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Engineering ignorance. The problem of gender equity in engineering.

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Men know nothing about the oppression they inflict[1].

Introduction

Feminist politics aims to dismantle women's inequality by naming and challenging sexual oppression and gender disadvantage. In modern Western feminism, work is an important site for this politics. It is both means and ends. Feminists argue that work itself should be redefined so that work activities outside the labor market are recognized, and demand that the conditions of work within the labor market be transformed to recognize diverse gender relations and practices. Feminists therefore argue that women's unpaid work be valued, that we should be aware of how certain tasks become gendered, that things valued as feminine should be re-evaluated, and that women have equal access to all forms of work so that unpaid work is distributed more equally.[2] These gains are the means to achieving feminist ends. Feminism brought women's work, which has been largely invisible, onto the stage and has effectively destabilized assumptions that women's work is gender-neutral (paid) or unimportant (unpaid).[3] Feminist campaigns for political change through women's access to paid work on equal terms with men have challenged assumptions about men's natural capacities, as much as they have women's.[4]

Women in Western societies have made advances in paid work, but have we become more equal? Have sexual oppression and gender disadvantage been transformed or at least reduced? Certainly women have made some gains over the last three decades, so that they are now engaged in every industry and occupation, at all levels of skill, knowledge and power. However, work continues to be a problem

for women; that is, compared to men, women do it for less pay, and in poorer conditions far fewer rewards[5]. Further, women's distribution across the labor market is uneven. They predominate in the flexible, low paid fields, while men continue to maintain their hold on permanent, full-time, highly-paid occupations in management and institutional power. The pathways to such high-level positions are discursively and materially complex and require the almost continuous negotiation of gendered politics[6]. Thus, women's entry into high status professions continues to be difficult, in spite of overcoming the obstacles to their access to higher education. Such has been the case in medicine and law for example where women comprise at least half of student enrolments and yet still do not have equivalent access to more senior positions in these occupations. But they do work in significant numbers that are sufficient to have some effect on workplace cultures and gender equity[7]. In this context, engineering is a particularly interesting example. It is an occupation in high demand and which is highly valued, and it has been subject to feminist campaigns for equity and diversity for at least two decades. Yet the gains have been slim. In western countries, women continue to be underrepresented in the engineering profession, both at student and at professional levels.

Higher education enrolment statistics for engineering in Australian universities show that women continue to have the lowest rate of female participation in all broad study areas at 14.1% in 2005[8]. In the USA, women made up 19.3% of total undergraduate engineering degree completions in 2005-06[9], 9.5% in the United Kingdom in 2005-06[10] and 18.5% in Canada in 2004[11]. The variation among these four countries is largely explained by different entry requirements. The UK and Australia demand that students have math, physics and chemistry, whereas Canada and the USA have slightly more flexible options. Overall, the proportion of women

students is persistently, and relatively, low compared with equivalent professional fields. While women now choose undergraduate level courses such as veterinary science and law in slightly greater numbers than males, the Australian engineering student cohort is still 86% male, with the next least popular area for females being architecture and building, with 59.3% male students[12]. The data also suggest that the number of women is lower in the more masculine areas of engineering like mechanical, electrical and aeronautical, compared with, say, chemical and civil, although an increase in the number of women in civil engineering may reflect the popularity of environmental engineering among women[13]. Although the proportion of women working as engineers has grown slowly, they leave the profession at a faster rate than do men[14]. A major US report on women in science, engineering and technology (SET) indicated that women are twice as likely as men to leave engineering and science careers, and also have much higher exit rates, than women in other professions[15]. Data collected by the Association of Professional Engineers, Scientists and Managers, Australia (APESMA) also confirm that the retention of women in the engineering profession is an ongoing problem. Their survey data indicate that in 1996, 18% of all engineering graduates were female. However, by 2006, female engineers made up only 11% of all engineers with between 7 and 10 years experience, which indicates that women are leaving the engineering profession 38.8% more quickly than their male counterparts[16].

Differences in the definitions of engineering professionals used in various databases make it difficult to find conclusive statistics on women's participation in the engineering workforce. However, membership statistics from Engineers Australia (the learned society for professional engineers in Australia) indicate that women constituted 4.0% of total membership in 1998 (excluding students), increasing to

6.7% in 2007. Of the female members (again excluding students) 49% were less than 30 years old in 1998, and 81% were younger than 40. In 2007 these figures were 48% under 30 and 80% under 40[17]. In the USA, women constituted 10.6% of employed engineers in 1999[18], 5.4% of engineering professionals in the UK in 2006[19] and 11.1% in Canada in 2006[20].

