

## **2006-1988: EFFECTIVELY RECRUITING ENGINEERS TO BECOME MBA STUDENTS**

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# Effectively Recruiting Engineers to Become Graduate Management Students

## 1. Introduction

Engineering is becoming an increasingly complex profession, one in which technical skills alone are no longer sufficient to guarantee professional success. In addition to a thorough understanding of the principles of engineering science and engineering design, one now needs to demonstrate exemplary communication and teamwork skills in order to succeed. Increasingly, it is also necessary for an engineer in a management position to understand and apply the principles of effective business administration, including knowledge of finance, operations management, and team development and leadership. Although these skills can be learned on the job, it is frequently more effective for aspiring engineering managers to develop them as part of a graduate management degree. In this paper, we will describe the benefits of a graduate management degree to a professional engineer, the graduate management programs available for engineering managers at Valparaiso University, and the methods used to recruit engineering graduates to become students in those programs. We will close with an assessment of the results of these efforts and lessons learned over several years of recruiting engineers to become engineering managers.

## 2. Benefits of Engineering Management Education for Engineering Students

It has been recognized for a number of years that every engineering graduate should possess some knowledge about the world of business, and that those competencies can serve to help them advance their careers.<sup>1-2</sup> The benefits of learning about the fundamentals of engineering management are numerous, including developing skills in leadership and teamwork that are valuable to the student even in other undergraduate courses.<sup>3,4</sup> Furthermore, developing skills in this area can promote entrepreneurship, which is a natural complement to engineering management skills.<sup>5</sup> Engineering management skills are so important and diverse that some universities offer accredited degrees that instill these skills in their students throughout their four-year undergraduate career. Although these programs vary in their areas of emphasis, all are designed to be practical degrees that prepare their graduates to become leaders in engineering organizations.<sup>6-10</sup>

Many undergraduate programs integrate engineering management skills into their senior design sequence.<sup>11-13</sup> Frequently, this is done in an effort to commercialize the senior projects themselves, but it is also done in an effort to instill an entrepreneurial spirit in the engineering students as they are on the verge of graduation. Similar benefits have been observed when applying the principles of engineering management to an undergraduate research program—student performance in the research project saw gains, and students also developed important skills in project management and scheduling.<sup>14</sup>

Although the benefits of engineering management education are significant, there are also several hurdles that minimize or prevent its inclusion in typical undergraduate engineering programs. The primary hurdle is the large amount of technical and non-technical material that already must be fit into a four-year engineering degree.<sup>15</sup> As the non-technical expectations on engineering graduates continue to increase, the faculty and administrators responsible for

undergraduate engineering programs have to make very difficult decisions about what is left out. Balancing technical vs. non-technical skills and balancing breadth vs. depth are among the most important decisions to be made by each institution in consultation with their constituents.<sup>16</sup>

Even if the faculty agree that precious time in the undergraduate program should be devoted to developing business competencies, one more hurdle remains. Most engineering faculty lack the expertise to teach these topics to their own students, and many lack professional experience in the engineering profession.<sup>17</sup> In order to successfully develop a high-quality program that blends engineering skills with business management skills, it is necessary to develop a close collaboration between engineering faculty and their colleagues in the business school.<sup>18</sup> At many universities, such a collaboration is very difficult to develop, which limits the success of a program to teach business skills to engineering students.

Addressing the concerns of an overloaded undergraduate curriculum and a lack of formal collaboration between engineering and business faculty, many universities have begun to offer Master's degrees in Engineering Management (MEM).<sup>19-26</sup> Such degrees are frequently administered within the College of Engineering and require a combination of engineering and business courses. These degrees are popular not only with recent graduates, but with professional engineers seeking to continue their professional development.<sup>27</sup> These programs have similarities to, but are different than, traditional Master of Business Administration (MBA) programs.<sup>28-29</sup> Although these are valuable and important programs, little research has been done on how to effectively recruit engineering graduates into these advanced degrees.

