Student Recruiting: A Report on Successful Techniques at Other Universities.

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Introduction

There has been much discussion regarding the recruiting and retention of engineering students. The 2004 ABET annual meeting looked at the changing demographics that engineering schools face. Historically the white male has dominated our profession. Our national demographics are shifting with Caucasian population falling as a percentage of the total. Minority population percentages are growing. With this change ABET is encouraging schools to emphasize diversity. [1] Multiple sessions at the ASEE Annual Conference, this sectional conference and the Christian Engineering Educators Conference have focused on this subject. The latest data on undergraduate engineering graduates show that the number of engineering graduates has increased each of the past four years, but in 2002-2003 the freshmen enrollment failed to increase for the first time in three years.[2]

At John Brown University (JBU), the university enrollment has been steadily increasing over the past ten years. The general enrollment attitude has been positive, but there have been specific departments that were not following the university trend. Engineering was one of those departments. Enrollment in engineering has been flat or slightly down over that time period. During that period, the Walton International Students Program was established that brought many students from Central America into our engineering program. This program provides full tuition, room, board, books and fees to needy Central American students. Instead of increasing our total enrollment, this program kept our enrollment stable as the domestic enrollment was actually declining.

A look at similar institutions within the Coalition of Christian Colleges and Universities did not indicate the same drop in domestic enrollment. In fact, there were institutions that established new engineering programs, completed the ABET accreditation process and established enrollments that were more than double that of JBU. This quick analysis indicated that we needed to answer two questions: What are other engineering schools doing to increase their enrollment? And what do we need to change in our recruiting process? The search for these answers prompted my university to fund travel to evaluate other universities' processes, look for common themes, and develop an action plan for our department. This paper will look at the methodology of my research, the results and conclusions.

Methodology

As I considered how to best answer these questions, I decided that qualitative research methods were most applicable to this process. Lincoln and Guba (1985) summarize well the key qualitative process concepts of: natural setting, human instrument, tacit knowledge, qualitative methods, iterative research, and case report and tentative applications.[3]

Natural Setting. Whatever the phenomenon being studied, meaning comes as much from the context and natural setting as from responses of the research subjects. The researcher looks beyond answers to interview questions to understand why actions take place, to assess the subject's reactions to questions and to explore how environment impacts behavior.

Each university's engineering department was evaluated as they took me through their recruiting process. It was important to distinguish both explicit and implicit activities. For example, at one institution the recruiting personnel stated that they were selling the total university and their process did not provide for selling separate majors. However, when I mentioned engineering they pull out a separate recruiting packet that was tailored to engineering students and a department presentation focused on engineering careers. At a second institute, they again were selling the total institution. But in this case, all campus tours started in the engineering building. The building, contents and heritage were considered key to the whole university. Without seeing the natural setting, I would have missed these subtle distinctions.

Human Instrument. The human is uniquely qualified to act as the qualitative research instrument due to the characteristics of responsiveness, adaptability, holistic emphasis, knowledge base expansion, immediacy of data processing, opportunities for clarification and summarizing, and opportunities to explore typical or idiosyncratic responses. The human excels in recognizing, recording and adapting beyond original data gathering intent. The process also utilized short encounters and multiple case studies. Data were analyzed using the case cluster method.[4]

*Tacit Knowledge***.** Tacit knowledge relies on the ability of the interviewer to recognize key triggers for probing and understanding. Recognition of body language, nervous idiosyncrasies, or similar nonverbal cues can key the researcher to important areas that require better understanding.

Qualitative Methods. Qualitative methods are extensions of normal human activities of looking, listening, speaking, and reading. The primary data gathering methods are observation, interviewing, and document search. Interviewing can cover a broad continuum including informal conversational interviews, guided interviews, open-ended interviews, and closed, fixed response interviews. [5] The interview guide method was chosen for this study.

Iterative Research. Qualitative research methods include the iterative process of purposive sampling, data gathering and analysis, and looking for convergent results that will yield grounded theory and emergent design

A key activity was obtaining the purposive sample by identifying and gaining access to individuals and schools who would become the subjects of this research. The selection process began by looking at private, Christian universities with an ABET accredited engineering program. I was most interested in schools that had either grown rapidly or were regionally located.

Cedarville University of Cedarville, OH created its engineering program and quickly became accredited in the early 1990's. Over the next ten years, their engineering department

grew to three times larger than our own. Oklahoma Christian University, Oklahoma City, OK; LeTourneau University, Longview, TX and University of Tulsa, Tulsa, OK were chosen due to their regional proximity. They would be competing with us for many of the same students and were expected to experience some of the same recruiting issues. Each school had been growing steadily with Oklahoma Christian showing the highest engineering growth rate. University of Arkansas – Fort Smith was added due to its proximity and the fact that it had a new program that was showing signs of good growth.

