

Detailing Recruitment Efforts to Interview Faculty about Gender in Engineering

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Abstract: *This paper details attempts to recruit 45 engineering professors to participate in an interview about gender in engineering. In 2014 and 2015, I attempted to recruit 45 engineering professors (representing roughly equal numbers across engineering disciplines, career ranks, and sex) from three different types of universities in different parts of the United States to participate in 60-minute interviews about gender in engineering. I kept records of response rates by engineering discipline, career rank, several different demographic categories, and institution type. These rates, along with a detailed description of my recruitment efforts, descriptions of the help I needed from others, the challenges I encountered, and participants' reasons for participating (or not) are presented here.*

Why detail recruitment efforts?

How difficult or easy is it to get 45 engineering professors to agree to participate in a one-hour interview about gender in engineering? Are some populations of professors more likely to participate than others? What extra measures must be taken when original plans yield insufficient numbers or participants? Why does someone choose to participate, or not? These are questions that have not previously been asked or answered, but which are explored in this paper. Exploring these questions is important for engineering education for three main reasons.

First, very little research has examined what engineering professors think about gender or women's underrepresentation in engineering or engineering education. In order to address that gap in research, a study is underway to interview 45 engineering professors to ascertain what and how they think about gender and women's underrepresentation in engineering (Beddoes, 2014a). Studying those in positions of power has been called "studying up" (Sprague, 2005). Given that such little research has taken this approach to research on gender in engineering, with almost all research focusing instead on students, one purpose of this paper is to help future researchers in planning their own research studies that involve studying up.

A second purpose is to contribute to knowledge about the level of willingness among engineering professors to participate in an interview about women's underrepresentation in engineering. A better understanding of professors' willingness to participate in an interview on this topic can also help others developing future studies by providing insight into the response rates they might expect. In sum, recruitment results in and of themselves can be informative, and they may also prove useful for researchers wanting to conduct similar studies in the future.

A third purpose of this paper extends beyond the specific topic of gender in engineering however. I aim to call attention to the messiness of research. Although recognized in fields such as Science and Technology Studies (STS) (e.g., Law, 2004), the messy realities of social science research are actively hidden in engineering education research. We (authors, reviewers, editors) collectively perpetuate a myth that our cleanly written methods sections reflect reality. If we do not perpetuate the myth, we risk our studies being seen as not rigorous, scientific or objective enough to warrant publication. The field has largely evolved around a discourse of rigor (Beddoes, 2011, 2014b) that serves to perpetuate the myth. The

theme of this conference is *translating research into practice*, albeit in the classroom: I suggest that there is also an opportunity to start translating *critical* methodologies scholarship into our writing, reviewing, and editing practices.

The paper unfolds as follows. First, I present a brief overview of the methodological justification behind the study. Next, I describe the plans I originally set out with for recruiting a diverse population at three different institutions. I then describe and discuss outcomes of those recruitment efforts. Response rates by institution, career rank, sex, and discipline are presented. Also described are the ways in which I sought help from colleagues in order to try to recruit fifteen participants at each institution. Following that, findings on reasons for participating, and not participating, are discussed. The concluding section summarizes the outcomes of recruitment efforts and reiterates the argument that it is important to highlight the messiness of research.

Why study up?

Studying down refers to the trend in social science to study – and typically locate problems within – groups and individuals in positions of lower social status and power (Nader, 1974; Sprague, 2005). Studying down is related to the *deficit model* approach to underrepresentation – one that frames the problem and its solutions around women (Faulkner, 2009). The problem with this approach is that it has left those in positions of higher social status and power, in this case faculty, unexamined. The point is not that it is unimportant to study those in positions of less status and power, but rather that studying down has dominated the research landscape, leaving a significant gap in knowledge about those in positions of power, and promoting social inequalities through methodologies that implicitly normalize those in positions of power (Beddoes, Forthcoming 2015). Sprague (2005) explains studying down thusly:

In sum, the kinds of questions posed tend to emphasize and even naturalize gender and racial/ethnic differences. Research questions are more likely to focus on members of disadvantaged groups and explore their deficiencies, while the attributes and practices of those with social power are much less likely to be exposed to social science surveillance. And in addressing social problems, the emphasis is more on the attributes of those experiencing the problem than on considering what it is about the current social order that makes the problem likely. In other words, there is a tendency to ask questions that make inequality seem either natural or the responsibility of those on the downside of social hierarchies. (p. 12)