### **3. Graduate Management Degrees at Valparaiso University**

Valparaiso University offers two graduate management degrees, a traditional MBA degree that is open to students of all backgrounds and an MEM degree that is open only to graduates of ABET-accredited undergraduate engineering programs. Although students with an undergraduate minor or major in business can complete the MBA degree in just 38 credits, most engineering graduates will require 52 credits to complete the program.<sup>30</sup> This means that a full-time MBA student with an engineering degree will probably need one-and-a-half to two years to complete the MBA degree, while a part-time student could take as long as five years. These 52 credits are broken into three categories:

1. Foundation Courses: 14 credits of 500-level courses designed to provide students with a similar knowledge base to that possessed by an undergraduate business major.
2. Core Courses: 26 credits of 600-level courses that form the base of the MBA programs. Courses are focused in three broad areas: values-based leadership, analytical decision-making, and strategic leadership.
3. Enhancement Courses: 12 credits of 700-level courses that allow students to customize the program to better fit their own interests and career goals.

The MEM degree can be completed by an engineering graduate in just 36 credits, a number that is very comparable to the 38 credits required by a business graduate to complete the MBA degree.<sup>31</sup> These credits can be broken down as follows:

1. MBA Foundation Courses: 8 credits of required 500-level MBA courses.
2. MBA Core Courses: 10 credits of required 600-level MBA courses.
3. Elective MBA Core Courses: 4 credits of additional 600-level MBA courses.
4. Specialized MEM Courses: 8 credits of courses in project management and project leadership in action specially designed for MEM students.
5. Electives: 4 credits from among remaining MBA courses and/or cross-listed technical courses in the student's engineering discipline.

Although it is apparent that these two degrees have similarities (approximately two-thirds of the MEM courses are selected from among the MBA courses), there are also significant differences. MEM students are required to take fewer of the Foundation courses than their MBA peers, but instead are required to take additional coursework specifically designed to prepare them for managing a team composed primarily of engineers.

The curricula for both degrees are shaped by two overarching areas of emphasis—values-based leadership and environmental stewardship. These two areas of emphasis were selected both to reflect the institutional values of Valparaiso University and to meet clear and present needs of today's business leaders. In an environment in which business leaders are becoming known more for their interest in the economic bottom line than for a balanced interest in economic, environmental, and social benefits to society, we believe that we can prepare graduates who are prepared to fill a role that is too frequently left empty. We strive to prepare our students to think of all constituents of a decision, to focus on all stakeholders rather than just stockholders. As a Christian university, we tend to attract students with a desire to make the world a better place, and we see it as our goal to provide them with the tools necessary to achieve that goal.

Furthermore, both programs thoroughly integrate technology throughout their curricula, building on a student's current technological knowledge to show them how that knowledge can translate to the use of technology in their careers. Students are taught about technological trends, the historical evolution and development of technology, and how they can spot future trends that could be either opportunities or threats for their own businesses and careers.

#### **4. Recruiting Engineering Students to Graduate Management Programs**

Students graduating with an undergraduate degree in engineering offer graduate management programs a unique opportunity. Their combination of technical and mathematical skills ensure their success in the analytical decision-making courses, but their lack of formal training in both values-based and strategic leadership present a challenge to both engineering students and their colleagues with an undergraduate degree in a business discipline. This challenge comes, primarily, in the form of communication. When these communication challenges are coupled with the Valparaiso University graduate management program's focus on group work, many of the students find themselves with an area of potential improvement. In specifically recruiting engineering students to these Graduate Management programs, we are able to offer an opportunity for improvement to both groups of students: those with an undergraduate degree in a business discipline and those with an undergraduate degree in engineering. The graduate management programs assist them in learning how to communicate with one another. Those from the business disciplines learn how to communicate with those who represent the more

technical side of an organization, and those from the engineering disciplines learn how to communicate with those who represent the more managerial side of an organization.

