

## **Sex Equity in the Sciences**

### **Success**

It is clear that the present generation of women have more science-related career opportunities than did the previous generation. Consider that in 1970, less than 8% of physicians were women, while today more than one fourth of practicing physicians are women. Further, today's overall data are skewed by the legacy of discrimination that has existed – there are far fewer older female physicians than there are younger female physicians, and as the older generation retires from the field, the numbers will become more sex-balanced. Female medical school graduations rates were less than 10% in 1970, while today that number approaches 50%.

National Science Foundation (NSF) data suggest that these trends extend beyond the field of medicine. Virtually every scientific field has seen increased participation by women in the last several decades. In some areas this increase is dramatic and in other areas more measured. Quite simply there is a higher percentage of women involved in science positions than used to be the case, at all levels and in all fields. Virtually every measurable statistic on women's representation in the sciences, whether through academic achievement, types of positions, or salary scales, shows that the last several few decades have shown tremendous growth for women.

I do not read these successes as evidence that we should sit back complacent that our work is done. However, compared to a decade previous, some amazing things have happened. And this fits my definition of a 'success' and it should be celebrated as such.

### **Vexation**

*What has worked?*

Still, many questions exist. Chief among these is to what we can attribute such growth over these past decades. Certainly the tens of millions of dollars spent by NSF on gender-equity projects in the sciences can not have hurt. Federal legislation such as Title IX of the U.S. Education Amendments of 1972 has not only encouraged sex-equitable policies and practices in sports, but has also most certainly affected public perceptions about 'appropriate' roles for women in society. The feminist movement has certainly contributed to shifting public sentiment about women's roles in society. And a deluge of science education research and practice has offered insights into ways in which science can be taught in more sex-equitable ways in schools. Yet we can not point to how effective each of these (and others) have been in enabling the growth in sex-equity in the sciences. Without such knowledge, it is perhaps difficult to know where to continue investing resources in the interest of closing those gaps that persist.

*Why do gaps still exist?*

Other questions must be asked as well. Why do women continue to lag behind men in the physical sciences and engineering, and especially as the prestige and level of those positions increase? Plenty of data support this contention, including the very purpose for the NBER's Conference for Diversifying the Science and Engineering Workforce at which Larry Summers made his now infamous remarks about women and science. Also, recent reports document that some women perceive the professional scientific work environment as 'chilly' or even hostile to their presence. Plenty of ideas exist to explain this gap: classroom practices, genetics, the nature of careers in science, different culturally-mediated interests between males and females, and outright sexism. Having better ideas about the source of the gap is important, as such understanding implies potential remedies.

My father-in-law is an interesting case. He makes comments like, "What do all these radical feminists want anyway, besides to just bitch?" and responding to a socially critical viewpoint of science, "sounds like a bunch of women who just couldn't handle doing real science." Yet, he has two daughters with medical degrees, and both of them tell me it is in no small part due to his insistence that they not view themselves as 'girls taking science', but as students taking science. Further, I asked him recently about his proudest accomplishments as dean of an engineering school. Without hesitation he beamed that he had changed rules that made it easier for women (and men) faculty to take time off to raise children without penalty towards tenure requirements, one result of which was a higher percentage of female engineering faculty than of many major universities in the U.S. Other initiatives resulted in higher female engineering graduate student enrollments than in the rest of the country.

Here is a man who believes (and with merit, I believe) that he is in tune with some of the realities that will increase female participation in sciences, especially engineering. Yet, he also represents someone who refuses to have his

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conception of science problematized. Is this a problem, since his methods have to some degree increased the numbers of female engineers, including tenured female professors? His belief is that structural components of university faculty policies contribute to the gap, and that changing those policies is the most direct way in which to change the results.

But if we follow this logic, would the focus be on simply entering women into an unchanged field? Would the introduction of more women into physical sciences and engineering fundamentally change the nature of the field itself by virtue of different values being brought to bear upon the field, or would the field's male-dominated ideologies subsume the spirit of women. Substantively and politically, does it matter which argument is used, as long as the result is more females into those fields?

I know that socially critical authors will argue that yes, it is still a problem if more women engage in an unchanged field. And while I agree that more women into an unchanged field leaves unresolved some essential issues about science, I have to wonder if such ameliorations are realistic. There have been many socially critical articles written over the last several years concerning the sex gap in the sciences. Yet, it is hard to find examples of projects that truly incorporate critical analysis of science to increase the numbers of females in science. I wonder if it is just too difficult to infuse critical ideas about science into classrooms. I also recognize the dangers of letting what *is* affect what *could be*.

*Why is this important to consider?*

Finally, there are many different ideas about why, or even *if*, it is important to get more women into the physical sciences and engineering. Some authors put forth that society loses out when a potentially skilled labor source goes untapped. Some stress the base inequity in resource and social capital distribution in society and that the gap is important because it represents women's limited access to socially powerful positions, thus perpetuating male hegemony. Still others offer that this gap limits to predominantly male the perspective through which science is realized in society, thereby producing a science that is not only biased, but less powerful a descriptor of the world than it could be were there a better sex-balance in who creates scientific knowledge. While these different schools of thought foreground different understandings about why this topic is worth considering, they would all agree that addressing, analyzing, and ameliorating this gender gap is worthy of attention. Yet even though individuals from many walks of life would agree it is important to address sex-inequity in the sciences, there is no clear means by which to do so, since there is no clearly attributable means by which what progress has been made has been made.

We have made amazing progress in increasing the numbers of females in science over the last several decades. We don't know to what to attribute that success, which makes future choices about research and resource allocation difficult. A gap still exists in the physical sciences and engineering, yet the cause for its source remains debated, and thus different potential ameliorations each have their costs and benefits. Finally, there is a balance between the depth of academic argument and the pragmatic policy realities that must be considered.

1. To what can the recent decades' successes be attributed? Does it matter?
2. Do we have a set of recommendations to provide to K-12 schools which we would be confident would mitigate gender inequities in science? If not, why not?
3. If we were able to provide a set of recommendations to K-12 schools, would it matter what the rationale behind those recommendations was (e.g., for the strength of the economy, for reasons of equity, for the good of science itself), provided it made science more sex-equitable?
4. Should strategies that have demonstrably worked to increase sex equity in the sciences be utilized, regardless of whether they problematize any facets of the ways in which science is practiced?
5. How much responsibility rests with science education compared with the science fields and the ways in which those fields are practiced, and what should the relationship between education and practice be?
6. What are the most important places to place science education research resources?
7. Is sex-equity in the sciences still an important area of concern, and if so, why?