The primary data analysis of these studies followed the constant comparative analysis method detailed by Glaser & Strauss (1967). [6] In this method, analysis began during the data-gathering phase, preliminary results began to emerge, multiple cases were studied in an effort to establish the results as a repeated outcome, and differences were also evaluated on a constant comparative basis to yield the final outcomes.

Results

As the information emerged, it became obvious that there are both positives and negatives to the recruiting process. We like to believe that we are always doing things that cause people to react positively to us. There are things taking place around us that may be either positive or negative. As recruiters we cannot control what may have happened to potential student prior to arriving on our campus. It is important to concentrate on the areas that we can control and make those experiences as positive as possible.

Where there are positive data I will identify the institution with the information. If I found something of a negative nature I will obscure the institutional identity. From the data gathered, I identified key recruiting elements of: fun, foundational, functional, facility and funding.

Fun. Current high school students have been actively involved in extracurricular activities. They are not ready to settle into a professional career. That will come after college. In the mean time they still want to enjoy life. Fun for them is anything interesting, exciting, enjoyable, risk taking or just avoiding responsibility. This is seen as the antithesis of classic calculus, physics, and chemistry. But for the engineering world, math and basic sciences are foundational to our courses. Herein lies our dilemma, how to make engineering fun while not sacrificing the technical truths.

The University of Tulsa (UT) uses undergraduate research and competitions as their fun elements. The undergraduate research program is very challenging academically, but from a recruiting perspective can be presented as very interesting, exciting and rewarding. The students are discovering new frontiers, helping humanity, and going somewhere no one else has gone. Some of the projects have been community service learning activities of mentoring and teaching underprivileged youth. Some projects are sold as adventuresome, cutting edge technical research. These projects are an adventure that has the potential of being highly recognized by others. Since 1995, thirty-six Tulsa students have received the prestigious Goldwater Scholarships based on their accomplishments. The challenge and recognition are intriguing to the students and are being effectively used for recruiting.

UT also participates in the hybrid-vehicle and robotic BattleBots competitions. The hybrid-vehicle competitors have finished first twice and second three times out of the past seven years. This is an excellent success record. Students are attracted by the fun and excitement of a competition that also has a component of traveling on the East Coast. The robotics team had the distinction of having the first all-women team in 2001. There is always the excitement of the competition, but this competition had the added draw of being televised on Comedy Central.

Cedarville University (CU) extensively uses competitions in their recruiting process. Their website states: "Engineering majors have opportunities to join project design teams for national competition which allows them to have fun while developing their skills and interacting with fellow engineers." [7] The engineering students compete in multiple competitions every year. The recruiting staff are constantly asking for more competitions as they see them as an important tool for their activities. The annual engineering newsletter gives significant coverage to the fun, travel and attention that results from the competitions. To build on competitions that take place off-campus, the engineering department has developed on-campus competitions. A popular campus events is the cardboard canoe race held during the annual homecoming weekend.

LeTourneau University (LTU) also makes competitions a key part of their senior design projects. They compete in half dozen national competitions where the students run all phases of the project from raising funds, design, construction and final competition. As students tour the campus, they are taken through the projects area and shown the race vehicles. There is a clear connection of using "toys" to attract potential students.

These are some examples of using fun for recruiting. At JBU, the decision was made to expand our "fun" and make sure that we actively use these elements in the recruiting process. There is a fall competition hosted in the Statics and Strength of Material class. The students build a bridge and have it tested to destruction. To provide higher visibility to our general student body, the testing is performed in the atrium of the Student Center. During the spring semester, a robotics competition is also held in the Student Center. Efforts are made to coordinate timing of each event to coincide with the Admission's Department student visitation days. Continued efforts will be made to integrate creative, active learning (fun) elements into more courses and keep these activities visible to any visitors.

Parents as stakeholders drive the next two results in the recruiting process. Today, society has given us the helicopter parent. They are constantly hovering over the students and actively involved in the decision making process. The parents will pay much of the college bills and therefore have laid claim to participating in key decisions. Choosing a college is obviously a key decision.

Foundational. Foundational is defined as making sure that the university provides a proper education for the investment. Most parents do not have pre-determined criteria for evaluating this issue. For larger schools, their reputation may be enough to answer this question. For smaller schools, they would ask: "Is your school curriculum as good as ….?" And they fill in the blank with the name of some nationally known large university. The parent is not looking

for a yes or no answer. Knowing if a particular institution is ABET accredited provides much satisfaction and comfort.

