# Preparing a Diversity Statement-An Introduction to Diversity Issues for Future Faculty

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#### Abstract

While the diversity in engineering classrooms strives to mirror the diversity of the society at large, our future engineering faculty are not explicitly prepared to deal with it. Using a mixed data approach, this paper describes how a writing exercise (preparing a diversity statement) and the associated peer-review discussion expanded the definition of diversity and the plans to address it in academia for two groups of participants in the Engineering Teaching Portfolio Program at University of Florida. Results of a follow up interview four years after graduation are also presented. Overall, the exercise proved to be an effective but low-cost modality of introducing future engineering faculty to issues of diversity in the classroom.

#### Introduction

The changing face of U.S. demographics as measured by U.S. Census has trickled down very slowly into the engineering classrooms. In 2007, the once-ubiquitous 'pale males' were only 52% of full time engineering undergraduate students<sup>1</sup>. However, the percentage of engineering bachelor degrees awarded to women (18.1%) or to African-American or Hispanic students (11%)<sup>2</sup> is much lower than the percentage of these groups in the total U.S. population<sup>3</sup> (50.9% and 25.5%, respectively). The engineering faculty population is even less representative of the general population, with women faculty constituting 11.8% and African-American and Hispanic faculty 5.9% of the engineering faculty nationwide<sup>2</sup>.

While the pressure to meet future demands for an engineering workforce representative of the society at large is increasing, present and future engineering faculty have very few opportunities to reflect on or discuss diversity before taking decisions (about admission policies, teaching methods, hiring or promotion criteria) which affect the under-represented campus groups. An even larger problem is that first time engineering faculty have less practice in teaching and reflecting about how their teaching influences students' learning then their counterparts in science or humanities.

The Engineering Teaching Portfolio Program (ETPP) recognizes this need to 'think before one has to act' and provides a structure and an immediate goal for this thinking—producing a teaching portfolio draft. In contrast with other portfolio programs, the ETPP includes a diversity-related component, and uses peer-review to both improve the quality of the product and create a network of future faculty.

After a short introduction to the development of the ETPP at the University of Washington and the studies developed in conjunction with multiple offerings of the program, this article presents

the implementation of ETPP at the University of Florida (ETPP-UF) in 2004-2005. In particular, this article concentrates on the discussions during the diversity sessions in ETPP-UF and the opinions of ETPP-UF participants (in 2005 and 2009) on the writing and use of diversity statements. Finally, a discussion of results and suggestions for future implementation are provided.

## **Engineering Teaching Portfolio Program**

The Engineering Teaching Portfolio Program, developed by the NSF-funded Center for Advancement of Engineering Education (CAEE) at the University of Washington (UW), is an 8 session peer-facilitated program in which each participant (engineering students or post-doctoral associates) produces a draft of a teaching portfolio containing a teaching philosophy statement, a diversity statement and 2-3 supporting artifacts, such as class syllabi, exams or student evaluations. The materials prepared by CAEE offer guidelines and information for the portfolio production, and the program allows for one peer-review of each component and a final review of the portfolio. The discussions peer-review process deepens the participants understanding of teaching and help to create a network of peers interested in teaching, effectively a network of future faculty.

At the national level, ETPP was offered on 16 different occasions at two institutions, before the end of the original funding grant (2007). The materials, reviewed three times, are now in a stable form and easily downloadable<sup>4</sup>. The program's original developers have also used modified versions of ETPP to lead undergraduates studying technical communication in preparing a professional portfolio<sup>5</sup>, or undergraduate tutors and teaching assistants in preparing a teaching portfolio<sup>6</sup>. The developers had also studied the different forms and uses of teaching portfolios in STEM disciplines, at national level<sup>7</sup>. If interested in adopting or adapting ETPP at your institution, please contact Prof. Jennifer Turns at University of Washington<sup>4</sup>.

### **Engineering Teaching Portfolio Program at the University of Florida**

The original program and an evaluation of its first two offerings were first presented nationally at the 2004 American Society of Engineering Education (ASEE) national conference<sup>8</sup>. The author of this paper saw this presentation and was interested in implementing the program at her home institution, as at the time there were no programs on the campus of the University of Florida (UF) dedicated to preparing future engineering faculty for teaching.

The local version of the program (ETPP-UF) was realized as a graduate student activity of the UF Society of Women Engineers branch (SWE-UF) with the encouragement of the Dean of Research and Graduate Programs in the College of Engineering. This was the first implementation of ETPP outside its originating campus, and a discussion of the experience was presented at the 2005 ASEE national conference<sup>9</sup>.

