

AC 2007-2856: EOE FIRST YEAR INTEREST GROUPS: A SUCCESS MODEL FOR INCREASING RETENTION

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EOE First Year Interest Groups: A Success Model for Increasing Retention

Abstract

Paper Overview

This paper provides an overview of First Year Interest Groups (FIGs) offered by the Equal Opportunity in Engineering (EOE) Program at The University of Texas at Austin. EOE FIGs serve as our most effective retention program for minority engineering students. Research on the academic development of minority engineering students and participant demographics will be shared. In addition, this paper outlines the curriculum content for weekly FIG seminars and defines marketing strategies used to engage minority engineering students.

Background

First Year Interest Groups (FIGs) were created at The University of Texas at Austin in 1998 to help students make the transition from being a high school learner to a university learner. The Equal Opportunity in Engineering (EOE) Program hosted two EOE FIGs in Fall 2000 and then doubled the number offered in Fall 2003. Currently, the EOE Program offers four major specific EOE FIGs designed to increase the retention rate of first year minority students in the College of Engineering at UT Austin. Offered in the Fall and Spring semesters, EOE's FIG initiative is a 28 week retention focused cohort program. EOE FIGs assist students with building a support network that includes peers, upper division students, faculty, and professional engineers. Each FIG consists of: (1) 20 to 26 first year engineering students; (2) two FIG Peer Leaders - upper division minority engineering students; (3) one FIG Academic Tutor – upper division minority engineering student; (4) one FIG Facilitator - staff member from the EOE Program. The participants in each FIG cohort share a common class schedule that includes three to four basic sequence courses in the engineering degree plan. One of these courses is a small, one-hour weekly seminar where students can get to know each other. Led by Peer Leaders, Academic Tutors, and EOE staff members, the FIG seminar is designed to help students improve study skills and develop strategies for academic success.

Since Fall 2003, 282 first year students have enrolled in FIGs hosted by the Equal Opportunity in Engineering (EOE) Program. EOE FIGs serve as our most effective retention program for minority engineering students. Currently, 93 percent of EOE FIG students are still enrolled in the College of Engineering. The retention rate after one year for EOE FIG students is 97 percent, 20 points above the college average. The retention rate after two years for EOE FIG students is 89 percent, 28 points above the college average.

Organization Background

The College of Engineering established the Equal Opportunity in Engineering (EOE) Program in 1970 to promote the recruitment, retention and academic development of African American, Hispanic, and Native American students interested in pursuing careers in engineering. Since that time, EOE has expanded its goals and now seeks to increase the diversity of its student body by supporting students who come from historically underrepresented population groups in Texas or

students who have backgrounds or experiences that will contribute to the overall diversity of the College of Engineering.

Introduction

First Year Interest Groups (FIGs) were created at The University of Texas at Austin in 1998 to help students make the transition from being a high school learner to a university learner. The College of Engineering fully supports the University wide FIG program and has contributed to its success by taking an active role. In Fall 2006, the College of Engineering offered 26 FIGs including four FIGs facilitated by the Equal Opportunity in Engineering (EOE) Program.

FIGs led by the EOE Program are designed to increase the retention rate of first year African American, Hispanic, and Native American students in the College of Engineering. EOE FIGs were initiated to address the following challenges: (1) gap in retention rates between minority and non-minority students in the College of Engineering; (2) large percentage of African American, Hispanic, and Native American students with limited exposure to strategies for academic success in higher education; (3) large percentage of African American, Hispanic, and Native American engineering students with limited knowledge about academic resources in the University and College. Since Fall 2003, 282 first year students have enrolled in EOE FIGs. Currently, 93 percent of EOE FIG students are still enrolled in the College of Engineering. In Fall 2006, the first time in college class included 207 underrepresented minorities, 53 percent of whom are registered for a FIG in the College of Engineering. Thirty percent of the incoming minority engineering students enrolled in an EOE FIG (n=62). Table 1 and 2 provide a summary of the ethnic, gender, and major distribution for Fall 2006 EOE FIG participants. Table 3 and 4 provide a summary of the ethnic, gender, and major distribution for Spring 2007 EOE FIG participants.

