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Balancing Breadth and Depth: An Analysis of General Engineering Programs

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Balancing Breadth and Depth: An Analysis of General Engineering Programs

Abstract

One of the goals of the Multidisciplinary Engineering Division of ASEE has been to promote engineering programs that are multidisciplinary, interdisciplinary, or otherwise categorized as general engineering. This is based on the conviction that graduating engineers would benefit from more breadth than might be available within traditional disciplinary programs. Non-disciplinary programs are currently accredited by ABET under the Criteria: Engineering, General Engineering, Engineering Physics, and Engineering Science. These programs are not evaluated using discipline-specific program criteria in addition to the general criteria. ASEE has served as the lead society for evaluating these programs since 2006.

This project involves an examination of the landscape of accredited engineering programs that are described as general or inter/multi-disciplinary. Periodic analysis and comparison of trends in the number of programs that focus on providing breadth relative to disciplinary program depth helps to identify patterns within engineering education. General programs exist for a variety of reasons. Some prioritize flexibility for students, others the integration of one or more topics (e.g. mechatronics), and others the development of truly interdisciplinary skill sets in students. Some institutions might also use a general program to incubate curricula for later transition to traditional disciplinary programs. Previous papers have classified general programs as having "philosophical", "flexible," or "instrumental" purposes.

This paper reviews general engineering programs currently accredited by ABET and categorizes them according to the ABET definition (Engineering, General Engineering, Engineering Physics, or Engineering Science) as well by program characteristics and purposes. It presents a historical trajectory of numbers of institutions and programs in the general program category. The paper concludes with a reflection on the relative success in shifting the balance of breadth and depth in engineering program offerings over the last 20 years.

Introduction

The Multidisciplinary Engineering Division of ASEE (MULTI) was formed in 2003 as a venue for promoting engineering programs and courses that are multidisciplinary, interdisciplinary, general, and/or integrative in nature [1]. This was based on the conviction that to be equipped for professional work in the 21st century, engineering students require curricula that provide breadth beyond what might be available within traditional disciplinary engineering programs [2], [3]. As the knowledge bases related to engineering analysis and design within traditional disciplines continue to grow, while the amount of space available in a 4-year bachelor's degree program remains the same, engineering programs are challenged to balance the desire for disciplinary depth with the desire for interdisciplinary breadth. Breadth in technical as well as non-technical subjects can be pursued within the traditional disciplinary engineering curriculum (e.g. by incorporating humanities courses, including students from multiple disciplines in capstone courses, or offering team-taught courses). However, in these programs, depth in a technical

discipline is often prioritized at the expense of interdisciplinarity. For this reason, the MULTI division is committed to advocating for general engineering programs and "representing the interests of multidisciplinary engineering on a national level with regard to accreditation" [4].

Non-disciplinary engineering programs are currently accredited by the EAC of ABET under the label of "Engineering, General Engineering, Engineering Physics, and Engineering Science" programs. Disciplinary or "named" engineering programs are subject to discipline-specific program criteria in addition to ABET's general criteria. Non-disciplinary programs are subject only to the general criteria. ASEE has served as the lead society for evaluating these programs since 2006. The Accreditation Activities Committee (AAC) of ASEE manages the assignment and training of ABET program evaluators for this category of engineering programs (along with general engineering technology programs).

This paper will present an examination of the landscape of accredited engineering programs that are described as general or inter/multi-disciplinary. Periodic analysis and comparison of trends in the number of programs that focus on providing breadth relative to disciplinary depth helps to identify patterns within engineering education, particularly over the last several decades. A historical trajectory of the numbers of institutions and programs in the general program category is presented for this purpose.

General engineering programs exist for a variety of reasons. Some prioritize flexibility for students, others the integration of one or more disciplinary topics (e.g. mechatronics), and others the development of truly interdisciplinary skill sets in students. Some institutions might also use a general program to incubate curricula for later transition to traditional disciplinary programs. Previous papers have classified general programs as having "philosophical", "flexible," or "instrumental" purposes [5]. This paper categorizes current general programs by purpose as well as institutional and program characteristics. The paper concludes with a reflection on the attributes of general programs and the relative success in shifting the balance of breadth and depth in engineering program offerings over the last 30 years.

Non-Disciplinary Programs Over Time

In the ABET database of accredited engineering programs [6], ASEE is identified as the lead society for all programs that do not fall under the control of discipline-specific lead societies. Included under the auspices of ASEE are programs whose disciplinary identity is 1) Engineering, General Engineering, Engineering Physics, and Engineering Science, 2) General Criteria Only (EAC), and 3) Mechatronics and Robotics Engineering. The first category includes engineering programs that are at least somewhat intentionally general/flexible. For clarity, this category will be referred to going forward as "non-disciplinary" engineering programs. The latter two categories include programs that are subject to the general criteria only because a suitable named program criteria does not yet exist. These are emerging or specialty disciplines (e.g. energy engineering and mechatronics engineering) that are motivated by the desire to increase depth in an area of engineering that spans multiple disciplines, rather than to provide students with more breadth more generally. For this reason, programs in the latter two categories were excluded from the non-disciplinary program analysis of this paper.

Program data for consideration in this project were captured in a spreadsheet downloaded from the publicly available ABET accredited program database on November 14, 2024 with search criteria specified as: Commission = EAC, Lead Society = ASEE, Discipline = All Disciplines, Degree Level = Bachelor Degree, and Country = United States. The choice of "All Disciplines" results in a list that includes all three of the disciplinary categories described above. Both current programs and those that have been accredited in the past were included in this spreadsheet. Sorting by the "Criteria" column (which ABET uses as a synonym for discipline) allowed for the elimination of specialty programs identified as General Criteria Only (EAC) (9 programs) and Mechatronics and Robotics Engineering (3 programs). It should be noted that as of the 2024-25 accreditation cycle, Mechatronics and Robotics Engineering programs have established their own discipline-specific program criteria under the leadership of ASME and IEEE. It is unclear why the 3 Mechatronics and Robotics Engineering programs referred to above still remain in the list of ASEE-managed programs (with the assumption of evaluation under the general criteria only).

