

2006-589: THE HIGHER EDUCATION JOB MARKET FOR M.S. AND PH.D. ENGINEERING EDUCATION PROGRAM GRADUATES

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The Higher Education Job Market for Engineering Education Program Graduates

Abstract

The potential job market in colleges and universities is investigated for graduates of new certificate, M.S., and Ph.D. programs in Engineering Education. Data sources include positions posted to engineering education listservs over a recent one year period and an anonymous survey of engineering academic deans. The results suggest that engineering education program graduates will be competitive for a variety of staff and faculty positions in colleges and schools of engineering. However, availability of tenure-track positions will be limited, as a Ph.D. in the discipline is generally required and very few Engineering Education departments currently exist. (This paper also discusses an engineering education certificate for graduates in traditional engineering disciplines. These graduates remain competitive for faculty positions in the discipline of their Ph.D. degree.) Despite negative comments about how engineering education graduates will fit into the current university faculty structure, there is support for the new engineering education M.S. and Ph.D. degrees and evidence that graduates will be considered for a variety of positions at four-year institutions.

Introduction

Recent years have seen the emergence of engineering education graduate programs and departments, including those at Purdue University¹, Virginia Tech², and the Ph.D. granting partners of the National Center for Engineering and Technology Education (Utah State University, University of Georgia, University of Illinois, and University of Minnesota)³. Though applications and informal inquiries attest to the interest in these programs, the question remains as to where (and whether) engineering education graduates will find work. Specifically, the research questions for this study were:

- What types of positions in higher education settings, including faculty positions, might be available to engineering education program graduates?
- Will engineering education graduates be accepted as competitive applicants for these positions?
- What job market considerations might guide the development of engineering education degree programs and the advising of engineering education students?

To answer these questions and triangulate the results, two different data sources were used. Position vacancies were tracked to estimate the number and type of positions available, while engineering academic deans were surveyed regarding their perceptions of how competitive engineering education graduates might be for these positions.

Method

There were two main sources of data in this study. The first was position vacancies posted to various listservs:

1. Wepan-1, the announcement email list for WEPAN, Women in Engineering Programs and Advocates Network. All but three positions in this study were posted to this list.
2. The ASEE Educational Research Methods Division list.

- The Assessment in Higher Education list (assess@lsv.uky.edu), which included one engineering-specific assessment position during the sampling period.

Both the web sites and print versions of ASEE *PRISM* (Classifieds) and the *Chronicle of Higher Education* were also monitored, but these did not provide additional relevant postings.

Second, engineering academic deans were invited to complete a survey of the types of positions available at their institutions and the desirability of engineering education graduates for these positions. The survey was designed based on positions posted to the listservs during the first six months of monitoring. Academic assistant and associate deans were targeted because they often directly supervise the staff positions included in the survey. The paper version of this survey is included in Appendix B. Table 1 summarizes the engineering education program descriptions presented to survey participants.

The Ph.D., M.S., and certificate in engineering education were evaluated by survey respondents. The intent of the certificate program is to augment the training of Ph.D. students in traditional engineering disciplines who wish to pursue tenure-track faculty positions. Since the job market for traditional Ph.D. engineering graduates is well-understood and unlikely to change as a result of the new engineering education certificate, the focus of this study was on the M.S. and Ph.D. graduates. An important question to answer is whether Ph.D. engineering education graduates will be able to find work in tenure-track faculty positions.

Table 1. Summary of the three engineering education graduate programs planned at Virginia Tech, as described in the survey. These are not necessarily the current requirements for the Virginia Tech degree programs.

Program	Targeted Source of Students	Number of Units	Focus of Coursework	Expected Higher Education Job Opportunities
Certificate	Students earning a Ph.D. in another engineering discipline	12	Pedagogy*	Tenure-track faculty in the Ph.D. discipline
Master's (M.S.) with thesis	Students with a B.S. in engineering	30	Pedagogy, assessment, statistics, and research methods*	Staff positions in administration**
Doctorate (Ph.D.)		37 course, plus research credits	Pedagogy, assessment, statistics, research methods, and proposal writing*	Staff positions in administration**, some faculty appointments

*All programs also include a required teaching practicum.