At UF, the program was run twice during the academic year 2004-2005; a detailed description of the two offerings, their campus impact, and of the campus-specific materials prepared by this author is published elsewhere<sup>10</sup>. Due to the departure of the author from UF, coupled with a change in leadership at both student and faculty advisor level of SWE-UF, the program was not

continued. However, the interest that it developed on campus contributed to the creation of a one-credit graduate course, offered for the last two years as part of the newly started Florida Institute for Development of Engineering Faculty<sup>11</sup>.

## **Diversity Statement Exercise within the ETPP**

While the pressure to meet future demands for an engineering workforce representative of the society at large is increasing, present and future engineering faculty have very few opportunities to reflect or discuss about diversity before taking decisions (about admission policies, teaching manner, hiring or promotion) which would affect the under-represented campus groups. While NSF funded research grants must address not only the 'intellectual merit' but also the 'broader-impact to society' criteria, future engineering faculty are not trained to think about or act on this second criterion.

Recognizing this need to 'think before one has to act', the ETPP included a diversity-related component. The diversity statement exercise is introduced and discussed in the sixth of the program's eight weeks. Participants are instructed to prepare at home a personal diversity statement, and discussions based on those written materials take place in session seven.

The UW developers presented at ASEE national conference the written instructions for these sessions, as well as the type of discussions provoked on their campus<sup>12, 13</sup>. In the following we present how the diversity-component took place on UF campus.

## **Diversity (ETPP-UF): Methods**

The data reported in this study were collected with multiple methods in 2005 and 2009, by researchers at both UF and UW. In 2005 at UF, after the Institutional Review Board (IRB) approved a collection protocol, exit surveys and semi-structured interviews were administered to participants in ETPP-UF. As approved in the protocol, these results were shared with the UW developers of the ETPP curriculum.

As part of the ETPP curriculum improvement study at UW, debriefing sessions were conducted by the UW developers with the UF adapter (this author) in March 2005 and June 2005. Moreover, as part of the evaluation study of the initial NSF grant, an independent evaluator conducted an interview with the UF adapter in March 2005. For this paper, the written records of these interviews <sup>14, 15, 16</sup> were used to supplement the author's original notes on the diversity session discussions.

In 2009, a short follow-up email survey was administered by this author to the participants in the 2005 ETPP-UF study. The 2009 answers, together with self-reported information on the professional network LinkedIn, were used to compile the professional trajectory for the 2005 participants.

**Diversity (ETPP-UF): Study Participants** 

This author presents elsewhere <sup>10</sup> the numbers of people who expressed interest in any of the ETPP-UF offerings, participated in two or more sessions, or participated in a critical mass of sessions. Eight people, including the author, participated in at least one of the diversity sessions or used ETPP materials to complete their diversity statement, and seven of them answered the exit survey and interview of the 2005 ETPP-UF study. Out of these, two were post-doctoral associates and six were engineering graduate students; six were women and two were men; three were U.S. citizens or permanent residents and 5 were international students/post docs; four were White, three Asian and 1 Hispanic.

### Diversity Sessions (ETPP-UF): 'International Group' Discussions, Fall 2004

The first diversity session of the Fall 2004 offering had four participants: two post-doctoral associates and two graduate students; two women and two men; two Taiwanese, 1 Indian and 1 Eastern European. All participants did their undergraduate studies outside of the U.S.A. As a result, this session had an animated discussion not only about diversity in U.S. engineering classrooms, but also about the differences in diversity perceived by participants between their respective home countries and the U.S.A (as represented by their UF experience).

Regarding *gender representation*, the participants remarked that it was more common for women to be in science and engineering (in Taiwan) and in science (in Eastern Europe) that they observed in the U.S.A./at UF.

Regarding race, they commented that their home countries are more homogenous racially that U.S.A and that their direct experience with people of other races happened mostly during their UF social activities, engineering classes and research activities. In particular, they met in person very few Black and/or African-American people. Both *racial stereotyping by and of international students* were reported.

The Indian participant commented how 'bad U.S. movies' usually portray the Black guys as being the bad guys, and how international students can come with this 'Black is bad' default image, then adapt it (or not) to reality. He mentioned making a Black friend and the negative reaction from his other (Indian) friends even if no negative information was known about his Black friend.

