

Focused Interest Group – Retention in Engineering

William C. McCarthy and Joseph E. Misquez

College of Engineering

New Mexico State University

PO Box 30001

MSC 3449

Las Cruces NM 88003

Wmccarth@nmsu.edu and emisquez@nmsu.edu

Introduction

The concept of a Focused Interest Group or FIG is not a new one. As the name implies, a group of students are linked together in a common set of courses that focuses their interest and engages their collective energy toward singular improvement. In other words, FIG students are challenged to tackle problems together in an atmosphere of collegiality that reinforces their ability to learn together while learning separately. The historical track record of success for FIGs has been impressive. University-150, a component of the engineering FIG, has for the first time as a class for freshmen engineering majors at NMSU, provided an avenue for success as capable as the Center for Learning Assistance (CLA) *Success* program has been for other colleges at NMSU.

Although FIGs have been around for a long time, they have not been seen as being useful in engineering where a “go it alone” spirit has been the tradition. Certainly, acceptance in the Engineering College has been slow to materialize. Recent stagnant enrollments in the College of Engineering, with evidence of a major dropout in engineering between the freshman and sophomore years, have begun to change minds. It became evident that mechanisms were needed to reverse this trend, prompting the idea of an engineering FIG engendering the success that FIGs have enjoyed in other discipline areas.

The Engineering FIG

With the concession of need, the Academic Dean looked to identify those students who would best benefit from a FIG as well as what courses to incorporate into the FIG. Engineering is built upon a strong foundation of mathematics and without help, students weak in mathematics are usually predestined to fail in engineering. This premise was used as the basis of the FIG criteria in the College of Engineering. The College requires that its entering students take a math placement exam to properly place the students in the correct level of mathematics. Freshmen that place at the intermediate algebra level have sufficient math skills to predict success in engineering given proper support, motivation and incentives and these are the students targeted for the FIG. Freshmen that place higher tend to have the prerequisite skills for engineering success without intervention. On the other hand, freshmen that place lower will have a tough time achieving an engineering degree (although not impossible) and typically need more help than a FIG can provide in the critical early stage of their education. Mathematics skill level, therefore, identifies the students who should be in a FIG and establishes one of the courses, intermediate algebra, for the FIG cluster.

A typical FIG is a blend of courses that should build solid study habits while satisfying basic requirements. In engineering, freshmen usually enroll in the one-hour Introduction to Engineering class during their first semester, an obvious FIG course. By design or not, the freshmen Chemistry class has become a “weed-out” course with a high fail rate. It also has intermediate algebra as a prerequisite. So students must have a good grasp of chemistry and algebra fundamentals to make it through. Students that begin at intermediate algebra have two and sometimes three semesters to complete before they acquire the prerequisites that will enable them to enroll in most engineering classes. Thus, they have time to take an

Introduction to Chemistry class in preparation for freshmen Chemistry and this became the third FIG course.

Freshmen students often come to college with poor study habits, a lack of self-discipline, or a lack of organization. Unlike high school, college students are not told what to do with someone looking over their shoulder to make sure that it gets done. The responsibility for completion of coursework is placed squarely on the shoulders of the student. For many, they are not prepared to accept this responsibility. Grouping students into common courses without attempting to give them the proper study tools to do well in these courses would be callous. As a result, a fourth course, University-150, was added to the FIG group whose intent is to foster the type of self-worth and identity that produces pride in performance. Further, the course would build team spirit with assurance to the students that they do not have to “go it alone” and instead insist that they rely on others to bolster their learning skills. FIG students will exit the class with friends and confidants to carry them through the difficult semesters ahead. This year was the first year that the FIG was organized for students majoring in engineering. Ed Misquez, the Associate Director for the Regional Alliance for Science, Engineering, and Mathematics for Students with Disabilities in the College of Engineering, was asked to teach the University-150 class because of his superb background in helping students.

