A Cross-Institutional Study of Engineering Education Faculty Profiles

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Abstract

This study considered the institutions of higher education that offer engineering education programs across the U.S. and the faculty profiles, as made available on their department and institutional websites. For this purpose, an online content analysis was conducted that considered eighteen (18) out of the twenty-four (24) U.S. institutions offering degree programs (M.S. and/or Ph.D.) and/or certifications in engineering education. The faculty information was found in the 'Faculty', 'Directory', 'The People' or 'People' section of the website, and their academic profiles were compiled. The focus of the study was to identify their terminal academic degree of the faculty members, their current tenure or non-tenure status, and their professional title within engineering education departments at U.S. institutions. It also identified which engineering disciplinary expertise among faculty was more prevalent in engineering education departments. This exploratory study has significant implications as it paints an initial landscape into the workforce composition of faculty members in the discipline of engineering education that could serve as a potential guide for engineering graduate students, postdocs, faculty, departments, or colleges who may want to include engineering education careers in their futures.

Keywords: engineering education, faculty, disciplines, academic backgrounds

Introduction

According to Froyd & Lohmann [1], engineering education became a scientific inquiry in the U.S. between 1890 to 1910 with the goal to innovate curricular design as well as pedagogical practices. Engineering education as a discipline and research field aims to assist students by a) providing evidence-based practices to instructors on engineering practices [2], b) ways to enhance students' learning experiences [3]; [4], c) incorporating effective teaching methodologies for students [5]; [6], d) integrating technology in the classroom [7]; [8]; [9], e) refining assessment methods [10], and f) enhancing curricula to meet the needs of students and implementing strategies to better equip the next generation of engineers [7]; [11]; [12]. Understanding engineering education from a historical perspective, it is integral to understanding the emerging trends, existing research areas, and current landscape of this field.

The research areas in engineering education are categorized into five broad areas of engineering: epistemologies, learning mechanisms, learning systems, diversity and inclusiveness, and assessment [13]. The pioneering institutions in engineering education included Purdue University, Virginia Tech, Ohio State University, Utah State University and Clemson University [14]. Currently, there are M.S., Ph.D., and graduate certification programs offered in U.S. institutions in the discipline of engineering education. There are about seven (07) engineering education centers working in the U.S. institutions as advertised on the institutional websites as of December 10, 2022 [15]. According to Aslam and Villanueva Alarcón [15], engineering epistemologies and engineering diversity and inclusiveness are two underexplored research areas in engineering education research after exploring the advertised research areas on the respective U.S. institutional websites.

Since engineering education is still considered a new discipline [16], [17], the composition of faculty expertise across the departments of engineering education in the U.S. may vary. This diversity in faculty may result in different research approaches, mentoring styles, and practices for engineering education. As the discipline of engineering education and its research practices continue to evolve, it will be important to document how expertise in engineering education faculty changes over time.

Motivation

This study expands on an earlier exploratory work [15] where a content analysis was used to investigate the landscape of select engineering education research centers. From those findings, it was evident that the seven centers [15] of engineering education primarily were composed of engineering faculty with minimal training in educational research and practice. The authors wondered how the composition of faculty expertise may vary if these were housed in established engineering education departments within the colleges of engineering.

The aim of this exploratory study was to expand upon prior work [15] to investigate the academic backgrounds of the faculty members within engineering education departments housed in colleges of engineering. We also studied the distribution of tenured & tenure-track, and non-tenure track faculty members in these departments.

Methodology

This study was based on a pragmatist research paradigm where information was put together to quantifiably provide a snapshot of the current landscape in engineering education departments. The researchers carried a philosophical assumption that understanding said expertise may help shed light into the epistemic beliefs in engineering education [18], which situates what expertise and practices may look like in these departments.

Many researchers working in the engineering education field may be aware of the discipline, however, faculty outside these circles may be unaware of the discipline of engineering education. As an effort to raise more awareness on the impact of engineering education research and practice, the authors' positionality stemmed from their reflections of their entry points into the field of engineering education. This introspection prompted the authors to explore and share as much information about the discipline as was available at the time of this work.