Within the non-disciplinary category, program names can be chosen that align with different aspects of the ABET discipline definition. Some programs were clearly identifiable as "engineering science" or "engineering physics." Of the remaining programs, some used "engineering" as the sole identifier, while others used engineering along with a "general" signifier. Other naming conventions were sorted into the following bins: 1) names that included some reference to "interdisciplinary", 2) names that included some reference to "multidisciplinary", 3) names that included some reference to "integrated", and 4) names that included some other reference that didn't match or was more specific than any of the previous categories. 179 distinct programs were counted, offered at 152 institutions at some point since 1936. The pie chart in Figure 1 shows the number and percentage of non-disciplinary programs that fall within each of these sub-categories based on program names.

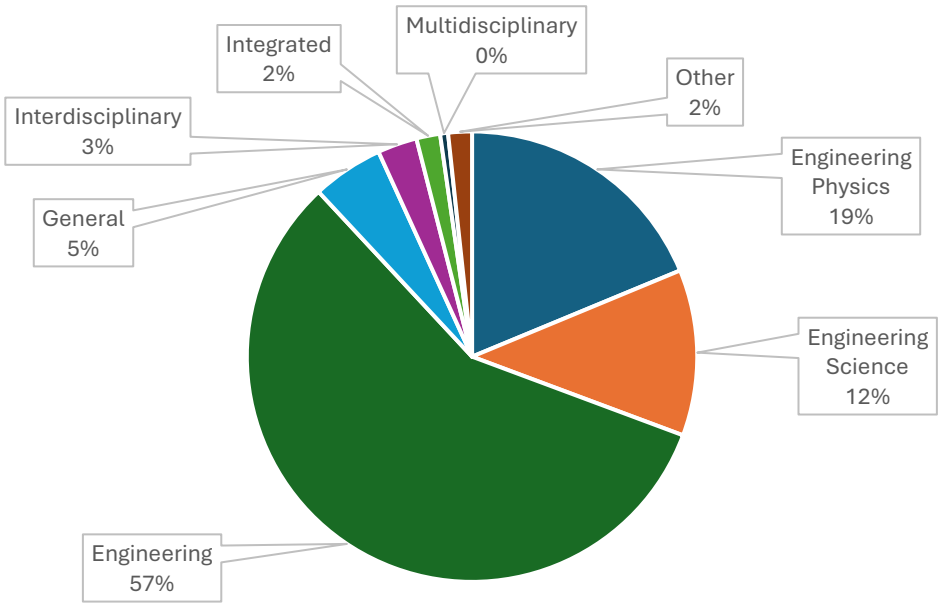

Figure 1. Classification of Non-Disciplinary Programs by Program Name

Perhaps unsurprisingly, the majority of programs (57%) self-identify as "engineering" (the least restrictive option). Where some additional specificity is added to the "engineering" designation, it is most often "engineering physics" (19%) or "engineering science" (12%). A relatively small number of programs self-identify as deliberately non-disciplinary, indicated with general, interdisciplinary, multidisciplinary, or integrated called out in the program name (10%).

Previous papers [7] – [10] have reported on the growth over time in the number of non-disciplinary engineering programs, the most recent being presented at the 2021 ASEE annual conference (including data up to 2018) [11]. Based on data gathered in 2024, it is clear that the number of non-disciplinary programs has recently increased significantly, as shown in Figure 2. In this bar-graph, the total number of non-disciplinary programs is indicated by the total height of the bar, with programs in specific subcategories indicated by different patterns within the bars. It appears that the number of engineering physics and engineering science programs have remained relatively stable since 1990 (with a handful being initiated and a handful being ended or transitioned during that time period), while the number of engineering/general and "other" engineering programs has grown significantly. The "other" engineering programs category here includes those designated as interdisciplinary, multidisciplinary, or integrated, as well as by other additional qualifiers. As of 2024, there are a total of 149 non-disciplinary programs being offered.

