

FEMINISM AND SCIENCE: TEACHING AND LEARNING 'SCIENCE IN THE MAKING'

BY VIVEK VELLANKI

Chayanika Shah in conversation with Vivek Vellanki

Vivek Vellanki: *You did your PhD in Physics from IIT in the 1980s, and you have written about the experience: "There is a common understanding shared by society that science and science institutes are male domains in general, and Brahmin male domains in particular." What was your experience as a woman and a student of science in IIT?*

Chayanika Shah: Actually, this is a post-facto realization. While I was there, I and others like me, never thought of ourselves as being different from the other students. In fact, I think the first feminist struggle that we had on my IIT campus was naming our hostel as Hostel 10. Earlier, it was known as the Ladies Hostel, and we said that since we were "students like everybody else", and since the other hostels were named Hostel 1 through Hostel 9, ours should be called Hostel 10. So back then it was a continuous claim to the space as a student and as an equal, to not emphasise the fact that we were women (definitely not ladies) and hence different in any way.

Now when I look back, I feel that it was, and it is, a very masculine atmosphere. When I went, there were 70 girls among a total student population of 3000. So obviously we were being looked at as weirdoes. I wrote about this too, they used to say that there are three genders: the male, female, and the IIT female. It was their way of sniggering at IIT females. Women at IIT, at that point, would try and be like the men, and would try and ignore all these barbs. In 2011, however, again, I read something in which the men at IIT were still trying to argue that women are not in IIT, because they look horrible, they are not working hard enough. And so the men still continue to say that there are three genders: male, female and they call them non-males now.

I think that this is a kind of totally masculine atmosphere—what it is to be a very small minority in a large number of students—to be one girl student in a class of 60, has to be experienced to be understood. And these are not just any ordinary men. They are men who have got approval from across society for being the brightest and the best of the lot, and have the

arrogance of being that way. They belong to upper classes and usually they belong to the upper castes too. There are multiple things that work for them, and so they are totally normative in some manner. All of us who are marginalized in any way, who do not fit in there—whether it is because of caste, whether it is because of gender, or whether it is because of caste and gender—feel an extreme sense of marginalization, but do not articulate it because all of us want to be a part of that student culture, and so we do not want to express our difference. It takes a very long time, it took me almost 20-25 years, and reading many other women's accounts, like Evelyn Fox Keller, who also took many years to talk about her own personal experience. So it is also reflecting on other women's experience of being in the sciences, and of mine, being in a male-dominated science and technology institute, and seeing that the problem was not really me—the problem was a lot in the culture of that space.

VV: *But, like you have written, it is also a question that has been negated. Historically, the gender difference in science has been discussed largely as a difference in numbers. You note that this is not a sufficient engagement, and you have just spoken about how it is a more complex issue. What is missing now?*

CS: So one of the reasons why a certain section of people are not there in any domain, like why women are not there in science, could be that they are inherently not capable of being in that domain, right? And in the sciences, one assumes that everybody is being tested on their merit and their work, and that there are no other biases that are coming in. So you are imagining that if people are not there, then they are not good enough. But it sounds funny, even today, to say that only upper-caste, upper-class men—white men in the US and Brahmin men over here—are the ones who are brainy enough to do something like science. It is a statement that should make us pause and think. Is it because others are not capable, or is it because there is something happening here which makes you feel like you do not belong here? That you-do-not-belong-here works in multiple ways. Within an institute, it works in marginalizing you, in ways in which people make fun of you, or people are very derogatory towards women in general. And that itself puts you in a defensive mode of sorts, which you don't recognize then. But there is definitely a space where you feel you don't want to be this woman that is being made fun of. So I negate my own self in multiple ways to become like them, to become acceptable.

All these biases are evident if we look at the numbers carefully. If you look at the number of women that are continuing in science, you see that it is

not only because of societal reasons that the numbers have gone down. Of course, those are reasons partially—that society itself does not think women are fit enough to do science. Women do have double burdens at home. Even if they are married to scientists, it is not as if the male scientists are going to take time off to do things at home. But over and above this, there is a whole thing of how you recruit. If I think that women are not good enough, I do not recruit them in the same manner. I do not encourage them to come in in the same manner that I would encourage somebody else. So my biases then percolate—in my recruitment, in how I look at their work, in how I evaluate, in how I give grants, in how I cite papers, and in so many other ways.