**Staff positions include opportunities in Assessment, Diversity Programs, Advising, Engineering Teaching Centers, and Curricular Improvement.

To collect the survey data, a web version of the survey was posted using Snap web survey software, and an invitation was sent through the ASEE dean's listserv. Approximately 55 responses were obtained in this manner. Then, at the engineering academic dean's meeting at the 2005 ASEE national conference, the attendee from Virginia Tech distributed paper versions of the survey to collect another 15 responses (to total 70). This person was careful to explain that if the web version of the survey was completed, the paper version was not necessary. A total of 70 responses were received. Assuming that there were no duplicate responses from any single

institution, the response rate can be calculated as 20% of the 345 institutions with at least one currently accredited ABET engineering degree program.

Position Posting Results

Table 2 summarizes the positions identified during the twelve-month sampling period. A table detailing each position is included in Appendix A. This gives a general, non-rigorous idea of the number and types of positions that might be available to M.S. and Ph.D. engineering education graduates interested in higher education work. It should be noted that there is likely a bias toward overrepresentation of diversity positions, since the main data source was the listserv for a professional society focusing on women in engineering programs.

Table 2. Summary of Position Postings. More detailed information for each position is provided in Appendix A.

Positions preferring Ph.D. (15 total positions over the 12-month sample period)	Positions preferring M.S. or B.S. with experience (9 total positions over the 12-month sample period)
<ul style="list-style-type: none"> • Six faculty positions (four tenure track, two lecturers) • One teaching center associate director and one engineering education center director • Two research scientist positions • One assessment director position • Three directors of diversity programs • One technical internship program manager 	<ul style="list-style-type: none"> • Seven diversity programs staff dealing with recruitment, retention and outreach • One lecturer position • One advising position • One assessment position (a professional society’s ABET coordinator) • One research coordinator position

All positions are specific to engineering, and those that specified a disciplinary background indicated either engineering, education, or either type of degree. One lecturer position, for example, specified an undergraduate degree in engineering and a doctorate in an education field. As a group, the postings list faculty, research, assessment, diversity programs, and advising positions. The dean’s survey asked the deans to rate the desirability of engineering education graduates for these types of positions. A copy of the paper version of the survey is included in Appendix B.

Survey Results: Certificate Program

The 12-unit certificate program was intended to be an additional credential for Ph.D. candidates in traditional engineering disciplines interested in tenure-track faculty positions. Therefore, this section’s survey questions focused on desirability of faculty candidates with traditional engineering degrees and a certificate in engineering education. The responses to this question are summarized in Table 3. Over 67% of respondents would find the candidates very desirable or somewhat desirable; however, 33% of deans appear to have indicated that the additional credential would make not difference.

Table 3. Desirability of engineering education certificate graduates with a Ph.D. in the discipline for tenure-track faculty positions. “Don’t know” was a fourth response option, receiving zero responses.

Response	Percentage of Responses
Very desirable, a likely finalist	16% (11 responses)
Somewhat desirable, a possible finalist	51% (36 responses)
Neutral opinion, it would not matter	33% (23 responses)

There was no open response question dedicated to the certificate program, but many deans chose to comment on this issue in the final survey question. A few made it clear that the certificate would be viewed as a secondary qualification to demonstrated research skill. One respondent summarized this view by writing:

Having a Ph.D. student take courses in teaching is an excellent idea if they are interested in an academic career. However, when recruiting for faculty positions, their potential for a successful research program is very important and the teaching experience would be frosting on the cake (not the cake).

Given two candidates with a similar research record, the certificate candidate would probably be more desirable. However, several deans felt the certificate should not be pursued at the expense of research skill development.

Survey Results: M.S. and Ph.D. Graduates in Staff Positions

The staff positions included in this survey were opportunities in assessment, diversity programs, advising, retention, engineering teaching centers, and curricular improvement. For each education level, nearly identical questions about the desirability of engineering education graduates for these positions were asked, though at the M.S. level focus was on “staff” and at the Ph.D. level positions were stated as “directors” and “coordinators.” (The exact wording can be found in Appendix B.) Generally, the responses were positive. These are summarized in Tables 4 and 5.