Research Approach & Design

This exploratory study thoroughly investigated the current state of engineering education as a discipline in the U.S. via an online content analysis of institutional or departmental websites to find information about the faculty members working in the respective institutions. The sections and pages of 'Faculty', 'Our People', 'People' or 'Directory' on the websites were used to collect information of faculty members. This information included their official job title, their terminal degrees, and the major of the terminal degree as advertised on the website. The names of the faculty members were not collected in this process to maintain their anonymity. The available information was put together to run the analysis. The data for this study was collected

on December 10, 2022. Any information updated on the websites after this date has not been included in this paper.

Research Questions

The primary research questions of this study are:

1) What was the distribution of tenured, tenure-track and non-tenure-track faculty members within the field of engineering education in U.S. institutions whose college of engineering houses an engineering education department?
2) What were the educational backgrounds of faculty members working in the field of engineering education in U.S. institutions whose college of engineering houses an engineering education department?

Research Findings

There are twenty-four (24) U.S. institutions that are offering engineering education PhD and/or M.S. degree and/or certifications programs. These institutions are listed in Table 1.

Table 1. List of U.S. institutions offering engineering education programs as of December 10, 2022

Serial No.	University		Serial No.	University
1	Purdue University		13	The University of Texas at Austin
2	Virginia Tech University		14	University of Cincinnati
3	Clemson University		15	University of Georgia
4	The Ohio State University		16	Rowan University
5	Utah State University		17	University of Texas at El Paso
6	University of Texas A&M		18	Mississippi State University
7	Florida International University		19	Louisiana Tech University
8	University of Buffalo		20	University of Nevada
9	University of Florida		21	New Jersey Institute of Technology
10	University of Michigan		22	University of St. Thomas
11	Arizona State University		23	University of Tennessee, Knoxville
12	University of Nebraska-Lincoln		24	Tufts University

Out of these twenty-four (24) universities listed in Table 1, six (06) universities including Louisiana Tech University, University of Nevada, New Jersey Institute of Technology, University of St. Thomas, University of Tennessee, Knoxville, and Tufts University do not include information about the faculty members on their institutional websites. It is also important to mention that the University of Kentucky includes engineering education as a research group under Stanley and Karen Pigman College of Engineering; however, there is no indication of whether the institution offer a certificate, M.S., or a Ph.D. program. Additionally, there is limited information about the faculty members serving within the research group. This presumably could be because they are full-time faculty in another department other than engineering education.

Hence, to ensure the accuracy of data, these institutions have not been accounted for in this study. About nine (50%) of these eighteen (18) universities are land-grant universities. Note that no other institution type (private universities) was included at this time although it is in the future purview of the authors.

Some of the universities include engineering education as certificate programs and/or M.S. programs and/or Ph.D. programs. A few universities include the degrees as interdisciplinary degrees, while some offer degrees in engineering with a focus in engineering education or engineering education systems & design. One institute offers an advanced graduate certificate in engineering pedagogies and practices. The programs offered by these institutions are shown in Table 2. In this table, (Y) represents that the program is offered in that institution.

Table 2. Summary of programs in engineering education in U.S. institutions as of December 10, 2022

Serial No.	University	M.S.	Ph.D.	Certificate
1	Purdue University	Y	Y	Y
2	Virginia Tech University		Y	Y
3	Clemson University		Y	Y
4	The Ohio State University		Y	
5	Utah State University	Y	Y	
6	University of Texas A&M*	Y	Y	
7	Florida International University		Y	
8	University of Buffalo **	Y	Y	Y
9	University of Florida		Y	Y
10	University of Michigan	Y	Y	Y
11	Arizona State University***		Y	
12	The University of Texas at Austin			Y
13	University of Cincinnati	Y	Y	
14	University of Georgia****		Y	
15	Rowan University****	Y	Y	
16	University of Texas at El Paso****	Y		
17	Mississippi State University****		Y	

* *Both M.S. & Ph.D. degrees are offered in interdisciplinary engineering*
** *The certificate offered has a focus in engineering pedagogies and practices*
*** *Ph.D. degree is offered in engineering education systems and design (EESD)*
**** *M.S. and/or Ph.D. degree is offered in engineering with a focus in engineering education*

The University of Nebraska-Lincoln offers faculty teaching fellows' program and graduate student teaching fellows' program and hence have not been included in the above table.

The research findings for this study have been divided into two sections:

A) Distribution of tenured, tenure-track and non-tenure-track faculty; these faculty were aggregated as tenured and/or tenure-track or non-tenure-track since the authors were unaware if these faculty were undergoing tenure and/or promotion at the time of study.