One alternative to studying down has been termed *studying up*. To study up is to have as a subject of inquiry those with greater social, economic, academic, or political capital, or powerful institutions more broadly. The benefits of studying up include:

- 1) Broadening the range of social phenomena that are “seen” and explored, thus creating better science;
- 2) Helping those in positions of less power understand how institutions operate so that they can better navigate, and change, them;
- 3) Shifting who we see as “the problem”: away from those with less institutional power, toward those who wield the power and institutional practices, and
- 4) Contributing new knowledge to our understandings of how power and inequalities operate (Gusterson, 1997; Nader, 1974; Sprague, 2005).

The original recruitment plan

I set out to interview a random sample of 45 tenured and tenure-track faculty members from a wide range of disciplines across three universities in different parts of the United States. I sought a range of career levels and an approximately equal number of men and women with

racial/ethnic diversity. They were offered a \$20 gift certificate to Amazon.com for participating. Potential participants were identified through public, departmental websites and then maximum variation sampling and purposeful random sampling (Patton, 1990) were employed, in order to try to get a random sample that still contained an approximately equal mix of men and women, career ranks, and engineering disciplines. Random sampling was employed because I wanted participants most likely to represent the majority of engineering professors who did not necessarily have strong interests in the topic, as would have been the case had I sent invitation emails through listservs such as that of the Society for Women Engineers. My hope was that personalized emails would be enough to elicit participation. The following email was sent to potential participants at all three institutions, with the subject line "Invitation to participate in NSF funded study":

I am a researcher at Oregon State University seeking engineering faculty members to participate in a research study. You were identified because you are a/n [career level] professor in [engineering discipline] who has taught undergraduate courses. The purpose of this study is to examine what and how engineering faculty members think about gender in engineering education.

Participation in this study involves:

- A time commitment of 1 hour*
- Participating in an interview at your office or other private location on campus*
- A \$20 gift card to Amazon.com for participation*

I would greatly appreciate your participation in this important research aimed at increasing diversity in engineering. I am interviewing faculty from three universities around the country, and results will be aggregated across the sites such that you will not be identifiable when findings are reported. A consent form with further information is attached to this email. If you agree to participate in the study, please contact me by phone or email by [date] to arrange an interview time and location.

Institutional Review Board (ethics) approval was received for this study before any recruitment efforts began.

Outcomes and discussion

Recruitment differences by institution and demographics

The three interview sites were chosen with the aim of institutional and geographic diversity. All were public universities, but in different parts of the United States and with different institutional identities. Institutions 1 and 3 were research universities in different regions of the US, and Institution 2 was focused on, and had a reputation for, excellence in undergraduate engineering education. As shown in Table 1, there were dramatic recruitment differences across the institutions. As discussed below in the *Enlisting help* section, however, the high response rate at Institution 2 can be explained in part from recruitment help received from a colleague at that institution. Recruitment at Institution 1 is on-going, and the ultimate goal of the study is to conduct 45 interviews.

Table 1. Recruitment overview by institution

Institution	N Participated	N Invited	Response Rate
1	11	39	28
2	14	35	40
3	14	82	17

As shown in Table 2, response rates across career rank, men, and women had less variation than across institutions. Women's response rate was 29% and men's was 23%. Assistant professors had the highest response rate of 30%, while Associate had the second highest at 24% and Full was the lowest at 23%.

Table 2. Participant demographics and response rate summary

Group	N Participated	N Invited	Response Rate
Assistant professor	13	44	30
Associate professor	11	46	24
Full professor	15	66	23
Women	18	63	29
Men	21	93	23

Ten different nationalities were represented, and five racial or ethnic groups, as self-identified by participants on a demographic form I asked them to complete at the end of the interview.