Table 4. Desirability of engineering education M.S. graduates for staff positions in administration. Number of responses is included in parentheses. The cells of each row, beyond the double line, should sum to 100%.

Type of Position for M.S. Graduate	Combined Desirable*	Very Desirable	Somewhat Desirable	Neutral Opinion	Don't Know
Advising	72% (62)	31% (33)	41% (29)	23% (16)	4% (3)
Assessment	74% (52)	24% (17)	50% (35)	20% (14)	6% (4)
Diversity Programs	71% (50)	24% (17)	47% (33)	21% (15)	6% (4)
Teaching Center	59% (41)	20% (14)	39% (27)	31% (22)	10% (7)
Curricular Improvement	52% (36)	16% (11)	36% (25)	39% (27)	10% (7)

*Combined desirable = very desirable + somewhat desirable

Table 5. Desirability of engineering education Ph.D. graduates for staff positions in administration. Number of responses is included in parentheses. The cells of each row, beyond the double line, should sum to 100%.

Type of Position for Ph.D. Graduate	Combined Desirable*	Very Desirable	Somewhat Desirable	Neutral Opinion	Don't Know
Advising	75% (52)	36% (25)	39% (27)	16% (11)	10% (7)
Assessment	80% (56)	40% (28)	40% (28)	13% (9)	7% (5)
Diversity Programs	72% (50)	26% (18)	46% (32)	21% (15)	7% (5)
Teaching Center	69% (48)	36% (25)	33% (23)	17% (12)	13% (9)
Curricular Improvement	68% (48)	27% (19)	41% (29)	19% (13)	11% (8)
Other Retention	57% (40)	26% (18)	31% (22)	30% (21)	13% (9)

*Combined desirable = very desirable + somewhat desirable

It is possible that familiarity with each of the types of positions or their duties affected the results. At both education levels, advising received the most positive response. All institutions, whether they have the resources to hire additional staff for assessment, diversity, or teaching centers, must provide advising to students. Likewise, all academic deans have to deal with ABET-related assessment, and this category scored second highest. At the other end of the spectrum, "other retention" positions received the least positive response, which could be in part due to lack of a clear definition. It was clear from the responses that many of the deans do not supervise an army of staff covering all of the areas listed in the tables above. When reporting the number of positions currently staffed at their own institutions, 33% of respondents indicated zero or one staff member. Their comments also reflected a perceived lack of available positions:

It will be desirable to have someone help us with some of the above mentioned type of positions listed in question 3. But we do not have the luxury of hiring anyone for these positions due to the lack of funds.

Unfortunately, we don't have the resources to staff any of the positions you list. My answers were, in effect, "what if" answers.

As Associate Dean, I do most of the other tasks mentioned in Q3.

We are seldom explicitly seeking individuals to fill such positions.

We just do not have these types of positions available on a regular basis.

However, the sample of 70 deans reported a total of 156 staff and non-tenure track faculty positions in their offices (estimated conservatively based on the lower bound of each range). Extrapolating from the 70 institutions represented to the 345 ABET-accredited institutions suggests there may be as many as 780 positions of these types across the United States.

In comparing responses for a given type of position across M.S. and Ph.D. job applicants, there were a few notable (but not statistically significant) differences. For undergraduate advising positions, master's-level candidates were more desirable. This is consistent with the position postings, which did not require an advanced degree. Respondents voiced some concern that the salary and prestige of these positions is lower than that of the engineering careers for which typical engineering education graduates will also be qualified by virtue of their B.S. engineering degrees:

Salary expectations for many of these positions.

Generally persons with an engineering undergraduate are going to expect to be at a higher pay scale than we hire at for advising.

I doubt that they would be valued more than other masters level degrees. Many current staff in these types of positions earn \$10 to 15K less than BS engineering graduates.

With an undergraduate degree in engineering why take on a staff position when they could work as professional engineers?

Ph.D. candidates were notably more desirable than M.S. candidates for positions in assessment, teaching centers, and curricular improvement. This may be due to the fact that people in these positions would be required to work closely with faculty and would have to gain their respect in order to be successful. Though it is unclear from the following comments whether staff or faculty positions are being addressed, acceptance by traditionally trained engineering faculty is an important issue:

Respect from others. Research-types can be condescending.