B) Educational background of faculty members

A) Distribution of tenured, tenure-track and non-tenure-track faculty

The information about faculty members collected from the institutional websites consisted of about 375 faculty members in thirteen (13) departments of engineering education, one (01) institute, one (01) center, and three (03) schools housed within sixteen (15) colleges and three (03) schools of engineering in eighteen (18) U.S. institutions. These include tenured & tenure-track, and non-tenure track faculty members. The distribution of these faculty members can be seen in Table 3.

Table 3. Breakdown of tenured, tenure-track and non-tenure-track faculty as of December 10, 2022

Serial No	University	Tenured & Tenure-track	Non-Tenure Track	Total
1	Purdue University	29	10	39
2	Virginia Tech University	40	14	54
3	Clemson University	16	7	23
4	The Ohio State University	8	19	27
5	Utah State University	9	1	10
6	University of Texas A&M	6	19	25
7	Florida International University	7	5	12
8	University of Buffalo, The State University of New York	8	16	24
9	University of Florida	6	24	30
10	University of Michigan	8	21	29
11	Arizona State University	10	0	10
12	University of Nebraska – Lincoln	0	6	6
13	The University of Texas at Austin	1	2	3
14	University of Cincinnati	11	6	17
15	University of Georgia	17	13	30
16	Rowan University	7	9	16
17	University of Texas at El Paso	4	0	4
18	Mississippi State University	14	2	16
Total		**201**	**174**	**375**

The numbers reflected in the above table have been included for the institutions that provided faculty information on their website with a clear indication of their current position. These positions or job titles have been used to categorize them into tenured & tenure-track, and non-tenure-track faculty members. The tenured & tenure-track faculty members included professors or full professors, distinguished professors, distinguished professor emeritus, professor emeritus,

associate professors, assistant professors, and an executive director. The non-tenure track faculty positions included joint faculty, affiliate faculty, lecturers, senior lecturer, instructional faculty, adjunct faculty, visiting faculty, directors, and clinical faculty members.

The total number of professors or full professors working in the discipline of engineering education is 78 (21%). The overall number of assistant professors working in the discipline of engineering education is 63 (17%) whereas the number of associate professors is 60 (16%). Similarly, the non-tenure track faculty count is 174 (46%). As shown in Table 3, the overall highest number of faculty members in the discipline of engineering education are in Virginia Tech University (54, 14%) followed by Purdue University (39, 10%).

The following diagram (Figure 1) gives a visual representation of the six universities with the highest number of faculty members in engineering education disciplines.

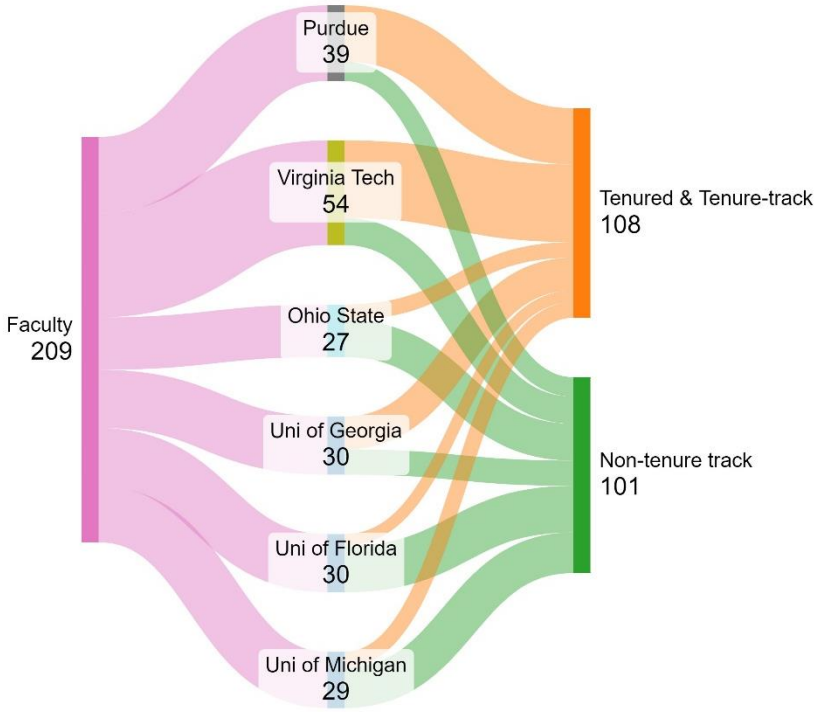

Figure 1. Distribution of tenured, tenure-track and non-tenure track positions in engineering education departments in six U.S. institutions as of December 10, 2022, per information on their institutional websites