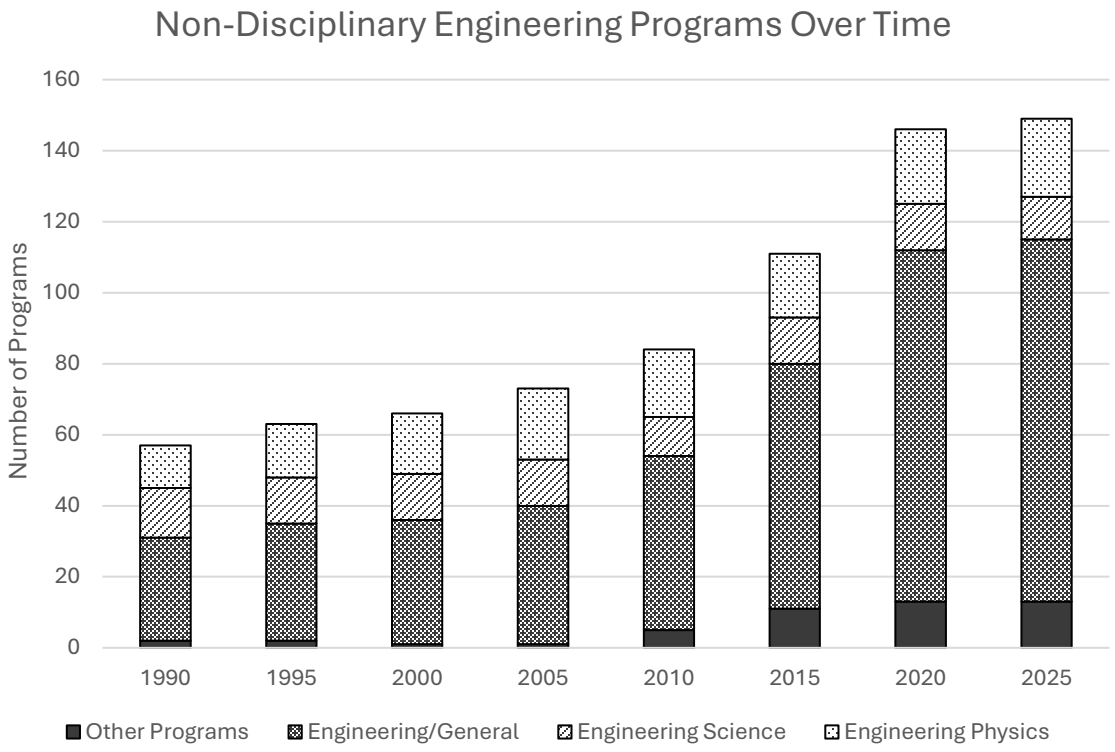

Figure 2. History of Non-Disciplinary Engineering Programs

Categorization by Number of Programs at Institution

Given the variety of uses for non-disciplinary programs, it is interesting to consider whether non-disciplinary programs are primarily offered as the sole option at a given institution or whether they are offered in addition to one or more disciplinary options. The pie charts below summarize the number of current non-disciplinary programs relative to the number of additional engineering programs available at the same institution. Figure 3a includes engineering science and engineering physics programs, while Figure 3b includes non-disciplinary programs outside of those designations (engineering, general, or other). It can be observed that engineering science/physics programs (N=34) are more likely to be offered as an addition to other engineering offerings (59%) than engineering/general (N=102) programs (30%). Also, it can be observed that general programs are more likely to be the only program at an institution (56%) compared to engineering science/physics programs (23%).

Of non-disciplinary engineering programs that have been initiated since 2010 as the only program at an institution, only 1 is identified as engineering science, 4 are identified as engineering physics, and 34 are identified as engineering/general. In that same time frame, 2 engineering science/physics programs were transitioned to engineering/general programs. For institutions planning to start offering an accredited engineering degree, the best choice would appear to be engineering (e.g. Bachelor of Engineering or Bachelor of Science in Engineering). It is likely that engineering is perceived as more marketable to prospective families and employers than engineering science or engineering physics. Engineering science or engineering physics degrees appear to be most often maintained at institutions with multiple degree options where those programs have a longer history.

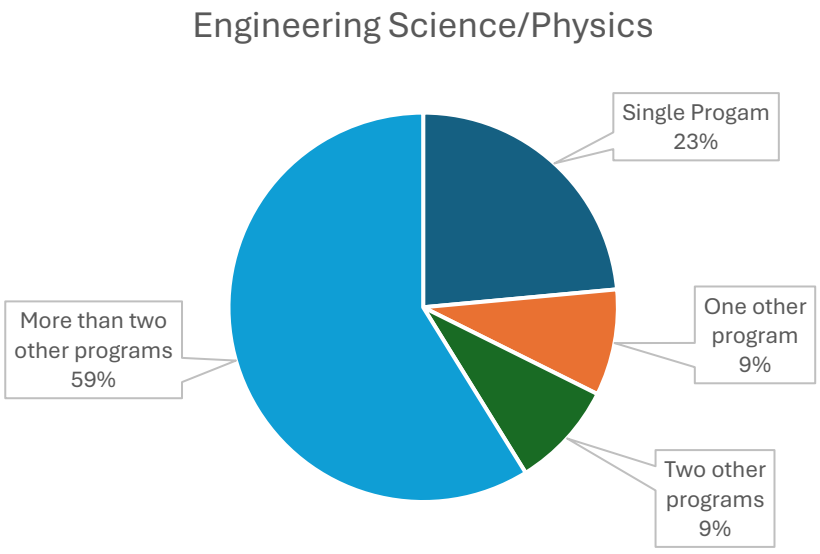

Figure 3a. Classification of Engineering Science and Engineering Physics Programs by Number of Additional Programs at the Institution

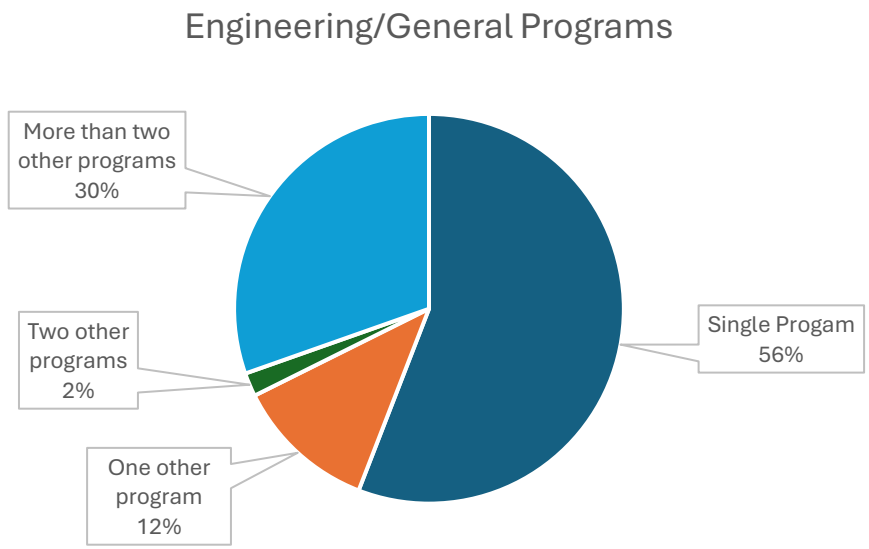

Figure 3b. Classification of Engineering Programs (General/Other) by Number of Additional Programs at the Institution

Categorization by Institution Type

Because the nomenclature related to general engineering programs can be confusing, Figure 4 is provided as a visual illustration of the terminology related to the categorizations in this paper. In particular, the term "non-disciplinary" is used here to describe programs where the ABET criteria is "Engineering, General Engineering, Engineering Science, and Engineering Physics" while in later analyses, "General Engineering" is used to refer to programs within that category whose names include engineering, general, inter/multi-disciplinary, or other (as opposed to engineering science and engineering physics). Previous figures include programs that have been accredited over time, including those that may no longer exist. Figures starting in this section include only currently accredited programs.