Lack of respect by PhD tenure-track faculty, especially those focused on research.

Would they have the technical expertise to have Ph.D. faculty accept them as full participants in the college? There is a real concern of people having appropriate credentials for the university and college positions.

A different set of respondents felt that the main issue for Ph.D. candidates being considered for staff positions would be over-education:

Person would be over qualified for diversity, retention staff, advising.

Over-qualified for diversity or retention roles.

I believe they are "overqualified" for the types of activities that dominate question 6.

I don't think that the PhD in engineering education would be a significant advantage over the MS noted in previous set of questions.

For the types of staff positions included in the survey, the engineering academic deans valued practical experience:

I would like the individual to have several years experience past the award of the degree before entering into any of the first six jobs.

Most candidates would be considered primarily for their experience, rather than such training without experience.

Many deans were satisfied with the education, psychology or counseling graduates they have hired in the past for these types of positions and did not expect engineering education graduates to be more desirable. Some respondents pointed out that a curriculum focused on pedagogy would not adequately prepare engineering education graduates for the varied demands of staff positions:

For advising I might still prefer persons with more background in counseling or higher ed administration. Prefer masters in other disciplines.

Hiring for advising or diversity programs would likely focus on preparation in counseling, etc. as well as personal attributes rather than pedagogy.

Aside from our Learning Center director, the folks playing the other roles are also responsible for issues/projects not directly related to the list of topics in the degree description above, including advising, counseling, mentoring, scholarship, procurement and distribution, and teaching.

Finally, a few respondents were concerned that engineering education graduates with B.S. engineering degrees would exhibit the most undesirable stereotypical traits of engineers:

Positions such as these typically require more people skills than technical skills. In advising, those with an engineering background tend to be less empathetic than say a psychology or education background. I am not sure that a Masters in Engineering Education would change that.

lack of diversity of interests and background

In sum, deans feared that engineering education graduates would be over-educated, under-qualified, not technical enough, too technical and lacking in people skills, and/or demand unrealistic salaries. While it is nearly impossible for one individual to complete a graduate degree while possessing all of these negative characteristics, this list suggests that the first cohorts of graduates may have a wide range of negative expectations to counter. It is particularly important to note that this resistance is not reflected in the position postings. For example, many

positions working closely with at-risk students requested a technical background. Perhaps the expectation in these cases is that the interview process would filter out applicants lacking appropriate empathy.

Survey Results: M.S. and Ph.D. Graduates in Faculty Positions

Perhaps the survey results of broadest interest are those related to faculty positions. This was certainly the interest of the respondents. Of 112 total comments obtained from the three open response questions, 37% addressed faculty hiring exclusively. Another 10% addressed faculty hiring issues in addition to other topics. Likewise, potential engineering education students are very interested in faculty positions. Of potential students responding to Virginia Tech’s open web survey, 47% expressed interest in teaching at the college or university level.

The results of the dean’s survey indicating desirability of engineering education graduates for faculty positions are listed in Table 6. Comments in the open-ended response items and in other areas of the paper surveys indicate that the “neutral opinion” and “don’t know” categories were used differently by various respondents. A negative option was not available, so two respondents wrote “impossible” and “would not consider” in the space provided to check the response for tenure-track faculty positions for Ph.D. graduates. For this reason, it is better to consider the results in aggregate; between 33 and 51% of deans consider advanced degrees in engineering education as desirable credentials for various university-level faculty positions. This is in sharp contrast to the responses for staff positions discussed above, which average 68% and are as high as 80%.

Table 6. Desirability of engineering education M.S. and Ph.D. graduates for faculty positions. Number of responses is included in parentheses. The cells of each row, beyond the double line, should sum to 100%.