VV: *And in your recent article you have drawn attention towards this. You cite reports and research from India and the US to emphasize the gender discrimination within institutions of science. Tell us some more about this.*

CS: As I look more closely at it, I feel that the number of women (and the percentage of women) who come into the sciences as compared to other disciplines is not very different until the graduation/post-graduation level. Within the sciences, we do not have data that is further segregated to show that there are more women in the softer sciences and fewer women in the harder sciences. But in the last 7 – 8 years, there have been studies by women in physics, in particular, across the world, to see why there are not enough women in physics, and these have been country-wide studies. The first study that was done in India looked at women in the sciences and located their problems completely in society. A later study, however, chose to look at women within the sciences post their doctoral degrees and those who had dropped out of being in active research. I think what was crucial in the study was the realization that we do not only have to talk to people who are there. We need to talk to people who are not there to understand why they are not there, and whether their decision to not be in the active research phase is because of societal reasons, or because there were reasons within.

I think that this shift helped give a new perspective, and hence the demand from these women changed. They said that we have to change the ways in which academia operates, we have to make policies which will encourage women to be there—this is from within. This is not a study done by sociologists. They are talking as scientists, and they are saying that the problems are not only outside. The problems are within the institution, because the institution is not gender-blind, it is very gendered. And it is operating at every step: in recruitment, in promotion, in grants, and in so

many other ways. Now women have become more vocal and are speaking more openly, and we see that the problem is not that society forces people to come out or does not allow people to continue, the problem is only partially there. A lot of the problem is also within the institution itself, and how it is gendered, it is masculinised, and how the way in which it is structured does not allow women to come in.

VV: *In your article you have taken a further step, and said, “The gendered character of science institutions draws from a general masculinisation of every aspect of science itself.” To borrow from your article and turn it around, where is the gender in Boyle’s law?*

CS: This is a tricky argument that one has to make continuously, in the sense that masculinisation is seen as only related to men, right? True it is inhabited by men. But masculinisation is a wider concept, and I get this from feminism: it is something that privileges men. It is not only about being men, in the same way that feminisation is not only about being women. This whole social process of masculinising a certain space or feminising a certain space privileges men and marginalizes women. But masculinisation is more than being men, and this is the understanding of feminism that I am bringing here. The often-quoted apparent neutrality of science—that science is something that is done by scientists, and scientists do not bring any of their social baggage to the work that they do—is, I think, a masculinisation. And I can explain why I call it a masculinisation. It is emphasizing the objectivity with which science is approached by these scientists. It is making science into a project which reinforces the fact that there is some objective truth about the world, which is separate from the subjectivity of the world.

I think that this separation itself, and the need to make this separation itself, is a gendered act. It is not about being men, it is not about oppressing women, it is not about men having power, it is more than that. It is about saying that the world is structured in a manner such that there can be this separation between the objective and the subjective. And I think that is called masculinisation. It is the method of science which is completely cut off from any kind of social rooting, which is in itself a masculinised version of science. What one sees from the history of science, and from looking back and understanding, is that there cannot be this kind of dichotomous separation of the objective and the subjective, of nature out there and society here, of study here and nature there. There cannot be this kind of separation because they always influence each other, and this

understanding itself I think is shifting the understanding of science as being masculine.

Every time that I speak of a feminist critique, people ask this question—so if women did it, would they not have Boyle's law? Is the feminist theory of gravitation going to be something different? The point is not that as a woman I would see a different theory of gravitation, but maybe as a woman, as a feminist, I would ask a very different question to explain this world. Maybe I would not look for a simple law to explain everything in the world. Maybe that is not what my quest would be. Maybe we would look at the world very differently, maybe we would not use the same methods and many of these things have been proven wrong in the last few years, like that the method of physics has to be applied to all sciences, and that the method of science has to be applied to all social sciences. We have already changed all of that. It has come because we have realized that this dichotomy does not operate. And it is good for even physics, the hardest of sciences, to acknowledge that this dichotomy is false in itself. And so when we are saying this, you understand that you will not get a feminist Boyle's law. But you will get a placement of Boyle's law within the knowledge of science in a manner which would be different—it would not become the most crucial thing.

And I think that there are multiple descriptions of this, of various things within science that we feel are very gendered. For people to understand masculinisation maybe they have to learn feminism and they have to learn feminism beyond women's oppression. I think that is the key, the turning point.