<table>
<tr><td></td><td colspan="8">EAC-Accredited Programs whose Lead Society is ASEE</td></tr>
<tr><td>Criteria</td><td colspan="6">Engineering, General Engineering, Engineering Science, and Engineering Physics
(Non-Disciplinary)
Figures 1 and 2</td><td>General Criteria Only (EAC)</td><td>Mech and Robotics</td></tr>
<tr><td>Program Name</td><td colspan="2">Engineering</td><td>General Engineering</td><td>Int/Multi</td><td>Other</td><td>Engineering Science</td><td colspan="2">Engineering Physics</td></tr>
<tr><td>Status</td><td>Historic</td><td colspan="3">Current Engr/Gen/Int/Multi/Other
(General Engineering)
Figure 3b, Figure 5</td><td colspan="2">Current Engineering Science and Physics
Figure 3a</td><td>Hist</td></tr>
<tr><td>Age</td><td></td><td>Older</td><td colspan="5">Recent (initiated after 2015)
Figure 6</td></tr>
</table>

Figure 4. Terminology, Categorization Clarification, and Figures

General engineering programs are currently being offered at 102 distinct institutions. To get a sense of the range and type of those institutions, the Carnegie classification characteristics of those institutions were identified and summarized in Figure 5. Data was found using the program lookup feature on the Carnegie website [12]. Classifications were based on 2019-2020 data (the most recent data available). Below is a summary of the Carnegie classification definitions referred to in this analysis. Additional details can be found on the Carnegie website.

- Type of Control
    - Private Not-For-Profit
    - Public
    - Private For-Profit
- Institution Type
    - Doctoral Universities (awarded >20 research/scholarship doctoral degrees and/or >30 professional practice doctoral degrees in multiple programs)
        - Very High Research Activity (R1)
        - High Research Activity (R2)
        - Doctoral/Professional (D/PU)
    - Master's Colleges and Universities (awarded >50 master's and <20 doctoral degrees per year)
        - Larger Programs (M1), >200 degrees per year
        - Medium Programs (M2), from 100-199 degrees per year
        - Small Programs (M3), < 100 degrees per year
    - Baccalaureate Colleges (awarded <50 master's and <20 doctoral degrees per year)
    - Special Focus Institutions
- Undergraduate Instructional Program (proportion of majors by degrees awarded)
    - Arts and Sciences Focus (>80% of degrees in arts and sciences)
    - Arts and Sciences plus Professions (60 – 79% of degrees in arts and sciences)
    - Balanced Arts and Sciences and Professions (41 – 59% in each)
    - Professions plus some Arts and Sciences (60 – 79% of degrees in professional fields)
    - Professional Focus (>80% of degrees in professional fields)
- Enrollment Profile
    - Exclusively Undergraduate
    - Very High Undergraduate (<10% graduate student FTE)
    - High Undergraduate (from 10 – 24% graduate student FTE)
    - Majority Undergraduate (from 25 – 49% graduate student FTE)
    - Majority Graduate (>50% graduate FTE)
    - Exclusively Graduate
- Undergraduate Profile Selectivity
    - Inclusive (open admissions or admitting ~80% or greater of applicants and/or requiring lower test scores)
    - Selective

    - More Selective (admitting ~ 55% or less of applicants and/or requiring high test scores)
- Institution Size
    - Very small (Student FTE <1000)
    - Small (Student FTE from 1000 – 2999)
    - Medium (Student FTE from 3000 – 9999)
    - Large (Student FTE >10,000)

Pie chart 5a displays the types of control for the institutions offering general engineering programs. It can be observed that approximately 2 out of 3 general engineering programs are offered at institutions that are classified as private not-for-profit. There are currently no general engineering programs being offered at for-profit institutions.

Pie chart 5b shows the categorization of institutions by institution type. Institutions in all categories are represented among those who offer general engineering programs, with the highest percentage identified as master's institutions. While it might seem logical to assume that general engineering programs would be most often located at schools with a focus only on undergraduate degrees, institutions who have a significant graduate education component (those focused on providing doctoral, professional, and masters-level degrees) offer 84% of general engineering programs. Baccalaureate institutions comprise only 14% of the total. This seems counterintuitive to the information presented in Figure 3b, where it is shown that only 44% of institutions with general engineering programs also offer other disciplinary programs (which might be the case more often for doctoral/masters institutions). These two sets of data can be aligned by recognizing that many institutions who offer a single engineering program are classified as master's degree granting institutions even though all of the master's degree offerings (typically a relatively small number) are in areas outside of engineering or STEM.

In pie chart 5c, institutions are categorized by the range of instructional programs offered. This captures the relative percentage of majors within the institution that can be classified as "arts and sciences" (typically associated with traditional liberal arts subjects) as opposed to "professional programs" (typically focused on preparation for a particular career). Institutions with a purely arts/sciences focus do not typically offer engineering (only 2% of the general programs are offered at institutions of this type). 61% of the institutions that offer general engineering offer a majority of majors that are classified as professional preparation. 37% offer a program portfolio that is balanced or majority arts/sciences.