Making it Happen

To build the FIG required the cooperation of the College of Arts & Sciences and they joined in the effort with enthusiasm. Course sections were identified that fit within the time structure and enrollments in these sections and were capped to allow for the availability of sufficient seats to accommodate a 25 student FIG. Recognizing what we were trying to accomplish, the Mathematics Department assigned one of their best teachers to the intermediate algebra FIG section. Finally, a university studies section directed at team building and study skill development, designated as University-150, was established specifically for the FIG.

Since the concept was new to engineering it was decided to build a single FIG group and use it as a trial balloon. Recruitment for the FIG came primarily through the summer new student orientation sessions offered periodically by the university. For this first-ever engineering FIG, participation was voluntary and the FIG concept needed to be sold. In the orientation sessions and despite the emphasis on its value in retention over the long haul, students meeting the criteria resisted enrolling in the FIG. The students, and more often the parents, expressed concern that they were being asked to take courses that would not satisfy degree requirements. It seemed to make little impression that a FIG was an ounce of prevention instead of the pound of cure that would be needed later to try to salvage their education. Other problems also interfered with the enrollment numbers. For instance, a number of eligible students claimed that their work schedule prevented them from signing up for one or more of the FIG classes. The bottom line was that the first FIG only attracted 16 participants. Nonetheless, it was felt that the number would be sufficient to provide evidence of the FIG's impact as these students and a comparable non-FIG group of students were tracked over time.

Having It Happen

For the students that completed the course it was generally accepted as a positive, and beneficial experience. They learned that their job as a student was to be punctual, attend class, turn in their assignments on time, and to work with their classmates as members of a team. Perhaps the most inspiring development occurred when it was learned that at least one of the students applied for work at the college of engineering and another was accepted into the RASEM program and received a \$1,500 mentorship.

Of the 16 engineering majors that enrolled for the University-150 course, 11 completed the course with the majority earning A's for their final class grade. From the onset, one student failed to attend class and was dropped by the official withdrawal date. Another student, who was maintaining an "A" average, discontinued attending class due to personal reasons although this student never officially dropped the class. The three remaining students who failed the course simply stopped attending class after mid-terms. These three also failed to officially drop the course. Various attempts were made to help the students salvage what was left of their grades, but it was apparent that they were not ready to enter college especially when it was noticed that they also regularly missed the other classes associated with the FIG curriculum, including Math-115, Chemistry-100, and Engineering-101.

Course Content

The course syllabus for the University-150 class is the best example of the direction taken by this year's FIG. As the opening paragraph explains to the new freshmen students:

"You are at the beginning of a new and exciting adventure — an adventure that will take you on a journey of discovery. You will learn new things about yourself and the world around you — and for the experience, you will never see the world in the same way again. Be prepared for surprises, "Aha" moments, the sight of new horizons, and an expanded perspective on all that you think, feel, and perceive. Be prepared, also, for disappointments and frustrations — not as barriers to success, but as signposts of opportunity — points of departure leading to new directions and self-actualization."

The success of University-150 was also based on the inclusion of a Peer Educator, a upper-classman student chosen from a group of applicants who would actually be responsible for organizing and teaching a number of lessons in University-150. The Peer Educator component of University-150 was perhaps the most efficacious of the course. This was evident by the responses that students gave when asked to evaluate the course at the end of the semester. For example one student responded by saying that "...it made it easier to understand certain things because she (Melissa Briggs) has gone through the same things." According to Mr. Misquez in his Peer Educator evaluation:

"Mel connected with the students in ways that I could never have anticipated. They responded in positive productive ways when, for example, they actually started taking notes in other classes or realized their own tendency to stereotype people from other cultural groups. Perhaps my experiences and abstractions of those experiences were so far removed from the everyday issues with which the students struggled, that it would have been pointless to try to connect — to span the gap between myself and the students. In this instance, Mel completed the circle: I was the mentor, she was the peer / teacher and by pooling our skills we were able to form a sort of on-going conversation that continued for the students and ourselves in and out of class. It formed the basis of a dynamic relationship between ourselves and the students."