One of the Taiwanese students commented about her TA experience with some of her African American undergraduate students. She had a relatively strong accent in English and her students had a regional accent with which she was not familiar and as a result the verbal communication between her and her students was very difficult. She felt that this didn't improve her appreciation of the students' abilities, or their understanding of her explanations.

Probably because both Asian and White people were represented in this session, there was no discussion of the interactions between Whites and Asians. The author's direct experience in engineering school, however, was that she heard more negative comments (from American undergraduate students, also from people of her ethnic group) about Asian students (Chinese in particular), than about any other race or cultural/religious group. To put things in perspective, in 2004 46% of the UF Engineering graduate students were international students, and at the

university level 21% of international students were Chinese or Taiwanese, making them the largest international cultural/religious group on UF campus<sup>17</sup>.

The discussion moved also from (i) a recognition of reality (minimal racial and gender diversity in engineering classroom compared to the racial and gender diversity of the state-at-large) to (ii) possible explanations of it (socio-economic factors for race, societal expectations for gender) to (iii) brainstorming for possible interventions at society level.

When one participant provided a simple example of intervention to obtain ethnic/racial representation in the classroom or workplace by 'imposing a quota system based on race', a counter-example was offered. In India, there is fixed quota system for the lower castes in public study and employment. Our Indian participant had an undergraduate classmate from a lower caste who was intelligent, but not serious in his study. When asked about it, that colleague commented that there was no need for him to work harder as he would be graduating from college and with the quota system for the large public sector he would have no problem being employed. The strict quota system was seen as a policy that hurts both the 'majority' (who see lower standards used for minority candidates and become resentful) and the 'minority' (who might decide to play the system instead of fully developing their capacities). This author reflected that more worldwide communication is needed about minority programs and their short and long term effects, instead of reinventing the wheel.

In the seventh session, the participants decided to focus their discussion on interventions possible at the new/ future faculty level, identifying participation in outreach activities, summer schools and mentoring of undergraduate students as useful and realistic activities.

#### Diversity Sessions (ETPP-UF): 'Women's Group' Discussions, Spring 2005

The second ETPP-UF offering ended up being a 'women's group', even though as a result to the inquiries received during the first offering ('If this is a SWE activity, are male participants welcome?'), we modified the recruiting advertising to de-emphasize the fact that SWE-UF is the organizer. The participants to the diversity sessions were four women; they were all members of SWE-UF, one post-doctoral associate and three graduate students, one Hispanic and three White, one international and three U.S. citizens or permanent residents.

As a result, the discussion concentrated largely on the *under-representation of women in STEM disciplines*, and with family-work balance. The comments of Larry Summers, at the time Harvard University's president, were still fresh, so we got into a discussion about 'is this under-representation a societal choice or is it personal choice'? We ended up in a discussion about how faculty members interact with students depending on their gender and race and whether they should or shouldn't interact differently.

We discussed whether, as a faculty, according more attention to the girls in your class means singling them out or simply giving them an opportunity to talk, alongside their more assertive, not necessarily better informed male colleagues. The conclusion was that a faculty should make a conscious *effort to include all* students in classroom conversation, regardless of their gender and assertiveness level

An interesting discussion developed around the handout 'It's All in What You Ask: Questions for Search Committees' 18. The participants answered two questions from the handout, in the process exchanging strategies on how to increase diversity in their group interactions.

The Puerto Rican participant said that she had the best of both worlds, an American-influenced education system and also a Latino culture at home. Her perception was that she personally was not treated differently from her male colleagues and, as a teacher, she would not treat female and male students differently.

One of the participants recalled a diversity training in which she participated while working in the corporate world. One of the exercises was to get together in a team, everyone wearing a hat. The hat had roles marked on them, and others were supposed to treat one 'as they would treat in reality' somebody with that particular role. After a while the hats were permuted in the team, and the interactions were repeated, this time according to the new roles. In this way everyone felt treated once as a valuable member, once not. The exercise's conclusion was that an assumption about someone's ability to contribute will determine how others interact with that person and reciprocally, 'people would adjust their actions to what is expected of them'. This example was considered very valuable by the other participants in the session, and a discussion ensued on how to be aware of one's assumptions/expectations about others. Another participant proposed to 'ritualize rotation of group roles' (such as leader, note taker, hacker) in lab planning meetings, so each group member would have the opportunity to function in each role.