Recruitment differences by discipline

At two institutions, the disciplines were split into three groups, those with the highest, middle, and lowest numbers of female students at the institution. The strategy was then to recruit an approximately equal number of participants from each group. At the other institution, the strategy was to try to recruit an approximately equal number from each discipline. As presented in Table 3, response rates varied drastically by discipline, ranging from a low of 9% for Biomedical to a high of 38% for Nuclear. No pattern emerged regarding correlation of response rate to representation of women in that discipline. There were disciplines with high representation of women and low response rates (e.g., Biomedical), and disciplines with low representation of women and high response rates (e.g., ECE). In fact, if response rates were divided into three groups, by high, medium, and low, disciplines from each representation group could be found in each response rate group.

Table 3. Participants and response rates by discipline

Discipline	N Participated	N Invited	Response Rate
Electrical/computer	7	22	32
Civil/environmental/construction	6	22	27
Industrial/operations/manufacturing	5	17	29
Chemical/biological	5	16	31
Mechanical	5	33	15
Aerospace	3	11	27
Nuclear	3	8	38
Materials	3	12	25
Biomedical	1	11	9
Other*	1	4	25

*Small, unique discipline, obscured to protect participant's identity

Enlisting help

At two institutions, I required the help of colleagues to try to recruit more participants. At Institution 2, I had only received eight responses, so one week prior to the site visit, I

contacted a colleague in the engineering college and asked if he would recommend names of a few people who might agree to an interview, not necessarily because they had a strong prior interest in gender in engineering, but for any reason. From the names I received that way, I sent email invitations to five people, all of whom agreed to participate. The email to those people was identical to the other invitations, except for the addition of one sentence stating that the potential participant had been identified by that other engineering faculty member. That colleague had also taken the initiative to send an introduction email to those potential participants, even though I had not requested that. The final interviewee at Institution 2 was enrolled last minute, essentially through snowball sampling, when another interviewee ran into him in the hallway and asked him if he had time to participate in an interview.

At Institution 3, I had the assistance of an engineering faculty member who helped me think about ways to successfully recruit 15 participants there. She believed recruitment efforts would be more successful if invitation emails came from her. The first 15 invitation emails came from her, but with the same instructions to contact me directly if they wished to participate. The subject line was "Help a colleague learn more about gender in engineering education." However, that approach yielded only two interviews. I then began to send out emails myself as at the other two sites, which still did not yield enough interviews. We then tried a third approach wherein I sent the initial email and the colleague sent a follow-up email encouraging the person to participate:

[First name], If you possibly have the time, I would like to encourage you to participate in this project - Please do contact Dr. Beddoes if you are interested!

Thanks -

These follow-up emails were sent to 37 people, six of whom agreed to participate in person, and several more who said they would participate another week by phone or Skype. However, my follow-up efforts to conduct four distance interviews only resulted in two being completed, because emails to two of those people have gone unanswered.

Reasons for participating

In the course of these recruitment efforts, I became interested in why those who agreed to participate in an interview did so. Starting with interview 21, I began the asking participants at the start of the interview why they had agreed to participate.

Table 4. Reasons for participating in an interview

Reason	N*
Interested in increasing the number of women in engineering and wondering why there are not more	11
Tries to be a helpful person in general, or help out other researchers, and/or caught on a good day	8
Just curious about what I would ask or what would come from the interviews	4
Had some involvement in research or program related to diversity	3
Wanted to learn more or something useful	2
Felt compelled to as part of a minority group or as an "outlier"	2
Knows and respects colleague who sent invitation/follow-up	2
Has a daughter	1

*Some participants gave more than one reason

Two participants felt compelled as part of a minority group or “outlier.” One felt that she was an “outlier” and had important stories and experiences to share that I would not otherwise hear. The other explained his reason for participating as related to being gay:

That's actually a good question because normally I would say no. Truthfully? Because I came out of the closet...So, I feel differentiated, in a way. I thought your topic was something that was not normally discussed and I think, as you'll see, my answers will be saying that we just don't talk about this in this department. I don't really know why other than that, and I'm sensitive now to issues of gender and sexuality and all that stuff.

Two other participants also chose to self-identify as gay or lesbian early on in the interview. I did not ask any questions about participants' sexuality in the interview or demographic form. Likewise, many participants mentioned at other points in the interview that having a daughter has influenced their thinking about women in engineering, but that did not specifically come up in responses to this question except for one person. To a lesser extent wives and sisters also came up as influential for thinking about this topic.