Table 1. EOE First Year Interest Groups (FIGs) – Ethnicity & Gender for Fall 2006 participants.

Ethnicity	Male	Female	Total	Representation
Hispanic	39	11	50	66%
African American	9	3	12	16%
White	3	1	4	5%
Asian	4	1	5	7%
Foreign	3	2	5	7%
Native American	0	0	0	0%
Total	58	18	76	100%

Table 2. EOE First Year Interest Groups (FIGs) – Majors for Fall 2006 participants.

Major	Total	Representation
Aerospace Engineering	7	9%
Architectural Engineering	1	1%
Biomedical Engineering	2	3%
Chemical Engineering	5	7%
Civil Engineering	14	18%
Electrical Engineering	21	28%
Mechanical Engineering	20	26%

Petroleum Engineering	4	5%
Undecided	2	3%
Total	76	100%

Table 3. EOE First Year Interest Groups (FIGs) – Ethnicity & Gender for Spring 2007 participants.

Ethnicity	Male	Female	Total	Representation
Hispanic	22	5	27	55%
African American	8	3	11	23%
White	2	0	2	4%
Asian	3	2	5	10%
Foreign	2	2	4	8%
Native American	0	0	0	0%
Total	37	12	49	100%

Table 4. EOE First Year Interest Groups (FIGs) – Majors for Spring 2007 participants.

Major	Total	Representation
Aerospace Engineering	6	12%
Architectural Engineering	0	0%
Biomedical Engineering	0	0%
Chemical Engineering	5	10%
Civil Engineering	5	10%
Electrical Engineering	15	31%
Mechanical Engineering	16	33%
Petroleum Engineering	2	4%
Undecided	0	0%
Total	49	100%

EOE FIGs provide active support and prepare students to be academically successful in the College of Engineering at UT Austin. The goals and objectives for EOE FIGs include the following: (1) develop a community of learners who feel connected with students, faculty, and staff; (2) help students make a successful transition from high school to university learning; (3) help students find a study group and get to know people; (4) increase student knowledge about engineering, strategies for academic success, and university services/resources; (5) increase the number of African American, Hispanic, and Native American students who receive degrees from the College of Engineering.

Program Overview

Enrollment in an EOE First Year Interest Group (FIG) gives first year students the chance to get off to a great start. EOE FIGs assist students with building a support network that includes peers, upper division students, faculty, and professional engineers. EOE's FIG initiative is a 14 week retention focused cohort program offered each Fall and Spring semester. Four major specific EOE FIGs can serve 95 first year engineering students. Each FIG consists of: (1) 20 to 26 first year engineering students; (2) two FIG Peer Leaders - upper division minority

engineering students; (3) one FIG Academic Tutor – upper division minority engineering student; (4) one FIG Facilitator - staff member from the EOE Program

The participants in each FIG cohort share a common class schedule that includes three to four basic sequence courses in the engineering degree plan. Table 5 and 6 provide details on the course line-up for each EOE FIG. One of these courses is a small, one-hour weekly seminar where students can get to know each other. Led by Peer Leaders, Academic Tutors, and EOE staff members, the FIG seminar is designed to help students improve study skills and develop strategies for academic success. The guiding principle used to generate the curriculum for weekly EOE FIG seminars is based on Alexander Astin's article, *Involvement: The Cornerstone of Excellence*. Astin states, "Excellence in education is directly related to student involvement as measured by five indicators: (1) time and energy devoted to studying; (2) time spent on campus; (3) participation in student organizations; (4) interaction with faculty; (5) interaction with other students."¹ EOE FIG participants are introduced to Astin's theory on *Student Involvement* and weekly FIG seminar topics are designed to integrate themes or teach skills that relate to the five measurable indicators of excellence in education listed above. Table 7 and 8 provide details on the weekly seminar topics for the Fall and Spring semesters.