In spite of gender equity campaigns by employers and professional bodies, evidence suggests that gender inequity is endemic within engineering workplace cultures. Research, both in Australia and overseas, has identified characteristics of an entrenched masculine culture as a major reason for women's lower representation in engineering[21]. Although women are as competent as their male colleagues in the technical dimensions of engineering, the gendered expectations and processes within engineering organizations are an entrenched problem for women's careers[22].

The problem may be put bluntly: why so few women engineers, and why is this apparently so impervious to change? In turn this raises a larger question: why does it matter to feminist politics whether gender equity is achieved in engineering? How does feminist politics benefit if women gain equality with men in engineering courses and in the profession? The taken-for-granted answer is that women should be equal in all areas of society, so they should have equal access to engineering education and to all levels of the profession itself. Since engineering appears to be an entrenched area of male dominance, such a goal is particularly compelling. However, we argue that the underlying assumptions about the problem and associated gender equity policies and campaigns at national and international levels need to be addressed. The key to these assumptions lies with the avoidance of gendered power relations, which we term "sexual politics"[23]. Sexual politics is useful for recognizing the everyday denial of gender which takes place within the complex gender

relationships of power as domination, resistance, alliances and pleasures that are central to all social institutions, including engineering organizations. When the relevance of gender as a cause or explanation for the absence of women from the central concerns of work and cultural change is denied, it is not just a matter of ignorance or carelessness. Rather, it is a clear sign that a non-egalitarian sexual politics that advantages men is in play.

This paper reflects on a series of studies made in the Australian engineering industry that looked at the lack of progress of women in engineering. We need a systematic way to recognize connections between gender and work, sexual politics and ignorance. This requires that sexual politics be made visible and known by investigating the various ways of not knowing in the workplace, by uncovering ways of not knowing, that is, the epistemologies of ignorance[24]. We explore the epistemological difficulties in the development of connections between the disadvantages women experience in male-dominated work, the campaigns for gender equity, and translation of these into feminist knowledge, politics and activism.

The studies

We have undertaken a long-term research project designed to investigate engineering as a resilient male-dominated occupation and industry. We have proceeded through a sequence of methodological stages, beginning with an analysis of a large quantitative survey of Australian women engineers (together with a matched sub-sample of men) undertaken by the National Women in Engineering Committee of the professional association, the Institution of Engineers, in 2000[25]. The resulting data indicate that women engineers are significantly more dissatisfied with the prevailing conditions and attitudes in their workplaces than are their male counterparts[26]. However, there was little information to suggest solutions that might increase the

small number of women studying or working in the field, in spite of growing demands from the engineering industry. Looking for more comprehensive and nuanced data that may allow a greater scope for analysis of this complex issue, we developed a qualitative study of semi-structured interviews with 51 engineers (41 women and 10 men) who were drawn from the national survey, with a further four interviews of women engineers via email across regional, remote and metropolitan centers of Australia[27].

This study produced important insights that are generally in line with other research on women's experiences in male-dominated work, in addition to those that are specific to engineering. The women engineers often recalled a childhood fascination for, and an expert facility with, engineering technologies. They experienced mixed feelings about their minority status in engineering classrooms as well as in the industry. Some took a certain pleasure in their difference: "I'm not like a lot of the females who I meet", not "the girly type", and can "laugh off" any comments relating to their gender. By contrast, those who have quit the industry cite men's difference, their behavior and masculine work styles as their primary reason[28]. Women engineers who resisted male-dominant sexual politics by refusing to adopt masculine patterns of behavior were more likely to leave the profession than those who conformed to prevailing styles of behavior. In addition, we found that pressures leading women to leave the profession are complex and include negative perceptions of their suitability, and their own internalized social expectations about what constitutes a good engineer, a good worker, and a good mother.

However, the focus on individual women in this study did little to explain engineering's resistance to gender diversity and equity, since the women's narratives of their experiences indicated complexities of gender relations and discourses that

extend well beyond gender roles. Thus it produced few useful strategies that might help overcome the male dominance of the field. What this study does suggest though, is that neither the problem nor the solution lies simply with women, but nor does it lie with men *per se*[29]. We therefore reframed our research focus away from individual women and men engineers and towards problematizing the work context and workplace culture. After all, engineering as a profession values the ability to work collaboratively and the sense of solidarity with the professional community[30], although it is an exclusive community which demands adaptation to the professional culture rather than challenges to its mores and practices[31]. And, as we demonstrate below, one of its key characteristics is that it is a culture dominated by a certain form of masculinity.