Out of total number of tenured and tenure-track faculty members (201, 100%), the highest number of tenured and tenure-track faculty members are working in Purdue (29, 14%) and Virgina Tech University (40, 20%). Similarly, the largest number of non-tenure track faculty members are at the University of Florida (24, 14%) out of the total (174, 100%). Out of the total faculty members (39, 100%) at Purdue University, the assistant and associate professors constitute about 30.8% (12) while the professors, full professors, professor emeritus, distinguished professors, and distinguished professor emeritus comprise a total of 43.6% (17) and the remaining 25.6% (10) fall under the non-tenure track positions.

Similarly, out of the total faculty members (54) at Virginia Tech, the assistant and associate professors make a total of 43% (23) while the professors, full professors, professor emeritus, distinguished professors, and distinguished professor emeritus contribute about 31% (17) and the remaining 26% (14) fell under the non-tenure track faculty category. The non-tenure tracks instructional (16), affiliate faculty (7) and senior director (01) at the University of Florida contribute about 80% to the overall faculty (30) working at the same institution at the time of data collection for this study.

B) Educational background of faculty members

The educational background of faculty members (375) in eighteen (18) U.S. institutions has been collated individually by looking at the faculty profiles to find and record the terminal degrees on their profiles. These terminal degrees include an M.S., Ph.D., or a Post-doc degree of faculty members who were identified in their respective engineering education department, at the time of this study, within the college of engineering. According to the Oak Ridge Institute, a post-doc is referred to as a training-focused academic research position undertaken by people after completion of a doctoral degree [19]. All the terminal degrees of faculty members have been put together in Table 4, Table 5, and Table 6.

These tables reflect the terminal degree of the faculty members. The faculty members with M.S. as their terminal degrees on their profiles have been put together in Table 4. Some of the faculty members hold a bachelors (hons.) degree and have been included in the M.S. category. Similarly, the faculty members with Ph.D. and Post-doc as their terminal degrees on their profiles have been put together in Table 5 and Table 6 respectively.

Table 4. Faculty members with M.S. terminal degree as of December 10, 2022

Disciplinary Focus of Terminal M.S. Degree	**Count**
Agronomy	1
Computer Science	5
Curriculum and Instructional Technology	1
Engineering	9
English Literature/English/American studies/TESOL	4
Environmental Economics	1
Information Systems and Education	1
Journalism	1
Learning Design & Technology	1
MBA International Business	1
Science and Mathematics	1
Teaching Engineering in Higher Education (Certificate)	1
Other*	2
Unknown**	9
Total	**38**

** Other includes two faculty with B.S. in Mechanical Engineering & Engineering Technology*
*** Unknown indicates that information about the field in which degree was pursued was not available on the institutional websites*

Table 5. Faculty members with Ph.D. terminal degree as of December 10, 2022

Disciplinary Focus of Terminal Ph.D. Degree	Count
Chemistry	5
Curriculum and Instruction	7
Ecology and Evolutionary Biology	1
Economics	1
Education/Science Education/Leadership, and Policy Studies	26
Educational Psychology	8
Engineering	105
Engineering Education	57
English/Rhetoric, Composition, and Literacy Studies	8
Geology	1
Heritage Studies/ Historic Languages, Cultures, and Literatures	2
Mathematics and Computation	1
Physics/Applied Physics/Geophysics/Physical Electronics/Computational Mechanics	7
Technology/Instructional Technology	2
Unknown*	92
Total	**323**

** Unknown indicates that information about the field in which degree was pursued was not available on the website*

Table 6. Faculty members with Post-doc [19] as terminal degree as of December 10, 2022

Disciplinary Focus of Terminal Post-doc Degree	Count
Analytical Cell Biology	1
Bioengineering and Biosciences	2
Biomedical Engineering	1
Biosystems and Agricultural Engineering	1
Ecological Designs and Analytical Chemistry	1
Engineering Education	1
Geological Sciences	1
Theoretical Physics	2
Unknown*	4
Total	**14**

** Unknown indicates that information about the field in which degree was pursued was not available on the institutional websites*