Engineering Education Degree	Type of Faculty Position	Combined Desirable*	Very Desirable	Somewhat Desirable	Neutral Opinion	Don’t Know
M.S.	Non tenure-track teaching	43% (30)	16% (11)	27% (19)	44% (31)	10% (7)
Ph.D.	Non tenure-track teaching	51% (43)	27% (19)	24% (24)	26% (18)	11% (8)
Ph.D.	Tenure-track faculty	33% (23)	14% (10)	19% (13)	47% (33)	16% (11)

*Combined desirable = very desirable + somewhat desirable

Many deans simply did not see engineering education graduates fitting into engineering schools and colleges without departments of engineering education:

Engineering pedagogy is a real need. I am not sure that the disciplines are ready to accept people who are trained in this without a credible dissertation in a traditional engineering discipline. Discipline specific expertise is essential to the survival of faculty in research and institutions who are expanding their research capability.

Engineering education is a very dear issue for me. I do not see this as an area of specialization for faculty. It would make a good adjunct to a traditional discipline specific research degree. This is the reality of the current climate, and it doesn't appear to be changing rapidly.

We are a research I university. We have hired one faculty member on an engr ed track. He has a PhD in MechE and training (and desire!) in education. We are WAY more likely to hire in this way rather than a PhD in education and a BS in a discipline. In any case, this candidate will be judged on the same criteria as others - scholarship, teaching, and service.

The number of positions well suited for these people is likely to be rather limited --- but, they can bring considerable strengths to some positions. For the PhD, a stronger scenario is to require an engineering

disciplinary MS as part of the program -- then, they may find a wider range of possible teaching opportunities.

There is some evidence that even at the Ph.D. level, an engineering education degree is perceived as shoring up only the teaching skills for a faculty candidate, with no attention to research. (It should be noted that the survey itself reinforced this perception, e.g. by describing each degree with “pedagogy” as the first term, and “research” as one of the last.)

PhD usually means a research track. Other emphasis could be viewed as a distraction. T&P committees would not care about this.

With the tenure-track focus on research these folks might be at a disadvantage.

A person who is interested in undergraduate studies and teaching is most likely to be a successful candidate for this program. The problem is that most of the rewarding system (tenure & promotion) is not based on this type of activities.

Teaching is primary at our institution, but research is equally important in the present climate, and tenure and promotion will weigh heavily on both teaching and research factors.

We would like faculty in addition to teaching engage in research to get research grants, publish papers and guide students.

Some deans did view engineering education as a potential research focus, but one unlikely to be supported at their institutions:

Probably would have difficulty in tenure track position, unless they were successful in attracting funding and publishing. Not clear if doing this in the area of engineering education would be sufficient.

Tenure track faculty in engineering will require a research orientation to be successful in institutions that are research oriented. A limited number of positions will be available for pedagogical research. Unless funding is increased in this area little attention will be paid to these types of faculty candidates.

It would be very desirable for tenure track faculty in an Engineering Education degree program to have a PhD in Engineering Education. For tenure track faculty in all other curricula, it is necessary to do engineering research and hence should have a PhD in discipline.

A few deans responded positively that for teaching positions, an engineering education degree would be desirable. However, there was concern over a lack of engineering depth among candidates with a B.S. degree in engineering and a graduate degree in engineering education.

Lack of depth in subject matter. The candidate would have had depth in engineering typically at undergraduate level, may be slightly higher. Such as candidate may be acceptable at very low level courses (100 level) but understanding of subject matter is highly desirable to teach upper level courses.

For positions in the classroom, there may be problems with the technical depth required to teach the engineering curricular courses.

For teaching positions, would need strong background in the particular discipline. Exception would be "freshman engineering" or other general programs.

One respondent pointed out repeatedly that engineering education graduates would be uniquely qualified to teach freshman engineering courses. Another cited an ABET requirement for instructors which this dean thought would be violated by not having an advanced degree in the engineering discipline being taught.

For each of the open response questions, there were consistently 2-3 responses from a handful of deans who did not see a need for engineering education programs and degrees. Some respondents thought the important skills could be learned independently of coursework:

We are quite happy with the faculty we have, who have no training in the areas you cover. Our junior faculty receive mentoring in teaching from senior faculty and this has proven very excellent. Non-tenure track faculty receive the same mentoring. It could be argued that we wouldn't need this mentoring for someone who already had this credential.

There is useful information out there related to engineering education but I am not sure that formal training is the way to go. Motivated faculty with an interest can usually learn and practice. It's the environment that is the main impediment.

And in their final thoughts:

It is NOT clear why you are considering doing this. The opportunities seem rather limited.

