How Gendered Language Reveals Women’s Underrepresentation in STEM

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Background

- Research shows that women are outnumbered by men in Science, Technology, Engineering, Mathematics, and Medicine (STEM) disciplines, especially at research institutions (Beutel & Nelson, 2005; Wilson, 2004; Long, 2001). While women comprise roughly half of the U.S. workforce, women hold less than 25 percent of jobs in STEM disciplines (United States Department of Commerce; 2011).

- To better understand this disparity, the present study examined twelve years of e-mail listserv communication from a research university. Coding for gender-specific language, our focus was on how language may reflect status differences or affect women’s success in STEM fields. The findings of this study may also provide additional insight as to how gendered language can express implied or expected roles for women in STEM disciplines.

Method

- E-mails from five faculty listservs at a research university were gathered from the years 2000-2012. These listservs included the College of Engineering and Applied Science, College of Medicine, Research Faculty, General Faculty, and Deans, Department Heads, and Directors. Messages were output in unix executable files, rendering over 60,000 pages of e-mails embedded in code. E-mail extraction revealed 3,364 unique e-mail messages, and an initial sorting of the e-mails identified 1,162 of which were specific to the STEM sciences.

- Data was analyzed qualitatively using Nvivo 10 software, comparing the differences in gendered language used in the university listservs. Using the Nvivo search function, two gender word searches were performed to examine language pertaining to men and women. Three researchers independently performed line-by-line coding of each email yielded in the word searches.

- E-mails were first examined using open coding in order to identify categories of text. Categories were shared between researchers, though they were blind to the text included within each category by the other researchers. After all categories were coded, researchers examined similarities and differences in coding for a reliability estimate and then adjusted codes based on consensus. Lastly, relationships across categories were examined using axial coding, rendering a broader conceptual framework (Strauss & Corbin, 1998).

Results

Five primary themes characterized gendered communication across the university.

1. A minority of e-mails discussed gender explicitly but, of those e-mails, many actively acknowledged gender disparities. Some of these e-mails focused on promoting women undergraduates in the STEM disciplines (Theme 1). E-mails from the CEAS listserv explain how the college was making strides to spark students’ interest in science and engineering through workshops and mentoring programs. For example: “We are now moving forward to organize the Summer 2012 REWU Program which will once again provide support and encouragement to undergraduate women in science, mathematics and engineering.”

2. As was the case for the students’ REWU program, most of the messages pertaining to women faculty were forwarded from outside organizations (Theme 2). For example, e-mails forwarded from NIH conveyed the importance of gender equality in clinical research, stating, “The NIH encourages applications from talented researchers from diverse backgrounds that may be underrepresented in biomedical research, including underrepresented racial and ethnic groups, persons with disabilities and women for participation in all NIH-funded research opportunities.”

3. UC had a number of programs promoting women’s advancement as faculty, though these initiatives were not exclusive to STEM (Theme 3). For instance, UC’s Women’s Leadership Conference was advertised on the DDD listserv, “Organized by UC women, the conference aims to provide opportunities to develop and enhance the leadership potential of women at all levels from all parts of the University.”

4. In contrast, language pertaining to men was often implicit (Theme 4). The word choices were not made to intentionally refer to men or gendered issues, but instead to convey general scientific concepts: “Nanofabrication is a new way to tailor properties and provide multi-functionality for materials, and it applies to everyone because it enables advances in man-made devices ranging from batteries to airplanes to medical systems.”

5. Comparing descriptors used in the discussion of individual men and women throughout the listservs may demonstrate additional implicit biases (Theme 5). Women were described using upbeat language and emotional descriptors: “[She] is student-centered and passionate about diversity.” While men were also sometimes represented in warm and passionate language, words of dominance were often interjected: “[His] energy and enthusiasm are legendary” or “[He is] the ‘father’ of green chemistry.” See Figures 1 and 2.

Discussion

- Many explicit references to women’s underrepresentation in STEM were found across the listservs. However, much of this proactive discourse was initiated from outside organizations.

- While e-mails rarely referred to men, gendered language such as “manning” or “man-made” replaced technical or non-specific words such as “operating” or “human-made” in many instances.

- Implicitly gendered language also suggests that the climate for women and men’s engagement in STEM varies. Especially among faculty, language conveyed implied expectations for gendered behavior: women were expected to be friendly and sincere, whereas men were expected to be authoritative and “fatherly.”

- More research is needed to connect these findings to their possible outcomes in the course of the twelve years (2000-2012) from which the email communication was gathered.

References