Table 5. EOE First Year Interests Groups (FIGs) – Cohorts & Fall Course Offerings.

Fall Semester - EOE FIG Cohorts and Courses	
<p>The Achievers (Electrical & Computer) <i>Seating capacity: 20 students</i></p> <ul style="list-style-type: none"> • M 408C - Calculus I • EE 302 - Intro to Electrical Engineering • EE 306 - Intro to Computing • FIG Seminar 	<p>Strength in Numbers (Aerospace & Civil) <i>Seating capacity: 25 students</i></p> <ul style="list-style-type: none"> • M 408C - Calculus I • CH 301 - Chemistry I • FIG Seminar
<p>The Visionaries (Mechanical) <i>Seating capacity: 26 students</i></p> <ul style="list-style-type: none"> • M 408C - Calculus I • CH 301 - Chemistry I • ME 302 - Intro to Mechanical Engineering • FIG Seminar 	<p>Infinite Momentum (All majors except EE) <i>Seating capacity: 25 students</i></p> <ul style="list-style-type: none"> • M 408C - Calculus I • or M 408D Calculus II • CH 301 - Chemistry I • FIG Seminar

Table 6. EOE First Year Interests Groups (FIGs) – Cohorts & Spring Course Offerings.

Spring Semester - EOE FIG Cohorts and Courses	
<p>The Achievers (Electrical & Computer) <i>Seating capacity: 20 students</i></p> <ul style="list-style-type: none"> • M 408D - Calculus II • EE 312 - Intro to Programming • FIG Seminar 	<p>Strength in Numbers (Aerospace & Civil) <i>Seating capacity: 25 students</i></p> <ul style="list-style-type: none"> • M 408D - Calculus II • PHY 303K - Physics I • FIG Seminar
<p>The Visionaries (Mechanical) <i>Seating capacity: 26 students</i></p> <ul style="list-style-type: none"> • M 408D - Calculus II • PHY 303K - Physics I 	<p>Infinite Momentum (All majors except EE) <i>Seating capacity: 25 students</i></p> <ul style="list-style-type: none"> • M 408D - Calculus II • or M 427K Differential Equations

<ul style="list-style-type: none"> • ME 205 – Computers & Programming • FIG Seminar 	<ul style="list-style-type: none"> • PHY 303K - Physics I • FIG Seminar
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Table 7. EOE First Year Interests Groups (FIGs) – Weekly Seminar Topics for Fall Semester.

Week	Seminar Topic
1	Welcome & Building Community: Making Engineering Connections for Success
2	Time Management: Developing a Personal Academic Plan
3	Building Community: Communication & Teamwork Challenge Course
4	Study Session for: Calculus I, Chemistry, or Freshman Engineering Course
5	Personal Safety On & Off Campus
6	Strategies for Interacting with Faculty & Academic Success
7	Mid-Semester Reflection on Personal Academic Plan & Behavior Modification
8	Peer Advising for Spring Courses & Online Tools for Academic Planning
9	Building Community: Pumpkin Carving
10	Study Session for: Calculus I, Chemistry, or Freshman Engineering Course
11	Building Community: Study Break
12	Study Session for: Calculus I, Chemistry, or Freshman Engineering Course
13	Engineering Scholarships, Financial Aid, Jobs On-Campus
14	End of Semester Celebration

Table 8. EOE First Year Interests Groups (FIGs) – Weekly Seminar Topics for Spring Semester.