Within the ABET system, schools are accredited by discipline or general engineering with concentrations. The schools that I visited displayed a mix of these options. Some recruiters place a strong emphasis on the fact that they have multiple accreditations; one for each engineering discipline in their school. Data do not support that this makes any difference in recruiting. Not being ABET accredited creates a negative situation, but any form of ABET accreditation removes the negative and does not create a differentiating positive.

A second positive stimulus is the recruiting and placement of graduates into engineering graduate level programs. Universities find it advantageous to have a list of students that have graduated with a masters or doctoral degree or are currently enrolled in these programs. The list includes research projects and publications.

At JBU, we have a motto of "Head, Heart and Hand." The Head represents the intellectual development of the student. An ABET response is consistent with the university and parental needs. In our niche market, the Heart is our desire to assist in the spiritual development of each of our students. The Hand is providing application and practice that is directly transferable into a career. These three elements provide our response to the "foundational" issue.

Functional. The functionality of an education is defined as the ability for a student to obtain employment after graduation. This translates itself three areas: 1) the market demand for people with an engineering education, 2) the amount of money to be made, and 3) university placement programs.

JBU provides concentrations in electrical and mechanical engineering and computer science. National data show that these degree areas have the highest demand in the job market. Parents often want their child to return within a few miles of home to begin their career. The students have no idea where they want to live and work. Universities talked about the job market in their geographical area. But none of them could guarantee a job, particularly not in a specific geographical location. All of them can point to data that show students finding a job somewhere within a reasonable time after graduation. Demand for engineering employees remains steady and strong.

Our profession is definitely national in nature. When asked about graduate's salary, a range of $45 - 55,000 was consistently noted. Each institution could identify salaries both above and below this range, but for recruiting purposes they stuck to the national norms. This is not a place where anybody wants to raise expectations beyond published national figures. [8]

Parents inquire about university placement offices for both summer internships and career positions. Again, the parent wants their child to have a job in their neighborhood. At John Brown University, we have students in all disciplines from over 40 states and over 40 countries. The demographics of the engineering department are just as diverse. It would be virtually impossible for a placement office to have relationships with companies in all of these

locations. We rely on showing how we help students to write resumes, network with friends and alumni, and successfully get a job as either interns or graduates.

Facility. Facility encompasses the engineering buildings, classrooms, and laboratory space and equipment. For both parents and students, first impressions can have a marked effect on their decision on which school to attend. Students expect to spend many hours in the engineering buildings. They want to feel comfortable. Is the general atmosphere inviting? Are there comfortable study areas? Are computers and equipment available 24/7? Is the technology up-to-date? Are faculty offices accessible?

There is a delicate balance required in this area. Students and parents expect advanced, state-of-the-art engineering facilities, the facility cannot look like a clinical laboratory. It must have a certain level of personal comfort and appeal. Pictures and decorations need a blend of technical content and appealing décor. Laboratory and classroom space must create a good image. A laboratory with no visible equipment may be neat and protected, but can leave an impression that the school is under funded and ill equipped. At the other end of the spectrum, a lab that requires you to pick your way through equipment and projects leaves an impression of overcrowding or poor safety.

In my visits, the Baldor Technology Building at the University of Arkansas – Fort Smith (UAFS) was considered a showcase. As you approach the building, you see a water sculpture that has combined technology and art. The hallways are wide and clean. Classrooms and labs occupy the same physical space, and are well equipped, spacious and neat. Glass walls provided excellent visibility into computerize manufacturing lab and training spaces. These spaces were maintained clean and pleasant to observe. First impressions were very positive. The faculty considered the building to be an important part of their recruiting.

First impressions at other universities were good. Each school had many good attributes with some areas of concern, but the general composite impression was good. At one university, an electronics lab was well laid out with a computer integrated with the instrumentation at every workstation. The image was high technology directly accessible to each student. My probing revealed that the internal processors were not state-of-the-art and each functioned as a simple word processor for creating lab reports. Visiting parents and students would probably not ask the same depth of questions that I did. They would leave with a very positive impression of high technology. The university created the positive image with limited expense.

Another university had experienced significant growth and then reached a plateau. Their classrooms and laboratory space showed well to any visitor. However, their project space was overcrowded and did not look safe. Projects were sitting outside in driveway and parking areas. The university recognized that this situation was hindering further growth and recruiting. Subsequent to my visit a new 8,800 square foot project building has been constructed to house this key program feature.