# Diversity Statement (ETPP-UF): 2005 Survey, 2005 Exit Interview and 2009 Follow-Up Survey

A large amount of data was collected through the 2005 survey and exit interview, and the 2009 follow-up email survey. From these, we present only the data associated to the professional career and the diversity statement.

In the 2005 Exit interview, we asked the participants 'What **Job** would you like to have in the **Future.**?. In Table 1 we report the answers in order of preference, and we code them as follows:

- -'Industry-Research'= industry or research laboratory
- -'Research Teaching' = faculty in a Carnegie Extensive (Carnegie 1) institution
- -'Teaching-Research'=faculty in a Carnegie Intensive (Carnegie 2) institution
- -'Teaching'= faculty in a Carnegie three or a Community College.

We compare those answers with the present-day work positions of people, as found on a general internet search or as self-reported on the professional network LinkedIn. We were able to locate in this way only six of the seven 2005 participants. Further, all these six had been asked to complete an email survey, and four of them answered.

We coded the 2009 answers in the same way as with the 2005 answers. For the two participants in post-doctoral positions; we marked their position in parenthesis and classified their answer depending on the amount of teaching they had been doing in their present position. We further inquired in the 2009 survey whether people had been teaching after completing ETPP (with the

possible answers 'Yes, in a STEM discipline', 'Yes, in a NON-STEM discipline' or 'NO') and whether they plan to teach in the future.

Who (code)	F101	F102	F103	F104	F105	F106	F107
1st Preferred	Teaching-	Industry-	Industry-	Research-	Industry-	Teaching-	Research-
Future Job (2005)	Research	Research	Research	Teaching	Research	Research	Teaching
2nd Preferred		Research-	Research-	Industry-	Research-		
Future Job (2005)	Teaching	Teaching	Teaching	Research	Teaching	Teaching	N/A
Present Job	Industry-	Industry-	(Research-	Industry-	Industry-	(Industry-	
(LinkedIn)	Research	Research	Teaching)	Research	Research	Research)	N/A
Teaching after							
ETPP(2009)	STEM	N/A	STEM	N/A	STEM	STEM	N/A
Plan to teach in							
the future (2009)	No	N/A	STEM	N/A	No	STEM	N/A

Table 1: Professional trajectory and teaching for survey participants (collecting year for information); parenthesis mark temporary (post-doctoral associate) positions.

We observe that the six respondents can be divided equally in three groups:(i) those who practice now in a position that they would not have chosen four years ago, (ii) those who work in their most preferred field and those who work in their less preferred field.

When asked in the 2005 exit interview if they prepared a diversity statement, only three of the answers were positive. More details were given answering the question: "Tell me about writing the diversity statement. How did you go about writing it the first time and how did it evolve over the course of the program?"

F102 (Y): It was very hard to write as no example was provided; the document evolved because of the group feedback; this is a document useful in a private setting, not in a public one.

F105 (N): The class discussion increased my awareness of the issue, but I didn't write a philosophy statement (as an external-usable document, is too dangerous 'whatever you say can be used against you'; it was difficult for me to write it even for myself).

F106 (Y): First I listed all the forms of diversity as I see it, and then I've tried to explain how a faculty member can address it in the classroom. Feedback from my colleagues helped me improve its writing style.

F107 (N): Wrote one draft diversity statement (plan to use information from it for interviews); developed based on the 'questions for faculty interview' [RR: handout for 'Questions for Search Committees']. I wouldn't put it in the portfolio though (without seeing the members of the job search committee).

We were interested in how the draft of the engineering teaching portfolio had been used, in full or in part, after the end of the ETPP. To this goal, we asked "Have you re-used language from the 'diversity statement' document?" Only two answers were positive, and they read:

F103 (Y): I used sections of my diversity statement document prepared during the ETPP course as part of a NSF grant application, which was awarded.

F106 (Y): Job application at community college; the position announcement was explicitly asking for a write-up addressing 6 dimensions, including 'Cultural Competence' defined as both cultural awareness and knowledge and intercultural

communication skills needed to interact successfully with people of diverse cultural backgrounds.

We were also curious whether the way people teach or practice engineering has changed as a result of participating in the ETTP. All four respondents answered negatively when asked about changes in practice; two answered positively to "Has your teaching and training activities, if any, changed due to ETPP to reflect diversity in your audience?"

F103 (Y): Slight modifications, mostly addressing diversity of background preparation for different students in the class (for example, when teaching MATLAB, some of the people were freshmen/juniors with no programming experience, while half where seniors with previous experience w. MATLAB; I ended up offering the seniors the opportunity to substitute a larger project at their level for the multiple simple homeworks addressed to the beginners).