Week	Seminar Topic
1	Welcome Back, Reflections, & Setting Goals
2	Resume Workshop
3	How to Prepare for a Career Fair
4	Study Session for: Calculus II, Physics or Programming Course
5	Building Community: Study Break Activity
6	Introduction to Leadership & Engineering Student Organizations
7	Study Session for: Calculus II, Physics or Programming Course
8	Building Community: Study Break Activity
9	Engineering Internships: Making Connections from Classroom to Career
10	Peer Advising for Summer/Fall Courses & Online Tools for Academic Planning
11	Building Community: Study Break
12	Introduction to Study Abroad: Global Engineering Education
13	Study Session for: Calculus, Chemistry, or Freshman Engineering Course
14	End of Semester Celebration

Getting Started - Program Expenses & Staff Resources

Staffing resources required to initiate and maintain EOE FIGs on an annual basis include: (1) a program coordinator (allocating 20% of work time from August through May); (2) four FIG Seminar Facilitators (allocating 15% of work time from September through April); (3) eight FIG Peer Leaders (allocating three hours per week throughout the Fall and Spring semester); (4) four FIG Academic Tutors (allocating four hours per week throughout the Fall and Spring semester). Approximately, \$30,000 per year is required to cover EOE FIG expenses. This includes staff salary, staff fringe benefits, participant support, materials, and supplies. Each year, the EOE

staff is required to solicit funding to support EOE FIGs. Currently, the EOE director submits proposals to various corporate foundations to secure funding to cover program expenses. Table 9 details the final expenses from 2005-2006 EOE FIGs.

Table 9. EOE FIG Expenses for 2005-2006.

Item	Expense
1 Program Coordinator (Salary & Fringe)	\$9,450
4 FIG Seminar Facilitators (Salary & Fringe)	\$10,300
8 FIG Peer Leaders (Salary & Fringe)	\$4,100
4 Academic Tutors (Salary & Fringe)	\$2,200
Participant Support (materials, t-shirts, snacks)	\$1,740
Supplies, Copies, & Postage	\$400
TOTAL	\$28,190

Planning and Preparation

The administrative aspect of EOE FIGs is managed by staff from the Equal Opportunity in Engineering (EOE) Program at UT Austin. With support from additional EOE staff, the lead program coordinator for EOE FIGs: (1) generates marketing material; (2) recruits participants; (3) generates the semester schedule and seminar curriculum; (4) reserves meeting rooms; (5) secures presenters and guest speakers as needed; (6) hires FIG student leadership team; (7) monitors students progress during the year; (8) evaluates student feedback; (9) and tracks retention data for previous EOE FIG participants.

Recruiting Process for EOE FIG Participants

At summer orientation, the EOE Program invites first time in college (FTIC) students to become part of an exciting community that focuses on academic success and personal growth. EOE hosts six orientation meetings called “EOE: Success in UT Engineering Starts Here”. During this one hour meeting, FTIC students have the opportunity to meet with EOE Staff and current engineering students in small groups and have their engineering/orientation questions answered. FTIC students learn about a variety of EOE services, including FIGs, tutoring, and professional development workshops. During summer 2006, EOE met with 138 engineering students which included 53 percent of the minority students expected to be at orientation. More than 72 percent of the students who attended the EOE orientation meeting registered for a FIG.

Program Assessment

Since Fall 2003, 282 first year students have enrolled in EOE FIGs. Currently, 93 percent of EOE FIG students are still enrolled in the College of Engineering. The retention rate after one year for students who enroll in EOE FIGs is 97 percent, 20 points above the college average. The retention rate after two years for EOE FIG participants is 89 percent, 28 points above the college average. Table 10 summarizes one year and two year retention rates for EOE FIG participants from Fall 2003 through Fall 2006. Using data from the past five years as a basis for comparison, the one year retention rate for all College of Engineering students is 77.6 percent. The two year retention rate for all College of Engineering students is 61.2 percent.

Table 10. EOE First Year Interest Groups (FIGs) – 1st & 2nd Year Retention Rates.