It seems that this is an effort to emulate the activities of the College of Education by an Engineering College. We know how the Colleges of Education have failed to meet the challenges of K-12 education in the USA. The USA is far below world standards in K-12 education, however Engineering Education in the USA is the world standard.

Some of the same deans who stated in earlier portions of the survey that engineering education graduates would never find tenure-track positions in traditional departments ended their surveys with positive, supportive thoughts:

I would really like to see more details on the coursework -- course summaries, who teaches them, who administers the certificate program, etc. Personally, it seems to be an excellent and needed program!

Keep working to change the paradigm about the importance of teaching.

I like this idea - Good Luck!

Discussion and Limitations

Analysis of job postings over a one-year period reveals many staff opportunities (17), fewer faculty positions (7), and disappointingly few tenure-track faculty positions (2). This information was used to construct a survey of engineering academic deans, who often supervise the types of staff positions that accounted for the majority of job postings. The position postings themselves indicated that M.S. and Ph.D. engineering education graduates with engineering undergraduate experience would be ideally qualified for many of these positions. However, the deans voiced wide-ranging and oftentimes conflicting concerns. The respondents suggested that these graduates would be over-educated, under-qualified, not technical enough, too technical and lacking in people skills, and/or demand unrealistic salaries. These objections run the gambit, an important concern for students considering an advanced engineering education degree and the faculty who advise them.

In specifically addressing tenure-track faculty positions, the deans were clearer in their reasoning: Ph.D. programs prepare graduates for research-focused faculty positions. Placement in these positions is a traditional measure of Ph.D. program success. These types of positions are not widely available in engineering education, and are unlikely to gain immediate respect among more traditional engineering faculty due to perceptions of rigor. The deans' responses also indicated a widespread perception that engineering education is focused on teaching rather than research, which can further erode the status of these degrees and faculty positions.

This study was inherently limited by the emergent nature of the engineering education field. With no graduates of these new programs yet on the job market, employers do not know to ask for them, nor do they have any positive experiences with them. It is possible that many positions

were missed, as there is no standardized location for posting engineering education openings. The survey response rate was low (estimated at 20%), and the responses indicated a wide variation in the deans' concerns about hiring engineering education graduates. This study has unearthed important and real concerns for pioneering engineering education graduate students and their advisors. It can be expected that at least some of these will be alleviated as the programs and graduates demonstrate success, while others may be due to inherent differences between traditional engineering disciplines and engineering education.

Summary

Two independent data sources were used to evaluate the potential higher education job market for future engineering education graduates. A sample of position listings revealed opportunities in faculty, research, assessment, diversity programs, and advising, many of which specified either an engineering or education background. Seventeen positions were identified during a one-year sampling period. Seventy engineering academic deans were also surveyed regarding the desirability of engineering education graduates for faculty and staff positions at their institutions. These results were markedly less optimistic, and at times conflicting with, the position postings. Most respondents indicated some desirability for all the position types included in the survey, but they also expressed a wide variety of concerns. Many expressed satisfaction with current employees as well as concern that the engineering education programs described would not sufficiently prepare graduates for the positions. For staff positions, the salary and prestige is lower than that of engineering positions for which graduates might also be qualified. The deans also made it clear that Ph.D.s in engineering education would not be able to find tenure-track positions outside of engineering education departments. Other comments indicated support for the new engineering education programs, but widespread recognition of the unique contributions of engineering education graduates to higher education may have to come with time.

Acknowledgements

The engineering academic dean's survey would not have been successful without the help of Dwight Wardell in emailing the invitation, Bevelee Watford for distributing paper versions of the survey, Robert Knee for posting the web survey and summarizing its results, and John Muffo for survey resources and expertise.

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Appendix A

Table 7. Detail of Engineering Education Positions Included in Study.

