

ETD Mini-Grant

Final Report

**A National Survey of Engineering Technology
Programs**

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Purpose of the Study

According to the Department of Education's Integrated Postsecondary Education Data System, 414 public, private, or for-profit academic institutions that awarded at least one 4-year Engineering Technology (ET) degree in 2014 (NAE, 2016). Within this group, 38 awarded 100 or more degrees that year. These institutions offer wide selection of programs in various engineering disciplines. Focusing on hands-on learning, ET programs and our graduates are making transformative changes to the industry and in our communities. As ET programs thrive around the country, we need to focus on program-wide continuous improvement to prepare our students for evolving challenges in engineering and technology. One way to drive continuous improvement is by comparing a program with its peer institutions' program or that of a national average. Many programs such as Physics and Chemistry conduct national surveys that provide program-specific national benchmark data in areas such as curriculum, undergraduate and graduate program, faculty, minorities, degree awarded, graduate employments, etc. These benchmark data permit individual department to see where they fit on the national landscape. Unfortunately, ET programs do not have a national benchmark dataset. ASEE college profiles include some data such as enrollment, faculty and research, degree awarded etc.; however, such data have not been aggregated to portray a national picture of ET programs (ASEE, 2017). If we don't know the current status of the ET programs, we may not know how to progress and measure progress of ET programs as a whole. The objective of this study is to conduct a national survey of 4-year ET programs in the USA.

Method

This study was initiated in March of 2019 and it engaged the whole ET community. For this study a systematic process was used to design and conduct the survey. Authors first communicated with the ET community to discern ET data needs. A short data needs email was sent out through ETD Listserv and requests were solicited to be included in the survey. The survey's primary focus was on following five major areas:

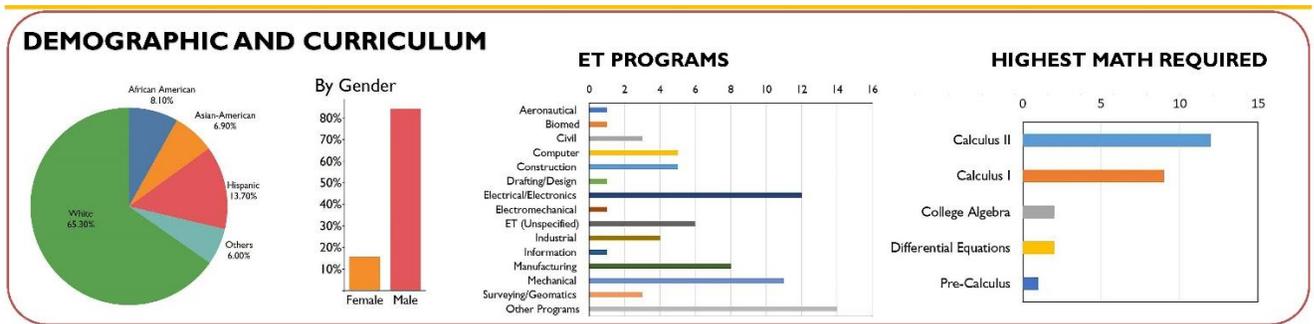
1. Curriculum – questions focused on ET programs taught, total number of students in the program, average class size
2. Students – questions focused on demographics: gender, age, race etc., faculty-to-student ratio
3. Faculty – questions focused on number of faculty, gender, tenure/non-tenure, course load, typical faculty commitment for teaching, research, and service
4. Diversity – questions focused on percent female student, percent minority students, percent female faculty, percent minority faculty
5. Degree and Employment – questions focused on degree awarded and who hires ET students

Data Collection

The survey questionnaire was created in survey platform REDCap, which is a secured tool to conducting surveys at authors' institution. Concurrently, authors worked on an Institutional Review Board (IRB) proposal and submitted it for approval. Once IRB approval was received, the survey was sent out to ET program chairs and coordinators around the country. The survey remained open for several months. Several reminders were sent requesting chairs and coordinators to complete the survey. A total of 38 responses were received with a response rate of 24%. However, 26 responses were complete and used for data analysis.

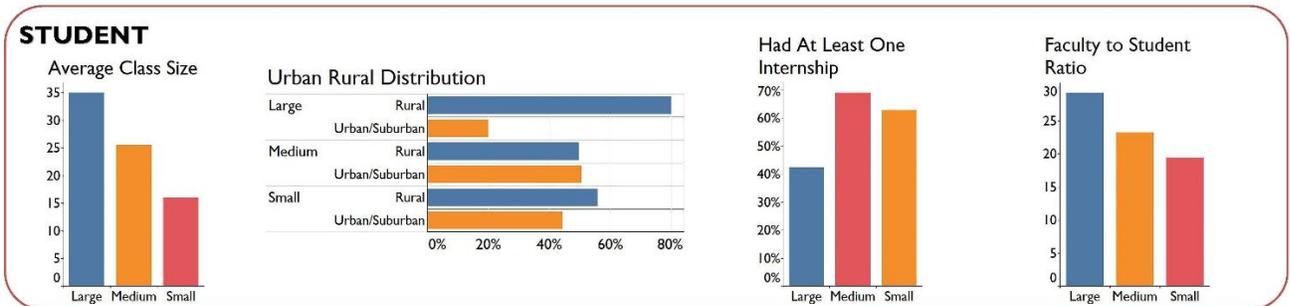
Results

Key findings in each of the five focus areas are summarized below.