This culture of engineering[32] derives from feminist research focus on the gendered culture of organizations[33]. Cultural processes involving discourses and practices in everyday interactions are productive for analyzing gender relations. Kanter's classic study[34] of a large American corporation paid attention to rituals, language, and symbols, observing that dominants (always men) exaggerate their culture in order to remind others (especially women) of their difference. The benchmark study of women and engineering by McIlwee and Robinson[35] built on Hacker's perception of the culture of engineering, which she saw as valuing technology and formal abstract knowledge as essentially male characteristics. Thus it is intrinsic to the sexual politics of engineering. McIlwee and Robinson found that "Where workplace culture was defined by engineers, it was imbued with the technical and interactional orientation associated with the male gender role"[36]. Nevertheless, workplace cultures, including those of engineering, vary within organizations, across sites, regions and type of function[37]. In addition, engineering cultures are likely to

mesh with other intensely masculine value systems. For example, Miller's study[38] of Canadian engineers in the mining industry found that values derived from the powerful symbols of the frontier myth and the romanticized cowboy hero were deeply embedded in the engineering occupation.

As we turned to investigate workplace culture, we noted Tonso's study of US engineering university faculties[39], which found that the gendering of technology and of the engineering profession is a key factor in women's exclusion. She observed that those who were attributed the highest status within the faculty student culture were not those who possessed real-world engineering expertise as described by industry employers. Rather, the campus culture defines belonging in terms of academic-science (as opposed to applications of science, and non-academic, non-technical skills) and male gender. Women's presence and actions were seen by both students and faculty members as an intention to reshape campus culture, and as a threat to the hegemonic, male-centered, academic-science form of practice preferred on campus; an instance of what we are calling sexual politics. In a similar vein, Tonso's study revealed how dominant meanings that have obscured women's contributions to technology are reiterated, reconstituting women as not technological, and women engineers as freaks of nature, obscuring their professional contributions, and failing to challenge the discursive mechanisms that hinder their professional progress.

On these grounds we sought to create new understandings of engineering workplace culture and to politicize its apparent gender neutrality by identifying and documenting the dominant normative patterns, as well as the mechanisms that reproduce these norms. In an effort to avoid the limits of a focus on individuals, we adopted a case-study approach focused on specific engineering organizations in order to make a more comprehensive analysis the individual and collective discourses and

practices that constitute workplace cultures. This approach demanded diverse methods, including the collection and analysis of organizational documents, online surveys, observations and interviews[40]. We undertook a study of the structures, policies and practices of three large engineering organizations in several sites in Australia and in various sectors of the engineering industry that were in, or were moving into, global marketplaces and looking for a competitive advantage. All had significantly restructured over the past decade, were facing a shortage of professional engineers and had implemented gender equity programs for their engineering workforce.

Of the three organizations, one was originally a public utility that had been corporatized about 10 years ago (referred to hereafter as Corporatized Utility, CU). Its workforce was 77% male, most of whom had worked for the organization for over 20 years, whereas most women had been with the organization for less than five years. The second organization (Mineral Processing, MP) was a multinational company in the mineral resources and processing sector, had the smallest number of female engineers of the three studied, with over 90% aged between 20-29 years. The third organization (Consulting Engineers, CE) was a multidisciplinary consulting private company principally owned by senior staff. Women made up 28% of employees and had a relatively wide age range. Over 80% had worked there for less than five years. The largest cohort of male respondents was in the 30-39 year age group, and 77% of males had worked with the organization for less than ten years. In summary, women were a minority in engineering work in each organization; they were generally young and had been working in the organizations for less time than most of the male respondents, although both CU and CE had a higher percentage of female engineers than is typical across the profession[41].

Three major themes emerged from this series of studies. First, gender equity has become an accepted demand, and resources allocated and efforts made to improve the proportion and standing of women engineers[42]. This is worth noting in light of our other findings. Second, these efforts have had limited success, and are met with the sexual politics of resistance, hostility or indifference by both women and men engineers[43]. Third, as we searched for causes, explanations and strategies for the low participation rates of women engineers, we were struck by the frequency with which gender, however understood by the participants, was denied as having any relevance to engineering as work or to engineering workplace culture.

