Creating and Maintaining the Momentum: outreach, recruitment and retention strategies from Nuclear Engineering

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Abstract
Nuclear Engineering is one of the older engineering disciplines experiencing a rebirth. How this rebirth gets articulated outside the discipline will determine, in part, its success. How has NC State's program capitalized on the spotlight to further engage in public education and strategic growth of their undergraduate and graduate programs? What role have students, faculty, staff, alumni and key external partners played in expanding the understanding of the field? We will present results of initiatives that have grown interest, increased enrolment and improved retention. This session examines strategies employed to broaden the perception of nuclear science from K-12 through graduate studies. NC State's Nuclear Engineering program is part of a Department of Energy Nuclear Engineering and Technology pilot project examining the creation and maintenance of this momentum.

Keywords
Nuclear engineering; K12 outreach; undergraduate recruitment; graduate recruitment

Strategic Enrolment Management (SEM) must be articulated at the departmental level for optimum success. In this paper, we will elaborate on SEM and tactics employed by North Carolina State University Department of Nuclear Engineering which has resulted in an average increase enrolment of 28% in the undergraduate program, 43% in the graduate program and a stabilization of student enrolment near targeted 120 and 50 respectively.

First, SEM is described as the cradle to grave approach within higher education. It is the process by which relations are forged, providing all concern with identifiable benefits. Adding to the typical components, we include outreach and recruitment, retention and career services along with graduation and alumni development. It is a comprehensive plan that involves academic and non-academic components. Realistic goal setting and implementation must be continuingly revised and sustained. Some of the obvious goals include stabilizing enrolment, establishing a symbiotic link between academics and SEM strategies, stabilizing finances, optimizing (non)-human resources, enhancing services and quality and maintaining external partnerships (with educators, administrators, industry and government).

It is paramount that we view students as clients in our service oriented, knowledge-based enterprise and we continually conduct internal and external market research—keeping us in touch with the needs of students, industry and the crucial role we play as intermediaries not to mention our role as innovators. In this highly competitive environment in which students and their influencers (e.g. parents, spouses, peers, mentors) forecast the future, we must become more adept at anticipating the unspoken often unformulated queries to better position what we have to offer. A lifelong relationship is being cultivated and as such it is important to emphasize that SEM is not simply an administrative function but incorporates the best learning and teaching environment. It is a balance of academic program development, academic infrastructure development, faculty hiring and development, academic policy development, recruitment and retention policies and procedures, to name a few variables.

A clear understanding of students' needs is paramount. Surveys of program participants and educators must occur for all activities, focus groups must become commonplace and designated contacts within the department must be available for suggestions and complaints with authority to integrate feedback into the overall strategic plan. Another crucial component of SEM requires an analysis of scores (e.g. PSAT, SAT, GRE), industry locations/needs, and of other programs (internally & at other institutions) with a geo-spatial breakdown. To this goal, geographic information systems (GIS) can play an essential part in geo-demographic analysis (illustrations available during presentation).

Expanding on [1]Dolence's phases of SEM, Table 1.1 provides a framework for outreach, identification, recruitment, retention and sustaining.

Decision Variables	SEM Phase & Key Indicators	Student/Influencers Decision	Sample Programs
Awareness & Understanding	*Outreach/Public Education Phase*	Knowledge base of discipline, applications & careers…societal utility	K12 school programs Science fairs Summer programs Educator workshops Speakers bureau
Image, Geography, Admissions Criteria	*Identification Phase* Prospects Pool Respondents Pool Application Requests	Decision to examine university esp. program	High schools programs utilizing student ambassadors Church fairs Transfer student programs Open Houses Career Fairs
Application procedures, financial aid policy, curriculum	*Recruitment Phase* Application, Acceptance and Enrollment Numbers	Decision to attend program	Telecounseling Departmental visits Career projections FR scholarships
Sustained financial aid, student life, curricula	*Retention Phase* FR, SO, JR, SR Dual degrees Masters, Doctoral	Decision to complete undergraduate and graduate studies with department	Scholarships Student groups Dual degrees & minors Co-ops Research programs Professional skills development Faculty reputation Diversified student body Orientation, Prevention & Intervention Programs
Sustained Relationship	*Sustaining Phase* Graduates Alumni	Decision to continue support of department	Career Services Mentorship Networking Reunions

Table 1.1 – Adapted SEM Framework

So, in following these principles of strategic enrolment management, NC State's Department of Nuclear Engineering emerges as a strengthen program as the Nuclear Engineering, Science and Technology (NEST) National Marketing Project commissioned by the Department of Energy and American Nuclear Society concluded.

To contextualize NEST National Marketing Project, we turn now to its goals and objectives. The project goals are to develop a nuclear engineering, technology and health physics marketing campaign pilot effort in two key areas of the country increasing awareness of nuclear engineering, science and technology as a viable college major and career for high school and college students. Subsequently, the pilot project would be expanded into a national marketing effort. The specific objectives are as follows—

1. To raise the awareness of nuclear engineering, technology and health physics among high school teachers nationwide;
2. To share marketing and recruiting best practices with member universities, thus enhancing their outreach capabilities;
3. To coordinate the outreach efforts of key entities (member universities, industry, government, trade associations, etc.) who regularly communicate with constituents such as high school and college students;
4. Develop a pilot project in several key geographic areas around the country to develop marketing efforts to test the concept;
5. Work with four pilot institutions that have nuclear studies to create a best practices or boilerplate marketing plan that can be exported to other nuclear programs nationally. Institutions that are selected for the pilot project included North Carolina State University, University of North Carolina – Wilmington, University of Massachusetts – Lowell and Three Rivers Community College (Connecticut);
6. To increase the diversity of college student population who major in the fields; and,
7. To develop a pilot project that targets middle school students of color.

The key audiences for the campaign included high school science teachers, middle school science teachers, high school guidance counselors, college and university faculty and staff at institutions in the pilot project regions that offered NEST, two-year institutions and key government, industry and association leaders.

To date, research has been conducted nationally with high school math and science teachers, current undergraduate and graduate students in nuclear engineering, technology and health physics students and directors at various engineering schools. During our presentation we will share the highlights of the research findings and implications for NC State's enrolment management strategies and tactics.

Bibliography

[1]Dolence, Michael. "Strategic Enrolment Management" in Claire Swann and Stanley E. Henderson (eds*.) Handbook for the College Admission Profession*. Westport, CT, Greenwood Press, 1998.

Biographical Information

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In Fall 2001, Marshall became the Director of Outreach Programs for the Department of Nuclear Engineering at North Carolina State University, Raleigh, NC. Her research interest lies in non-military applications of nuclear

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