = 34)					
#	Item	M	*sd*	SA	A	N	D	SD	NR
1.	**(R)** The classroom was too noisy for me to learn effectively	3.79	1.04	5.9	2.9	20.6	47.1	23.5	0.0
2.	The classroom had enough light for me to learn effectively	3.62	1.02	17.6	47.1	14.7	20.6	0.0	0.0
3.	The classroom temperature was comfortable enough for me to learn effectively	3.12	1.20	8.8	41.2	11.8	29.4	8.8	0.0
4.	**(R)** The classroom did not have enough space for me to learn effectively	3.26	1.14	5.9	23.5	20.6	38.2	11.8	0.0
5.	Overall, I was able to learn effectively in this classroom	3.59	0.96	14.7	47.1	20.6	17.6	0.0	0.0

Note: n = sample size, M = mean, *sd* = standard deviation, SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, *SD* = Strongly Disagree, NR = No Response.
Items were coded on a 1-5 scale (1 = Strongly Disagree to 5 = Strongly Agree).
Items beginning with **(R)** have their scores reversed so that higher means indicate more positive responses.

Table 17
Frequency of Categories for Open-Ended Responses to Item 14 and Item 15 about Classroom

Type	Category	Frequency	Percent
Liked	Comfort	8	30.8
	Equipment	2	7.7
	Size	13	50.0
	Variety	2	7.7
	Other	1	3.8
	Total	**26**	**100.0**
Disliked	Distractions	17	25.4
	Equipment	17	25.4
	Space	8	11.9
	Temperature	16	23.9
	Other	9	13.4
	Total	**67**	**100.0**

Note: Respondents were asked to provide 3 responses to the "liked" item and 3 responses to the "disliked" item. Percents based on actual response counts, not respondents.

Table 17 displays the frequency of coded categories from the open-ended questions related to the classroom environment. The plurality of positive comments related to classroom size (50%) and comfort (31%). Some sample positive comments included: "allows you to be comfortable with your class notes," "I liked the comfort of the classroom," and "Classroom experience was more personal." The top three things students didn't like about the classroom were: (a) Distractions (25%); (b) Equipment (25%); and (c) Temperature (24%). Some sample negative comments included: "Distractions in class: Residents walking through class to do laundry," "Noisy from residents," "People walking past and using vending machine," "Lack of availability of Video/audio equipment," "No electronics for visual aid (TVs, VCR, DVD)," "Normally had a

bad temperature--either too hot or too cold," "Temperature was not always sufficient for learning," and "Stuffy atmosphere."

Table 18 displays the frequency data for the six items associated with the residence hall course location. Three of the items (item 6, 9, and 12) seemed to have similarly positive mean responses. The most negative responses were for item 11, where 35% of respondents disagreed and 29% agreed that they would have performed better academically had this course been taught somewhere else on campus with recoded mean of 3.03 (*sd* = 0.97). Based on standard deviations, student responses were generally more varied for location items than for classroom items.

Table 18
Location Evaluation Items

				Percent (*n* = 34)					
#	**Item**	**M**	***sd***	**SA**	**A**	**N**	**D**	**SD**	**NR**
6.	I found it convenient to have this course taught in the residence hall	3.56	1.42	35.3	26.5	5.9	23.5	8.8	0.0
7.	I was more motivated to attend this course because it was taught in the residence hall	3.12	1.20	17.6	17.6	29.4	29.4	5.9	0.0
9.	I was able to get to know my fellow engineering students better because this course was taught in the residence hall	3.53	1.08	14.7	44.1	29.4	2.9	8.8	0.0
11.	**(R)** I would have performed better academically if this course had been taught somewhere else on campus	3.03	0.97	5.9	23.5	35.3	32.4	2.9	0.0
12.	Overall, I liked having this course taught in the residence hall	3.44	1.40	29.4	26.5	14.7	17.6	11.8	0.0
13.	I would recommend that this course continue to be taught in the residence hall	3.12	1.30	17.6	23.5	23.5	23.5	11.8	0.0

Note: *n* = sample size, *M* = mean, *sd* = standard deviation, SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, *SD* = Strongly Disagree, NR = No Response.
Items were coded on a 1-5 scale (1 = Strongly Disagree to 5 = Strongly Agree).
Items beginning with **(R)** have their scores reversed so that higher means indicate more positive responses.