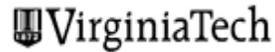
Position Title	Preferred Education Level	Hiring Institution and Department	Fields (quoted from posting)
Associate Director for Teaching Initiatives	Ph.D.	Massachusetts Institute of Technology, Teaching and Learning Laboratory	A Ph.D. in an appropriate field such as science education, engineering or higher education
Assistant or Associate professor, STEM education research	Ph.D.	South Dakota School of Mines, First Year Experience	Backgrounds in all areas of engineering and science will be considered
Associate Professor, Engineering Education*	Ph.D.	Arizona State University, Ira A. Fulton School of Engineering	Earned doctorate in engineering or closely related field
Assistant or Associate Professor of Technology Assessment	Ph.D.	Stony Brook University, Department of Technology and Society, College of Engineering and Applied Sciences	Doctorate in science and technology studies or a Doctorate in Science or Engineering, or closely related area
Assistant or Associate Professor of Educational Technology	Ph.D.	Stony Brook University, Department of Technology and Society, College of Engineering and Applied Sciences	Doctorate in educational technology or closely related area
Lecturer	Ph.D.	University of Toronto, Faculty of Applied Science and Engineering	Bachelor's degree in a science or engineering discipline and a master's or doctorate degree in a relevant educational field
Faculty Associate	Ph.D.	University of Wisconsin-Milwaukee, College of Engineering and Applied Science	A Master's degree in engineering is required; a Ph.D. degree in engineering is preferred
Quantitative Research Scientist	Ph.D.	University of Washington, Center for Engineering Learning and Teaching	Education, engineering, cognitive psychology, social sciences or related field
Qualitative Research Scientist/Engineer	Ph.D.	University of Washington, Center for Engineering Learning and Teaching	Cognitive science, learning sciences, science/math/engineering education or related disciplines
Director of Assessment**	Ph.D.	North Carolina State University, College of Engineering	Social science research or related discipline
Postdoctoral position (Manager, Internships in Public Science Education program)	Ph.D.	University of Wisconsin – Madison, Materials Research Science and Engineering Center (MRSEC) on Nanostructured Interfaces	A doctorate in engineering, physics, or chemistry is required and a strong interest in science and technology education
Director, Graduate Diversity Recruitment Initiatives (STEM)	Ph.D.	University of Washington, Dean of the Graduate School	Scientist or engineer
Assistant Dean/Director of Diversity Affairs Programs	Ph.D.	University of Wisconsin-Madison, College of Engineering	Math, science or engineering
Executive Director	Ph.D.	University of Georgia, Peach State Alliances for Minority Participation	(unspecified) background in science, technology, engineering and mathematics (STEM) fields

Position Title	Preferred Education Level	Hiring Institution and Department	Fields (quoted from posting)
Director*	Ph.D.	University of Michigan Dearborn, Henry W. Patton Center for Engineering Education and Practice	Required: Masters Degree in Engineering, Mathematics or Science Desired: Ph.D.
Lecturer in Global Industrial Management	M.S.	Stony Brook University, Department of Technology and Society, College of Engineering and Applied Sciences	master's or higher degree in industrial management or closely related area
Recruitment and Retention Coordinator	M.S.	Michigan State University, College of Engineering	Masters Degree in counseling, higher education, or related field or equivalent experience
Diversity Programs Advisor	M.S.	Cornell University, Office of Diversity Programs in Engineering	[experience with similar programs] and/or an engineering math, or science discipline highly desirable
Program Coordinator for Diversity	M.S.	University of Maryland College Park, Science and Technology: Addressing the Need for Diversity Program	Student affairs, higher education, advising/counseling, administration, education, science, mathematics or social sciences
Education Manager	M.S.	ASME (engineering professional society)	[5 years experience] in a related area of engineering, education, association management or equivalent
Academic Program Coordinator	M.S.	Kansas State University, Mechanical and Nuclear Engineering	(unspecified)
Research Coordinator	M.S.	University of Tennessee, College of Engineering	Preferably engineering or related discipline
Education and Diversity Coordinator	(not specified)	NEES Corporation inc., the technical coordination, administrative, and outreach center for the George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES)	experienced administrator of Federal or governmental educational programs, with direct experience working in Science, Technology, Engineering, or Mathematics (STEM) disciplines
Outreach Coordinator	B.S.+ 3 years experience or M.S.	Iowa State University, Program for Women in Science and Engineering	Science, math, engineering, education or related fields
Assistant Director of Diversity Programs in Engineering	B.S.+ 2-3 years experience	Cornell University, Office of Diversity Programs in Engineering	(not specified)
Director of the Minority Engineering Program	B.S.	Colorado School of Mines	A Bachelor's degree and prior experience working with underrepresented student populations; bachelor's degree in engineering, science, or mathematics desirable
Assistant Director for Recruitment and Co-Curricular Programs	B.S.	University of Maryland, College of Computer, Mathematical and Physical Sciences	Any of math, sciences, engineering or business degree preferred [plus experience] and an interest in math and sciences is essential