F106 (Y): The introductory courses I am teaching allow me to teach to a broad student body with widely ranging interests and skills. Introductory courses provide important opportunities for encouraging this diverse group of students to pursue further studies in engineering. I was taught during the ETPP program, that the main goal is to ensure that students develop a solid knowledge base of fundamental engineering topics and mathematical methods.

Keeping in mind that the diversity statement had been developed as part of an engineering teaching portfolio, we can conclude that it has be used for its purpose by all the program's participants who are presently teaching or are still interested in an engineering faculty career. This conclusion is moderated by the small number of respondents to the survey and needs to be integrated in a larger survey for all ETPP participants.

#### **Discussion of Results**

In both sessions, participants thought first of diversity in terms of gender and race, characteristics that are easily observable. It took prompting to expand the discussion on diversity to include age, nontraditional students, socio-economical status, first generation college students, and learning styles.

In both the Spring and Fall offerings, the discussions were animated and sincere. The author hypothesizes that this was due both to the familiarity of the participants with each other and the perception of the environment as being safe. The diversity session is late enough in the program that the participants are comfortable communicating. At the same time, while they are together in ETPP, they are not working together in the lab or in the classroom, so it is possible to discuss participants' experiences with direct bosses or professors without fear that their comments will be transmitted to those bosses. As the author put it in the interview<sup>16</sup>, they were 'people that you know well enough but at the same time don't directly affect you, [and] your career'.

The inequality in representation of women and men in the engineering classroom was seen as having not only a detrimental effect on society, but also on people's personal lives. A wish was expressed 'to go home to your life partner and talk about your work and they would understand it.' The male students commented, "Yeah, it's comfortable to be in a guys-mostly classroom, but

where are all the girls?" Conversely, the female students were commented, "Hey, I was one of so few in my engineering class, it felt kind of strange."

The discussions about the people of color in engineering featured also featured a discussion of two incidents of racial stereotyping of and by engineering graduate students. For a sociologist or a person working in student affairs, it might be interesting to see to what extent this discussion is representative of a large phenomenon in engineering graduate students, to what extent this stereotyping continues for engineering faculty, and whether there is a difference between foreign-born and native-born faculty.

Overall, we observe a greater appreciation of the process of 'writing a diversity statement' than for the generated product. The discussion provoked by the assignment 'write a diversity statement' and the session instructions and supporting handouts, were considered useful, but there was less perceived value for the 'diversity statement' as a public document. However, those participants who continued working in academia did end up using the document for job applications or as part of an NSF grant.

## **Implementation Possibilities**

While following the instructions would allow one to prepare a portfolio 'at home', participants in both UF and UW offerings repeatedly defined the peer-review and the in-class discussions as an essential part of the program <sup>19,20</sup>. As such, using the 'writing the diversity statement' exercise is more effective if done in a group than alone. Moreover, because (i) the diversity issues are perceived as sensitive and (ii) people need time to become comfortable with each other, it makes sense to keep this exercise integrated in a larger program.

Possible implementations of the 'writing a diversity statement' exercise are ETPP, another future faculty program, a 'Professional Orientation' program for graduate students, or as part of a grant writing program. In this last case, the component could be framed as 'how do you address the NSF broader impact criterion?' We can also imagine this exercise used as a part of a year-long program for newly hired faculty or as part of a CAREER grant writing group, if care is taken in choosing the facilitator for the group.

Participants are aware of issues of diversity framed in terms of gender and race/ethnicity, but issues of age, nontraditional students, socio-economic status, first generation college students, and different styles of learning might need prompting from a facilitator to come into discussion. We can suggest a connection with the evolution from 'design for the American with Disabilities Act' to universal design. Indeed, teaching methods that 'attract minorities' are overall methods that engage and retain more of our engineering students.

#### **Conclusions**

As this author proved<sup>10</sup>, ETPP can be transferred to another institution, and it is a low-cost, good-impact way to prepare one's engineering graduate students for the teaching aspect of their future career. In particular, the participants reported that the diversity statement exercise and the associated peer-review discussion expanded their definition of diversity and their plans to

address it in academia. A follow-up survey documents participants' use of the diversity statement four years after ETPP. The article ends with a section on alternative implementations of the diversity statement exercise.

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Accuracy of all websites was checked on April 10, 2009.

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