In Table 4 and Table 5, for the sake of simplicity, all engineering degrees including electrical and computer engineering, mechanical engineering, civil engineering, biomedical engineering, systems engineering, industrial engineering, aeronautical and astronautical engineering, materials science and engineering, petroleum engineering, interdisciplinary engineering, sustainable engineering, biosystems/biological and agricultural engineering, bioengineering, mining and mineral engineering, environmental engineering, chemical engineering, nuclear engineering,

ceramic engineering, and computer engineering have been categorized as ‘engineering’. We recognize that this is a simplistic way of collapsing categories and that each discipline carries its own set of practices and cultures. However, this aggregation allowed us to paint a landscape for the reader to understand. The detailed breakdown of Table 4 and Table 5 are reflected in Appendix 1 and 2 respectively.

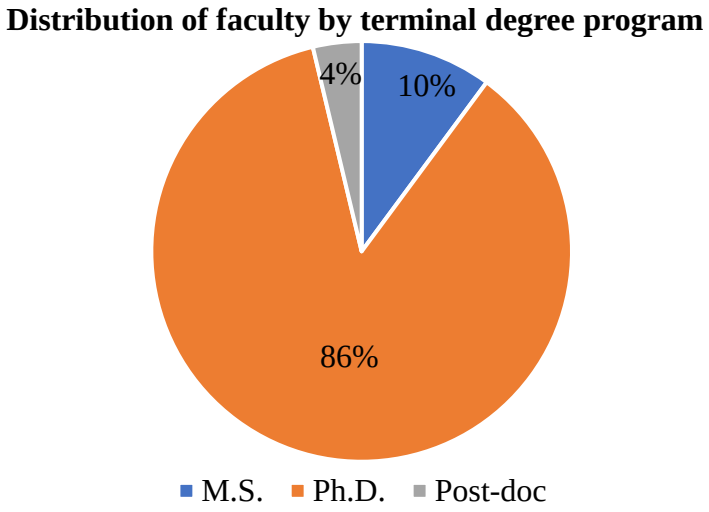

Figure 2. Overall distribution of faculty by programs working in the discipline of engineering education in colleges/schools of engineering as of December 2022

As shown in the above figure, the total number of faculty members working in the discipline of engineering education with a M.S., Ph.D., or a Post-doc in engineering and other disciplines are 38 (10%), 323 (86%) and 14 (4%) respectively. The representation of disciplines collated in six main categories for faculty members with a M.S., Ph.D., and/or a post-doc degree is shown in Figure 3.

Out of the total faculty members with M.S. degree (38, 10%) serving in the discipline of engineering education, most of them have their terminal degrees in engineering (9, 24%) followed by computer science (5, 13%) and English literature/English/American studies/TESOL (4, 11%). Specifically, within engineering, faculty with M.S. in electrical and computer engineering were prevalent (3, 8%) as shown in Appendix 1.

The faculty members with Ph.D. as their terminal degree (323, 86%) working in an engineering education discipline have their academic background in engineering (33%) followed by engineering education (18%), education/science education, education, leadership, and policy studies (8%), educational psychology (2%), and English/rhetoric, composition, and literacy studies (2%). Specifically, within engineering, faculty with Ph.D. in mechanical engineering were prevalent (7%) as shown in Appendix 2.

Lastly, in the limited number of post-docs (14, 4%) serving in the discipline of engineering education, their academic background was in theoretical physics, bioengineering and biosciences, engineering education, geological sciences, analytical cell biology, biomedical

engineering, biosystems and agricultural engineering, and ecological designs and analytical chemistry.

The following diagram (Figure 3) showed the distribution of their terminal degrees by subject area or major for all faculty members. Terminal degrees can include an M.S., Ph.D., or a Post-doc degree of faculty members who were identified in their respective engineering education department, at the time of this study, within the college of engineering. These terminal degrees were categorized into six categories.