EOE FIG Participants in:	Total # of Students	# of Students Retained in College of Engineering after 1 year	# of Students Retained in College of Engineering after 2 years
Fall 2003	61	61 (100%)*	54 (88%)**
Fall 2004	71	68 (96%)*	64 (90%)**
Fall 2005	74	71 (96%)*	
Fall 2006	76		

* 77.6% - 1 year retention rate for all COE students (based on a 5 year average)

** 61.2% - 2 year retention rate for all COE students (based on a 5 year average)

In addition to measuring the effectiveness of EOE FIGs with 1 and 2 year engineering retention rates, the lead program coordinator monitors the students' academic progress at the end of Fall and Spring semesters. Table 11 provides a Fall 2005 Grade Analysis for minority students who participated in EOE FIGs as well as a comparison to minority students who choose not to enroll in EOE FIGs. Table 12 provides a Fall 2006 Grade Analysis for minority students who participated in EOE FIGs as well as a comparison to minority students who choose not to enroll in EOE FIGs.

Table 11. EOE First Year Interests Groups (FIGs) – Fall 2005 Grade Analysis for FTIC minority students who participated in EOE FIGs vs. non-EOE FIG participants.

	Visionaries (ME)	Achievers (EE)	Strength in # (ASE/CE)	I. Moment. (all but EE)	Minority FTIC Participant EOE FIGs	Minority FTIC Non Partic. EOE FIGs
Number of minority students enrolled	18	18	10	9	55	154
Percent of enrolled students who are ethnic minority	78%	95%	43%	100%	74%	100%
Number of FIG Students with UT GPA 3.0 or better after Fall 2005	9 (50%)	11 (61%)	4 (40%)	8 (89%)	32 (58%)	85 (55%)
Average SAT Score	1184	1186	1236	1164	1191	1220
Average UT GPA after Fall 2005 (cumulative)	3.04	2.77	2.78	3.31	2.94	2.79
Average Technical GPA for Fall 2005	2.84	2.46	2.43	3.39	2.73	2.54

Table 12. EOE First Year Interests Groups (FIGs) – Fall 2006 Grade Analysis for FTIC minority students who participated in EOE FIGs vs. non-EOE FIG participants.

	Visionaries (ME)	Achievers (EE)	Strength in # (ASE/CE)	I. Moment. (all but EE)	Minority FTIC Participant EOE FIGs	Minority FTIC Non Partic. EOE FIGs
Number of minority students enrolled	16	16	19	11	62	151
Percent of enrolled students	80%	73%	91%	79%	82%	100%

who are ethnic minority						
Number of FIG Students with UT GPA 3.0 or better after Fall 2006	11 (67%)	8 (50%)	9 (47%)	4 (37%)	32 (52%)	90 (59%)
Average SAT Score	1198	1176	1182	1181	1185	1248
Average UT GPA after Fall 2006 (cumulative)	3.03	2.68	2.79	2.70	2.81	2.92
Average Technical GPA for Fall 2006	3.00	2.64	2.64	2.76	2.71	2.58

Evaluation surveys are administered to FIG participants at mid-semester and at the end of the semester. Quantitative and qualitative data is collected and used to evaluate the effectiveness of EOE FIGs and to direct future efforts to enhance and evolve the program. Overall, 100 percent of the EOE FIG participants, who completed end of Fall 2006 semester evaluations, agreed that the weekly FIG seminar content provided them with information and strategies that assisted them in making a successful transition from high school to the college environment. In addition, 98 percent of these students would recommend an EOE FIG to a friend. EOE FIG participants are asked to rate the quality of the information provided during each weekly FIG seminar. Table 13 provides average scores that were collected from Fall 2006 EOE FIG participants.

Table 13. EOE First Year Interests Groups (FIGs) – Average scores from Fall 2006 End of Semester EOE FIG Participant Evaluations.