Within that framework the course objectives, as devised by the CLA under the guidance and tutelage of director Dr. Susan Brown and associate director Terry Cook, included:

- appreciate the goals, methods, and values of higher education;
- become independent, motivated learners;
- establish a mentor relationship with a faculty or staff member on campus;
- become part of a community of fellow learners;
- become familiar with the campus resources and services available;
- enhance your reading writing, speaking critical thinking, library and study skills;
- evaluate your talents and interests in relation to career planning;
- examine and clarify values;

- recognize and appreciate cultural diversity.

The objectives were achieved through a series of class assignments which were assembled by Dr. Brown and Ms. Cook as a result of previous experiences with courses similar to University-150. The assignments were based on outside class activities, presentations by guest speakers, reaction papers to classroom activities, library research report, and lessons designed for engineering students, such as notetaking involving Newton's Laws of Motion. Assignments included the following:

- **Autobiography (50 points)** — Type or handwrite an autobiography of at least 250 words in length. Leave a space between each line. See assignment sheet for complete description.
- **Join a Campus Club or Organization (25 points)** — Attend at least two meetings. Write a one to two page typed paper about your experiences in the organization your perceptions of yourself and others in the organization, and how being in the organization has influenced you.
- **Campus Activities (75 points)** — Attend with a friend three of the following: theater, symphony, sporting event, choir, or lecture. Turn in a one page reaction paper describing what you attended,, how you felt about it, and what you learned about yourself by attending this activity. Be as specific as possible about your feelings.
- **Study Skills (125 points)** — Demonstrate that you can apply time management, note taking, study reading, memory and concentration, test preparation, and test taking skills to your other classes.
- **Library Research (150 points)** — Complete the library research assignment. Give a brief presentation to the class.
- **Reaction Papers (75 points)** — You will be asked to turn in a series of reaction papers. These assignments will ask for your reactions to activities we have completed in class or your experiences outside of class. They should be between 250 and 500 words. I will be looking for more than a description of the activity or experience. I want to know your reactions, perceptions, feelings, opinions, and/or suggestions.
- **Instructor Meeting (25 points)** — Before the midterm exam, you must make an appointment to come and see me. We'll talk in general about how you are doing in this class and in your other classes. If you have a specific concern, we can talk about it at the time.
- **Interviews (125 points)** — You will be interviewing a professor you would like to know better, or a professor in your major. Write a one to two page paper describing the person and the interview.
- **Policies Quiz (25 points)** — There will be a quiz covering important policies that you need to be aware of as a student.
- **Exams (100/125 points)** — There will be both a mid-term and a final in this class.
- **Participation (100 points)** — Individual participation is required.

Conclusion

The FIG concept itself is a tried and true solution for at-risk students. Was it as effective with engineering students as for students from other disciplines? At present, insufficient hard evidence is available to prove the concept one way or the other which leaves us with only anecdotal evidence. For example, when students were asked at the end of the semester if the course helped them to become a better students, some responded in the following way:

- Yes, because now I understand what duties the university student has to do.
- Yes, I learned all the information everyone forgets.
- The part at the beginning of the semester that taught us to use schedule books to keep track of assignments helped me to stay on top of assignments.

When asked if students would recommend the course to incoming freshmen some responded thusly:

- Yes, because it will help them adjust to college life and it helped me so it should help them.
- Yes, it's a good class for preparation and for scared freshmen. Lots of instruction.
- Yes, it really helped with the transition from high school to college.

Based on the experiences of the first FIG, a rethinking of the FIG concept for engineering students and the recruitment of students into FIGs is in order. Should the College adopt a policy that all at-risk students enroll in a FIG? What is the optimum number of students in a FIG and are sufficient resources available to support multiple FIGs? Should different FIGs offer differing clusters of courses? The answers to these and other questions have yet to be determined.