Table 19 displays the frequency of coded categories from the open-ended questions related to the classroom location. Most positive responses related to Convenience (50%) and Distance (48%). Example comments included: "don't have to go out in inclement weather," "From being in the engineering dorm, I knew where to get help from other students for quick questions," "The class was very convenient," "Distance. Having class in the residence halls puts the classroom relatively close. It also guarantees that I won't have to completely cross campus for class," "Everyone in the class lived relatively close ([same residential community])," and "Short distance to travel." The most negative responses related to accessibility because students who did not live in the residence hall where class was held did not have a key to enter the building.

Table 19
Frequency of Categories for Open-Ended Responses to Item 14 and Item 15 about Location

Type	Category	Frequency	Percent
Liked	Convenience	20	50.0
	Distance	19	47.5
	Other	1	2.5
	Total	**40**	**100.0**
Disliked	Accessibility	8	66.7
	Distance	2	16.7
	Other	2	16.7
	Total	**12**	**100.1** [a]

Note: Respondents were asked to provide 3 responses to the "liked" item and 3 responses to the "disliked" item. Percents based on actual response counts, not respondents.
[a] Total percents may not equal 100 due to rounding.

Table 20 displays the frequency data for the two items associated with evaluating the ESD enrollment restrictions. Only half of the students liked the fact that enrollment was limited to engineering students (item 10). Almost half of the respondents neither agreed nor disagreed that they were more motivated to participate in the course because it had only engineering students (item 8).

Table 20
ESD Enrollment Evaluation Items

				Percent (n = 34)					
#	Item	**M**	***sd***	**SA**	**A**	**N**	**D**	**SD**	**NR**
8.	I was more motivated to participate in this course because it had only engineering students	3.00	1.13	8.8	20.6	47.1	8.8	14.7	0.0
10.	I liked the fact that enrollment in this course was limited to engineering students	3.21	1.09	5.9	44.1	23.5	17.6	8.8	0.0

Note: n = sample size, M = mean, sd = standard deviation, SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree, NR = No Response.
Items were coded on a 1-5 scale (1 = Strongly Disagree to 5 = Strongly Agree).

Due to the small number of open-ended responses to items 14 and 15 related to the ESD/limited enrollment aspect, they were not coded. However, sample responses to item 14 included: "Having the class with engineering students that I know was very helpful" and "I liked the people in the class because we had things in common." Sample responses to item 15 included: "don't get to meet new people" and "only engineering students-no academic diversity."

Overall, respondents were almost evenly split when asked whether they would like to see more courses taught in the residence hall—11 (32%) agreed, and 13 (38%) disagreed. Some students were aware that they were the first group to go through the ESD residence hall courses as evidenced by one student's comment, "Felt like guinie [guinea] pig."

The open-ended responses and focus group discussion provide some insight into the students' mixed views. Students in the focus groups were asked to respond to three questions regarding the residence hall courses:

1. In general, how do you feel about having classes taught in the residence halls ([or dining facility])?
2. To what extent does having classes taught in the residence halls ([or dining facility]) affect your ability to learn?
3. Would you like to see additional university courses offered to engineering students in the residence hall ([or dining facility])?

The participants who responded to these questions gave generally unfavorable responses. Most of those responses were directed at classroom environment issues. Some examples include:

- "I didn't like it. I mean liked it for the fact that you had to walk a very short distance but I didn't like the environment. It didn't seem like a teaching environment."
- "I think it was terrible because most of the time we were stuck outside waiting because you couldn't get in. If it was a different res hall you ain't got a key you can't get in so… and it was small and so I didn't like it."
- "I wouldn't say it affected it in any way. It's just not a classroom environment. It's just not preferable over a regular classroom."
- "We had a lot of people who were always, we were down in the basement and people were always coming in to do laundry and stuff. It just kind of gets you sidetracked."

Of the 9 freshman Exit Survey respondents, 7 (78%) indicated having participated in ESD core university courses; however, only 5 (56%) participated in ESD residence hall courses. None of the respondents indicated dissatisfaction with the ESD residence hall courses.

Table 21 compares the retention status of the freshman engineering student participants in fall 2007 ESD residence hall courses with all other freshman engineering students for the 2007-2008 academic year. It is noteworthy that non-ESD residence hall course participants were twice as likely to change major, more than 3 times more likely to leave SIUC for non-academic reasons and twice as likely to leave SIUC under academic suspension.