The enrollment profile of these institutions is summarized in pie chart 5d. A sizable majority (77%) have student populations that qualify as exclusively, very high, or high undergraduate. The selectivity of institutions offering general engineering degrees (pie chart 5e) spans all three levels, with the majority concentrated in the "selective" category (47%). It is reassuring to see that 32% of the institutions are classified as "inclusive," an indication that a wide range of students have access to the breadth of a general engineering degree. Finally, pie chart 5f presents the relative share of institutions of different sizes that offer general engineering programs. It would be interesting to contrast this distribution with that of institutions who offer disciplinary engineering programs, but that analysis was beyond the scope of this project.

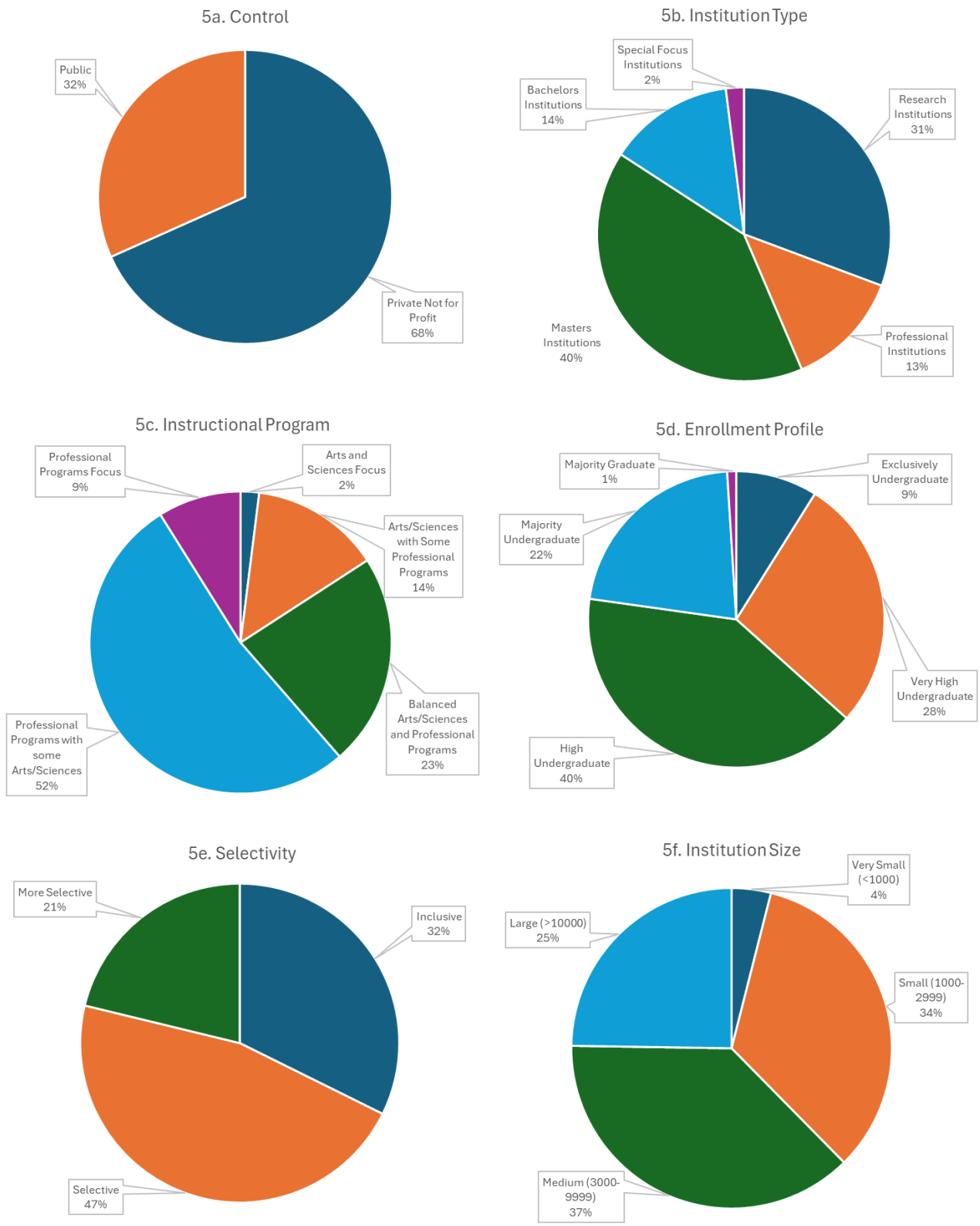

Figure 5. Carnegie Classification of Institutions Currently Offering General Engineering

Categorization by Program Motivation

General engineering programs are offered for a variety of reasons. Some prioritize flexibility for students, others the integration of one or more particular disciplines in a focused way that could be thought of as a new discipline (e.g. mechatronics), and others the development of a truly interdisciplinary, integrated approach to engineering problem-solving and design. Some institutions might also use a general program as a placeholder or interim option for later transition into one or more traditional disciplinary programs.

Motivation Category Descriptions. Newberry and Farison [5] have identified three primary reasons that institutions might choose to offer non-disciplinary programs: 1) instrumental purposes: initiation/maintenance of engineering at institutions with fewer resources and/or incubation towards later disciplinary programs, 2) philosophical purposes: alignment with institutional mission (e.g. to prioritize liberal arts) and/or commitment to providing additional breadth beyond what is expected in traditional disciplines, or 3) flexibility purposes: providing an option for students (typically in addition to traditional disciplinary programs) to customize curriculum towards individual student interests or career goals or to facilitate cross-disciplinary experiences. Instrumental programs tend to provide multiple tracks, options, emphases, or concentrations within the major that may relatively closely replicate similar disciplinary programs. Philosophical programs are more likely to offer a single degree program that is intentionally interdisciplinary at least to some extent, either combining multiple disciplines into a broad foundation, or allowing students to custom-design their engineering experience by choosing electives that support interdisciplinary preparation for a career path of their choice. Flexible programs are typically offered as an alternative path to depth-focused disciplinary programs and tend to have characteristics that match those of philosophical programs.