On a scale of 1 to 5, please rate the quality of information provided during each seminar? (1 – Poor; 2 - Below Average; 3 – Average; 4 – Above Average; 5 - Excellent)				
Seminar Topic	Visionaries	Achievers	Strength in #	I. Momentum
Welcome: Making Engineering Connections for Success	4.5	4.1	4.5	4.4
Time Management: Developing a Personal Academic Plan	4.4	4.3	4.6	4.4
Communication & Teamwork Challenge Course	4.6	4.7	4.7	4.8
Study Session for: Calculus I, Chemistry, or Freshman Engineering Course	3.7	3.9	4.4	3.6
Personal Safety On & Off Campus	4.4	3.8	4.6	4.3
Strategies for Interacting with Faculty & Academic Success	4.2	3.9	4.4	4.3
Mid-Semester Reflection on Personal Academic Plan & Behavior Modification	4.1	4.3	4.5	4.6
Peer Advising for Spring Courses & Online Tools for Academic Planning	4.471	4.313	4.583	4.286
Building Community: Pumpkin	4.667	4.133*	4.636	4.800

Carving				
Study Session for: Calculus I, Chemistry, or Freshman Engineering Course	4.118	3.938	4.333	4.167
Building Community: Study Break	4.471	4.313**	4.875	4.667***
Study Session for: Calculus I, Chemistry, or Freshman Engineering Course	4.188	3.938	4.300	4.333****
Engineering Scholarships, Financial Aid, Jobs On-Campus	4.625	3.929	4.500	4.000
End of Semester Celebration	4.824	4.933	4.833	4.857

* Tips for Studying in Groups; ** Planning for Final Exams; *** Student Health Workshop; **** Building Community: Study Break

EOE FIGs create a collaborative learning community that focuses on academic success and personal growth. The vision for EOE FIGs is to achieve the results described in Ray Landis' NACME monograph, *Retention by Design: Achieving Excellence in Minority Engineering Education*. Landis states, "Promote a high level of collaborative learning among the student community to achieve positive outcomes such as improved academic performance, improved retention, enhanced student satisfaction with the learning experience, improved oral communication skills, and higher student self-esteem."² Table 14 provides a brief summary of general responses that capture the group consensus of Fall 2006 EOE FIG participants.

Table 14. EOE First Year Interests Groups (FIGs) – Fall 2006 End of Semester EOE FIG Participant Evaluations.

Why would you recommend an EOE FIG to a friend?
<ul style="list-style-type: none"> • It helped me make friends and form study groups. • It was a great help and made my freshman year excellent. • Helps you transition from high school and builds your characteristics as a college student. • It's a great place to learn ways to be a success at UT • FIG helps w/ successful mental strategies and ways to succeed. • EOE FIG gives you a chance to have prior knowledge for things to come. • The EOE FIG is a great way to form study groups and to learn about college social life and becoming an adult.
How can EOE FIGs be modified to help make your 1st semester even more successful?
<ul style="list-style-type: none"> • They can hold more study sessions to prepare for test • More study sessions and homework help days • More times for studying and tutoring would be more helpful
General Comments
<ul style="list-style-type: none"> • The program was great. It really helped me • Good program A++++ • Couldn't have been happier doing this! Looking forward to next semester. • It was a great first semester!

References

1. Astin, A.W. (July/August 1985). "Involvement: The Cornerstone of Excellence," *Change* 17.
2. Landis, R.B. (October 2005). "Retention by Design: Achieving Excellence in Minority Engineering Education," *NACME*.

Biographical Information

ANDREA OGILVIE is the Director of the Equal Opportunity in Engineering Program at UT Austin. She came to UT as Director in July 2001 after six years in industry where she worked as a Structural Engineer for KBR and HDR Engineering, Inc. designing petrochemical and commercial structures, respectively. Andrea received her BS Civil Engineering degree from UT in May 1995 and her Texas Professional Engineering License in February 2001. She is an active member of the National Association of Multicultural Engineering Program Advocates (NAMEPA) and the American Society of Engineering Education (ASEE).