Table 21
Retention Status of Freshman ESD Course Participants

	ESD Residence Hall Course Participants (n = 44)		**All Other Freshman Engineering Students** (n =133)	
Status	**Frequency**	**Percent**	**Frequency**	**Percent**
Retained in COE	38	86.4	88	66.2
Changed Major	1	2.3	6	4.5
Left University [a]	2	4.5	21	15.8
Academic Suspension	3	6.8	18	13.5

Note: [a] Left SIUC for reasons other than academic suspension

Engineering Learning Skills (ENGR 111 A/B) Courses

Student responses to the ATMI, course grades, and Exit Survey responses contributed to the evaluation of the ENGR 111 courses. It is noteworthy that there were some differences between the freshman ENGR 111 students and freshmen in the COE as a whole. Freshman ENGR 111 students were more likely to have minority status than freshmen in the COE as a whole (52% in ENGR 111 versus 27% in the COE as a whole). Additionally, ENGR 111 students had mean ACT Math (M = 21.8) and Composite (M = 21.9) scores, which were below the mean COE freshman ACT Math (M = 25.6) and Composite (M = 24.7) scores.

Table 22 displays the mean ATMI scores for repeat responders on the pre- and post surveys. The ATMI responses indicated some improvement in overall attitudes toward mathematics on all subscales except Value, which remained the same. Although none of the differences were statistically significant, it is noteworthy that the repeat responders had moderately high mean attitude scores on all of the scales both at the beginning of the semester (pre-ATMI) and at the end of the semester (post-ATMI).

Table 22
Pre/Post ATMI Total and Scale Score Descriptive Statistics (n = 28)

		Mean [a]	Std. Deviation	Std. Error Mean
Pair 1	PRE SELF CONFIDENCE	3.52	0.61	0.116
	POST SELF CONFIDENCE	3.56	0.74	0.139
Pair 2	PRE VALUE	4.10	0.50	0.094
	POST VALUE	4.10	0.58	0.110
Pair 3	PRE ENJOYMENT	3.55	0.59	0.112
	POST ENJOYMENT	3.67	0.60	0.113
Pair 4	PRE MOTIVATION	3.51	0.58	0.110
	POST MOTIVATION	3.67	0.68	0.129
Pair 5	PRE TOTAL ATMI	3.67	0.49	0.093
	POST TOTAL ATMI	3.74	0.58	0.110

Note: [a] The ATMI scores were scaled from 1 to 5 with higher scores indicating more positive responses.

Students in the ENGR 111 courses were graded on a Pass/Fail/Incomplete scale. Only 34 freshman ENGR 111 students (53%) passed in the fall 2007 semester. Of the remaining 30 freshman students, 21 (33%) received an incomplete, 7 (11%) failed, and 2 (3%) did not receive a grade at all.

The following summarizes the Exit Survey responses related to the ENGR 111 (A/B) courses for the 9 freshman respondents:

- 3 (33%) were satisfied with the ENGR 111A or ENGR 111 B course and none were dissatisfied
- 7 (78%) indicated that their lack of enjoyment with required courses contributed to their choice to leave the COE

- 7 (78%) reported that their dislike of math courses contributed to their choice to leave the COE
- 2 (22%) reported that their lack of high school math preparation contributed to their choice to leave the COE, but 4 (44%) reported their high school math preparation was not an important factor in their choice to leave the COE

Table 23 compares the retention status of the freshman ENGR 111 (A/B) students from the fall 2007 semester with freshman engineering students in MATH 111 from the fall 2007 semester. The retention rate for freshman engineering students in MATH 111 (70%) was higher than the retention rate for freshman ENGR 111 (A/B) students (58%). A slightly higher percentage of freshman ENGR 111 (A/B) students left SIUC under academic suspension, and ENGR 111 (A/B) students were almost twice as likely to leave SIUC for reasons other than academic suspension.

Table 23
Retention Status of Freshman ENGR 111 and MATH 111 Students

	ENGR 111 (A/B) Students for Fall 2007 (n = 64)		**MATH 111 Students for Fall 2007** (n = 30)	
Status	**Frequency**	**Percent**	**Frequency**	**Percent**
Retained in COE	37	57.8	21	70.0
Changed Major	3	4.7	1	3.3
Left University [a]	12	18.8	3	10.0
Academic Suspension	12	18.8	5	16.7

Note: [a] Left SIUC for reasons other than academic suspension.

Discussion

The purpose of this study was to evaluate five components of an engineering residential college initiative in its first year of implementation. The five components included: (a) requiring freshman and sophomore engineering students to live in engineering student designated (ESD) residence halls; (b) providing trained Peer Mentors to live with the freshmen and provide leadership and academic and social guidance; (c) providing free Peer Tutoring in the ERC for engineering-related and university core courses; (d) offering ESD sections of residence hall courses (speech communication and English); and (e) providing Engineering Learning Skills (ENGR 111 A/B) courses in the ERC.