> *I in my entire life have never felt anything but advantaged being a woman in this industry.* (woman engineer, CE)
>
> *It doesn't worry me whether people are men or women to be honest, I don't look to that sort of difference.* (male, manager, asset planning, CU)

Although each organization endorsed gender equity policies, each was confronted by the apparent puzzle of the failure of engineering to attract and retain women. From senior management, to personnel managers, to newly fledged engineers, we repeatedly heard the phrase, "I don't know" until we became convinced this itself may prove to be a clue.

> A: *Why do I think there are so few women engineers? Well I think it's a perception out there that it's very technical or hard to do it.*
>
> Q: *Why, what's that got to do with women then?*
>
> A: *Um, because I think the criteria to get into engineering college is a bit more stringent than criteria to get into an arts degree or whatever, that could be a reason.* (male engineer, MP)
>
> Q: *But women are graduating with really highly scores.*

A: *Okay, well, I don't know why, why, why people, why women are not doing engineering, because I know that there are four or five women in mechanical engineering out of hundred boys, so, um, which is worrying sometimes, because you know, how do you get one out of a hundred? It's very hard for us and we've managed to get one out of a hundred this year, we had to sell all the positiveness about engineering.*

Q: *Okay, so it's about getting them first?*

A: *Yeah, if you don't get them in, then you don't get them out.* (male engineer, CU)

Whether we asked engineers or their managers why there are so few women engineers, both men and women converted their not knowing into commonplace explanations. The result is that reasons for the persistence of women's low participation in the industry are not known.

It appeared that this not knowing, or ignorance, is a critical ingredient in the problem. This led us to the question: What are the knowledge and practices of ignorance, the epistemologies of ignorance, that account for the ways in which that not knowing is produced and sustained?[44] As Nancy Tuana argued, understanding ignorance and the complex practices of its production is equally as important as understanding the practices of knowledge production. Furthermore, ignorance is not a simple lack, but is better understood as a set of practices with complex supporting social causes equivalent to those involved in knowledge practices[45]. Ignorance, like knowledge, is interrelated with power and, therefore, with politics. Thus, ways of not knowing about gender and change are shaped by a politics of gender or sexual politics. Tuana explained that "tracing what is not known and the politics of such ignorance should be a key element of epistemological and social/political analyses,

for it has the potential to reveal the role of power in the construction of what is known and to provide a lens for the political values at work in our knowledge practices"[46].

We argue that ways of not knowing about gender and change are shaped by a politics of gender, or sexual politics. The concept of sexual politics not only recognizes that men's concerns and practices are the norm, but it also draws attention to the invisibility of men's power, which is constituted as the normal way of being. Our conception of a sexual politics reframes the analysis away from a gender-inclusive approach where women are merely slotted in, without any apparent impact. The concept operates with multiple discursive meanings of gender and power that avoid binary categories, and directly addresses the dominance of masculine heterosexuality, which much gender-inclusive theory and politics fails to do.

Sexual politics typically works through practices of invisibility. One way of making visible and unpacking the different forms of sexual politics is to investigate the various ways of not knowing in the workplace. Tuana used the women's health movement as a case study to elaborate feminist challenges to epistemologies of ignorance (that is, theories of knowledge of ignorance). Our study is a kind of precursor, since it examines the characteristics of ignorance in play in the case of the lack of women engineers. It sets out to trace what is not known by examining how the politics of such ignorance is derived from epistemologies of ignorance.

In sum:

1) the overwhelming denial of gender as a factor indicates that an epistemology of ignorance is in play

2) not wanting to know that changing the effects of gender is political and that such change necessitates challenging sexual politics.

We aim to identify the production of ignorance as a way to understand the

workings and effects of power[47] and how this can be obscured or made invisible. In this case, the production of ignorance helps to obscure the sexual politics in engineering that contributes to the general failure to increase women's participation in engineering. We apply a modified version of the taxonomy of ignorance devised by Tuana[48] to the data from our studies of engineering workplaces to identify grounds for a feminist challenge to epistemologies of ignorance in engineering and contemporary workplace cultures. This taxonomy may be a lens that sharpens our way of seeing the data to reveal how the problem of women engineers, and hence the solutions, is framed. We argue that it is not so much ignorance about why there are so few women engineers that is the issue, but rather how such ignorance is underpinned by a deeper ignorance about sexual politics.

A taxonomy

In this discussion we apply several categories of ignorance to the data we derived from our case studies. We thus reread the interview texts to go beyond an investigation of the problems and towards explanations of the lack of success in increasing women's participation in engineering that may enable more effective challenge to the problems of women's limited success in making feminist changes to workplace cultures and power.