Although team and individual communication are seen as the greatest challenge between students of different disciplines in Graduate Management programs, it is the most effective recruiting tool that can be used for both groups. The Valparaiso University graduate management programs have found particular success in the use of personalized communication in the recruitment of engineering graduates. Engineering graduates, on a general level, can be expected to be more technologically savvy than their business counterparts. Thus the personalized communication for these students often comes in the form of email, instant messaging, and blogging. The MBA Office serves as a single contact point for all students interested in graduate management programs. Prospective students have the ability and are encouraged to contact the Assistant Director of the MBA Program at any point in time, regardless of whether they have specific questions or only need general program information. Today's prospective students come from a world of instant gratification and constant technological communication. The graduate management programs at Valparaiso University work to use the expectations of these prospective students to set a communication standard for their own office.

In addition to round-the-clock availability and instant answers, the graduate management programs at Valparaiso University also use two key areas of curriculum focus as an effective recruiting tool: environmental stewardship and values-based leadership. Leadership skills, in general, are typically why a student would enroll in either an MBA or Master of Engineering Management program, but Valparaiso University has a unique offering in its focus on values-based leadership. This focus is designed to allow students to leave the program with a strong moral compass, helping them to see how their management decisions will impact all of an organization's stakeholders. Environmental stewardship is taught to be a part of these decisions, and those affected by an organization's environmental impact are considered by Valparaiso University to be key stakeholders in the organization. Located in northwest Indiana, where the steel manufacturing industry has had a great environmental impact on local ecology, environmental stewardship is not just a concept, but also a reality that works to serve the entire population. Many prospective students are already a part of this local industry and have a personal desire to see that business has a positive influence on the environment.

## **5. Assessment of Results**

Since its inception in Fall 2002, seven percent of the alumni of Valparaiso University's MBA program had previously earned an undergraduate degree in engineering, and twenty-six percent of Valpo MBA alumni have been employed in an engineering or manufacturing environment. Currently ten percent of Valparaiso University MBA students possess an undergraduate degree in engineering.

The Valparaiso University Master of Engineering Management program will enroll its first class in the Summer of 2006. Enrollment is expected to be approximately sixteen to twenty percent of the total enrollment in graduate management programs.

## 6. Lessons Learned

As stated earlier, the most effective recruiting tool for Valparaiso University's graduate management programs has been a personalized communication plan for each prospective student. While time consuming, this communication plan allows the Assistant Director of the MBA Program to understand the wants and needs of each student looking to enroll in a graduate management program. This assessment then allows Valparaiso University to hone the needs of the program toward the needs of the majority of its students and to continue the personalization throughout each student's planned curriculum. This recruitment strategy has been used since the beginning of the graduate management programs but has been better tailored over time to maximize its effectiveness. Now more than ever, students are encouraged to find a program that best fits their needs. Valparaiso University strives to fit the needs of each student, but recognizes that it cannot meet the needs of all students. For this reason, and because of its personalized communication, Valparaiso University's graduate management programs can discourage those students whose needs will not be met by the programs offered from applying, resulting in higher yield rates overall.

## 7. Conclusions

By developing graduate management degrees that are attractive to engineering graduates, Valparaiso University is helping to develop engineering leaders for the 21<sup>st</sup> century. Whether they select the traditional MBA program or the newly developed MEM program, they will graduate with a combination of skills that will prepare them to bridge the gap between the technical skills of engineering and the marketing, finance, and management skills necessary to lead a successful organization. The programs' success in recruiting engineering graduates can be attributed to three factors: First, by focusing on values-based leadership and environmental stewardship, the programs tend to attract students whose personal philosophy is aligned with that of the university. Second, by demonstrating the close linkage between emerging technology and the corresponding opportunities and threats to business organizations, students can see the linkage between their engineering studies and possible completion of a graduate business degree. Finally, the recruitment efforts for both programs are highly personalized, with a great deal of time and energy going into making personal contacts and establishing long-term relationships that promote honesty and an understanding of how the programs offered by the university can promote the student's long-term professional goals.

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