While I was not actively seeking participants who were part of the Society for Women Engineers or any other relevant project such as ADVANCE (which is a U.S. National Science Foundation program dedicated to advancing the careers of female science and engineering professors), the random sampling approach did happen to produce a participant pool in which such people were included. Several of those people related their interest in participating to prior involvement in such groups or initiatives.

Reasons for not participating

For the most part, participants who did not wish to participate in an interview simply did not reply to my email of course. However, when recruiting at Institution 3, I received two replies in fairly short succession and was struck by the fact that both were from full professors at an R1 university who felt strongly enough to reply to tell me that the study was not worth their time. One person replied that an hour of her time “for this” was too much to ask. The other sent me what appeared to be a pro forma email saying that he receives too many survey requests and that since they almost always impact him negatively and take “WAY” too much of his time, he does not do them, and would I please remove him from my email list. I was curious about this, so I wrote back: “Hi - There is no email list, and this request was not for a survey. I was fascinated by your reply though. Would you mind telling me how you've been adversely impacted by surveys? Just curious.” To which I received a somewhat lengthy reply of questionable logic and continued conflation of my project with a survey. To paraphrase: He said that *every time he goes to a hotel, buys something or takes a flight, he is asked to complete a survey, which is not intended to help him, but to extract more money from him or to help a company. Every survey he has ever seen is poorly written and slanted to meet the needs of the author, and multiple choice questions with ratings of 1 to 5 are very limiting. Most surveys ask the wrong and irrelevant questions and take too much time, which impacts him adversely. NSF should not fund surveys because they are intrusive and ineffective: Witness the damage student course evaluations have done. There is no relationship between learning and course evaluations. The only thing surveys are good for are selling products and predicting voting. And explaining all of that to me has already taken too much of his time.*

Perhaps it should be reiterated that nowhere in the recruitment email or consent form was the study presented as a survey. Nonetheless, the sense of burden felt was not limited to this potential participant. Another person (who did participate) explained why she usually does not participate in others' studies:

That's a good question. I saw your request and actually I probably get two or three survey requests a day, many of them are pertaining to being a woman in engineering, or being a faculty member. So a lot of these are topical related. So it's gotten to the point where they become burdensome. Everybody wants to survey you for some reason or another nowadays, and I appreciate the opportunity for feedback and why

people want to get back the surveys. But I've become a lot more critical about which surveys I choose to respond to and why.

It is in fact a widely recognized phenomenon that women in engineering are asked to do things, such as participate in studies, more than men precisely because they are women in engineering. However, these responses do contrast with one participant whose response was simply, "It's not a hard thing to do."

Another unusual feature of Institution 3 was that ten people wrote back to explain that they would participate if they could, but they could not, either because of family obligations, being out of town, being too busy, etc. Because I did not receive any replies like this from either of the other two sites, I suspect people wrote back to send these explanations because of the colleague who was helping with recruitment at Institution 3, and a desire to show her that they had a reason for not participating.

Conclusions

The strategy of sending personalized emails to a random sample of potential participants was eventually successful to some extent, albeit requiring persistence. To date, I have had to send 156 personalized invitations and enlist the help of two colleagues to enroll 39 participants. The greatest variations in response rates were by institution and discipline, rather than sex or career level. Response rates by discipline ranged from 9% to 38%, with Biomedical being the lowest and Nuclear being the highest; although, the greatest number of participants came from Electrical and Computer Engineering. When asked why they agreed to an interview, participants provided a wide range of reasons, including genuine interest in the topic, just wanting to help a colleague with research, and feeling compelled to.

I am not suggesting that faculty are more or less likely to participate in an interview about gender than another topic. I do not know how my experiences compare to those of others who have tried to interview professors about different topics. I am not claiming that it was more or less difficult to recruit for a study about gender. I *am* suggesting that there is value in detailing recruitment efforts of this sort for future researchers and in disrupting the discourse of rigor by highlighting the messiness of research. As we think about translating research into practice, our practices as scholars, reviewers, and editors, the types of methodologies literature that influence us, and the stories they allow us to tell about research, deserve further reflection.

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