ESD Residence Halls

Most of the freshman Residential College Follow-up Survey (RCFS) respondents indicated receiving social benefits from living in the ESD residence halls. Furthermore, they indicated that living in the ESD residence hall helped them to adjust to university life. There was considerable disagreement among respondents about whether the ESD residence halls were physically or socially isolated from the rest of campus. Focus group comments about the ESD residence halls were generally positive, but participants expressed some concern about dealing with SIUC Housing regulations and being required to live in the ESD residence halls beyond their freshman year. Most of the Exit Survey respondents who lived in the ESD residence halls expressed

satisfaction with them. Due to small numbers of RCFS respondents who did not live in the ESD residence halls, examination of spring 2008 retention data must be cautiously interpreted.

Peer Mentor Program

More than half of the freshman RCFS respondents reported interacting with a Peer Mentor during the 2007-2008 academic year. Overall, most of those who interacted with a Peer Mentor interacted at least weekly. Most of the interactions involved receiving personal and academic advice. The most frequent personal issues discussed with Peer Mentors related to balancing study and social activities.

The Peer Mentors evaluated the Peer Mentor Program during the spring 2008 semester. Almost all of them indicated that they provided their mentees with a "great deal" of academic or course related support. Most mentors agreed or strongly agreed that they were able to answer questions about university life and that they adjusted their approach to mentoring each student as their relationships developed. Almost all of the mentors indicated that they exerted at least some positive influence on the personal and academic challenges for their mentees. Most mentors indicated that living in the residence hall was a necessary component for the success of the Peer Mentor Program. Some mentors expressed that they were able to address student concerns that might otherwise never have been addressed. Some mentors expressed concern that there wasn't enough mentor commitment and accountability among other mentors.

Students in the focus groups echoed many of the Peer Mentor comments. Focus group participants almost universally wove positive comments about the impact of the Peer Mentor Program throughout the focus group discussion. Some, however, also expressed concerns about the commitment and accountability of some of the mentors to the freshman engineering students.

The spring 2008 retention data gave the strongest support for the effectiveness of the Peer Mentor Program. Students reporting Peer Mentor interaction had an 88% retention rate, which is 16% higher than students not reporting Peer Mentor interactions. Additionally, students not reporting Peer Mentor interactions were almost three times more likely to leave SIUC under academic suspension and almost twice as likely to leave SIUC for reasons other than academic suspension.

Peer Tutor Program

Only 28% of the freshman RCFS respondents reported that they had used the Peer Tutor Program. Those who used the Peer Tutor Program indicated that they used it infrequently with 62% using the service less than once per week. Students who used the Peer Tutor Program overwhelmingly used it for their math courses. Most were satisfied with the Peer Tutor Program, and almost all would recommend its use to other first-year engineering students.

The retention data based on Peer Tutor Program use reveals mixed outcomes. There was no practical difference in overall retention between respondents who reported using the Peer Tutor Program versus those who did not; however, those who did not use the service were more than three times more likely to leave SIUC under academic suspension.

ESD Residence Hall Courses

Overall, most of the respondents to the ESD Course Evaluation Survey expressed positive attitudes toward having the residence hall courses offered in the ESD residence halls. Although the Likert-type items toward the classroom environment received the most positive responses, the open-ended responses identified most negatively with the classroom environment. It was evident from the open-ended responses that the ESD course participants would have liked to have seen more planning and preparation for the ESD environment. Many of the comments indicated the need for adequate educational technology, equipment and furnishings, rooms with better access control during class, and rooms with better climate control would have improved their ESD residence hall course experience. Although the ESD residence hall classroom location was acknowledged to be convenient, students expressed concern about having class delivered in a residence hall that had restricted access. Students also expressed mixed feelings about having ESD enrollment restrictions. Some noted that it was nice to have class with students they knew; however, others commented about the lack of social and academic diversity in the ESD sections.

The comments elicited during the focus groups were almost all negative. Focus group participants did not like the distractions from non-participating residents, the lack of accessibility to the locked residence hall, or the fact that the classrooms did not look like other classrooms. Student opinions were mixed about whether more ESD courses should be offered in the residence halls.

Freshman ESD residence hall course participants' retention rate was 20% higher compared to all other engineering freshmen. Non-ESD residence hall course participants were twice as likely to change major, more than 3 times more likely to leave SIUC for non-academic reasons and twice as likely to leave SIUC under academic suspension. Based on these data, there is evidence of retention benefits from offering ESD residence hall courses.