The source for all postings was the wepan-l listserv, except *ASEE ERM listserv & *PRISM* and **Assessment in Higher Education listserv.

Appendix B.

Beginning on the following page is the paper version of the engineering academic dean's survey.



Engineering Education Graduate Degree Market Research Survey

Please help us determine the potential employment market for graduates of programs in Engineering Education at the graduate certificate, master's, and doctoral levels. Each degree is described in greater detail below along with the accompanying questions. All include engineering pedagogy and a teaching practicum, while the doctoral program requires research methods coursework.

Certificate Program

Description: 12 graduate credits focusing on engineering pedagogy, including a supervised teaching practicum.

Target: Ph.D. students in traditional engineering disciplines who plan to use the certificate as an additional credential in applying for tenure-track faculty positions.

1. In your opinion, would candidates with a Ph.D. in a traditional engineering discipline and a certificate in engineering education be more desirable for tenure-track faculty positions at your institution?
 Very desirable, a likely finalist
 Somewhat desirable, a possible finalist
 Neutral opinion, it would not matter
 Don't know
2. How many tenure-track engineering faculty do you expect your institution to hire in the next calendar year?
 1-5
 6-10
 11-20
 more than 20

Master's Program with Thesis

Description: 30 graduate credits including engineering pedagogy, assessment, statistics, supervised teaching practicum, and thesis research.

Target: It is expected that most applicants will hold an undergraduate degree in engineering or physical science.

3. Please rate, whether in your opinion, candidates with an undergraduate degree in engineering and a master's in Engineering Education will be desirable for each of the following types of positions:

	Very desirable, a likely finalist	Somewhat desirable, a possible finalist	Neutral opinion, it would not matter	Don't know
Coordinators of engineering-wide assessment efforts				
Staff of engineering diversity programs				
Staff of engineering advising centers				
Staff of engineering/science teaching centers				
Coordinators of curricular improvement initiatives				
Non tenure-track teaching faculty in engineering				

4. Approximately how many people total (with any educational background) are currently employed at your institution in the types of positions listed in Question 3?

None
 One
 Two
 Three
 Four
 Five
 More than Five

5. What reservations might you have about hiring a candidate with an undergraduate degree in engineering and a master's degree in Engineering Education for the positions listed in Question 3?

Ph.D. Program

Description: Dissertation plus 37 graduate course credits including engineering pedagogy, assessment, statistics, research methods, proposal writing, and supervised teaching practicum.

Target: It is expected that most applicants will hold an undergraduate degree in engineering or physical science.

6. Please rate whether, in your opinion, candidates with a Ph.D. in Engineering Education will be desirable for each of the following types of positions:

	Very desirable, a likely finalist	Somewhat desirable, a possible finalist	Neutral opinion, it would not matter	Don't know
Coordinators of engineering-wide assessment efforts				
Directors of engineering diversity programs				
Other retention staff				
Directors of engineering advising centers				
Directors of engineering/science teaching centers				
Coordinators of curricular improvement efforts				
Non tenure-track teaching faculty in engineering				
Tenure-track faculty in engineering				

7. What reservations might you have about hiring a candidate with a Ph.D. in Engineering Education for the positions listed in Question 6?

8. What is the approximate number of engineering faculty at your institution?

1-50

51-100

101-200

201-300

300 or more

Five

More than Five

9. Please share any additional comments:

Thank you for completing the survey.

Please return to any Virginia Tech faculty member at the conference; fax to (540) 231-5974; or mail to Maura Borrego, Department of Engineering Education, College of Engineering (0218), Blacksburg, VA, 24061.

www.enge.vt.edu

www.aap.vt.edu/snap/eeersearch.htm

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