Key Findings:

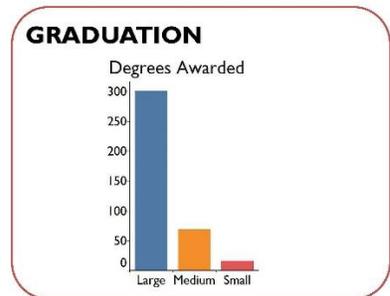
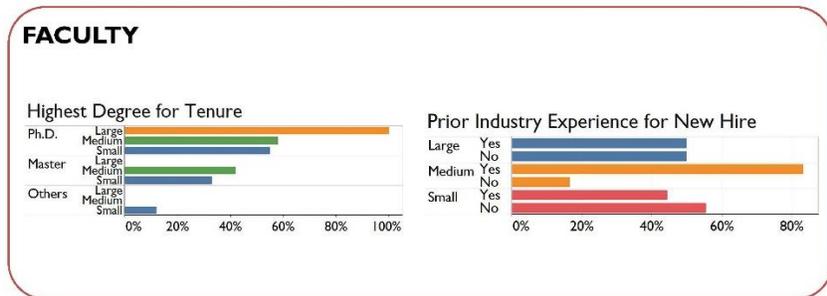
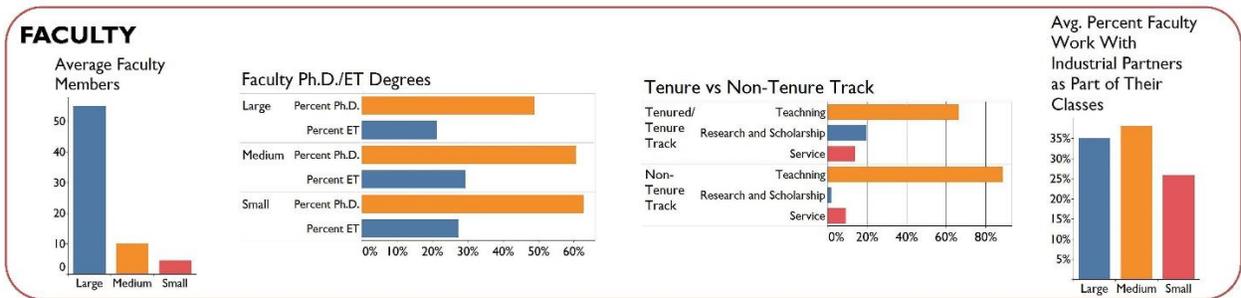
- Hispanic students doubled last 10 years
- Female enrollment is low, about 15%
- Mechanical, Electrical and Computer are popular ET programs
- Calculus I and II are common highest math requirement for ET programs



ET programs were categorized as large, medium and small using the equation: $Output = 0.5 * Enrollment + 0.5 * Graduation$. If output > 400 → Large; If $400 > output \geq 100$ → Medium; if output < 100 → Small.

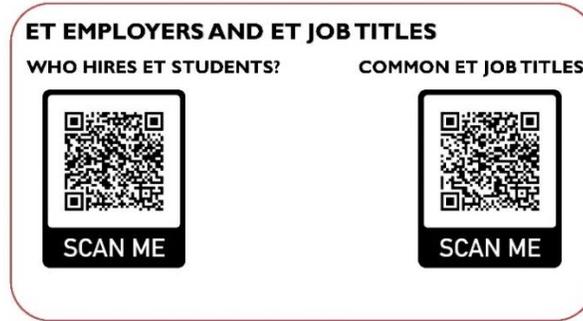
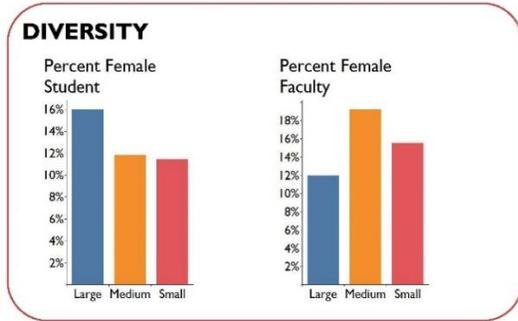
Key Findings:

1.
 - Class size and faculty to student ratio are high for large ET programs
2.
 - More ET students are from rural than urban areas
3.
 - Students at medium size ET programs are doing more internships than other two groups



Key Findings:

1.
 - About 50% ET faculty members have PhD and about 25% faculty members have ET degrees
2.
 - Tenured/Tenure-Track responsibilities
 - Teaching: 70%, Research: 20% and Service: 10%
 - Non-Tenure Track:
 - Teaching: 90%, Research: 0% and Service: 10%
3.
 - About 32% faculty members are engaged with industry partners. Industry experience is valued for new hire
4.
 - Ph.D. and master's are highest degree required for tenure



Key Findings:

1.
 - Female student enrollment is higher in larger ET programs than other two categories, but still low
2.
 - About 15% faculty members are female
3.
 - ET students are hired by national and international companies and in most cases hired as an engineer

Conclusions

The ET national survey has gathered key benchmark data for ET programs on five key areas: curriculum, student, faculty, diversity, graduation and employment. Individual program can use these data to know where they stand compare to the national average. ET leadership can use these information to devise strategies to bring ET programs to the next level.

Acknowledgment

The authors thank ASEE Engineering Technology Division Min-Grant program for funding this project.

References

ASEE. (2017). *Engineering College Profiles & Statistics Book*. <https://www.asee.org/papers-and-publications/publications/college-profiles>

NAE. (2016). *Engineering Technology Education in the United States*. Washington, DC: The National Academies Press. doi:10.17226/23402-

Fund Utilization

Item	Description	Amount
Travel to CIEC 2020	Travel to Orland to attend CIEC 2020 conference and to present a poster based on the study	\$800
Lab Software	Purchase of five 1 year license of Nvivo 12 @ \$800 (education version) to conduct qualitative study	\$4,000
	Total	\$4,800

