

R3: A Three-Pronged Model for Engineering Student Success

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Abstract - The College of Engineering Student Success Center at Tennessee Tech has developed and implemented a three-pronged model for student success, R³: Recruitment, Retention, and Recognition. The Center works in collaboration with the General and Basic Engineering Department, the Office of Enrollment Management, other campus offices, industry, and alumni, to ensure engineering students at the university have the needed support system to become successful. This workshop will present the main components of the R³ model, including curricular, co-curricular, and extra-curricular activities. The facilitators will discuss “lessons learned” and will present data from the Center’s program evaluation. Moreover, the workshop is designed to be interactive and hands-on, so that attendees will leave with specific ideas for strengthening or developing recruitment, retention, and recognition opportunities on their campuses.

Index Terms - Advising, High impact practices, Professional development, Student success

INTRODUCTION

The College of Engineering Student Success Center opened its doors in 2013 and has since developed and implemented a three-pronged approach to student success, R³: Recruitment, Retention, and Recognition. The model encompasses student supports offered through the Student Success Center. Since the model’s implementation, the center has seen positive impacts on student success, such as an 81% persistence rate from first to second year for first-year freshmen in the center’s advising program [1]. Within the Student Ambassador program, which was started and is managed by the Center, students have gone on to graduate school, joined the College of Engineering’s advisory board, and received job offers five months before graduation. One former ambassador and current alumni just received the national 2017 STEP Ahead Emerging Leader Award. Another support within the model, an outreach program entitled Makers on the Move, offers service learning for engineering students and has reached over 5,000 secondary

school students and community members. Finally, we have seen incremental changes that we hope to build into long-term successes with support programs that will be described in this workshop. As we continue to seek opportunities for students to engage in meaningful activities—curricular, co-curricular, and extra-curricular—that engage and motivate, the R³ model will continue to evolve and develop.

BACKGROUND

The R³ model is based on educational research that argues for a combination of efforts and supports to ensure student success for a broad number and variety of students [2], especially considering that every student will have a unique background and all students will “start from diverse places,” thus needing different supports and finding engagement and motivation in different sources [3]. Furthermore, the supports within the R³ model are based on evidence-based practices, student success and retention research, and engineering education research [4]-[9].

WORKSHOP DESCRIPTION

Workshop facilitators will offer an interactive, hands-on session, using active learning and strategic doing techniques [10]-[11]. This workshop is suited for attendees in different roles, including educators, student success professionals (e.g., advisors), and enrollment management professionals. The workshop’s goal is to offer attendees strategies for recruitment, retention, and recognition in their own universities, recognizing that the strategies we have developed will need to be adapted for each campus’s own “culture and goals” [12]. Specifically, we will ask attendees to identify supports, networks, stakeholders, and resources to help develop recruitment, retention, and recognition strategies to fit their needs and goals.

WORKSHOP FORMAT

Workshop activities will focus on components of the three R’s. The facilitators will provide an overview of the components that work together to form the supports for the

model. Then, individual components, as outlined below, will be discussed. In order to ensure attendee participation and to make the workshop interactive, facilitators will ask participants to engage in dialogue in small and large group format, with some hands-on activities for demonstration. The workshop will be broken into three parts, where the presenters will ask attendees to pair off for think/pair share and break up into small groups to discuss strategies for each of the 3 R's. We will come together at the end of each part for large-group discussion.

I. Recruitment

Recruitment plays a large role in student success and is a priority in the College of Engineering. Heeding the call to increase a diverse, STEM-educated workforce, several initiatives have been developed.

Specifically, the College of Engineering Student Success Center staff and the Interim Chair of the General and Basic Engineering Department utilize the three following activities for recruitment:

- **VIP Visits:** Students interested in attending Tennessee Tech have the option of scheduling a visit through Tech's Admissions Office for an on-campus tour and information sessions. When students indicate an interest in engineering, they are sent to faculty and staff in the College of Engineering for their information session.
- **Outreach:** The Clay N. Hixson Student Success Center has developed an outreach program, Makers on the Move. This program utilizes a maker-space approach to outreach, where near peers—engineering students—facilitate STEM lessons on a mobile lab (the STEMmobile) at regional schools and events.
- **Scholarships:** In an effort to recruit competitively, the College of Engineering offers scholarships.

