

Undergraduate Student “Wants” Concerning Their Academic Experience in the UW-Madison College of Engineering

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Introduction

In Sept. 2006 the Polygon student leadership was solicited to provide input on the top three to five changes COE students would like to see in their academic experience in COE. The stated purpose was to feed into planning within COE directed toward guiding significant changes in academic programs. The student leadership was to determine the process by which they garnered ideas but the intent was for the proposed ideas to be representative of undergraduate student thinking.

In September 2009, the Differential Tuition Committee, within Polygon, was asked to determine the relevancy of the previously developed student wants which were described in the original version of this document.

Process

In order to receive a broad spectrum of knowledge and experience, the student leadership questioned attendees of Polygon’s October 11th 2006 General Meeting. Polygon General Meetings are comprised of representatives from recognized student organizations in the College of Engineering. This particular meeting included members from 34 different organizations within the COE¹. Representatives were divided into small discussion groups of four to five students to brainstorm ideas for improvement. Whether these are termed “needs” or “wants” or exactly how to characterize the input is not relevant. This document provides a reasonable student viewpoint on transformations needed to improve and add value to their educational experience. At Polygon’s October 18th Officer Meeting the officers of the council discussed and prioritized the input gathered from the previous week. It should be noted that the 27 officers on the council are very diverse in age and field of study. The outcomes of these meetings were relayed verbally to Assoc Dean Steve Cramer by the Polygon co-chairs (Craig MacKenzie and Nicole Rybeck). Seven high priority wants were identified that were consolidated to five needs as described herein.

In October 2009, a forum open to all COE students was held in response to the request that the Differential Tuition Committee review the 2006 “student wants” document. The purpose of the forum was to discuss the 2006 document and generate ideas to update the document. After considering the opinions presented at the forum, the Differential Tuition Committee revised this document and presented the changes to Polygon for voting. All Polygon student organization representatives in attendance at the October 21, 2009 general meeting² were asked to vote on endorsing the updates made to this “student wants” document, and the endorsement passed.

Student Priorities for Educational Excellence

1. Improve hands-on learning and experiences

Students want more hands-on instruction and experience. Specifically they would like to see extended student shop hours and significantly increased and formalized training on use of shop equipment. But the need can also be met by enhancing experiences where hands-on instruction already exists including laboratories and student competitions. Societal changes along with the dawn of the digital age have shifted the activities of pre-college students away from a historical prevalence of hands-on experiences. Undergraduates in engineering recognize the importance of working with their hands to aid their learning in engineering design and engineering visualization. They believe that the best engineers know how to design, fabricate, and test models and prototypes.

2. The need for relevancy in curriculum and curriculum reform

Students feel that their departmental curricula are products of evolution and departmental politics rather than carefully and strategically targeted sets of courses to best prepare students for engineering careers of tomorrow. Students believe curricula contain unnecessary extra's that are ultimately irrelevant to their career goals, are distractions to their education. While faculty may argue that students do not always know the ultimate relevancy of certain aspects of education, it is incumbent upon faculty to clearly present the relevance of course content. If each department were to develop a degree curriculum from scratch, the resulting curriculum would in some cases look much different than what is currently offered. Departments should continually explore ways to keep their curricula relevant and convey this relevancy to their students

3. Improve supplementary instruction

Improved supplementary instruction can take several forms. The highest priority improvement is to enhance teaching assistant training particularly with regard to teaching skills and English speaking skills for native non-English speakers. Other forms of supplementary instruction mentioned include formal credit supplementary instruction sessions for the large, primary engineering courses. Such courses are now offered for certain math and physics courses. It was acknowledged, however, the need for these supplementary instruction classes is decreased when normal discussion sessions exist and are effectively taught. Finally more discussion sections in higher level courses are needed to lessen the need to find faculty during office hours. The bottom line is that undergraduate students are looking for more effective credit-bearing venues conducted in an informal, safe and non-intimidating environment by which they can interact with teaching staff on course material.