1) *Knowing that we do not know, and not caring to know*. According to Tuana, this relates to knowledge that is not linked to our interests. All our participants knew that women can be engineers because we're all equal now, and most know that the number of women engineers remains low in spite of various programs aimed at recruitment and retention. But caring to know *why* these programs appear to have had little effect is a different matter. Some suggested that perhaps the problem is intrinsic to the nature of engineering work, with its large structures, heavy machines, dirty

mines, long and unpredictable hours, outdoor work and remote locations. However, other occupations share some of these characteristics. Besides, engineering work increasingly includes indoor technologies such as computing, as well as involving extensive teamwork. Others speculated on the lack of knowledge about what engineers do, but were unclear about why male students and workers manage to access it, while very few women do. Or perhaps it is because there are plenty of attractive alternatives for trained engineers rather than working in a profession that can become boring.

The question that arises is why are these clearly inadequate reasons allowed to stand? Why is the problem of failed equity programs not pursued more vigorously by employers, personnel and the profession itself? What interests are at stake here? What is being deflected by these speculations? As we have suggested above, the answers appear to lie with the refusal to recognize and to know the role of sexual politics in workplace cultures. And hence, there is a very real reluctance to tackle the deep entrenchment of male dominance.

2) *Do not even know that we do not know*. This form of ignorance clouds certain topics because our current interests, beliefs and theories obscure them[49]. Two key reasons advanced for the paucity of women engineers are also common to any argument about women's limited or disadvantageous position in the public domain, namely family and education. Family refers specifically to the bearing and rearing of children, while education usually indicates the problematic connection between women and math, sciences, and university engineering programs. Although education is seen as open to change with programs encouraging girls to study math and science, their frequent successes over boys are largely obscured by beliefs that these are hard and unfeminine subjects, and thus unlikely to attract substantial numbers of girls[50].

The family is perceived as a social institution with diverse meanings as well as various and changing normative structures, practices and social locations. However, what we do not know that we do not know is how resilient are the gendered assumptions about the family that constitute it as the central institution in women's lives[51]. More than a century of sustained activism by feminists has challenged such gendered assumptions by identifying the family as a site of complex gender relationships of power as domination, resistance, alliances and pleasures. However, the discursive and material male dominance within the family is largely obscured by the discursive validation of gender equity. Indeed the ubiquitous touchstone of the universal value of the family appears to have overwhelmed feminist advocacy of thoroughgoing change to the family itself. Michelle Barrett's and Mary McIntosh's clear indictment of familialism more than 20 years ago, with its concomitant individualism and corrosive impact on the common good, has largely been stifled[52]. Although the size and shape of the family, particularly in the West, has changed considerably, the possibilities for egalitarian intimate relationships seem to have become distant goals.

Q: *How do you think the fathers do their parenting, if they're working twelve hours a day?*

A: *I think they leave a lot up to their wives.*

Q: *So the alternative is to have a partner at home?*

A: *Oh yeah, I didn't think of that, yeah (laughs).* (woman engineer, C3)

In consequence, those workplace policies that are intended to ameliorate the effects of women's family responsibilities, and described as "family-friendly policies" fail to offer any challenge to the gender politics of the family. Options such as maternity leave and flexible work hours do contribute to women's capacity to

participate in the workforce, but in the case of engineering, the limitations are exposed when family pressure increases, for example, following the birth of a second child, or when work pressure conflicts with family needs. Both women and men engineers agree that women find it very difficult to sustain their commitments to both.

> *Oh well, they've got a work–life balance committee. At this stage I think that's more lip service than actually doing anything, because I don't think they're getting to the core of the problem, you know, it's fine to put on lunches about Thai cooking and speeches about how you know, someone just coped with their latest newborn … but I don't think that's really getting to the core of the problem.* (woman engineer, CE)

This woman engineer did not elaborate on the core of the problem, but we suggest that she was pointing to the perceived intransigence of the conflict between work and family demands for women.

3) *Willful ignorance where "they do not know and do not want us to know".* More definitively, such determined ignorance is "a systematic process of self-deception, a willful embrace of ignorance, that infects those who are in positions of privilege, an active ignoring of the oppression of others and one's role in that exploitation"[53]. Who "they" are who do not want us to know is not obvious in engineering, but this category of ignorance serves to highlight the ambivalence and reluctance to engage with the implications of sexual politics in the industry. There is an evident desire to ignore the sexual politics of the problem, but it takes many forms.