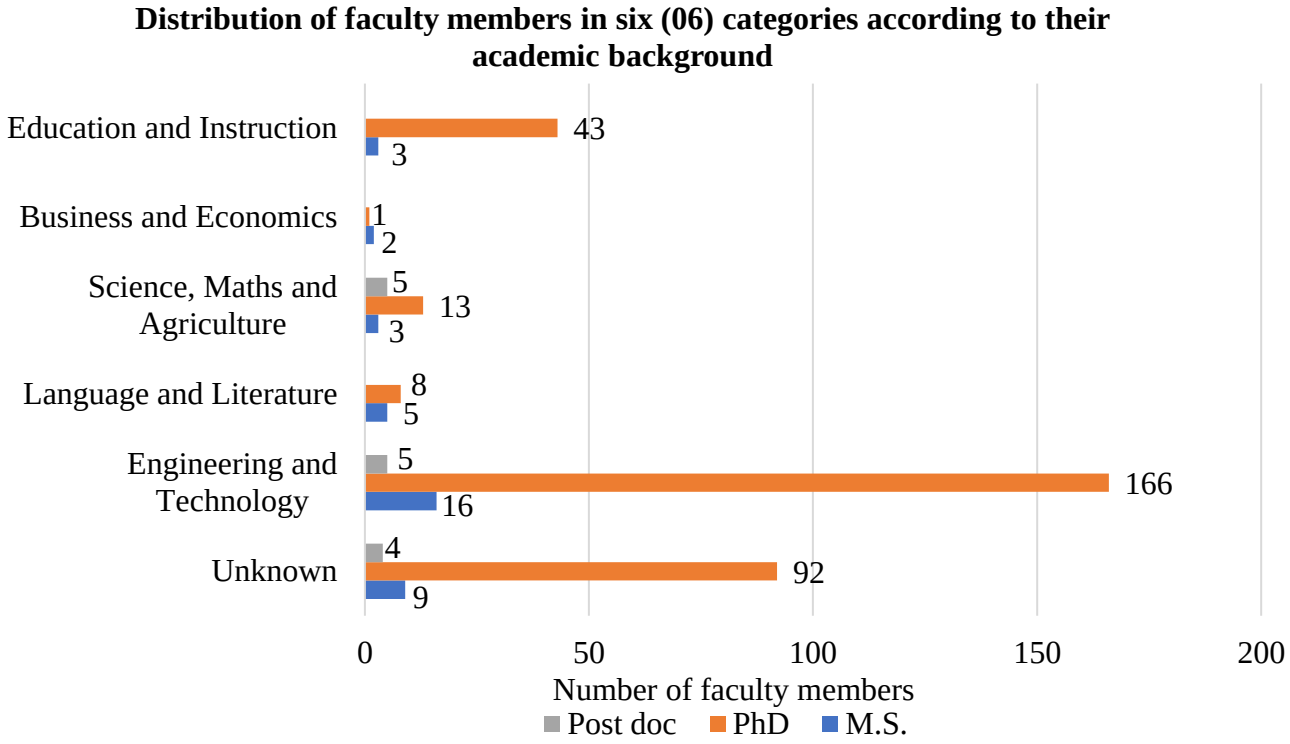

Figure 3. Overall distribution of faculty in six categories according to their terminal degree working in the discipline of engineering education in college of engineering as of December 10, 2022

The terminal degree by subject or major of faculty members included in each category in the above figure is shown in Table 7. This table reflects all faculty members (375) included in this study. In this table, similar to Table 4 and Table 5, all the engineering degrees including electrical and computer engineering, mechanical engineering, civil engineering, biomedical engineering, systems engineering, industrial engineering, aeronautical and astronautical engineering, materials science and engineering, petroleum engineering, interdisciplinary engineering, sustainable engineering, biosystems/biological and agricultural engineering, bioengineering, mining and mineral engineering, environmental engineering, chemical engineering, nuclear engineering, ceramic engineering, and computer engineering have been categorized as ‘engineering’.

Table 7. Categories and their respective terminal degree by subject or major

Categories	Terminal degree by subject or major
Engineering and Technology (187, 49.9%)	Engineering, Computer Science, Engineering Education, Physical Electronics/Computational Mechanics, Engineering Technology, Technology/Instructional Technology, Bioengineering and Biosciences
Language and Literature (13, 3.5%)	English Literature/English/American studies/TESOL, Journalism, English/Rhetoric, Composition, and Literacy Studies
Science, Math, and Agriculture (21, 5.6%)	Information Systems and Education, Agronomy, Science and Mathematics, Chemistry, Geology, Ecology and Evolutionary Biology, Mathematics and Computation, Theoretical Physics, Geological Sciences, Analytical Cell Biology, Ecological Designs and Analytical Chemistry, Physics/Applied Physics/Geophysics
Business and Economics (3, 0.8%)	International Business, Environmental Economics, Economics
Education and Instruction (46, 12.3%)	Teaching Engineering in Higher Education, Curriculum and Instructional Technology, Learning Design & Technology, Education/Science Education/Leadership, and Policy Studies, Educational Psychology, Curriculum and Instruction, Heritage Studies/ Historic Languages, Cultures, and Literatures
Unknown* (105, 28%)	Unknown