In addition to the above, the team will discuss a strategic plan for recruiting underrepresented students into the College of Engineering. This plan involves partnerships with the Office of Multicultural Affairs, the College of Engineering Advisory Board members, and the Admissions Office.

II. Retention

Retention is the primary focus of the College of Engineering and the Student Success Center, which offer multiple programs that meet the criteria of High Impact Practices (HIP) or that follow best practices for student success [6], [9]. The facilitators will discuss the following:

- **Pre-registration:** Students coming to Tennessee Tech attend a Student Orientation, Advisement, & Registration (SOAR) session in the summer prior to their first term. At that time, they meet their advisor and register for classes. The sessions serve

as a proactive strategy for preparing students for the fall, ensuring a level of confidence before classes start, and increasing the likelihood that the student will attend in the fall.

- **First-year connections course:** The first-year connections course offers incoming engineering freshmen the opportunity to develop their college readiness skills, such as time management and study skills, in a seminar with other first-year engineering students. Moreover, the first-year connections course employs a peer mentor to work with the students, offering advice and mentorship.
- **Advising:** Five professional advisors work with the College of Engineering to advise freshmen and sophomore students in five out of six engineering departments. The advisors use “intrusive” advising techniques to lower attrition.
- **Peer Tutoring:** The Student Success Center manages engineering peer tutors, separate from the generalized tutoring services on campus, to assist with engineering courses.
- **Supplemental Instruction:** The Student Success Center employs undergraduate students to serve as supplemental instructors for courses in engineering with high DFW rates. These supplemental instructors, trained in active learning techniques, attend class and hold study sessions.
- **Service learning:** The aforementioned outreach program, Makers on the Move, serves as a recruitment program, but it also serves as a retention program, as it offers undergraduate engineering students the opportunity to participate in service learning, which is a documented high impact practice.
- **Professional Development:** Two professional development opportunities offered by the Center will be discussed:
 - **Engineering Student Ambassadors,** where students are selected as leaders in the College and are offered networking and training opportunities.
 - **Renaissance Engineer Professional Development Series,** where speakers from the community, who are often industry partners and/or alumni, offer hour-long seminars on various topics.

Overall, these supports are geared towards keeping students on track towards their degree, offering help when needed, providing students with a sense of belonging in the College of Engineering, and preparing students to be leaders in the workforce.

III. Recognition

A third priority for the College of Engineering and Success Center is to recognize students for their accomplishments,

both for the traditional academic accomplishments such as high grades and pursuit of research, as well as for non-technical skills and efforts, such as leadership and service. We will discuss the following opportunities we have developed to recognize the students in the College of Engineering:

- **Scholarship Awards Banquet:** The Clay N. Hixson Student Success Center has collaborated with the Development Office for several years to hold a scholarship awards banquet. This banquet recognizes students for their achievement in acquiring a scholarship; it also brings together donors and their scholarship recipients for a networking opportunity.
- **Eminence Awards Banquet:** The students in the College of Engineering are recognized for various achievements at the end of the academic year with an awards banquet. Some of the categories of recognition include research, scholarship, service, and leadership.
- **Student Ambassador Program:** The Student Ambassador program serves as a retention program, but it also overlaps in this area of recognition. The Ambassadors are recognized for their communication and leadership skills at the Eminence Awards Banquet, and they are offered opportunities such as monthly professional development.
- **Networking and professional development opportunities:** One way that students in the College of Engineering are recognized is through funding for professional development, such as travel to conferences when students are presenting, or assistance with competition team travel. Moreover, students who engage in service and outreach are recognized for their assistance through company/factory tours.

In addition to offering workshop attendees the opportunity to brainstorm and trouble shoot ways that they can integrate recruitment, retention, and recognition strategies on their own campuses, we will also share the ongoing formative assessment and program evaluation findings for the various programs. As a part of this section, we will discuss “lessons learned,” as we have adjusted our supports to address feedback and to meet ever-changing needs.

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