> *It's probably politically incorrect to say that perhaps females aren't interested in building things.* (male engineer, CU)
>
> *As much as people hate to admit it, but it's a blokes' job.* (male engineer, CE)
>
> *Like any construction environment, people are very tough, and the way they*

speak is very rough … if you're a woman you have to be prepared to take that as part of the way they operate. (woman trade union official)

While some will name the gender dimensions of engineering, they will go no further, balking at the notion of a politics in which they themselves are actively engaged. They maintain a determined ignorance that deflects sexual politics as an external imposition requiring political correctness or an acceptance of the way things are.

4) *Ignorance is produced by the construction of epistemically disadvantaged identities.* At the center of a politics of ignorance of women engineers lies the invisible construction of women as lacking authoritative knowledge, credibility and capacity. In the face of the public acceptance of women's equality, women engineers simply "don't cut the mustard" as one engineering manager told us. As a result, women still endorse the view that merit is gender-neutral:

I would rather be perceived as getting the job because of merit, not because, just because I'm a girl. (engineer, MU)

Janet Smithson and Elizabeth Stokoe reframed the issue of gender-neutral language as situated in organizations where women are at risk of backlash, and where they employ gender-neutral terms to deflect it, while men benefit from maintaining the organizational politics of gender inequality[54]. They argued that where debates on gendered issues occur within a determinedly gender-neutral context, in practice they result in the maintenance or encouragement of gendered practices in organizations.

In addition, women's knowledge and professional practice are rarely trusted, and as feminist theorists argue, trust is a "necessary and inherently valuable part of epistemic agency"[55] and without it, they remain disadvantaged in relation to men. Where women do gain credibility, it is an occasion of note.

> *I know a mining engineer, a female mining engineer, has to prove to them that she knows her stuff and she has to earn their respect a lot more [than young male engineers].* (woman engineer, CE)

Certainly, whatever position they may take up in the public domain, women must always go further and work harder to achieve equality with men. The limitations of this approach are particularly stark in engineering where women rarely gain identities as authoritative practitioners. The organizations in our case studies had all developed and implemented gender equity programs designed to overcome women's disadvantage and to recruit and retain engineers in a highly competitive labor market. Even in simple numerical terms, these programs have registered little success. Perhaps most telling is the paucity of women at senior or partner levels of the industry. As one woman engineer observed:

> *How do you get more women into engineering? It's like a catch 22; you'll get more women in when there's more women there.* (woman engineer)

Although it may be that Kanter's nostrum still holds[56], that women's situation in male-dominated workplaces will only improve when the proportion of women increases, the problem of catch 22 remains: how do we overcome the kind of ignorance that serves to reinforce oppressive practices and discourses? Thus our exploration of a taxonomy of ignorance in a particular kind of workplace that has been resistant to positive gender change, leads to questions of politics.

Towards a feminist politics of engineering

Problem-solving is defined as a central function of engineering. The denial of a key feature of the problem, namely gender, distorted the way the problem could be framed or understood. In the series of studies that we made on why there are so few women engineers, we found that the lack of progress for women resulting from

programs for gender equity in engineering stems from a politics of ignorance and a refusal to know and challenge the role of sexual politics in workplace cultures. In other words, the crucial ignorance at stake is of making politics in all its complexities and challenges, specifically feminist politics. Where gender equity programs in engineering organizations or in engineering curricula in universities aim for gender-neutrality in order to be accepted, resourced and implemented, they nevertheless fail to overcome gender inequity. What is required are feminist liberatory epistemologies that enable a direct challenge to oppressive sexual politics and that may transform identities, meaning systems and social practices (Peterson, this issue) and are critical resources for feminist politics.

We questioned whether engineering matters to feminism, since not all occupations are worthy of a progressive feminist politics. Does engineering have potential value to feminist goals? We argue that engineering matters to a feminist politics of work since engineering affects almost every aspect of daily life, and plays a crucial role in economic performance within a rapidly restructuring global economy. Engineering's problem-solving methodologies grant it the capacity to address issues of social justice and equity central to feminism. Yet the tendency for dominant engineering discourses to value technological solutions over all others has restricted the potential contributions of engineering to society while its own practices have rigidified and hardened[57]—an outcome of epistemologies of ignorance in this field. Thus, it is critical that feminism takes up the challenge posed by the ignorance of sexual politics, rather than rely on the evasive strategies of gender-neutrality. And engineering matters as an exemplar of the possibilities of feminist politics and feminist epistemologies.

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