Recent Program Classification. Judging which programs fit into which categories can be problematic without inside knowledge. However, there are program features and public descriptions that can be used to help determine typology. Due to the complexity of the analysis, the choice for this project was to focus on programs that have been initiated relatively recently: in particular, programs that first received ABET accreditation within the last 10 years (after 2015) were reviewed. This includes a total of 40 programs out of the 102 general engineering programs that are currently accredited. It should be noted that this total of 40 recently established programs exceeds the total of 34 programs that were in existence and examined by Newberry and Farison in 2003 [5]. A list of these programs, along with information about institution characteristics, can be found in Table 1 at the end of this paper. Explanations of abbreviations used are included on the second page of the table.

A key factor in making determinations of motivational category is the presence of multiple tracks (also described as concentrations, emphases, or options) within a given general engineering program. This information is provided in the table. Programs with multiple tracks are more likely to be classified as instrumental in motivation, under the assumption that the tracks are designed to replicate disciplinary degree requirements and that the tracks are not accredited as disciplinary programs due primarily to a lack of resources or other considerations (e.g. a public institution in a state system in which additional disciplinary engineering degree offerings could not be approved). Each of the programs was placed into a motivational category based on the program

name, presence of other EAC-accredited programs offered, the existence of pre-established tracks within the general engineering major, and an examination of program descriptions provided on university websites or in catalogs. Programs that used words and phrases such as "broad-based," "liberal arts-focused," "well-rounded," "multidisciplinary perspective," "interdisciplinary," or "integrated" were more likely to be categorized as philosophical (as opposed to instrumental). All programs at institutions where additional EAC-accredited programs are also offered were classified as flexible. This raised a difficulty with the classification system, in that some of the flexible programs appeared to satisfy philosophical concerns (to provide a broad experience) as opposed to merely maintaining a space for taking courses from multiple disciplines or combining courses towards depth at the intersection of one or more disciplines. Figure 6 summarizes the results of the analysis.

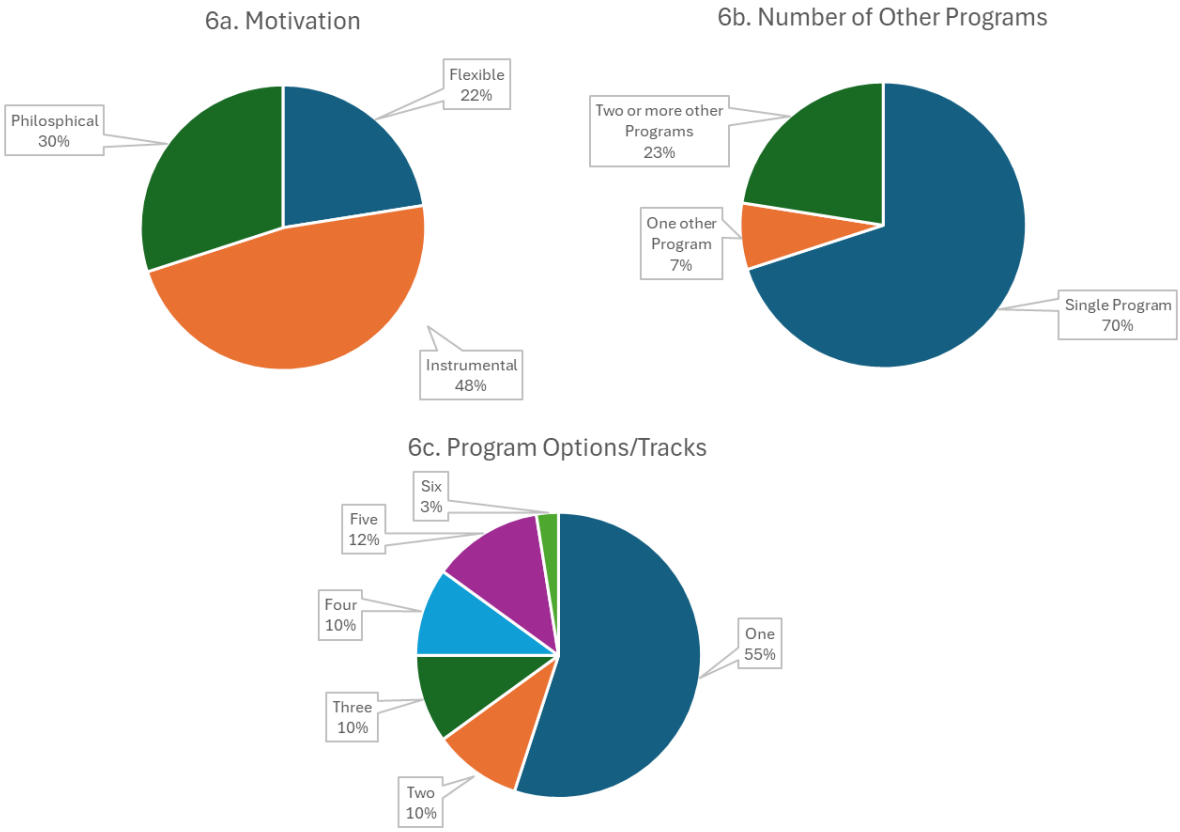

Figure 6. Classification of General Programs Established since 2015

History of Instrumental Programs. The "instrumental" designation includes some general programs that may eventually be transitioned into disciplinary programs at the same institution, given time and opportunity. To determine the number of historical programs who might have aligned with this purpose, a review was performed of programs that were identified as instrumental in the 2003 analysis [5]. To identify possible transitions, the history of accredited

programs at each of these 20 institutions was evaluated. It was found that only 4 of those institutions (20%) appear to have replaced a general program with multiple disciplinary programs. Half of the institutions still offer a single general program. Each of these could be primarily motivated by philosophical rather than instrumental considerations, given their longevity. Or some of them could still be considered instrumental, to the extent that they might be offered at small institutions where it is still not practical to offer multiple programs, or they may be offered at regional public institutions where there may be state system limitations on how many institutions can offer disciplinary programs. Five institutions have added additional disciplinary programs since 2003 but still retain the general option (so these would now be included in the flexible category). At one institution, a general program has been retained alongside a single disciplinary program, which indicates that the general option could still be instrumental in nature. In a separate analysis of all general engineering programs that had been accredited historically (in 1990), but had since been discontinued (19 programs), it was determined that 12 (63%) appear to have been transitioned to one or more disciplinary programs.