As stated earlier, the University of Tulsa sells undergraduate research. A facility tour revealed numerous well-equipped but small laboratories. Most of these labs were dedicated to a

particular research project and not accessible to the general student population. But the image was very consistent with their theme of undergraduate research opportunities.

John Brown University has recently completed a facility facelift as a result of this study. Pleasant, technologically appealing lobby area; well-lit entrances, lobby and hallways; new paint and carpet; and comfortable student study areas were key considerations in our improvements. The goal is to avoid any negative impressions when we have visitors. As we grow, it would be our desire to build a new facility that would be a recruiting showcase.

Funding. Ultimately the issue of money exists in most areas of our life. This is not different for the recruiting process. Data indicate that the caliber of student required to succeed in engineering programs creates a financial issue. There was anecdotal evidence at most of the universities that to succeed in engineering the entering student must have an ACT score of 26 or higher, especially on the math section. There are examples of students above this level that do not stay in engineering and those below that work hard and succeed. But 26 was consistently identify as a knee in the curve where success was typically identified and expected.

Above this level, we are looking at high achievers. These students have done well in their studies and know that they are above average in scholastic achievement. Parents have high expectations for these students. All of these students expect some form of scholarship. Many universities list scales on their financial aid web sites. The prospective student can go directly to the web site and identify their level of financial aid that is academic, non-need based. Even if financial need is a non-issue, each student and their parents expect any institution to match these scholarships. Some recruiters identify these scholarships as vanity scholarships. They are very necessary in the recruiting process and become a strong competitive factor.

The University of Tulsa actively pursues National Merit Scholars. These students will receive scholarships that pay full room, board, tuition and fees. The past few years they have successfully recruited 50-60 scholars to their university. Eighty percent (80%) of these students go into engineering programs.

High achieving students expect to receive an equivalent scholarship package at most state universities. In some cases the students also receive a monthly stipend. The regional legislative bodies have funded scholarships at this level.

Arkansas has the Governor's Scholar and Distinguished Scholar Program. Every year these funds are at the mercy of legislative action. For the current program, an ACT level of 27 qualifies students as Governor's Scholars. An ACT of 32 or higher qualifies a student as a Distinguished Scholar. The Distinguished Scholar receives $10,000 per year and the Scholar receives $4,000. These funds can be used at any public or private university in Arkansas. At the University of Arkansas, tuition, room, board and fees are currently set at about $9,100 per year while John Brown University is at $20,910 for the same categories. At the UofA, the Distinguished Scholar goes to school for free. At the private institution, the student has to come up with additional funds. This is definitely a recruiting factor.

Similarly, the Oklahoma State Regents for Higher Education fund many scholarships for Oklahoma students attending in-state universities. The no-need, academic scholarships are triggered at an ACT of 30 or higher. The Regional University Baccalaureate Scholarship provides for $3,000 plus tuition waiver. The Academic Scholars Program provides for $5,500 plus tuition waiver. Average costs to attend a state comprehensive university for 2004-05 were $10,624, which includes $4,106 for tuition. These scholarships allow the students to attend four years of college at little cost. When a student and parent look at the absolute educational dollars invested, it is difficult for private institutions to compete without significant discounting.

Missouri has had their Bright Flight scholarship program for many years. This program was instituted by the legislature to keep bright student within the state of Missouri. Originally this scholarship was triggered by an ACT of 26 and covered state university tuition. Over the years this single scholarship area has eroded with the ACT requirement increasing to 30 and the award level set at $2,000. However, the state university system has Chancellor's, Curator's and Excellence Scholarships at significantly higher funding levels. When high achieving students receive multiple awards, all or most college expenses are covered.

The small private institutions do what they can to compete. There is no way for them to match the state universities. Discounting at these universities runs from 30-50% for entering engineering students. Every school desires to increase this area so that they can compete better with the state schools. This can not happen without significant endowments into the general or engineering scholarship programs.

Conclusion

There is still plenty of room for growth in our engineering programs. There are plenty of bright students coming out of the high schools. The market demand for engineers is holding steady and starting salaries are higher than most professions. There is significant competition between universities throughout the United States. Successful recruiting programs must consider fun, foundational, functional, facility and funding elements. There is plenty of opportunity within each of these areas for universities to be unique and develop their own response to their niche market. Recruiting will continue as a challenge, but universities can make strategic changes that increase the attractiveness of their program.

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Biography

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Larry Bland is currently an Assistant Professor of Engineering at John Brown University. Dr. Bland has been at John Brown since 2002. Prior to his academic career, he spent over 30 years in industry. His industrial career moved from engineering to executive management with significant international experience. Since joining John Brown, Dr. Bland has been active in improving the engineering recruiting efforts.