** Unknown indicates that information about the disciplines in which degree was pursued was not available on the institutional websites*

Discussion

This study explored the distribution of tenured, tenure-track and non-tenure track faculty members and their academic backgrounds working in eighteen (18) U.S. institutions in engineering education. These universities offer engineering education degrees or certification programs. As of December 2022, this study has found that the highest number of faculty members in the field of engineering education are working at Virginia Tech University. Note that Purdue University and Virginia Tech University are two of the pioneer institutions in which engineering education was established in 2004 as an academic unit within colleges of engineering and/or science [14]. In 2004, Purdue University offered a Ph.D. and M.S. in Engineering Education with 19 full-time and 9 courtesy appointments. On the other hand, Virginia Tech offered a Ph.D. degree and a graduate certificate in Engineering Education with 14 full-time appointments [14]. This indicates that the two institutions have continued to support and solidify the engineering education departments in their respective institutions. Other institutions including University of Florida, University of Michigan and University of Texas A&M are also rapidly growing their engineering education programs (e.g., research groups) by inducting more faculty members and increasing capabilities as reflected in Table 2.

Also, it is important to mention that faculty disciplinary backgrounds in engineering education departments are changing and there is a rise of inter-, cross-, multi-, and transdisciplinary faculty

who may not have a STEM terminal degree. Perhaps, this change in the faculty composition allows for further 'cross-fertilization of ideas' [14, p. 1044] across other disciplines outside of engineering. For example, in Virginia Tech, the academic background of faculty members consisted of engineering, linguistics, communications, English, math, higher education, and learning sciences [14]. Furthermore, it may be that this evolving composition and expertise by the faculty in these departments may be a strategic initiative to more meaningfully meet ABET criteria (e.g., Criterion 3 of Student Outcomes where students should have the "ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment" [20, p. 9]). Perhaps, expanding the expertise of the faculty allows for more quality assessments and evaluation of student outcomes to be conducted in the engineering classroom. Overall, this exploratory study found that faculty members with the following disciplinary backgrounds are being recruited into engineering education departments:

- Learning design and technology
- Environmental economics
- Engineering technology
- Journalism
- Science and mathematics
- Educational psychology
- Curriculum and instruction
- Rhetoric, composition, and literacy studies
- Education, leadership, and policy studies
- Heritage studies, and history languages, cultures, and literature among others.

Future studies are needed to understand the impacts that these inter- and multidisciplinary departments have on both research and teaching practices in these departments.

Finally, it was important to note an observation and perhaps an emerging trend. In this exploratory study, it was found that the highest number of non-tenure track faculty across an engineering education department housed in a college of engineering was in the University of Florida at the time of this study. It is interesting to note that these instructional faculty have a 20% appointment of scholarship of teaching and learning as part of their professional responsibilities. This is a unique model compared to other departments and may suggest an evolving trend of the field and composition of these engineering education departments. It will be important to study this model further soon.

Overall, this exploratory study served to provide a snapshot of the composition of faculty and their expertise in engineering education departments housed in the colleges of engineering in the U.S. While we did not explore the reasons for this diverging and evolving expertise, it is important to note the value that these departments are placing on inter- and multi-disciplinary knowledge. It will be worth understanding the reach and impact that these departments will place on the educational and professional progressions of engineers in the future. For now, this paper as well as our previous paper [15], serves as a starting collection of important information that

may guide the decisions of other engineering departments or colleges seeking to start a similar department or program at their home institution.

Limitations

There are some limitations to this research study. The information of faculty members has been collected from their respective institutional websites. Some of the websites did not include the qualifications of the faculty members and have been excluded from the study. Similarly, the information about the faculty members changed based on the hiring and exit process of the faculty members in their respective institutions. For this purpose, the research team selected a time (December 10, 2022) to gather the information based on which the analysis has been conducted. The categorization of tenured, tenure-track and non-track faculty from the official job titles may vary based on different locations and the nomenclature that they use. The self-identified race and gender of the faculty members have not been included in the study as it was not mentioned on the institutional websites. Also, it is unclear if terminal degrees were in flux at the time of our online content analysis; future work could explore if this information varied across different engineering education departments.