Conclusions and Future Research

The goal of this investigation has been to get a better understanding of the engineering education landscape, with a focus on non-disciplinary engineering programs. It is encouraging to observe the increase in the number of non-disciplinary programs that has taken place over time, particularly within the last 10 years. As can be seen from the data about these programs, there is a high degree of diversity among programs and institution types. However, it is not clear that the proliferation of general programs has resulted in more degree programs that provide significantly increased breadth or interdisciplinarity, given the small number of programs that can be classified as philosophical rather than instrumental or flexible. The number of students graduating from these types of programs remains vanishingly small compared to the number of students graduating from disciplinary programs that typically emphasize depth over breadth. The 2023 edition of the *ASEE Engineering & Engineering Technology by the Numbers* report [13] identifies 1,888 bachelor's degrees awarded in the "Engineering (General)" category, out of a total of 134,090 total engineering degrees awarded (1.4%). It would be interesting to investigate the trends in numbers of students graduating from non-disciplinary programs over time in comparison to those graduating from more traditional disciplinary programs.

Non-disciplinary programs represent excellent opportunities for incorporating more breadth into engineering education, as well as providing pragmatic advantages for institutions that currently offer them or are contemplating the addition of a new engineering educational pathway. These programs can also allow for innovations in curriculum structure and pedagogy that might be more difficult to implement within traditional disciplinary degrees. For example, the Integrated Engineering program offered at the Iron Range and Twin Cities campuses of Minnesota State University is an innovative degree program that not only focuses on breadth, interdisciplinarity, and experiential learning, but is also aimed at meeting the needs of non-traditional and diverse learners. Students also benefit from the flexibility and customizability that is allowed by many non-disciplinary programs.

However, anecdotal evidence points to a perception among some prospective students and engineering employers, as well as within the academy more broadly, that non-disciplinary

programs might be less rigorous and less likely to provide enough depth in technical content. The increase in the number of general engineering programs offered over time may suggest that these negative perceptions are being dispelled. The MULTI division is well-positioned to get the word out about the value of a non-disciplinary degree and how additional breadth in technical and non-technical areas might align well with employer expectations. Surveys of employers and prospective students about their attitudes toward general degrees could aid in tracking the levels of positive/negative perceptions.

Ultimately, the value of general programs that prioritize breadth over depth should be established based on student outcomes. It would be helpful to have a comparison of outcome attainment for students from non-disciplinary programs as opposed to disciplinary programs, but obtaining this information would likely be a complex and challenging undertaking. One of the questions that occasionally comes up in the Accreditation Activities Committee (AAC) of ASEE is whether or not program criteria are needed for the programs it supervises (in addition to the general criteria) that would encourage a more deliberate focus on holistic education. Since flexible and instrumental programs (which make up the majority of non-disciplinary programs) might not be willing or able to meet requirements above and beyond the general criteria, the disadvantages of adding program criteria to promote breadth in non-disciplinary programs would seem to outweigh the benefits.