Engineering Learning Skills (ENGR 111 A/B)

The ATMI responses from the ENGR 111 (A/B) courses indicated some improvement in overall attitudes toward mathematics; however, the gains were small and did not appear to translate into either better student performance or higher student retention. For example, only half of the students received a passing final grade. Most exit survey respondents who had taken ENGR 111 (A/B) indicated that, although they were satisfied with the ENGR 111 (A/B) course, their lack of enjoyment with required courses and their dislike of math courses contributed to their choice to leave the COE.

Retention data with respect to ENGR 111 (A/B) suggest that the ENGR 111 (A/B) courses were not effective components for increasing freshman retention rates. ENGR 111 (A/B) had a lower retention rate relative to the freshman retention rate for MATH 111 and the College of Engineering as a whole. Further data may provide insight into the relationship between ENGR 111 (A/B) participation and retention.

Conclusions

The Engineering Residential College (ERC) initiative under evaluation at SIUC is focused on improving student retention. A goal for this study was to identify effective and sustainable

components of the ERC contributing not only to retention of freshman engineering students but also to their future graduation. This study evaluated five components of the first year of the ERC using multiple measures and outcomes.

Two of those components, the ENGR 111 (A/B) courses and offering Engineering Student Designated Sections (ESD) of core university courses in the residence halls were considered academic programs. The SIUC College of Engineering reports an overall freshman retention rate of 71%. Students participating in ESD residence hall courses were retained by the college of engineering at a demonstrably higher rate (86%); however, no comparison group of students taking similar courses in a different setting was used in this evaluation. Students participating in the MATH 111 course in the fall 2007 semester were retained at about the same rate (70%) as the overall COE freshman retention rate; however, students in the ENGR 111 (A/B) courses were retained at a much lower rate (58%). This suggests that the ENGR 111 (A/B) courses were not an effective component for student retention and thus should be further evaluated.

Three components of the ERC program were considered non-academic programs: (a) ESD residence halls; (b) Peer Mentor Program; and (c) Peer Tutor Program. An important limitation to this study is that self-report data regarding these non-academic programs was collected only from students enrolled in the Introduction to Engineering Course (ENGR 101). Some of the freshmen for this cohort did not enroll in ENGR 101 during the 2007-2008 academic year. Furthermore, it is worth noting that the evaluation of the Peer Mentor and Peer Tutor Programs is directly related to the ESD residence halls because these programs are based in the residence halls.

This study found evidence that the ESD residence halls impact student retention compared to the overall COE freshman rate based on self-reported residence status. Interestingly, students reporting living in the residence halls and students not reporting living in the residence halls were retained at high rates (i.e., 79% and 88%, respectively). However, the sample of freshmen not reporting living in the residence hall is small, thus making it difficult to draw conclusions. Additionally, this study found quantitative and qualitative evidence for the effectiveness of the Peer Mentor Program based on self-reported interactions with Peer Mentors. Those students who did not report interacting with Peer Mentors were retained by the COE at approximately the same rate as the overall COE freshman retention rate (72%); however, those who reported interacting with Peer Mentors were retained at a much higher rate (88%). Evidence regarding the effectiveness of the Peer Tutor Program based on self-reported Peer Tutor use, found that those who used the Peer Tutor Program were retained at a slightly higher rate than those who did not report using the Peer Tutor Program (84% and 80%, respectively) with both groups being retained at a higher rate than the overall COE freshman retention rate of 71%.

The overall impact of the first-year implementation of the Engineering Residential College (ERC) at Southern Illinois University Carbondale has been an increase in freshman student retention by 7% over previous years. One must be cautious in making broad conclusions because only one year of data has been compiled and the sample size is small. The effectiveness and sustainability of the ERC and each of its components will continue to be evaluated.

Acknowledgement

This material is based upon work supported by the National Science Foundation under Grant No. DUE 0622483.

Bibliography

[1] National Academy of Engineering (NAE), 2005. *Educating the Engineer of 2020: Adapting Engineering Education to the New Century,* Washington, DC: The National Academy Press.
[2] Zhang, G., T.J. Anderson, M.W. Ohland, and B.R. Thorndyke, 2004. Identifying Factors Influencing Engineering Student Graduation: A Longitudinal and Cross-COE Study. *Journal of Engineering Education*, 93: 313-320.
[3] Tinto, V., 1975. Dropout from Higher Education: A Theoretical Synthesis of Recent Research. *Review of Educational Research*, 45: 89-125.
[4] Tapia, M., & Marsh, G. E., II., (2004). An instrument to measure mathematics attitudes. *Academic Exchange Quarterly*, *8*(2). Retrieved June 1, 2007, from http://rapidintellect.com/AEQweb/cho25344l.htm