Conclusions and Future work

This study is a continuation of a previous online content analysis exploratory study on research areas of engineering education research centers [15]. This study particularly considered eighteen (18) of the twenty-four (24) U.S. institutions that offered engineering education degree or certification programs. The information about the faculty members working in these institutions was compiled together to understand the distribution of tenured & tenure-track, and non-tenure track faculty members. The highest number of faculty members in the field of engineering education is at Virginia Tech University. Additionally, the educational background of faculty members was also put together to understand their trajectory in engineering education.

The findings of the study reflect that out of the total faculty members working in the departments of engineering education within colleges/schools of engineering as of December 10, 2022, most of them hold a Ph.D. degree with a major in an engineering field of different disciplinary backgrounds or in engineering education. This is followed by M.S. and post-doc as terminal degrees for the remaining faculty members that consisted of expertise outside of engineering education. Generally, the terminal degrees, not including engineering or engineering education, for the faculty members working in the discipline of engineering education are in computer science, English literature/English/American studies/TESOL, education/science education/leader and policy studies, educational psychology, educational leadership and public policy, heritage studies, historic languages, cultures, and literatures amongst others. The academic background of faculty is integral to record as it reflects the fluidity and acceptance that exists in the discipline of engineering education. The faculty members with a post-doc are limited in number.

Future work will begin to explore the research and teaching impacts and outcomes that has been generated from these departments (e.g., publications) to better situate and help decision-makers seeking to create similar engineering education departments or programs in their colleges of engineering.

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Author Contributions

Gadhaun Aslam (first author) conducted data collection, data analysis, interpreted results, wrote the article, and made the final edits as received. Dr. Idalis Villanueva Alarcón (second author) conceptualized and refined the research idea, supervised the research, and contributed to editing the article.

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Appendices

Appendix 1. Faculty members with M.S. as terminal degree

Disciplinary Focus of Terminal M.S. Degree	Count
Agronomy	1
Biomedical Engineering	1
B.S. Engineering Technology	1
B.S. Mechanical Engineering	1
Civil Engineering	2
Computer Science	5
Curriculum and Instructional Technology	1
Electrical Engineering/Electrical & Computer Engineering	3
English Literature/English/American studies/TESOL	4
Environmental Economics	1
Industrial Engineering	1
Information Systems and Education	1
Journalism	1
Learning Design & Technology	1
MBA International Business	1
Mechanical Engineering	1
Science and Mathematics	1
Systems Engineering	1
Teaching Engineering in Higher Education (Certificate)	1
Unknown*	9
Total	**38**

** Unknown indicates that information about the field in which degree was pursued was not available on the institutional websites*

Appendix 2. Faculty members with Ph.D. as terminal degree

Disciplinary Focus of Terminal Ph.D. Degree	Count
Aeronautical and Astronautical Engineering	5
Architectural Engineering	1
Bioengineering	5
Biomedical Engineering	5
Biosystems/Biological & Agricultural Engineering	2
Ceramic Engineering	1
Chemical Engineering	10
Chemistry	5
Civil and Environmental Engineering	3
Civil Engineering	6
Computer Science/Computer Engineering	10
Curriculum and Instruction	7
Ecology and Evolutionary Biology	1
Economics	1

Education and Computer Science & Engineering	1
Education, Leadership, and Policy Studies/Engineering and Public Policy	11
Education/Science Education	15
Educational Psychology	8
Electrical and Computer Engineering	2
Electrical Engineering	9
Electrical Engineering and Computer Science	1
Engineering	4
Engineering Education	57
English/Rhetoric, Composition, and Literacy Studies	8
Environmental Engineering/Environmental Design and Planning	3
Geology	1
Heritage Studies/ Historic Languages, Cultures, and Literatures	2
Industrial Engineering	6
Interdisciplinary Engineering	1
Materials Science and Engineering	3
Mathematics and Computation	1
Mechanical Engineering	23
Mining and Mineral Engineering	1
Nuclear Engineering	1
Petroleum Engineering	1
Physics/Applied Physics/Geophysics/Physical Electronics/Computational Mechanics	7
Sustainable Engineering	1
Technology/Instructional Technology	2
Unknown*	92
Total	**323**

** Unknown indicates that information about the field in which degree was pursued was not available on the institutional websites*