Table 1. Characteristics of Recently Initiated General Engineering Programs

Recently Initiated Engineering/General Engineering Programs (since 2016)							Carnegie Classification					
	School Name	Program Name	Purpose	Number of other EAC programs	Year First Accredited	Tracks, Emphases, or Options	Control	Institution Type	Instructional Program	Enrollment Profile	Selectivity	Size
1	Azusa Pacific University	Engineering	Inst	0	2018	4: Mech, Elec, Comp, or Syst	PNFP	R2	P+AS	MAJU	INC	MD
2	Baldwin Wallace University	Engineering	Phil	0	2021	1: general	PNFP	M1	BASP	HU	SEL	MD
3	Boise State University	Engineering	Flex	5	2020	1: general	PUB	R2	P+AS	HU	SEL	LG
4	Bryan College	Engineering	Inst	0	2021	6: Engr Mgmt, Mech, Comp, Civ, Chem, Biol	PNFP	M3	P+AS	HU	INC	VS
5	Campbell University	Engineering	Inst	0	2019	4: Chem/Pharm, Elec, Electromech Syst, Mech	PNFP	D/PU	P+AS	MAJU	INC	MD
6	Central College	Engineering	Phil	0	2018	1: intersection of mech/elec	PNFP	BAS	AS+P	EXU	INC	SM
7	College of the Ozarks	Engineering	Phil	0	2019	1: core engr (concentrations require extra CH)	PNFP	BDF	P+AS	EXU	SEL	SM
8	Cornell College	Engineering	Phil	0	2017	1: general	PNFP	BAS	AS+P	VHU	SEL	SM
9	Doane University	Engineering	Inst	0	2019	5: Elec, Env, Mech, Civ, Gen	PNFP	M1	P+AS	MAJU	SEL	SM
10	East Tennessee State University	Engineering	Phil	0	2019	1: general	PUB	R2	P+AS	HU	SEL	LG
11	Eastern Mennonite University	Engineering	Inst	0	2019	2: mech and comp	PNFP	M2	P+AS	HU	SEL	SM
12	Elon University	Engineering	Inst	0	2019	5: gen, biomed, comp, env, mech	PNFP	D/PU	P+AS	HU	MSEL	MD
13	Embry-Riddle Aero Univ - Worldwide	Engineering	Phil	0	2019	1: integrates aero, mech, elec, mechatronics	PNFP	M1	PF	MAJU	??	MD
14	Endicott College	Engineering	Inst	0	2021	5: gen, comp, energy/eng, mech, robotics	PNFP	M1	P+AS	HU	SEL	MD
15	Florida International University	Interdisciplinary Engineering	Flex	6	2020	1: general	PUB	R1	BASP	HU	SEL	LG
16	Grand Canyon University	Engineering	Flex	3	2019	1: project management	PNFP	D/PU	PF	MAJU	??	LG
17	Greenville University	Engineering	Phil	0	2019	1: integrates mech/elec	PNFP	M3	P+AS	VHU	INC	VS
18	Hanover College	Engineering	Phil	0	2019	1: multidisciplinary	PNFP	BAS	AS+P	EXU	SEL	SM
19	Henderson State University	Engineering	Inst	0	2018	3: gen, elec, mech	PUB	M2	P+AS	VHU	INC	SM
20	Indiana State University	Engineering	Inst	0	2019	3: civ, ind, mech	PUB	D/PU	P+AS	HU	INC	MD
21	Methodist University	Engineering	Phil	0	2019	1: ind and systems	PNFP	M3	P+AS	HU	INC	SM
22	Mount Vernon Nazarene University	Engineering	Inst	0	2017	3: mech, elec, comp	PNFP	M2	P+AS	HU	INC	SM
23	Norwich University	Engineering	Flex	3	2021	1: general	PNFP	M1	P+AS	HU	SEL	MD
24	Nova Southeastern University	Engineering	Inst	0	2019	2: biomed, ind and systems	PNFP	R2	BASP	MAJG	SEL	LG
25	Randolph-Macon College	Engineering	Inst	0	2022	1: general	PNFP	BAS	AS+P	EXU	SEL	SM
26	Rose-Hulman Institute of Technology	Engineering Design	Flex	9	2020	1: design	PNFP	SF	P+AS	VHU	MSEL	SM
27	Saint Francis University	Engineering - General	Inst	1	2019	5: aero, comp modeling, innov, mech, rob	PNFP	M1	P+AS	HU	SEL	SM
28	Saint Vincent College	Engineering	Inst	0	2021	4: chem, env, materials, mech	PNFP	BAS	AS+P	VHU	INC	SM
29	Southern Arkansas University	Engineering	Phil	0	2018	1: general	PUB	M1	P+AS	HU	INC	MD
30	Tennessee Technological University	Engineering	Flex	5	2019	1: general	PUB	R2	P+AS	VHU	SEL	MD
31	Texas A&M University	Interdisciplinary Engineering	Flex	15	2018	1: general	PUB	R1	BASP	HU	MSEL	LG
32	University of Mary Hardin-Baylor	Engineering	Inst	0	2019	2: elec, mech	PNFP	D/PU	P+AS	HU	INC	MD
33	University of Mississippi	Engineering	Flex	7	2021	1: general	PUB	R1	P+AS	HU	SEL	LG
34	University of Northwestern	Engineering	Inst	0	2019	4: civ, elec, mech, gen	PNFP	M3	P+AS	VHU	INC	SM
35	University of San Diego	Engineering	Flex	3	2019	5: gen, biomed, software, sustain, eng and law	PNFP	R2	BASP	MAJU	SEL	MD
36	Viterbo University	Engineering	Phil	0	2021	1: general	PNFP	M1	PF	MAJU	SEL	SM
37	Wake Forest University	Engineering	Phil	0	2020	1: general	PNFP	R2	AS+P	MAJU	MSEL	MD
38	Western Carolina University	Engineering	Inst	1	2016	3: mech, robotics and auto, civ	PUB	D/PU	P+AS	HU	SEL	LG
39	Whitworth University	Engineering	Inst	0	2020	1: general	PNFP	M2	AS+P	VHU	SEL	SM
40	Winona State University	General Engineering	Inst	1	2021	2: elec, industrial statistics	PUB	M2	P+AS	VHU	INC	MD

Table 1 (continued)

Abbreviations				
Purpose			Undergraduate Instructional Program	
Inst	Instrumental (vehicle for disciplinary options)		ASF	Arts & Sciences focus
Flex	Flexible (broad alternative to disciplinary programs)		AS+P	Arts & Sciences plus Professions
Phil	Philosophical (intentionally broad)		BASP	Balanced Arts & Sciences/Professions
			P+AS	Professions plus Arts & Sciences
Control			PF	Professions focus
PNFP	Private not-for-profit		Enrollment Profile	
PUB	Public			
			EXU	Exclusively Undergraduate Four-Year
Institution Type			VHU	Very High Undergraduate
			HU	High Undergraduate
R1	Doctoral Universities - Very high research activity		MAJU	Majority Undergraduate
R2	Doctoral Universities - High research activity		EXG	Exclusively Graduate
D/PU	Doctoral/Professional Universities			
M1	Master's Colleges and Universities - Larger programs		Undergraduate Profile	
M2	Master's Colleges and Universities - Medium programs			
M3	Master's Colleges and Universities - Small programs		INC	Inclusive
BAS	Baccalaureate Colleges - Arts & Sciences Focus		SEL	Selective
BDF	Baccalaureate Colleges - Diverse Fields		MSEL	More selective
B/A	Baccalaureate/Associates's Colleges			
SPF	Special Focus Institutions		Size	
			VS	Very small (FTE<1000)
			SM	Small (FTE from 1000-2999)
			MD	Medium (FTE from 3000 - 9999)
			LG	Large (FTE >10000)

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