4. Develop a uniform COE policy for awarding technical electives for student org. involvement

Undergraduate involvement in student organizations has evolved dramatically during the last decade with increased involvement in technical activities including design, construction and testing of engineering models for student competitions. In addition, leadership requirements and the sophistication of activity planning has placed new demands on student org leaders. Students feel torn between full participation in these enrichment-volunteer activities and formal class work. Given the skill development now inherent in many student org activities, students would like to see these activities recognized in some form as part of their formal education. This is already occurring in some select instances but not uniformly in COE. Students do not want to give up significant levels of the autonomy and self-control they now enjoy in student org activities by formalizing recognition of activity through technical elective credits.

5. Facilitate formal degree opportunities to broaden education.

Students are seeking ways to broaden and enrich their technical education which will be recognized as part of their academic efforts. Specifically, cross-listing more classes leading to the opportunity to fulfill major requirements and at the same time encourage second majors in nontechnical areas was identified as a high priority need. Potentially expanding or better targeting humanity, social science and other nontechnical credits in degree curricula might accomplish the same. Students are seeking the opportunity to broaden and/or add nontechnical dimensions to an otherwise focused technical education. In particular topics such as ethics and politics were mentioned as examples where students believe that further education would add value to their academic experience and improve their chances professionally. The key point here is that they seek formal recognition for these efforts as opposed to a custom supplementary list of classes appearing on their transcript.

Additional Notes

The Differential Tuition Committee recognized a broad need encompassing all student wants and needs. Overall, students want their engineering experience to leave them with marketable skills. This encompasses all five wants and also includes some services of the College of Engineering that are already well established. This includes career advising services, in particular Engineer Career

Services and the Career Fairs in the Fall and Spring because real world experiences, such as co-ops or internships, allow engineering students to gain valuable insight into what employers seek in full-time professionals. Other opportunities for academic enrichment, including Study abroad and undergraduate research, were also considered very important. These additional opportunities help set students apart from competition when seeking jobs.

Next Steps

The next steps are for the College of Engineering administration to examine these wants in the context of current operations and environment, and to define near-term steps which can be taken to use this feedback in COE plans for educational reform.

¹ Student organizations represented at the Polygon Meeting of Oct. 11th, 2006:

Alpha Omega Epsilon
American Indian Science and Engineering Society
American Institute of Aeronautics and Astronautics
American Institute of Chemical Engineers
American Society of Agricultural Engineers
American Society of Civil Engineers
American Society of Mechanical Engineers
ASAE Quarter Scale Tractor Team
Biomedical Engineering Society
Concrete Canoe of ASCE
Construction Club
Engineering EXPO
Human Powered Vehicle Team
American Nuclear Society
Formula SAE Racing Team
IEEE Robot Team
Institute of Electrical and Electronic Engineers
Institute of Industrial Engineers
International Association for the Exchange of Students for Technical Experience
Kappa Eta Kappa
National Society of Black Engineers – Wisconsin Black Engineering Student Society
Polygon Engineering Student Council
Pi Tau Sigma
SAE Mini-Baja Team
Tau Beta Pi
UW Steel Bridge Team
Wisconsin Engineer Magazine
Society of Hispanic Professional Engineers
Society of Women Engineers
Students Uniting Business and Engineering
Theta Tau
Triangle Fraternity
UW Zero-G
Cap Zero-G

² Student organizations represented at the Polygon Meeting of Oct. 21st, 2009:

Alpha Nu Sigma
Alpha Omega Epsilon
American Institute of Chemical Engineers
American Nuclear Society
American Society of Agricultural and Biological Engineers
American Society of Civil Engineers
American Society of Mechanical Engineers
AMS International: The Material Information Society
Biomedical Engineering Society
Chi Epsilon
Concrete Canoe of ASCE
Emerging Green Builders
Engineering World Health
Engineers Without Borders
Eta Kappa Nu Honor Society
IEEE Robot Team
Institute of Industrial Engineer
Kappa Eta Kappa
National Society of Black Engineers – Wisconsin Black Engineering Student Society
One Laptop per Child
SAE Clean Snowmobile Team
SAE Formula Team
SAE Mini-Baja Team
Tau Beta Pi
Theta Tau
Triangle Fraternity
UW Steel Bridge Team
Wisconsin Engineer Magazine
Women in Nuclear