VV: *You have just pointed out a very interesting and important aspect—you spoke about the nature of science and the history of science, something that is not taught in schools. As a student of science myself, I never read about it. But feminist studies in science have provided a new direction to this debate on science education. The shift is, as you have noted in your paper, from readymade science to science in the making. Would you be able to explain this a little more?*

CS: For me particularly, I think that one of the reasons why I found science very distant and different at the point when I decided not to continue research was that I found it very separated from my everyday life. Looking back at the history of science, the sociology of science and science studies

in general, I feel that this is one area in which science is lacking, as we talked about earlier. The separation is so intense, that what we teach actually is only the final product. We never bother to talk about the historical context within which these discoveries were made. We never bother to talk about the impact of these things on society, even to that extent. We do not bother to talk about what the debates were when these ideas were being talked about. Somewhere, contextualizing these theories within the process of science in the making is what one is saying is doing away with the separation—bring it closer, bring it together, recognize that there is an impact of society on science and science on society, and do it within education.

This is something that might engage and keep many people, who are marginalized in different ways, whether they are women, whether they are people of color, or whether they are Dalits in this country, all people who feel that this is a domain that is not accessible to them, who maybe will now feel that science has become more accessible because it has become more real, more connected to our lives and to the world that we live in, and it actually makes science richer. That way, you are talking about science as something that is created by human beings, ordinary human beings. And so it is a knowledge system that has evolved from amongst society, and it is as cultured as any other knowledge system. I think that what we try to do in courses and what we try to talk about within education is that when we teach science, let us not teach it as a final product. Let us teach it as it evolved, along with its history, sociology, location, and the debates surrounding it, all of which are very crucial. This is something that we have completely lost out on. Scientific method is something that we think all scientists know by themselves, but it is not something that we are teaching at all. Yet, all of us have a notion of science being objective, because of the fact that we teach it in this manner—that it is just knowledge that people get from somewhere and that tells us about the world.

VV: *You have played a prominent role in drafting a course on science education that draws on feminist studies in science and inculcates the aspects you have spoken about. It is a significant shift. How have students responded to this course? And how has your own understanding shifted over the last few years?*

CS: To start from the end, I think my understanding—to come to this, what you asked earlier—of science in the making and science as a final product is through the engagement of teaching this course. So it has also helped me understand debates in education and debates in science studies. I came into this field with my understanding of feminism and my understanding of science as I was taught. I engaged with the discipline of education and the discipline of science studies and that has influenced my understanding of the feminist critiques as well. I am locating feminist critiques as one kind of critique, along with many others. There are postcolonial critiques, and other critiques of science, and I would place feminist critiques as one of them. Similarly for education, one looks at how other subjects are being taught and tries to see where science is different, and how it is differently looked at by placing it in a context.

As far as the course went, I think I had been very lucky because we had very few students and again, I think the question of science education comes up, of whether you want to go for it or not. The other thing is that people are looking for pedagogy courses. So they do not really want a course that does not talk about pedagogy as much or in equal terms. However, this course talks about pedagogy as well as critically looking at science. We have had a few students, but we have had very good students. And in every batch there have been a couple, two or three students, who have continued the engagement with science education in this manner. And that for me is a very big achievement, because there are not too many people talking about things like this. So in that sense, what a course should do—in terms of igniting willingness in some people, to take

these ideas forward and to make this discipline richer, is something that this course has managed to do even in its short run of four or five years. And it has not always been easy, because it kind of shakes a lot within you. The most that people react to is bringing feminism to science. They do not react to bringing history, philosophy or sociology to science, but bringing feminism to science is like the last straw for them. But this does move people; it moves them to think a little differently. In whichever way or place people already are, if they are ready to rethink, they move ahead. If they are not ready to rethink, and we have had students like that too, who feel like this is taking it too far, then their arguments get built more and more. So I think it gives some space for engagement to every student. It is not that everyone starts thinking the way I think, that is not the purpose of the course. But it makes everyone start thinking, and I think that is what the course needed to do, and in that sense I think it has been a successful course.

[1]*Dr Chayanika Shah is a feminist and queer rights activist. She has a doctorate in physics and has taught graduate students at a college affiliated to the University of Mumbai for over twenty years. She has also designed and taught courses on “Feminist Science Studies” and “Science Education” to masters students at Tata Institute of Social Science, Mumbai. Some of her co-authored books are “Bharat ki Chaap” a companion book for the 13 episode documentary of the same name on History of Science and Technology in India and “We and Our Fertility: The politics of technological intervention”. She can be reached at chayanikashah@gmail.com*

Reference:

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