

Industrial Experience and Engineering Freshman: A Pilot Program

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Introduction

Increasingly, industrial experience before graduation is highly desirable for successful placement of engineering graduates in permanent engineering positions. However, the number of participants in the traditional cooperative education program at Mercer University has declined in recent years. In order to encourage a higher degree of participation, the Mercer University School of Engineering, in collaboration with the Career Services Office at Mercer University, has recently implemented a pilot program, the Initial Freshman Experience program.

The program objectives were outlined to benefit both Mercer University students and employers. The following objectives were developed: to improve student learning inside and outside the classroom, to prepare students for the journey of lifelong learning, to increase the number of students with practical engineering experience prior to graduation, to strengthen relationships between Mercer University and employers who hire Mercer University students and graduates, and to provide enthusiastic and high-quality graduates for our employers.

In its first year, there has been significant participation in this program at Mercer University. Anecdotal evidence from student participants suggests that they enjoyed the experience and were eager to continue in the cooperative education program. Evidence from the employer evaluations indicates employers were satisfied with the students' work performance.

Mercer University's School of Engineering retention rates of students from freshman to sophomore are significantly higher than in the past. It is too early to determine at this time if the Initial Freshman Experience program has been a factor in this improvement in retention. However, studies will be conducted to determine the long-term effect.

Description of Program and Reasons for Its Introduction

In order to increase the number of students available to participate in the cooperative education program, to combat students losing interest in engineering, and providing opportunities for students to test their interest in, and suitability for, a career in engineering, the School of Engineering and Career Services jointly developed the Initial Freshman Experience (IFE) Program. Mercer University has for several years had more cooperative education employment opportunities available than students participating in the program. Anecdotal evidence and interviews with students participating in the cooperative education program revealed students did not want to commit to more than one semester before they knew whether they would enjoy the experience. Students reported they felt it was easier to leave a non-engineering related position if they did not enjoy the work, whereas they did not like the long-term commitment cooperative education entailed. However, once they did a work experience they generally decided to continue, either with the same employer or a different one.

The IFE began in the 2000 – 2001 academic year (AY) at Mercer University. The program is designed to provide professionally supervised engineering experience for Mercer

University students who have completed their freshman engineering requirements with a minimum 2.0 grade point average (GPA). The program objectives are to significantly increase the pool of engineering students who have gained practical work experience prior to graduation, strengthen relationships with employers who hire Mercer University students and graduates, improve student learning inside and outside the classroom, prepare students for the journey of lifelong learning, and provide enthusiastic and high-quality individuals for our employer partners. As part of the development process, several employers having a strong relationship with Mercer University were contacted during the fall of 1999. Although most employers expressed concern over the one-term commitment, several employers agreed to interview the freshman students and, if a candidate was acceptable, hire the student.

The School of Engineering, through its partnership with the Career Services Office, was able to provide individual career development support for every student who chose to participate. This unique pairing of Career Services with the academic mission of the School of Engineering leveraged the expertise of both departments. Another beneficial outcome of this pairing is the development of relationships between freshman students and the Industrial Experience office and the supporting unit in Career Services earlier in the students' academic careers.

Requirements for Participation

The School of Engineering introduces students to the world of engineering through the completion of the freshman year course of study. The students are exposed to a freshman engineering design course, problem solving course, and a course in ethics, in addition to the traditional courses of calculus, physics, and chemistry. Students who wished to participate in the IFE were exposed to the world of professional career development by participating in resume and communication workshops provided by Career Services.

All entering freshman engineering students are eligible to participate in the IFE upon completion of their first year in the School of Engineering with at least a 2.0 GPA. They completed two workshops provided by Career Services, one concerning resume development and the other for developing good interviewing skills. These workshops were completed by the students prior to Mercer University's annual Career Fair in the spring semester. After the Career Fair, employers contact those students they wished to interview. Once the students obtained job offers from employers, they were registered and encouraged to treat this opportunity as a learning and academically focused professional work experience through the completion of learning objectives, evaluations and a comprehensive written report due at the end of the summer session.

For a company to be allowed to participate in the IFE, the employer was asked to provide each student a professional work experience, supervised by an engineer, for the summer session. Their commitment to the student was only for the summer session unless they chose to have the student return. They were asked to assist students in the preparation of learning objectives, to prepare a final work report, and to complete a performance evaluation of the student worker. The employer reviewed the student's final work report to assure no proprietary or confidential material was present. Most important, employers were asked to encourage students in the development of professional work habits, ethical decision-making, and quality interpersonal skills.

Results

At Mercer University, during the 2000 – 2001 AY, approximately 25% of the entering freshman class participated in the resume and interview workshops. Of those, 45% obtained summer employment in engineering internships. The types of internships ranged from manufacturing operations, programming, various engineering tasks, and special engineering projects. Practically all of the students did engineering-related functions. The salaries for the IFE students ranged from \$9.75 to \$13.25 per hour. Typical industries that placed our students include aerospace, heating and air conditioning, paper mill, telephone, government contractors, and a biomedical pharmaceutical company. From employer evaluations, we find most of the students performed extremely well. Some of the employer comments were: “Student’s great attitude a plus ... work ethic will be an asset to any organization,” “... student is a cut above the rest,” “Student exceeded expectations of intern program,” “... provided great support for multi-million dollar project,” etc.

Student surveys showed that students regarded their experiences positively and wanted to continue working in some form of internship or cooperative experience. However, students did express anxiety in beginning work in an engineering environment with no previous experience. Most students were able to overcome this anxiety once they reported to work, as employers were accommodating to the students by assigning tasks that were within their capabilities.

Future Direction of the Program and Conclusions

Based on feedback from employers and students, we will add two additional workshops for students for the 2000 – 2002 AY. The first of the two workshops will be designed to answer some of the students’ concerns regarding professional expectations, such as what to wear, the importance of being punctual, acceptable behavior, etc.

Several students were asked to attend company-related formal functions during their internship periods. Students often felt unprepared for these types of functions; the School of Engineering and Career Services response has been to develop an etiquette workshop to be presented to the freshman participating in the IFE during the 2001 – 2002 AY.

The School of Engineering and Career Services will include a workshop for participating employers. The workshop would help clarify their commitment to the student once employed, discuss the student requirements for Mercer University, and how the employer could facilitate the student in this task. Student speakers from past work rotations should be available to answer questions specific to student needs, experiences expected and obtained, and anxieties.

The School of Engineering’s Industrial Experience Office and the Career Services Office have determined the first offering of the Initial Freshman Experience program was a great benefit to our engineering students based on employer and student feedback. With the addition of the three workshops, this program will benefit future freshman students and will improve their future employment success. This program offers our students the ability to gain real-world engineering work experience early in their academic careers and let them carry their experiences into the classroom and to ultimately facilitate our graduates in becoming better engineers. This will also improve our employers’ recruiting success here at Mercer University and allow them to develop more realistic expectations of our graduates.

Biographical Information

SHELIA BARNETT is an Assistant Professor in Industrial Engineering at Mercer University. She is also the Director of the Industrial Experience Program in the School of Engineering. She received her Bachelor of Science degree in Industrial Engineering and Master's Degree in Industrial Engineering from Clemson University.